

**RECENT ADVANCES IN SMART INNOVATIVE
IDEAS WITH MULTIDISCIPLINARY RESEARCH
(IC-RASIMR-2019)**

Editors

Dr. V. K. Sethi, Dr. Sharad Gangele,
Dr. Ashok Kumar Gupta, Dr. Priyadarshini Agnihotri,
Prof. Ajay Jain, Prof. N. P. Gandhi



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HETEROGENEOUS MULTI-CLUSTERED ENERGY EFFICIENT ROUTING PROTOCOL IN WIRELESS SENSOR NETWORK

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Abstract - The applications of Internet of things (IoT) devices and sensors are now increasing exponentially and it is achieving various statuses in industries. Wireless sensor networks (WSN) have become a prominent base for envelopment of IoT and smart devices. Modern progressions in IoT bring out many benefits over traditional sensing devices and provided the researchers to develop a small, power efficient, low-cost, and multi-functional sensor devices. In this paper, we are presenting a heterogeneous multi-clustered energy efficient routing (HMCEER) protocol in Wireless Sensor Network with three levels of heterogeneity. HMCEER uses three energy levels to select cluster head in the wireless sensor network to improve network lifetime and throughput. The simulation result presents a significant improvement of network lifetime and throughput as compared to standard LEACH and LEACH based protocols.

Index Terms: WSN, LEACH, Energy Efficiency, Cluster, Sink Mobility, HMCEER.

1 INTRODUCTION

Wireless sensor network (WSN) is an active research field and its application sets are rapidly growing. Wireless sensor networks (WSNs) offer huge benefits as compared to that of wired sensor networks, for example, no cabling, high mobility, low installation cost and simple deployment [1]. WSN is advantageously deployed to bring up Internet of things (IoT) applications richer sensing and actuation capabilities [2], [3]. Basically sensor network is a number of small sensor nodes deployed to cover a specific area to gather information using sensing capabilities and it is transferred to the base station (BS) as presented in Figure 1.

A radio communication system is needed for information transmission process which consists of the following:

- A processing unit having Digital to Analog Converter,
- A memory unit,
- Digital Signal Processing (DSP) unit which performs the data transmission process according to the system requirement.

The communication among nodes and node to base station is performed by using multi-hop or direct transmission, depending on the cluster location. In the multi-hop data transmission, nodes communicate with each other using minimal transmission power [4]. Since WSNs control mostly all aspects of modern life, particularly after the progression of IoT technology, such taxonomy will provide readers with all the required information to start any real life application considering all the application physical and logical requirements [5]. In fact, WSN solutions already cover a very broad range of applications, and research and technology advance continuously expand their application field. This trend also increases their use in IoT applications for versatile low-cost data acquisition and actuation. The last

years have shown us a wide range of Wireless Sensor Networks (WSNs) The application areas

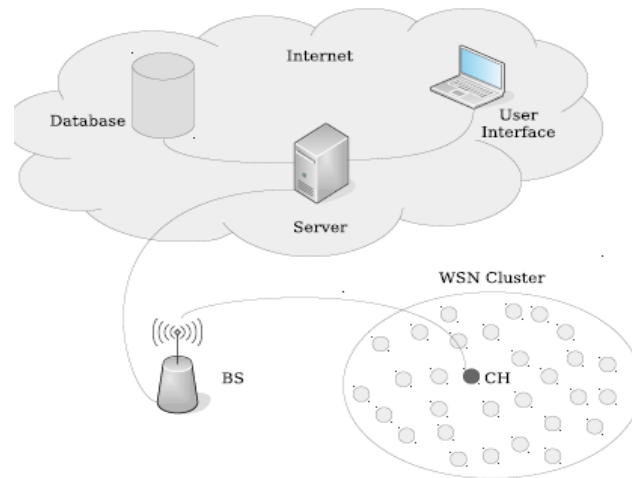


Fig. 1 Basic WSN Working Model

of WSN are military, environmental monitoring, agriculture, home appliances, industry automation and health monitoring [6]. The sensor nodes are just dropped randomly to form ad hoc network where the nodes work automatically. The sensor nodes communicate in the peer-to-peer network and transfer the sensed data from one node to another. An in-built source of power supplies the energy required for the node to perform the programmed task [7]. Since the sensor nodes are low battery powered with the on-board power supply, the high energy consumption by the sensor nodes in performing its intended tasks is the main issue in WSN. Generally, the energy consumption in terms of data transmission is comparatively much higher than the data sensing and processing [8].

2 RELATED WORKS

A large number of proposals in terms of distributed and centralized algorithms for clustering in WSNs can be found in the literature at present [9]. Clustering in WSN based on coverage area of network helps to achieve better energy efficiency [10]. The WSN area is split up into many clusters depending on some established characteristics. Only the CH (cluster head) node is able to communicate with the sink node, and hence, its role in WSN is significant [11], [12]. **Ren et al. [13]** furnished a unified framework of clustering approach in vehicular ad hoc networks, it includes neighbor sampling, back off-based cluster head selection and backup bluster head based cluster maintenance schemes. Neighbor sampling scheme can filter out unstable neighbors in order to increase vehicle link stability. Back off-based cluster head selection scheme allows vehicles to make their own cluster head decisions in a distributed manner, which can reduce the clustering management overhead.

Yang et al. [14] studied how to improve the delay and throughput performance for delay-tolerant data collection applications in Wireless Sensor Networks with Mobile Sinks (WSN-MSs). They proposed a novel routing metric, contact aware expected transmission count, based on queueing analysis theory to estimate the packet transmission delay over opportunistic links. By implementing the contact-aware expected transmission count in TinyOS routing standard, they demonstrated that current contact-aware expected transmission count based

routing protocols for WSN with static sinks can be easily applied to WSN-MSs by using contact-aware expected transmission count. They also introduced a throughput-optimal data collection scheme, opportunistic backpressure collection, by integrating contact-aware expected transmission count into the Lyapunov optimization framework [15]. In contrast to current WSN-MS schemes, the opportunistic backpressure collection does not require any mobility prediction and performs well in large-scale sensor networks with multiple fast moving sinks.

Nayak et al. [16] proposed formation of multiple chains protocol among sensor nodes which is found where every node is connected to one another to form a chain and the sink node is kept stationary. The network area is divided into several clusters based on its distance from sink node. **Kulshrestha et al. [17]** applied some intermediate procedure; several routes can be produced in order to transmit data so that waiting for a particular route is not required. The flat routing protocols used in WSN are not good for lifetime enhancement even though there is an appropriate criterion taking lesser time. But the multipath routing protocols are suitable for enhancing the lifetime of WSN.

Jafri et al. [18] introduced the mobility of the sink node in an improved version of PEGASIS-based IEEP protocol, namely MIEEPB. The MIEEPB is based on the concepts of multi-clustering and multi-chain formation with introduction of sink node mobility. The mobility of the sink node affects the lifetime of the WSN to a large extent. In MIEEPB, a 100 100 m² area of network was considered and divided equally into four different sections.

Basumatary et al. [19] proposed a multi-clustered routing algorithm called as MERAMC for WSN. By dividing the sensor nodes into several clusters through the application of clustering algorithm, each cluster has its own local base stations (cluster heads) to which they send their sensed data. The sink node having unlimited power source travels across the whole network area in a clockwise direction in a fixed trajectory, and it collects the aggregated data from CH nodes.

3 PROPOSED PROTOCOL

We propose a protocol “heterogeneous multi-clustered energy efficient routing (HMCEER)” for WSN in this paper. Each cluster has its own local base stations (cluster heads) to which they send their sensed data. The sink node having unlimited power source travels across the whole network area in a clockwise direction in a fixed trajectory, and it collects the aggregated data from CH nodes. To save battery power, basically the following four steps are followed:

A. Deployment of Sensor Node

To achieve efficient communication, random deployment of sensor nodes at fixed positions within the WSN area is adopted in the proposed multi-clustered algorithm. Every deployed sensor node is assumed to possess similar properties having limited and equal amount of battery power. There is an uninterrupted flow of information to the mobile sink node that moves continuously at various locations within the entire WSN area in each round.

B. Clustering

To create clusters, each node decides either to become a CH or to remain as the normal node for the round. Based on a percentage suggested by the user, this decision of the sensor nodes is made. To become a CH, a number (say q whose value is found between 0 and 1) is chosen at random by every sensor node. Then, $T(n)$ (a threshold value) is calculated using the suggested percentage of becoming CH, P and

the current round r . In real-time scenario, WSNs have more than two types of heterogeneity. Therefore, in TBEEEDRA, we use the concept of three-level heterogeneity and characterize the nodes as: normal, intermediate and advanced. The probability for three types of nodes is given in equation below and is taken from the LEACH protocol:

$$P_i = \begin{cases} \frac{P_{opt} E_i(r)}{(1 + m(a + m_0 b)) E_a(r)}, & \text{if } S_i \text{ is normal node,} \\ \frac{P_{opt}(1 + a) E_i(r)}{(1 + m(a + m_0 b)) E_a(r)}, & \text{if } S_i \text{ is intermediate node,} \\ \frac{P_{opt}(1 + b) E_i(r)}{(1 + m(a + m_0 b)) E_a(r)}, & \text{if } S_i \text{ is advanced node} \end{cases} \quad (1)$$

G represents the list of nodes that were not CHs in the last $\frac{1}{P}$ rounds. Every sensor node will utilize an equal amount of energy in order to become a CH.

C. Energy Model

The radio/energy models discussed in [14] are used in this paper. The energy models are given in equation 2 to 6. To run the trans-receiver process, an amount of 50 nJ/bit (E_{elec}) energy is spent and 100 pJ/bit/m² (ϵ_{amp}) energy for running transmitter amplifier. Figure 2 shows the energy model:

$$E_{TRS}(k, d) = E_{TRS_elec}(k) + \epsilon_{amp}(k, d) \quad (2)$$

$$E_{TRS}(k, d) = E_{elec} * (k) + \epsilon_{amp} * k * d^2 \quad (3)$$

$$E_{RCV}(k) = E_{RCV_elec}(k) \quad (4)$$

$$E_{RCV}(k) = E_{elec} * k \quad (5)$$

$$d_0 = \sqrt{\frac{E_{fs}}{E_{mp}}} \quad (6)$$

D. Mobility of Base Station

We assumed that the sink node has unlimited power source to complete the programmed task. The performance of WSN is measured in round parameter. When the sensed data is sent to the CH from where it is collected by the sink node, it is considered as the completion of one round. The sink node moves continuously, starting from the location (20, 80) in a clockwise direction with a pre-defined fixed path. The sink node moves into forward, downward, backward and upward directions, respectively, to complete its data collection from the cluster head nodes. Figure 3 shows the pre-defined fixed path of the sink node. This movement of the sink node continues till the simulation reaches to its last round. Figure 4 shows the movement of the sink node across the whole network area with the above-mentioned pre-defined path during the simulation process. Here, all member nodes are represented by small circle symbols, CHs are represented by star symbols, and the large red circle represents the sink node. As we can see only the location of the sink node and the cluster heads are changed in every round, the coordinates of the other sensor nodes remain same.

E. Proposed Algorithm

The pseudo code of the proposed heterogeneous multiclustered energy efficient routing (HMCEER) protocol is given below:

Algorithms 1: Pseudocode of Proposed Algorithm

Deploy the sensor nodes randomly across the network area.

for all sensor nodes do

$i = 1$ to n , $S(i) = (X_i, Y_i)$

 Randomly establish the sensor nodes

end

Elect the cluster heads (CHs) based on $T(n)$

Form the clusters, using elected CH

for every cluster do

 Transmit the sensed data to the CH

 CH forwards it to the sink node

end

Move the sink node to its next location

4 SIMULATIONS AND RESULT

Figure 2 shows the comparison plot for dead nodes versus number of rounds in LEACH and MERAM-C. Figure 3 presents a plot for dead nodes VS number of rounds in proposed protocol HMCEER. The first node died at 1000th round in LEACH, the first node died at 800th round but in MERAM-C but in HMCEER, first node died after 3000th round.

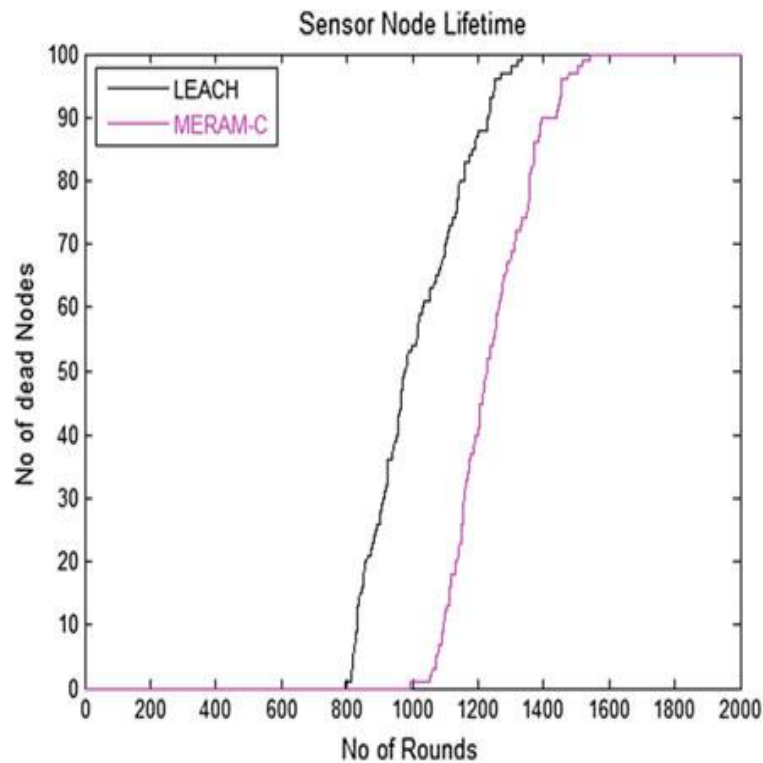


Fig. 2 Number of Dead Nodes in LEACH & MERAM C Protocols

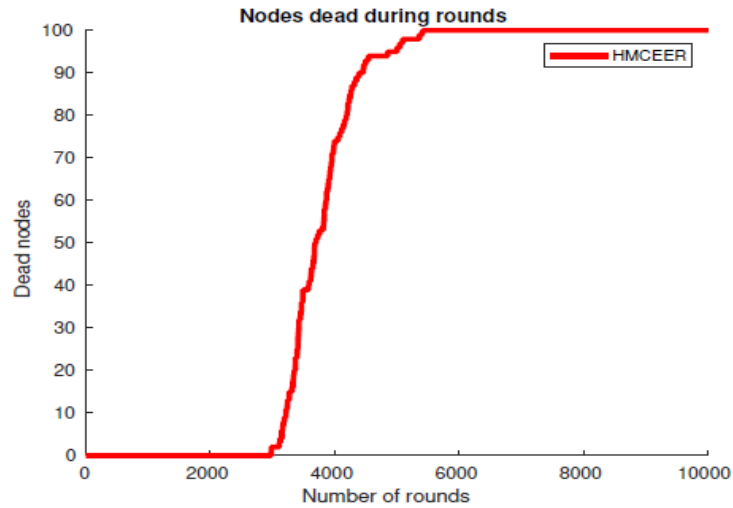


Fig. 3 Sensor Node Lifetime (Dead Nodes)

Figure shows the comparison plot for live nodes versus number of rounds that each node completes before reaching to energy level zero. The lifetime of the network reached at 1300th rounds in LEACH, whereas in HMCEER the network lifetime reached at 1500th rounds. From the figures, it is shown that the lifetime of WSNs using the proposed HMCEER protocol is longer than using LEACH protocol.

Figure shows the comparison plot for packets sent to the base station versus number of rounds in the HMCEER, MERAM-C and LEACH protocols. The number of packets transmitted in the LEACH protocol was 10,967, whereas in HMCEER the number of packets transmitted was 27,090

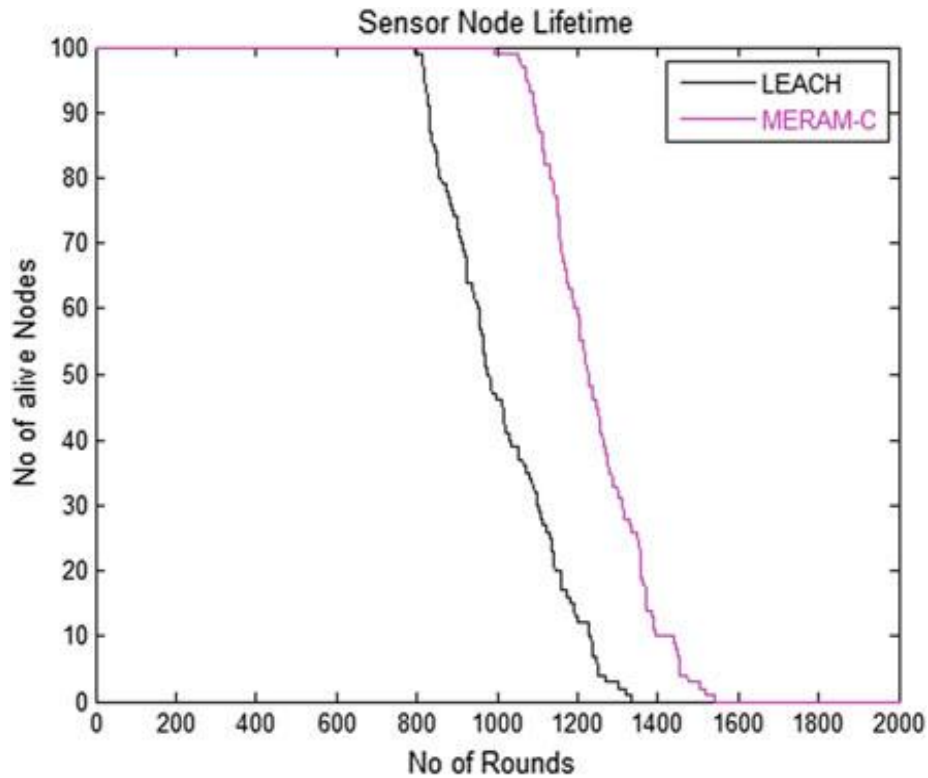


Fig. 4 WSN Lifetime in LEACH & MERAM C Protocols

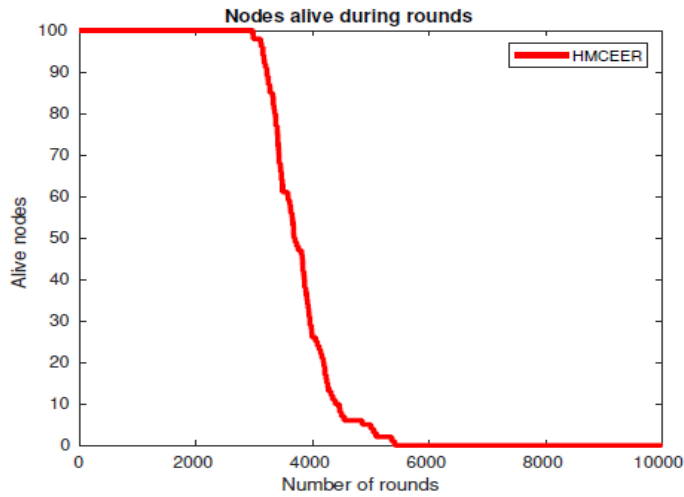


Fig. 5 Sensor Node Lifetime (Alive Nodes)

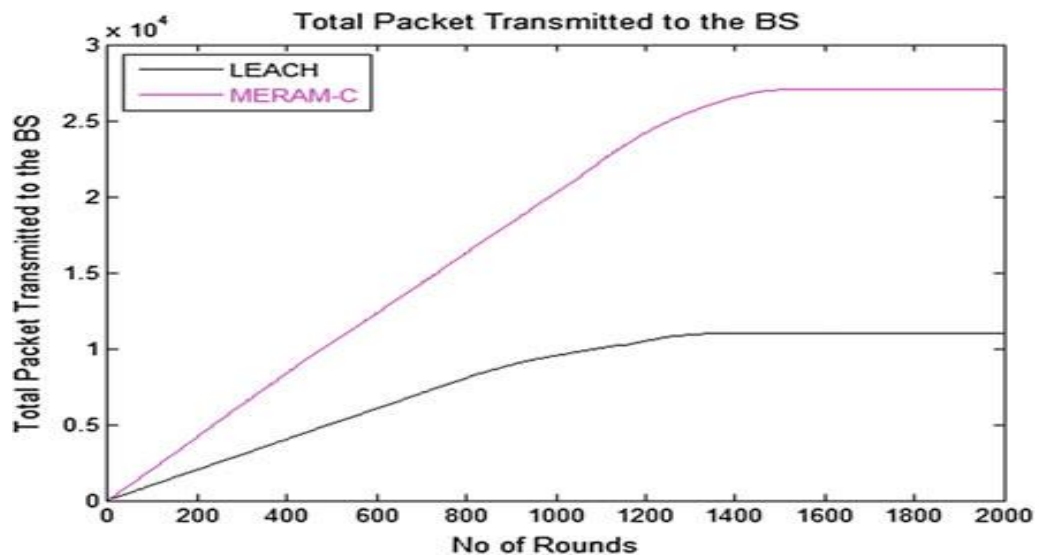


Fig. 6 Throughput in LEACH & MERAM C Protocols

Which shows that the results of HMCEER are better than the LEACH protocol?

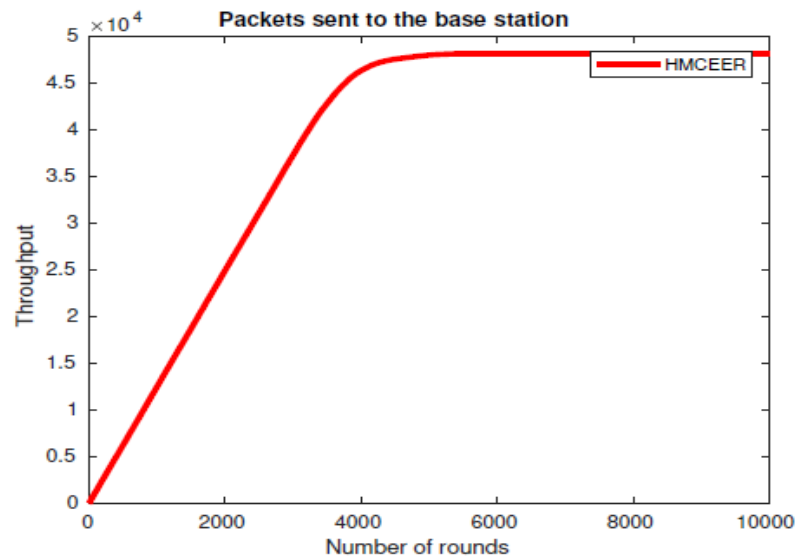


Fig. 7 Throughput (HMCEER)

5 CONCLUSIONS

In this paper, a heterogeneous multi-clustered energy efficient routing (HMCEER) protocol was proposed. It was also shown that the lifetime of the WSN using the proposed protocol (HMCEER) is longer than the lifetime of the WSN using the standard WSN LEACH protocol. It was also observed that the three level heterogeneity of nodes and mobility of base station not only decreases the load on the cluster head but also enhances the network lifetime.

Further improvement can be done on the mobility pattern of the sink node considering larger network area for wireless sensor networks.

REFERENCES

1. Y. Gui, Z.-g. Tao, C.-j. Wang, and X. Xie, "Study on remote monitoring system for landslide hazard based on wireless sensor network and its application," *Journal of Coal Science and Engineering (China)*, vol. 17, no. 4, pp. 464–468, 2011.
2. Q. Chi, H. Yan, C. Zhang, Z. Pang, and L. D. Xu, "A reconfigurable smart sensor interface for industrial wsn in iot environment," *IEEE Transactions on Industrial Informatics*, vol. 10, no. 2, pp. 1417–1425, May 2014.
3. R. Fantacci, T. Pecorella, R. Viti, and C. Carlini, "A network architecture solution for efficient iotwsn backhauling: challenges and opportunities," *IEEE Wireless Communications*, vol. 21, no. 4, pp. 113–119, August 2014.
4. S. Pandey and S. Varma, "A range based localization system in multichip wireless sensor networks: A distributed cooperative approach," *Wireless Personal Communications*, vol. 86, no. 2, pp. 615–634, Jan 2016. [Online]. Available: <https://doi.org/10.1007/s11277-015-2948-3>.
5. E. Fitzgerald, M. Pi'oro, and A. Tomaszewski, "Energy-optimal data aggregation and dissemination for the internet of things," *IEEE Internet of Things Journal*, vol. 5, no. 2, pp. 955–969, April 2018.
6. N. M. Boers, P. Gburzyński, I. Nikolaidis, and W. Olesiński, "Developing wireless sensor network applications in a virtual environment," *Telecommunication Systems*, vol. 45, no. 2, pp. 165–176, 2010.
7. H. S. Abdel Salam and S. Olariu, "Toward efficient task management in wireless sensor networks," *IEEE Transactions on Computers*, vol. 60, no. 11, pp. 1638–1651, Nov 2011.
8. T. Y. Chen, H. W. Wei, Y. C. Cheng, W. K. Shih, and H. Y. Chen, "An efficient routing algorithm to optimize the lifetime of sensor network using wireless charging vehicle," in *2014 IEEE 11th International Conference on Mobile Ad Hoc and Sensor Systems*. IEEE, Oct 2014, pp. 501–502.
9. A. A. Ahmed, H. Shi, and Y. Shang, "A survey on network protocols for wireless sensor networks," in *Information Technology: Research and Education, 2003. Proceedings. ITRE2003. International Conference on*, Aug 2003, pp. 301–305.
10. N. Ramluckun and V. Bassoo, "Energy-efficient chain-cluster based intelligent routing technique for wireless sensor networks," *Applied Computing and Informatics*, 2018. [Online]. Available: <http://www.sciencedirect.com/science/article/pii/S2210832717302181>.
11. M. I. Chidean, E. Morgado, E. del Arco, J. Ramiro-Bargueño, and A. J. Caamaño, "Scalable data-coupled clustering for large scale wsn," *IEEE Transactions on Wireless Communications*, vol. 14, no. 9, pp. 4681–4694, Sept 2015.
12. D. Izadi, J. Abawajy, and S. Ghanavati, "An alternative clustering scheme in wsn," *IEEE Sensors Journal*, vol. 15, no. 7, pp. 4148–4155, July 2015.
13. M. Ren, J. Zhang, L. Khoukhi, H. Labiod, and V. Vèque, "A unified framework of clustering approach in vehicular ad hoc networks," *IEEE Transactions on Intelligent Transportation Systems*, vol. 19, no. 5, pp. 1401–1414, May 2018.
14. S. Yang, U. Adeel, Y. Tahir, and J. A. McCann, "Practical opportunistic data collection in wireless sensor networks with mobile sinks," *IEEE Transactions on Mobile Computing*, vol. 16, no. 5, pp. 1420–1433, May 2017.
15. T. Shuminoski and T. Janevski, "Lyapunov optimization framework for 5g mobile nodes with multi-homing," *IEEE Communications Letters*, vol. 20, no. 5, pp. 1026–1029, May 2016.
16. S. P. Nayak, S. C. Rai, and S. K. Pradhan, "Mera: A multi-clustered energy efficient routing algorithm in wsn," in *2015 International Conference on Information Technology (ICIT)*, Dec 2015, pp. 37–42.
17. J. Kulshrestha and M. K. Mishra, "Energy balanced data gathering approaches in wireless sensor networks using mixedhop communication," *Computing*, Mar 2018. [Online]. Available: <https://doi.org/10.1007/s00607-018-0597-6>.

18. M. R. Jafri, N. Javaid, A. Javaid, and Z. A. Khan, "Maximizing the lifetime of multi-chain PEGASIS using sink mobility," CoRR, vol. abs/1303.4347, 2013. [Online]. Available: <http://arxiv.org/abs/1303.4347>.
19. H. Basumatary and M. M. Singh, "Multiclustered energy-efficient routing algorithm with mobile sink node moving in clockwise direction," in Proceedings of International Conference on Recent Advancement on Computer and Communication, B. Tiwari, V. Tiwari, K. C. Das, D. K. Mishra, and J. C. Bansal, Eds. Singapore: Springer Singapore, 2018, pp. 645–654.

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AN EXPLORATORY SURVEY ON IMPROVEMENT OF HIGHER EDUCATION SYSTEM AND LEARNING METHODS USING BIG DATA ANALYSIS

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Abstract - Improvement and moderation of quality management system in higher education and learning are one of the challenging task. In this age of data science, better decision making supports can be provided for quality education by previous educational big data analysis. In this paper, an exploratory survey of several quality improvement and moderation techniques are discussed with reference to educational data analysis. Modern education system are continuously investigating more efficient technologies for better management, strategies, planning and support decision making activities for a better management of the current appendage. This survey is based on the big data analyze of the students feedback on their curriculum activities and concluded with future recommendations.

Keywords: Data Analysis, Big Data, Higher Education, Learning, Quality Management

1 INTRODUCTION

Nowadays, with the rapid development of information technology, the great role of big data is being gradually recognized and found, which has been widely used in many fields [1]. Big data has the characteristics of large volume, high speed, high valuation and strong authenticity as presented in Figure 1. Strengthening the integration of big data tech-

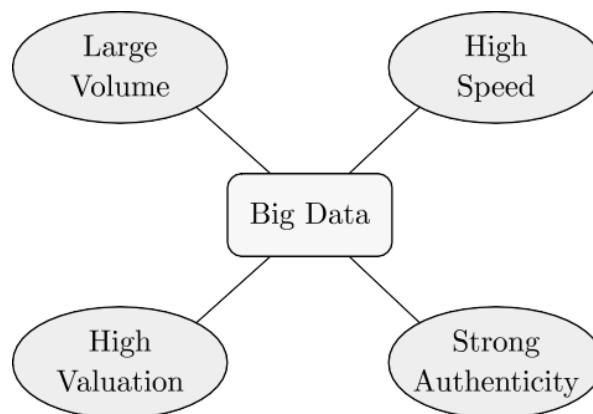


Figure 1: Big Data Characteristics

nology, concept and educational monitoring and evaluation is a major practical problem to solve the current development of education. The arrival of big data era will inject new vitality into the teaching activities [2, 3]. Benchmarking big data systems has become one of the most important driving forces for research and development efforts in a wide range of areas including data management systems, hardware architectures, operating systems and programming systems [4, 5] Big data requires novel and effective data networking, storage, management, access and analytics [6].

With monitoring the whole process of school management, teacher education and

student growth and mining the produced big data, we can evaluate the development of student's personal ability, cognition, emotion and so on after their college life, as well as the situation of education and teaching of teachers, which can provide a scientific analysis method to improve the education process and the education quality, and can also guide parents, teachers, schools and society to establish a correct concept of higher education quality and then promote the development of Students Quality Education [7, 8].

With the development of big data and the deepening of the reform of higher education in many countries, the use of big data technology to collect comprehensive and accurate data for scientific and effective evaluation of education quality has become one of the urgent tasks for the reform of higher education. With the integration of big data and the higher education quality evaluation, we construct the higher education quality monitoring and evaluation platform based on big data [9–11]. Through the application of the higher education quality monitoring and evaluation platform, it can be integrated with fragmentation evaluation into systematic evaluation to ensure the comprehensiveness and sustainability of the evaluation, which solves the problem of asymmetric information collection. At the same time, we can query or browse data in a real time and dynamic manner, and can also perform data aggregation, processing and analysis according to the practical need in order to provide scientific practice and theoretical basis for the macro-decision of education administration department [12, 13]. The analytical and processing techniques in big data analysis can be improved by implementing system level parallelism and task parallelization in real-time applications [14, 15].

2 LITERATURE REVIEW

Big data analysis and data mining in higher education is a modern research and it is gaining popularity because of its potentials to educational institutes Alaskar *et al.* [16] presented result study that indicates data mining techniques (DMT) capabilities provided effective improving tools for student feedback analysis. It showed how useful data mining can be in higher education in particularly to predict acceptance and changes of curriculum by students. They collected the data from student by using questionnaire to find the relationships between behavioral factors of student. For future work, application of data mining techniques in educational field can be used to develop performance monitoring and evaluation tools system. DMT has a potential in performance monitoring of High school and other levels education offering historical perspectives of student's performances. The results may both complement and supplement tertiary education performance monitoring and assessment implementations. Li *et al.* [17] constructed the quality monitoring system of higher education based on big data, which involves front-end platform development and back-end system development including the system development of data acquisition, data analysis, machine learning, data storage, and data analysis. The content of the monitoring involves:

- The evaluation of education and teaching quality of school and teachers, teaching ability, and teaching process.
- The evaluation of learning effect and learning development in the process of student's learning.

The system can provide direct, reliable and visual data support. At the same time, it can also provide the participants in the education (educational management, educational policy makers, administrators, teachers and parents) with a more comprehensive and objective understanding of the current situation of education

development and the improvement direction from feedbacks.

Cantabella *et al.* [18] proposed the use of big data technologies and a framework to attempt to obtain student behavior patterns and be able to provide conclusions to increase student performance by improving their learning process. We selected a big data solution based on Azure HDInsight using its HDFS implementation. The tool used to transfer data from Sakai database was Sqoop, and these data were stored in a Hive data warehouse.

Gangele *et al.* [19] proposed a model which can be beneficial to similar courses to share and discover motivation behavior of students. Data mining techniques can be applied to discover knowledge. Particularly, association rules discovered and the rules can be sorted using lift metric then the rules can be visualized. Then classification rules can be discovered using decision tree. The proposed model as students behavior assessment framework works using data mining technique, it presents the indication to the critical quantities that control the students behavior on learning method. The proposed framework can be applied to extract valuable data that shows all characteristic of student behavior by clustering and subdivision of the student behavior large data set.

Athani *et al.* [20] proposed an automated system that emphasis on making predictions of student's for the advancement of institution is very essential. The proposed automated system emphasis on making predictions of student's academic performance and social behavior. The accuracy of the model is also calculated. Further scope is to build a classifier using Support Vector Machine (SVM) and analyze which classifier is more appropriate in carrying out the classification.

Aldowah *et al.* [21] surveyed many articles describing applications of educational data mining and learning analytics in higher education. They found that educational data mining and learning analytics are commonly used to provide opportunities and solutions to various learning problems related to computer-supported learning analytics (CSLA), computer-supported predictive analytics (CSPA), computer-supported behavioral analytics (CSBA), and computer-supported visualization analytics (CSVA) as presented in Figure 2. In general, most data mining tech-

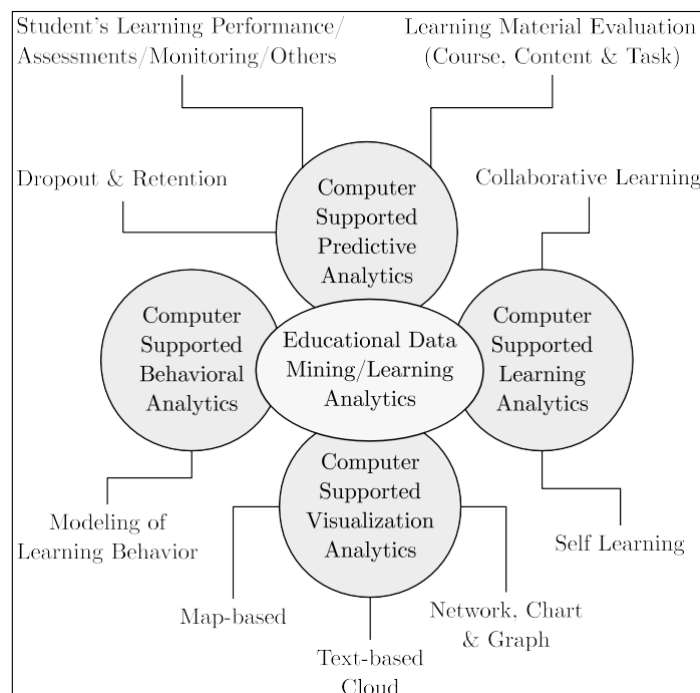


Figure 2: Data mining schemes in higher education

niques are well suited for specialization of educational data mining and learning analytics. The major data mining techniques of clustering, association rule, visual data mining, statistics, and regression are commonly used across these dimensions. However, this review has found that some techniques, such as sequential pattern mining, text mining, correlation mining, outlier detection, causal mining, and density estimation, are not commonly used due to the complexity in obtaining the attributes necessary to regulate or adapt to individual needs.

Jie *et al.* [22] generated autonomous learning platform, by static and mining of the 2015 grade learner's landing and resource browsing data that generated in the "Engineering Mechanics Experiment", they found many basis characteristics and influenced factors of learners' online study behavior. As following, from the perspective of the group, the online learning behavior is relatively balanced in the distribution of time, and the highest landing rate appeared at the 6th and 7th week. From the perspective of the single, the students' online learning time is relatively less, and the intrinsic influenced factors are student level, professional and gender, among which the level factor is the most important factor, the next is the professional factor and it is mainly associated with their professional characteristics and belonged managing team. The attentions paid by the learners of different resources mainly depend on their characteristic, their layout on the home page of the course and the student's own needs. Gurumoorthy *et al.* [23] reviewed on the web usage of online networking sites and the behavior mining of the male students by analyzing the log records are inspected. They analyzed male gender based behavior of students based on total moment spent on Internet per a day during different periods of a different program. From this review the social site Facebook is utilized by numerous male at a normal of 93% for the individual utilize, business, contemplates, and so forth and there is a continuous increment in the rate of web-based social networking utilization in the current years. Miller *et al.* [24] presented the study on school-based behavioral assessment methods which was conducted in order to shed light on the extent to which behavior assessment methods capture intended trait-level variance and determine the degree to which methods utilized impact findings. Support was found for the presence of strong methods effects for all of the assessment methods utilized, which included three of the most common behavior assessment methods used in schools. These findings are consistent with long-standing recommendations calling for the use of multi-source multimethod assessments in the realm of behavioral assessment. Juhanak *et al.* [25] presented process mining methods which can be used to detect the standard quiz-taking behavior pattern and differentiate it from non-standard or aberrant behaviors. These methods simultaneously allow for identifying and differentiating between various types of non-standard student behaviors during involvement with quiz-taking learning activities in learning management system.

3 ARCHITECTURE OF QUALITY MANAGEMENT EDUCATIONAL MODEL

The characteristics of higher education monitoring and evaluation can be combined with the big data processing platform to form a multi-functional system with functions of big data acquisition, data processing and results usage. The overall system architecture is demonstrated in Figure 3.

Database construction is the basis of educational quality

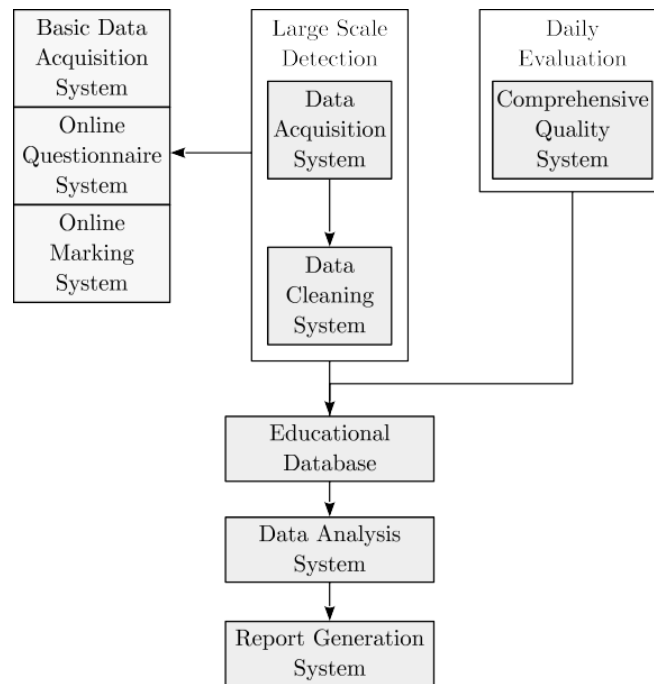


Figure 3: Architecture of Higher Education Quality Management System

monitoring, including school management, teachers, student information and other basic information. We use image recognition technology to realize the automation of paper data collection, and achieve orderly collection of teacher’s data by network questionnaire. During the process of data collection, we need to ensure the practicality of the data source, the normality of the process, and the safety of the monitoring system. We collect information on the goals of the school, the resources of teaching, the daily teaching information, the academic achievements of students, the on and off campus activities of students, and the community evaluation information [26].

Since traditional report has the shortcoming of insufficient information, in our research, we intend to use heuristic, visual data mining technology, human-computer interaction and other technologies on the report generation system to achieve large-scale data mining and human-computer interaction. Under the premise of scientific theory guidance and accurate evaluation results, a specific analysis model can be formed by collecting and analyzing the data, then create the analysis software. The system automatically generates quality monitoring report with school-teacher-student integration.

The higher education quality evaluation system relies on big data network system, which forms a complete platform with data acquisition, data storage, data processing and result feedback. Only by combining the two together can we construct a complete system of information exchange, mutual promotion, common development and effective operation.

4 PROPOSED APPROACH

4.1 Machine Learning Approach

Machine learning based classification is a process which involves separation of classes based on extracted features. After the classification, classes formed will be distinct from each other. Different classes will have different features. The patterns found in the training data-set play an important role to build the classifier. There

are many classification algorithms like k-nearest neighbors, decision tree learning, support vector machine, naïve bayes and neural networks which can be used according to the requirements of an application. In the proposed system, machine learning based Naïve Bayes classifier is used. Naïve Bayes classifiers are statistical classifiers. Given a tuple, this classifier can predict to which particular class a tuple belongs to. A Naïve Bayesian classifier is based on Bayes theorem two classes are pass and fail. This classification is performed on the training data-set. Training is done to predict whether the student will pass or fail and also to predict the other attributes of a student which describes a students' social behavior. Later, by using this model, prediction is made whether a student will pass or fail and also prediction is made for any attribute given the other remaining attributes as predicting social behavior.

There are several indices to measure degree of impurity quantitatively for behavior analysis. Most well known indices to measure degree of impurity are Entropy, Gini index, and classification error.

$$\text{Entropy} = \sum_j -p_j \log_2 p_j \quad (1)$$

Entropy of a pure table (consist of single class) is zero because the probability is 1 and $\log(1) = 0$. Entropy reaches maximum value when all classes in the table have equal probability.

4.2 Machine Learning based Proposed

$$\text{Gini Index} = 1 - \sum p^2 \quad (2)$$

Model

The data-set considered usually contains sets of tuples and attributes. Each tuple represents the attribute values of a student or it provides the details of the student in terms of academic performance and social behavior. The data-set considered, contains some categorical data for the certain number of attributes. Figure 4 represents machine learning based model for behavior analysis.

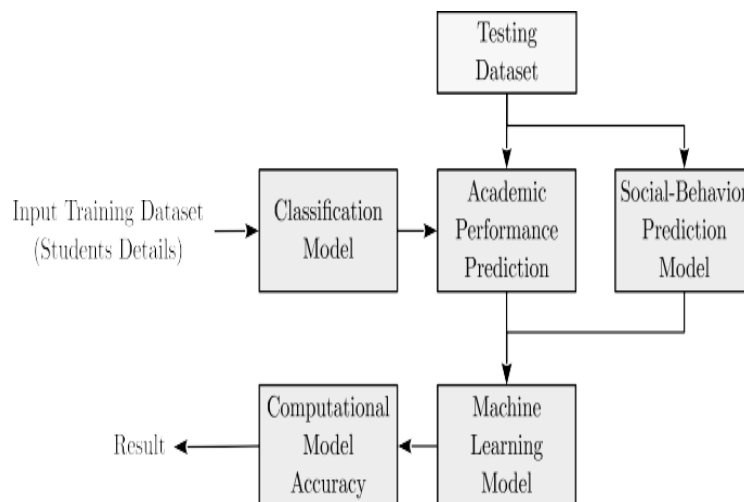


Figure 4: Machine Learning based Proposed Model

As the pre-processing step, all the categorical information is converted into binary data with “yes” being as “1” and “no” being as “0”. After the pre-processing step, the data-set consists of totally 35 attributes for each student and only numerical data is present. In the next step, the classifier is built using Naïve Bayes algorithm to classify the student as pass or fail. Naïve Bayes classifier is applied to the training data-set which is preprocessed. This data-set also contains class labels with pass (class label), labeled as 1 and another class label, fail, labeled as 0. All these steps come under the training phase. The testing data-set is given as an input to the built classifier for the prediction. The Naïve Bayes algorithm, first classifies the students into two classes. Those Gini index of a pure table consist of single class is zero because the probability is 1 and $1 - 1^2 = 0$. Similar to Entropy, Gini index also reaches maximum value when all classes in the table have equal probability.

$$\text{Classification Error} = 1 - \max\{p_i\} \quad (3)$$

Similar to Entropy and Gini Index, Classification error index of a pure table (consist of single class) is zero because the probability is 1 and $1 - \max(1) = 0$. The value of classification error index is always between 0 and 1.

5 CONCLUSION

The main objective of the study is the identification of highly influencing predictive variables on both the course and student performance and to reveal the high potential of data mining applications for university management, referring to the optimal usage of data mining methods and techniques to deeply analyze the collected historical data. Data mining techniques are widely used for extracting previously unknown patterns and finding relationship between different features. In this paper, a comprehensive survey and model based analysis of simple data mining based prediction model were presented. Model employs both classification and clustering techniques to identify features affecting student performance in selected courses in order to assist academic stakeholders to improve academic performance which is the main goal of study.

REFERENCES

1. F. Matsebula and E. Mnkandla, “A big data architecture for learning analytics in higher education,” in *2017 IEEE AFRICON*, Sep. 2017, pp. 951–956. [Online]. Available: <https://doi.org/10.1109/AFRCON.2017.8095610>
2. M. Jose, P. S. Kurian, and V. Biju, “Progression analysis of students in a higher education institution using big data open source predictive modeling tool,” in *2016 3rd MEC International Conference on Big Data and Smart City (ICBDSC)*, March 2016, pp. 1–5. [Online]. Available: <https://doi.org/10.1109/ICBDSC.2016.7460352>
3. E. Dumbill, “Making sense of big data,” *Big Data*, vol. 1, no. 1, pp. 1–2, 2013, pMID: 27447028. [Online]. Available: <https://doi.org/10.1089/big.2012.1503>
4. R. Han, L. K. John, and J. Zhan, “Benchmarking big data systems: A review,” *IEEE Transactions on Services Computing*, vol. 11, no. 3, pp. 580–597, May 2018. [Online]. Available: <https://doi.org/10.1109/TSC.2017.2730882>
5. C. Bizer, P. Boncz, M. L. Brodie, and O. Erling, “The meaningful use of big data: Four perspectives – four challenges,” *SIGMOD Rec.*, vol. 40, no. 4, pp. 56–60, Jan. 2012. [Online]. Available: <http://doi.acm.org/10.1145/2094114.2094129>
6. H. Fang, Z. Zhang, C. J. Wang, M. Daneshmand, C. Wang, and H. Wang, “A survey of big data research,” *IEEE Network*, vol. 29, no. 5, pp. 6–9, Sep. 2015. [Online]. Available: <https://doi.org/10.1109/MNET.2015.7293298>
7. F. Lu and Y. Fan, “Analysis on higher education scientific and technological innovation based on panel data,” in *2009 International Conference on Test and Measurement*, vol. 1, Dec 2009, pp. 37–40. [Online]. Available: <https://doi.org/10.1109/ICTM.2009.5412915>
8. G. L. Shook and J. E. Favell, “The behavior analyst certification board and the

- profession of behavior analysis,” *Behavior Analysis in Practice*, vol. 1, no. 1, pp. 44–48, Jun 2008. [Online]. Available: <https://doi.org/10.1007/BF03391720>
9. J. C. Sun, G. Hwang, Y. Lin, S. Yu, L. Pan, and Y. Chen, “A votable concept mapping approach to promoting students’ attentional behavior: Based on the evidence of mining sequential behavioral patterns,” in *2017 IEEE 7th International Symposium on Cloud and Service Computing (SC2)*, Nov 2017, pp. 275–278. [Online]. Available: <https://doi.org/10.1109/SC2.2017.53>
 10. M. Drosou, H. Jagadish, E. Pitoura, and J. Stoyanovich, “Diversity in big data: A review,” *Big Data*, vol. 5, no. 2, pp. 73–84, 2017, pMID: 28632443. [Online]. Available: <https://doi.org/10.1089/big.2016.0054>
 11. J. Aikat, T. M. Carsey, K. Fecho, K. Jeffay, A. Krishnamurthy, P. J. Mucha, A. Rajasekar, and S. C. Ahalt, “Scientific training in the era of big data: A new pedagogy for graduate education,” *Big Data*, vol. 5, no. 1, pp. 12–18, 2017, pMID: 28287837. [Online]. Available: <https://doi.org/10.1089/big.2016.0014>
 12. R. Ranjan and J. Ranjan, “Predicting parameters importance in higher education using data analysis: A regression model,” in *2016 Second International Conference on Computational Intelligence Communication Technology (CICT)*, Feb 2016, pp. 605–608. [Online]. Available: <https://doi.org/10.1109/CICT.2016.126>
 13. V. K. Ong, “Big data and its research implications for higher education: Cases from uk higher education institutions,” in *2015 IIAI 4th International Congress on Advanced Applied Informatics*, July 2015, pp. 487–491. [Online]. Available: <https://doi.org/10.1109/IIAI-AAI.2015.178>
 14. P. Goldar, Y. Rai, and S. Kushwaha, “A review on parallelization of big data analysis and processing,” *International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE)*, vol. 23, no. 4, pp. 60–65, August 2016.
 15. Y. Zhang, T. Cao, S. Li, X. Tian, L. Yuan, H. Jia, and A. V. Vasilakos, “Parallel processing systems for big data: A survey,” *Proceedings of the IEEE*, vol. 104, no. 11, pp. 2114–2136, Nov 2016. [Online]. Available: <https://doi.org/10.1109/JPROC.2016.2591592>
 16. K. Alaskar, P. G. Tandale, and A. Basade, “Data mining applications in higher education,” *Proceedings of National Conference on Emerging Trends: Innovations and Challenges in IT*, vol. 19, no. Y, p. 20, April 2013.
 17. Y. Li, P. Li, F. Zhu, and R. Wang, “Design of higher education quality monitoring and evaluation platform based on big data,” in *2017 12th International Conference on Computer Science and Education (ICCSE)*, Aug 2017, pp. 337–342. [Online]. Available: <https://doi.org/10.1109/ICCSE.2017.8085513>
 18. M. Cantabella, R. Martínez-España, B. Ayuso, J. A. Yáñez, and A. Muñoz, “Analysis of student behavior in learning management systems through a big data framework,” *Future Generation Computer Systems*, vol. 90, pp. 262–272, 2019. [Online]. Available: <https://doi.org/10.1016/j.future.2018.08.003>
 19. S. Gangele, K. Soni, and S. Patil, “Data mining approach towards students behavior assessment methods for higher studies,” *International Journal of Computer Applications*, vol. 181, no. 30, pp. 11–14, Nov 2018. [Online]. Available: <http://www.ijcaonline.org/archives/volume181/number30/30171-2018918099>
 20. S. S. Athani, S. A. Kodli, M. N. Banavasi, and P. G. S. Hiremath, “Student academic performance and social behavior predictor using data mining techniques,” in *2017 International Conference on Computing, Communication and Automation (ICCCA)*, May 2017, pp. 170–174. [Online]. Available: <https://doi.org/10.1109/CCAA.2017.8229794>
 21. H. Aldowah, H. Al-Samarraie, and W. M. Fauzy, “Educational data mining and learning analytics for 21st century higher education: A review and synthesis,” *Telematics and Informatics*, vol. 37, pp. 13–49, 2019. [Online]. Available: <https://doi.org/10.1016/j.tele.2019.01.007>
 22. Wang Jie, Lv Hai-yan, Cao Biao, and Zhao Yuan, “Application of educational data mining on analysis of students’ online learning behavior,” in *2017 2nd International Conference on Image, Vision and Computing (ICIVC)*, June 2017, pp. 1011–1015. [Online]. Available: <https://doi.org/10.1109/ICIVC.2017.7984707>
 23. K. Gurumoorthy, P. Suresh, and K. Murugan, “Behavior educational mining of male students by analyzing log files,” in *2017 2nd International Conference on Computing and Communications Technologies (ICCCT)*, Feb 2017, pp. 37–40. [Online]. Available: <https://doi.org/10.1109/ICCCT2.2017.7972243>
 24. F. G. Miller, A. H. Johnson, H. Yu, S. M. Chafouleas, D. B. McCoach, T. C. Riley-Tillman, G. A. Fabiano, and M. E. Welsh, “Methods matter: A multi-trait multi-method

- analysis of student behavior,” *Journal of School Psychology*, vol. 68, pp. 53–72, 2018. [Online]. Available: <https://doi.org/10.1016/j.jsp.2018.01.002>
25. L. Juhaňák, J. Zounek, and L. Rohlíková, “Using process mining to analyze students’ quiz-taking behavior patterns in a learning management system,” *Computers in Human Behavior*, vol. 92, pp. 496–506, 2019. [Online]. Available: <https://doi.org/10.1016/j.chb.2017.12.015>
26. B. Williamson, “The hidden architecture of higher education: building a big data infrastructure for the ‘smarter university’,” *International Journal of Educational Technology in Higher Education*, vol. 15, no. 1, p. 12, Mar 2018. [Online]. Available: <https://doi.org/10.1186/s41239-018-0094-1>

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PERFORMANCE HEAT TRANSFER COEFFICIENT USING CORRUGATED SURFACE AND HEAT EXCHANGERS

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Abstract - Heat exchangers are used in different purposes in various industrial, commercial & domestic applications. Some common examples include sensible cooling & heating in chemical processing, condensation and steam generation in power plants, agricultural and pharmaceutical products, waste heat recovery etc. Increase in Heat exchangers performance can lead to more economical design of heat exchanger which can help to make energy, material & cost savings related to heat exchange process. Making corrugation on pipe smooth surface is one such technique. Literature shows numerous works being carried out in this area, where parameters under study are inside diameter of pipe, corrugation depth, corrugation pitch, temperature and phase of liquid. The combination of varying inside diameter of tube, ratio of corrugation depth to inside diameter and ratio of corrugation pitch to inside diameter shows effective results pertaining to enhancement of heat transfer. Results showed that corrugated tubes can enhance heat transfer coefficient on both the outer and inner heat transfer surface area without a significant increase in pressure drop. It also results in Increase in fluid mixing, unsteadiness, turbulence flow or by limiting the growth of fluid boundary layers close to the heat transfer surface is done by corrugation on the surface of pipe.

Keywords: Heat exchanger, heat extension, corrugated surface, heat coefficients.

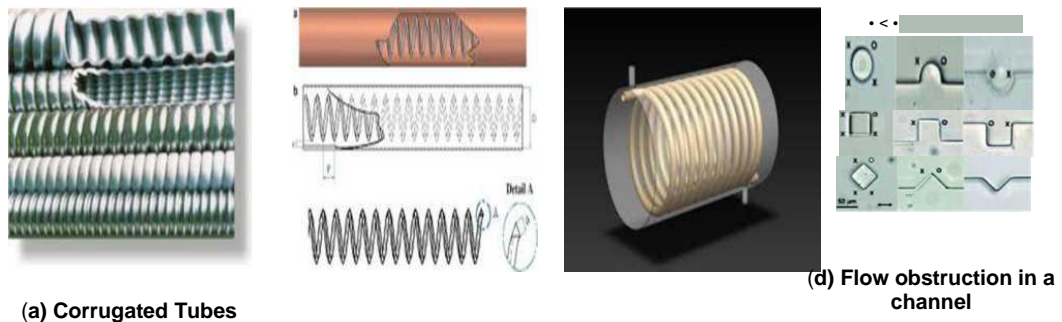
1 INTRODUCTION

Heat exchangers are used in different purposes ranging from conversions, utilization & recovery of thermal energy in various industrial, commercial & domestic applications. Some common examples include condensation and steam generation in power plants, sensible cooling & heating in chemical processing, agricultural and pharmaceutical products, fluid heating in manufacturing & waste heat recovery etc. Increase in Heat exchangers performance can lead to more economical design of heat exchanger which can help to make energy, material & cost savings related to heat exchange process. Heat transfer augmentation is a technique needed to increase the thermal performance of heat exchangers effecting energy, material & cost savings. These techniques are also referred as “heat transfer enhancement techniques” or “heat transfer intensification techniques”. Convective heat transfer is improved by reducing the thermal resistance in the heat exchanger is what augmentation techniques do. This heat transfer augmentation technique leads to increase in heat transfer coefficient but at the cost of increase in pressure drop. So, analysis of heat transfer rate and pressure drop is the major parameters which are to be taken care of during design of heat exchanger using any of this technique. Heat transfer augmentation method refers to the improvement of thermo-hydraulic performance of heat exchangers. Existing enhancement techniques can be broadly classified into three different categories: (a) Passive Method (b) Active Method and (c) Compound Method. Passive Method: These methods generally use surface or geometrical modifications to the flow channel by incorporating inserts or additional devices. This inserts results into increase in the pressure drop but on other hand they promote higher heat transfer coefficient by disturbing the existing flow behavior. In case of extended surfaces, effective heat transfer area on the side of the

extended surface is increased. Passive method holds the advantage over the active method as they do not require any direct input of external power. Heat transfer augmentation by these methods can be achieved by using treated surfaces, rough surfaces, extended surfaces, displacement enhancement devices, swirl flow devices, coiled tubes, additives for liquids, flow disruptions, channel curvature, re-entrant obstructions, and secondary flows.

Active Methods: These methods are more complex in nature from the use and design point of view as the method requires some external power input to cause the desired flow modification and improvement in the rate of heat transfer. It finds limited application because of the need of external power in many practical applications. In comparison to passive methods, these methods have not shown much potential as it is difficult to provide external power input in many cases. Various active techniques are as follow mechanical aids, surface vibration, fluid vibrations, electrostatic field, injection, suction, and jet impingement.

Compound Methods: A compound augmentation method is the one where more than one of the above mentioned method is used in combination with the purpose of further improving the thermo-hydraulic performance of a heat exchanger. Figure 1 shows various heat augmentation techniques



2 LITERATURE REVIEW

Heat transfer enhancement technique can produce superior heat exchanger performance. One such technique is the use of corrugated tube instead of smooth tube. Corrugated tubes can enhance heat transfer coefficient on both the outer and inner heat transfer surface area without a significant increase in pressure drop. Increase in fluid mixing, unsteadiness, turbulence flow or by limiting the growth of fluid boundary layers close to the heat transfer surface is done by corrugation on the surface of pipe. In order to reduce the size of industrial shell and tube heat exchangers corrugated tubes are chosen. However, use of corrugated tubes to replace conventional smooth tubes has only been reported over past two decades. It is still a new method for improving the heat transfer performance of heat transfer equipment.

Zimparov [1], investigated for heat transfer enhancement using combination of three-start spirally corrugated tubes with twisted tape. The test section comprises of three start spirally corrugated tubes combined with five twisted tape inserts with different relative pitches. The Reynolds number in the range from 3000 to 60000 was varied during experiments. The height to diameter ratio (e/d_i) and relative pitch (p/d_i) parameters were 0.0407, 0.0569 and 15.3, 12.2, 7.7, 5.8, 4.7 respectively.

Zimparou [2] developed a mathematical model in a turbulent flow regime to calculate friction factor and heat transfer coefficient for a spirally corrugated pipe combined with twisted tape inserts. The results obtained were compared with experimental data. The results showed good agreement between the predicted and experimental data.

Rainieri and Pagliarini [3] conducted experiments to investigate thermal performance of corrugated tubes. Different corrugation such as helical and transverse was made on the smooth surface of the pipe with different pitches. Reynolds number ranging from 90 to 800 was varied in experiments and working fluid employed was ethylene glycol. On comparison between three types of tubes such as smooth tube, helical corrugated tubes and transverse corrugated tube, the results showed that helical transverse corrugated tubes were having the highest heat transfer enhancement than helical corrugated and smooth tubes.

Laohalertdecha and Wongwises [4] studied condensation and evaporation process in corrugated tubes with R-134a as working fluid. The behavior of heat transfer coefficient and pressure drop due to change in pitch were prime focus of study. For all experimental conditions performed, corrugated tube are better than those of the smooth pipe for heat transfer coefficient and pressure drop. Moreover, the results also showed that the corrugation surface promotes turbulent flow. On the other hand, the effect of pitch on the pressure drop was insignificant.

Babra et al. [5] experimentally studied heat transfer process in chemical and food industry for single phase using corrugated tube. Reynolds number was varied from 100 to 800 and ethylene glycol was used as working fluid. Experimental findings showed that heat transfer enhancement using corrugated tube over smooth pipe was from 4.27 to 16.79. The friction factor also shows the increase by up to 1.83 to 2.45 times as compared to smooth tubes. They proposed correlation for Nusselt number and friction factor using this experimental data.

Nozu et al. [6] conducted experiments in the annulus of a double - tube coil consisting of three U - bends and four straight lengths. The working fluid used in experiments was R-113, R-114 and a zeotropic refrigerant mixture during condensation process. The test section comprises of a corrugated copper tube having inner diameter of 17.2 mm. The mass flow rate was varied in the range of 80 to 240 kg/sm². The results showed that U bend showed higher heat transfer coefficient as compared to straight tubes and local heat transfer coefficient decreased along the tube length.

Laohalertdecha and Wongwises [7] conducted experiments for condensation process and R-134a was used as working fluid. The test section was a horizontal counter flow tube in tube heat exchanger having test length of 2000 mm. Inside tube of tube in tube were changed during experiments, one was smooth pipe and another was corrugated pipe having inner diameter of 8.7 mm. the outer tube was made from smooth copper tube with inner diameter of 21.2 mm. Corrugation depths were 1, 1.25 and 1.5 mm, whereas pitches used were 5.08, 6.35 and 8.46 mm respectively. The results showed that the Nusselt number and two phase friction factor were significantly higher for corrugated tubes as compared to smooth pipe.

Vicente et al. [8] presented measurements of mixed convection heat transfer and isothermal pressure drop in corrugated tubes for laminar, transition and turbulent flow regions. The working fluid used was water and ethylene glycol. The results indicated that the corrugated tubes have higher heat transfer enhancement as compared to smooth tube over specified conditions. Pressure drop significantly increased from 25% to 300% when flow starts from laminar region and when subsequently reaches turbulent region.

Dong et al. [9] experimentally determined the turbulent friction and heat transfer characteristics for four spirally corrugated tubes with various geometrical parameters. The working fluid used was water and oil. Reynolds number was varied from 6000 and 93000 for water and from 3200 to 19000 for oil. Compared

to smooth pipe, their results showed that the heat transfer coefficient enhancement varied from 30% to 120%, while the friction factor increased from 60% to 160%.

Subhashis Ray et. al.[10], the possibility of using wire loop structures on the active plate of a parallel plate channel for efficient heat transfer augmentation was explored. For this purpose, experiments and numerical simulation were carried out for periodically fully developed turbulent flow in typical repeating modules using the reliable $k - \epsilon$ model. Reynolds number was varied from 2000 to 20000. The effect of three different loop densities on fluid flow and heat transfer characteristics were investigated when wire loops were placed perpendicular to the main flow direction. Studies were carried out for fixed loop density of 2270 loop/m² on the effect of loop orientation on various parameters. The maximum attainable loop density was found to strongly depend on the loop orientation owing mainly to the geometric as well as manufacturing constraints. Loops oriented diagonally to the main flow direction offer the best performance were observed.

Mohsen Sheikholeslami et. al. [11], insertion of swirl flow devices enhance the convective heat transfer by making swirl into the bulk flow and disrupting the boundary layer at the tube surface due to repeated changes in the surface geometry. In this it was observed that: the heat transfer coefficients of the coiled tubes with larger pitches are less than those of the ones with smaller pitches; and the effect of pitch on Nusselt number is more visible in high temperatures. Delta winglets generate the vortices which increases the heat transfer without much increase in friction factor in solar air heater or heat exchangers. Curved trapezoidal winglet delta winglet had the best thermo - hydraulic performance in fully turbulent flow region. Wire coil gives better overall performance if the pressure drop penalty is considered. The use of coiled square wire tabulators leads to a considerable increase in heat transfer and friction loss over those of a smooth wall tube. The helical ribs have a significant effect on the heat transfer and pressure drop augmentations. The use of coiled square wire turbulators leads to a considerable increase in heat transfer and friction loss over those of a smooth wall tube.

Jian Guo et al. [12] To get the best heat transfer performance with the least flow resistance laminar forced convective heat transfer was studied. The variation calculus method is employed to establish the equations describing the optimized fluid velocity field and temperature field. Numerical solutions of the equations for a convective heat transfer process in a section cut of a square duct indicate the optimized flow should have a transverse secondary swirl flow pattern considering of multiple vortices with identical swirl direction in the junction region of any two neighboring vortices. The calculated transverse secondary flow in the tube with four reverse vortex generator inserts approximately follows the optimized flow pattern and the tube is thus found to have the best thermo - hydraulic performance, validating the proposed convective heat transfer enhancement method. The objective function for heat transfer enhancement and the constraint function for external pump work consumption were derived, and the optimization equation for flow and temperature fields were established via the variation calculus method. Enlightened by these theoretical results, a novel convective heat transfer enhancement method for laminar flows was proposed, which relies on the excitation of transverse swirl flow.

M M K Bhuiya et al. [13] the study explored the effects of the double counter twisted tapes on heat transfer and fluid friction characteristics in air flow in a heat exchanger tube. Four different twist ratios were used in experiment with double counter twisted tapes i.e. $\gamma = 1.95, 3.85, 5.92$ and 7.75 using air as testing

fluid in a circular tube turbulent flow region where the Reynolds number was varied from 6950 to 50,050. The double counter twisted tape offered a significant enhancement of heat transfer, friction factor as well as thermal enhancement efficiency compared with the plain tube values. The Nusselt number and friction factor for the tube with double counter twisted tape inserts obtained were 60 to 240% and 91 to 286% higher than those of the plain tube values at the comparable Reynolds number respectively.

Wen-Chieh Huang et al. [14], Heat transfer enhancement of repeated ring-type ribs in circular tubes was experimentally investigated. Air, water and ethylene glycol - water solution (33.3% EG by vol.) were used as the working fluid. The Reynold number (Re) was in the range of 3601 - 26025 and the Prandtl number (Pr) was in the range of 0.7-15.6. The rib pitch-to-tube inner diameter ratio (p/d) and rib height-to-tube inner diameter ratio (e/d) were arranged in the range of 0.29-5.8 and 0.025-0.069 respectively. The Nusselt value increases with e/d value and it decreases with an increase of the p/d value. In addition, the Nu value increases with the Re value and it is proportional to the 0.45 power of the Pr value. The mechanical energy consumption index and the Nu enhancement index were used to compare the heat transfer enhancing tubes to a smooth tube. At e/d 60.043, for achieving an effective heat transfer enhancement, the p/d value needs to be smaller than 4.35 at e/d 0.069, for avoiding a large pressure drop, the p/d value should be larger than 1.45.

Targanski and Cieslinski [15] conducted experiments during evaporation inside a smooth stainless steel pipe, smooth copper pipe and two enhanced pipes. The working fluid used to study the heat transfer coefficient and pressure drop are pure R-407C and R-407C/oil mixtures. The parameters which were controlled are average saturation temperature, mass flow, inlet vapor quality and exit vapor quality, whose values were 0°C, 250 to 500 kg/m².s, 0 and 0.7 respectively. It was observed that the heat transfer coefficient and pressure drop for the enhanced tubes were distinctly higher than those of the smooth tube. The maximum enhancement factor and penalty factor for corrugated tube were 1.25 and 1.8, respectively.

Tabish Alam et. al. [15] various turbulence generators such that ribs, baffles and delta winglets are considered as an effective technique. This paper represents the extensive literature review of various tabulators investigated for enhancing heat transfer and friction in solar air heaters and heat exchangers. The correlations developed for heat transfer and friction factor in solar air heaters and heat exchangers by various investigators have been presented and reviewed. Transvers rib at different angle further enhances the heat transfer due to movement of vortices along the rib and formation of a secondary flow cell which results in high heat flow region near the leading end. Delta winglets generate the vortexes which increase the heat transfer without much increase in friction factor in solar air heater or heat exchangers. Thus there is tremendous scope.

3 METHODOLOGIES

In the compact heat exchangers, the heat transfer rate can be enhanced by manipulating the surface geometry of the plates by employing gas suitable enhancement technique. The principle behind this technique is as follows. The basic equation for the heat transfer retina we fluid heat exchanger is given by

$$q = UA\Delta T_m$$

Where q is the rate of heat transfer, U is the overall heat transfer coefficient based on area A , which is either of the areas A_j or A_o , the tube side and shell side areas respectively and ΔT_m is the logarithmic mean temperature difference defined as

$$\Delta T_m = \frac{(\Delta T_2 - \Delta T_1)}{\ln\left(\frac{\Delta T_2}{\Delta T_1}\right)}$$

Where $\Delta T_1 = (T_{h1} - T_{c2})$ and $\Delta T_2 = (T_{h2} - T_{c1})$

Being the temperature differences between the hot and cold fluid sat sections (1) and (2) respectively as shown in Fig. 1.4. The over all thermal resistance is given by

$$\frac{1}{UA} = \frac{1}{h_i A_i} + \frac{1}{h_o A_o} + \frac{t}{kA}$$

Experiments were performed to determine forced convection heat transfer coefficients for air flowing in a corrugated channel. Measurements were performed for corrugation angles of 0° , 20° & 40° . The flow rate was varied over the range 1000 to 4000 Reynolds nos. The experimental test apparatus and the corrugated channel employed in the current investigation are similar to that described by same authors previously. A detailed presentation of the design and fabrication of the experimental apparatus and evaluation of experimental results is available. For a uniform heating condition the periodic flow employed in the experiment, the wall temperatures at a succession of point separated from each other by an axial distance (S) lie on straight line.

$$h = [Q_{cycle} / (T_w - T_b) A_{cycle}]$$

The hydraulic diameter D_h is used as the characteristics dimension, the cycle-average Nusselt number follow as

$$Nu = hD_h/k$$

Where

$$D_h = [(2HW)/(H + W)]$$

The nodes were clustered in order to effectively resolve the strong gradients near the walls. The choice of grid width used in this study is governed by accuracy of solution and by computation time.

Limitations are described below:

- Low Pressure up to 300 PSI.
- Low temperature up to 300 F.
- Limited capacity.
- Limited plate size 0.02 square meter to 1.5 square meter.
- Large difference b/w flow rates can't be handled
- The corrugations inclination angle β varies from 14° to 72° .
- The range of Reynolds numbers is from 5 to 25,000

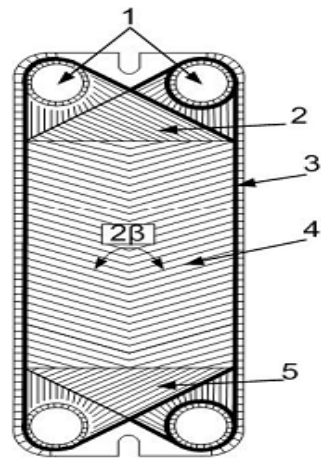
The average Nusselt number Nu_m is defined as

$$Nu_m = \left(\frac{h_m D_h}{k}\right)$$

Where h_m is the average heat transfer coefficient and can be written in the form

$$h_m = 1/S[\int_0^S h_x dx]$$

The PHE plate



- 1 – heat carrier inlet and outlet;
- 2, 5 – zones for flow distribution;
- 3 – rubber gasket;
- 4 – main corrugated field

Fig. 1: For plate heat exchanger corrugated channel

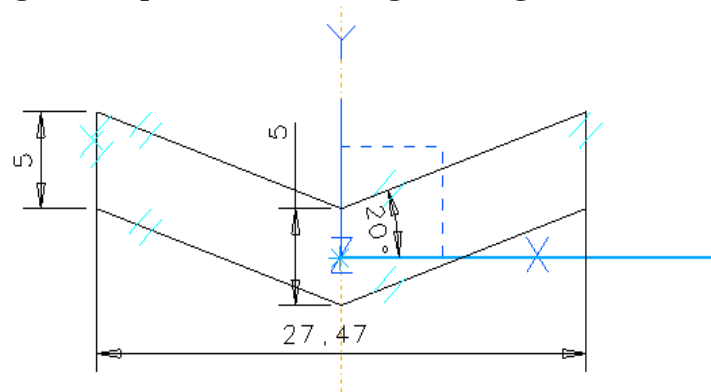


Fig. 2: For 20° inclined corrugated heat exchanger channel

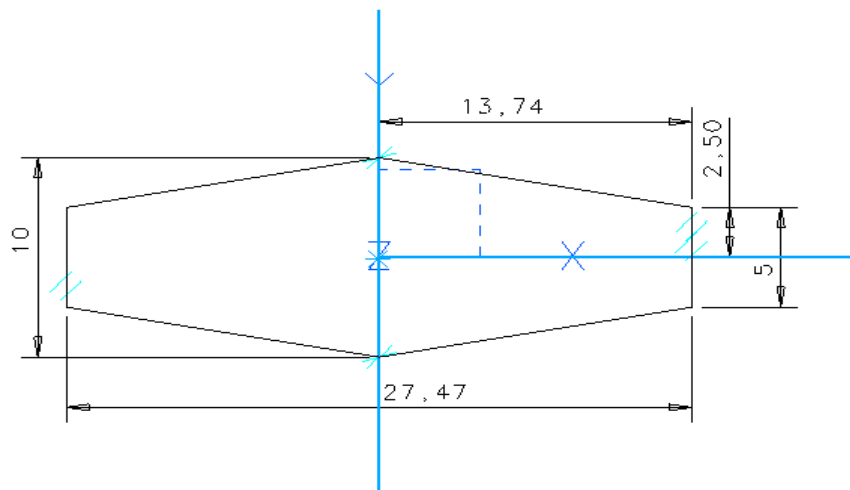


Fig. 3 For opposite corrugated 20° channel

3.1 Problem Solving Steps

After determining the important features of the problem user will follow the basic procedural steps shown below.

1. Create the model geometry and grid.
2. Start the appropriate solver for 2D or 3D modeling.
3. Import the grid.
4. Check the grid.
5. Select the solver formulation.
6. Choose the basic equations to be solved: laminar or turbulent (or in viscid), chemical species or reaction, heat transfer models, etc. Identify additional models needed: fans, heat exchangers, porous media, etc.
7. Specify material properties.
8. Specify the boundary conditions.
9. Adjust the solution control parameters.
10. Initialize the flow field.
11. Calculate a solution.
12. Examine the results.
13. Save the results.
14. If necessary, refine the grid or consider revisions to the numerical or physical model. Step 1 of the solution process requires a geometry modeler and grid generator. You can use GAMBIT or a separate CAD system for geometry modeling and grid generation. You can also use TGrid to generate volume grids from surface grids imported from GAMBIT or a CAD package. Alternatively, user can use supported CAD packages to generate volume grids for import into T Grid or into FLUENT. In Step 2, user will start the 2D or when interphone coupling is to be included.

4 MODELING & SOLUTION

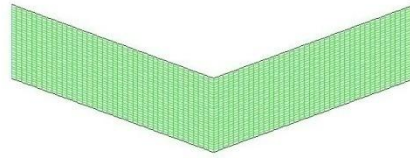
4.1 CFD Programs

The availability of affordable high performance computing hardware and the introduction of user-friendly interfaces have led to the development of commercial CFD packages. Before these CFD packages came into the common use, one had to write his own code to carry out a CFD analysis. The programs were usually different for different problems, although a part of the code of one program could be used in another. The programs were inadequately tested and Reliability of the results were often questioned. Today, well tested commercial CFD packages not only have made CFD analysis a routine design tool in industry, but also have helped the research engineer focus on the physical system more effectively. All formal CFD software contain three elements

- (i) A pre-processor (ii) The main solver, and (iii) A post-processor

4.2 Mesh Generation:

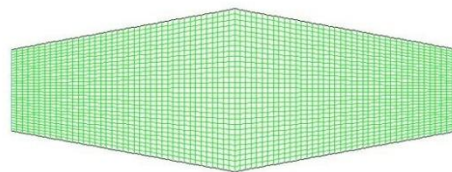
- Grid 80×31 fine mesh generated for all type profile. Mesh profile for geometry 20° & opposite corrugated duct given below.
- The governing equations were solved using the CFD package FLUENT5/6 with the following simplifying assumptions.
- Being a small PHE, there is normal- distribution flow.
- Most of the choicer based on previous studies on plate heat exchangers. Afte results were obtained, them was refined and the solution recalculated, until are' tmes dependent was obtained.



Mesh

ANSYS FLUENT 12.0 (2d, dp, pbns, lam)

Fig. 4: Mesh profile for the 20° inclined channel



Mesh

ANSYS FLUENT 12.0 (2d, dp, pbns, lam)

Fig. 5: Mesh profile for opposite corrugated duct

5 RESULTS

There we will plot for ANSYS analysis results and compare it with experimental data. The accuracy achieved between the experimental and ANSYS approach results is 10 to 14 % (maximum absolute relative errors). This is because we considered some ideal condition like no slip, incompressible fluid which are not valid for experimental works. So there is some error present always. This graph will be only for 20° angle profile.

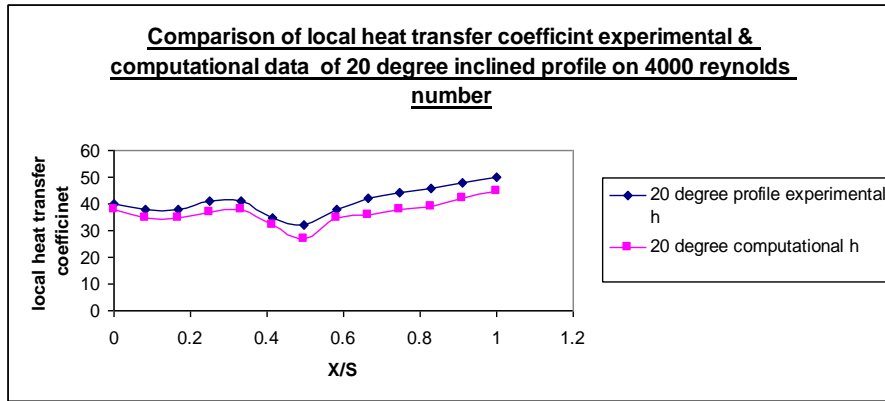


Fig. 6: For Average surface local heat transfer coefficient for opposite corrugated duct

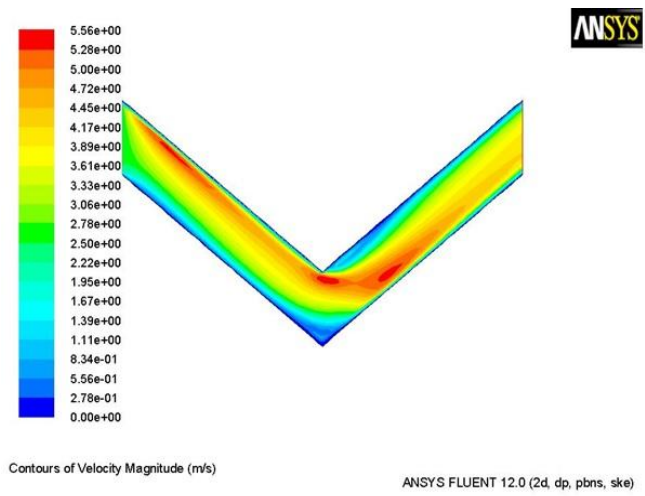


Fig. 7: For. Velocity contour for 20° inclined profile at 4000 Reynolds number

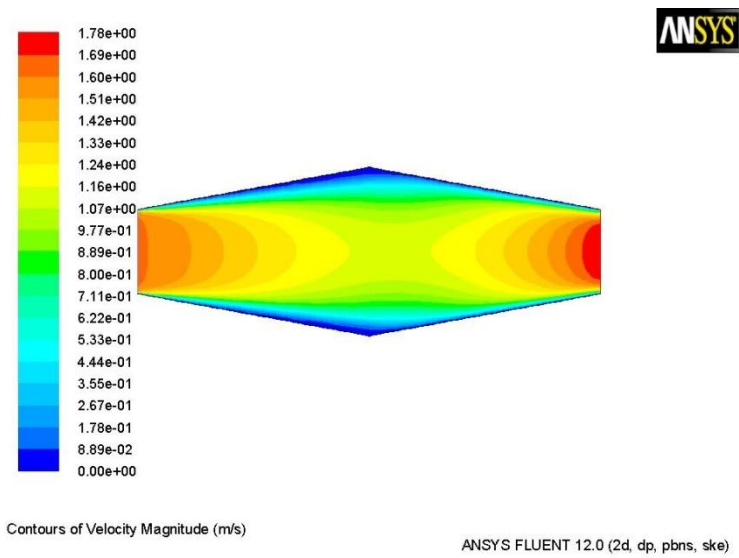


Fig. 8: For Velocity contour for opposite corrugated profile at 4000 Reynolds number

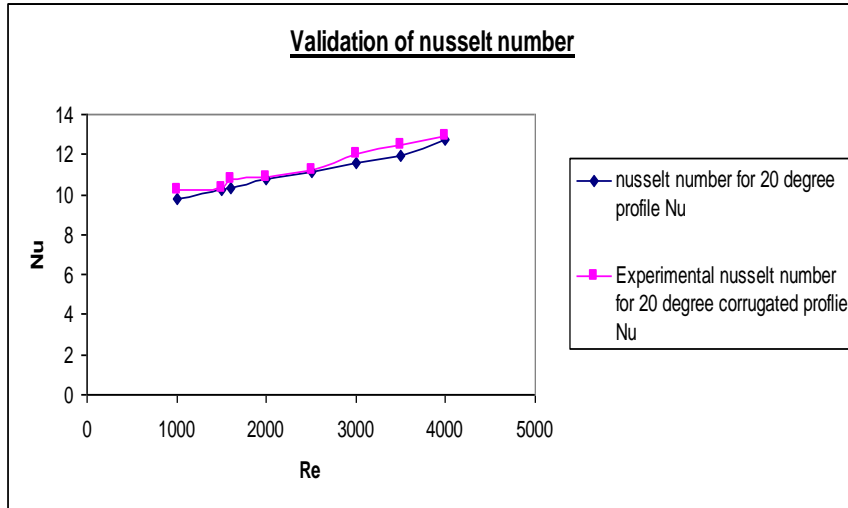


Fig. 9: Validation of Nusselt number

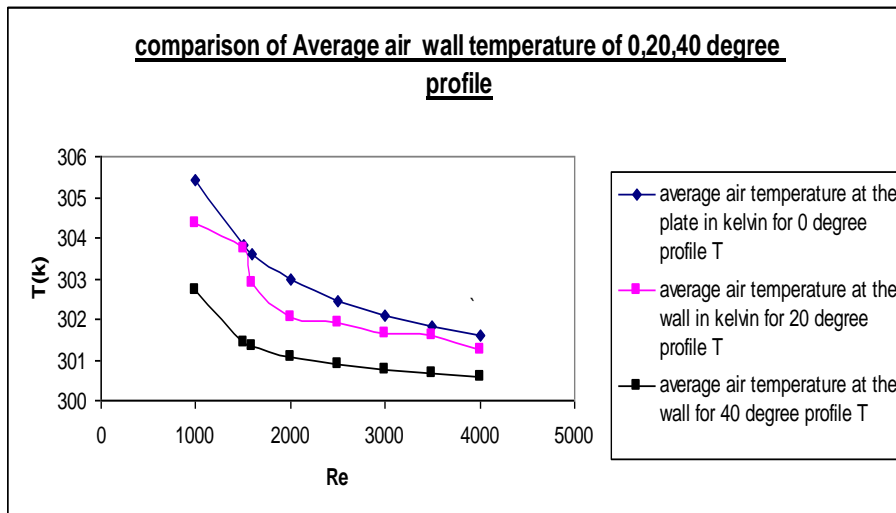


Fig. 10: For comparison of Average air wall temperature of 0, 20° & 40° profile

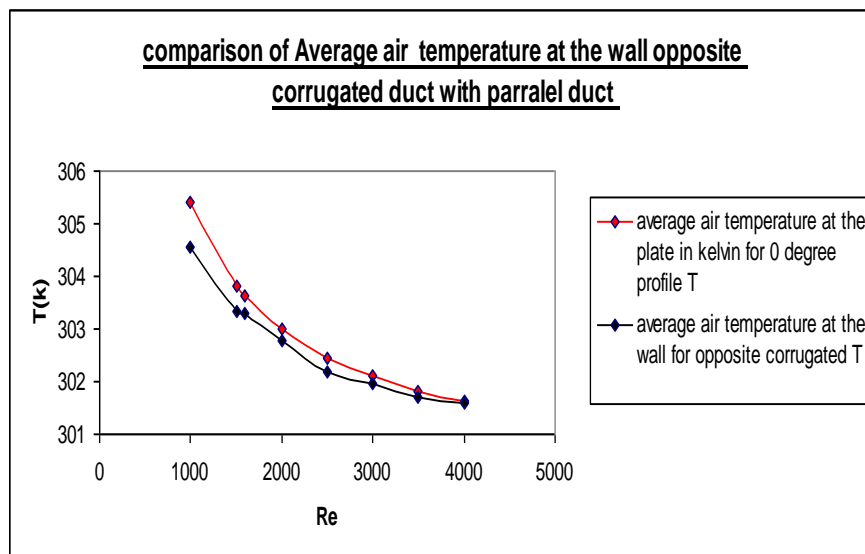


Fig. 11: For comparison of Average air temperature at the wall of opposite corrugated duct with parallel duct

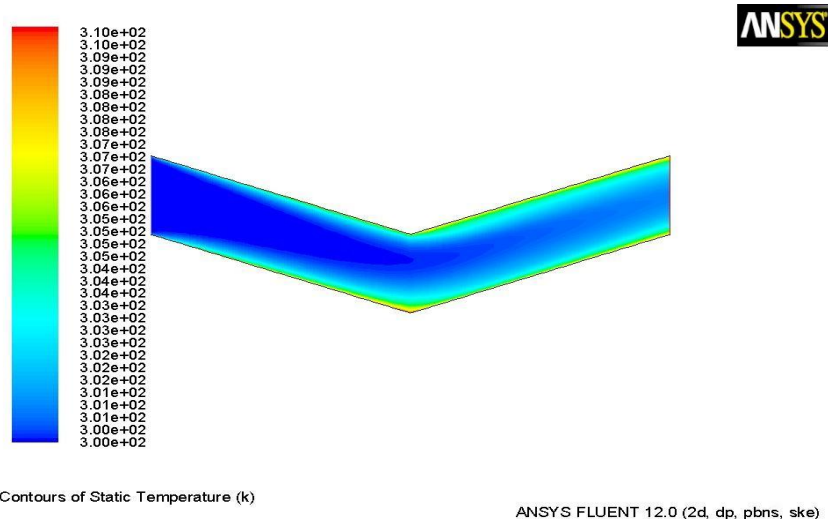


Fig. 12: For temperature contour of 20° profile

6 CONCLUSIONS

In the present study, influence of different angle of corrugated heat exchanger & opposite corrugated duct have been analyzed by using ANSYS 12.0. The results of the analysis are summarized as follows,

- The heat transfer coefficient increases with increasing distance. But it found to drop suddenly at the valley section.
- The average air temperature of the wall tends to decrease with increasing air mass flow rate. However, this effect tends to diminish as the Reynolds number increases.
- For a given Reynolds number and heat flux, the average plate temperatures at higher wavy angle are lower than from lower wavy angle.
- It can be easily seen that average heat transfer coefficient & average Nusselt number increase with increase in Reynolds number for corrugated channel. Same happens with opposite corrugated channel.
- As we can see that enhancement ratio is about 1.75-1.76 in case of 40° & in case of 20° its about 1.62-1.64. In case of opposite corrugated channel it is found to be around 1.4 - 1.6. Thus from the above results it is clear that to get better performance from the corrugated heat exchanger the inclination from the horizontal axis should be more beneficial.

7 FUTURE SCOPES

In the present work I did a two dimensional analysis by using ANSYS and validation of the results generated by this ANSYS with the existing results. The works also have some future recommendations.

- Three dimensional numerical study of the work.
- More different type geometry could be analysis.
- Experimental analysis with opposite corrugated channel should be analysis.
- Wave type geometry could be also analysis in plate type heat exchanger

REFERENCE

- Corrugated tube in a double pipe heat exchanger”, **ME Thesis, Gujarat Technological University, Gujarat, India, 2016.**
- Zimparov V.**, “Enhancement of heat transfer by combination of three start spirally corrugated tubes with a twisted tape”, International Journal of Heat Mass Transfer, 2001, 44, 551-574.

3. **Zimparov V.**, "Enhancement of heat transfer by a combination of a single start spirally corrugated tubes with a twisted tape", *Journal of Experimental Thermodynamic Fluid Science*, 2002, 25, 535-546
4. **Zimparov V.**, "Prediction of friction factors and heat transfer coefficients for turbulent flow in corrugated tubes combined with twisted tape inserts. Part 1: friction factors", *International Journal of Heat Mass Transfer*, 2004, 47, 589-599
5. **Zimparov V.**, "Prediction of friction factors and heat transfer coefficients for turbulent flow in corrugated tubes combined with twisted tape inserts. Part 2: heat transfer coefficient", *International Journal of Heat Mass Transfer*, 2004, 47, 385-393.
6. **Rainieri S., and Pagliarini G.**, "Convective heat transfer to temperature dependent property fluids in the entry region of corrugated tubes", *International Journal of Heat Mass Transfer*, 2002, 45, 4525-4536.
7. **Laohalertdecha S., and Wongwiset S.**, "The effects of corrugation pitch on the condensation heat transfer coefficient and pressure drop of R-134a inside horizontal corrugated tube", *International Journal of Heat Mass Transfer*, 2010, 53, 2924-2931.
8. **Laohalertdecha S., and Wongwiset S.**, "An experimental study into the evaporation heat transfer and flow characteristics of R-134a refrigerant flowing through corrugated tubes", *International Journal of Refrigeration*, 2011, 34, 280-291.
9. **Barba A., Rainieri S., and Spiga M.**, "Heat transfer enhancement in a corrugated tube", *International Communication on Heat Mass Transfer*, 2002, 29, 313-322.
10. **Nozu H., Honda H., and Nakata,** "Condensation of refrigerants CFC 11 and CFC 113 in the annulus of a double tube coil with an enhanced inner tube", *Journal of Experimental Thermodynamic Fluid Science*, 1995, 11,40-51.
11. **Nozu S, Honda H, and Nishida S,** "Condensation of a zeotropic CFC 114 - CFC 113 refrigerant mixture in the annulus of a double-tube coil with an enhanced inner tube", *Journal of Experimental Thermodynamic Fluid Science*, 1995, 11, 364-371.
12. **Laohalertdecha S., and Wongwiset S.**, "Condensation heat transfer and flow characteristics of R-134a flowing through corrugated tubes", *International Journal of Heat Mass Transfer*, 2011, 54, 2673-2682.
13. **Vicente P.G., Garcia A., and Viedma A.**, "Experimental investigation on heat transfer and friction factor characteristics of spirally corrugated tubes in turbulent flow at different Prandtl number", *International Journal of Heat Mass Transfer*, 2004, 47, 671-681.
14. **Dong Y., Huixiong L., and Tingkuan, C.**, "Pressure drop, heat transfer and performance of single phase turbulent flow in spirally corrugated tubes", *Journal of Experimental Thermodynamic Fluid Science*, 2001,24, 131-138.
15. **Targanski T., and Cieslinski J.T.**, "Evaporation of R407C/oil mixtures inside corrugated and micro -fin tubes", *Applied Thermodynamics Engineering*, 2007, 27, 2226-2232.
16. **Ray S., Eder R., Wittenschlaeger T.M., and Jaeger I.**, "Numerical and experimental investigation of heat transfer augmentation potential of wire loop structures", *International Journal of Thermal Sciences*, 2015, 90, 370-384.
17. **Sheikholeslami M., Bandpy M.G., and Domiriganji D.**, "Review of heat transfer enhancement methods: Focus on passive methods using swirl flow devices", *Renewable and Sustainable Energy Reviews*, 2015, 49, 444-469.
18. **Guo J., Yan Y., Liu W., Jiang F., and Fan A.**, "Enhancement of laminar convective heat transfer relying on excitation of transverse secondary swirl flow", *International Journal of Thermal Sciences*, 2015, 87, 199-206.
19. **Mogaji T.S., Kanizawa F.T., Filho E.P.B., and Ribatski G.**, "Experimental study of the effect of twisted tape inserts on flow boiling heat transfer enhancement and pressure drop penalty", *International Journal of Refrigeration*, 2013, 36, 504-515.
20. **Bhuiya M.M.K., Sayem A.S.M., Islam M., Chowdhury M.S.U., and Shahabuddin M.**, "Performance assessment in a heat exchanger tube fitted with double counter twisted tape inserts", *International Communications in Heat Mass Transfer*, 2014, 50, 25-33.
21. **Huang W.C., Chen C.A., Shen C., and San J.Y.**, "Effects of characteristic parameter on heat transfer enhancement of repeated ring type ribs in circular tubes", *Experimental Thermal and Fluid Science*, 2015, 68, 371-380.
22. **Guo J., Yan Y., Liu W., Jiang F., and Fan A.**, "Enhancement of laminar convective heat transfer relying on excitation of transverse secondary swirl flow", *International Journal of Thermal Sciences*, 2015, 87, 199-206.

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A EXAMINATION DISSERTATION ON VAPOR COMBINATION COOLING METHOD OPERATIONAL ON LIBR/H₂O

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Abstract - For the rapid growth and development of the countries there has been continues demand of energies. These energies are generally meet with burning of fossil fuels which has led to global warming. So for meeting the huge demand of Refrigeration and air conditioning at large scale Vapor absorption system working on Lithium Bromide and water is used. Solar energy and Waste heat from industries are the most favorable options because these sources do not degrade the environment anyway. The research work done on VAS working on LiBr/H₂O for cooling purpose is based on First and Second Law of thermodynamics has been done in context of one of its major component Generator. The researchers have tried to find out the optimum COP of the system varying the different parameters affecting its performance. They found that Generator temperature has highest influence on the COP of the system. The research work has been categorized into two groups: Energy analysis and Energy analysis. A brief description of literature reviews and their findings has been tabulated under.

Keyword: Refrigeration, Energy, Generator, solar energy, COP.

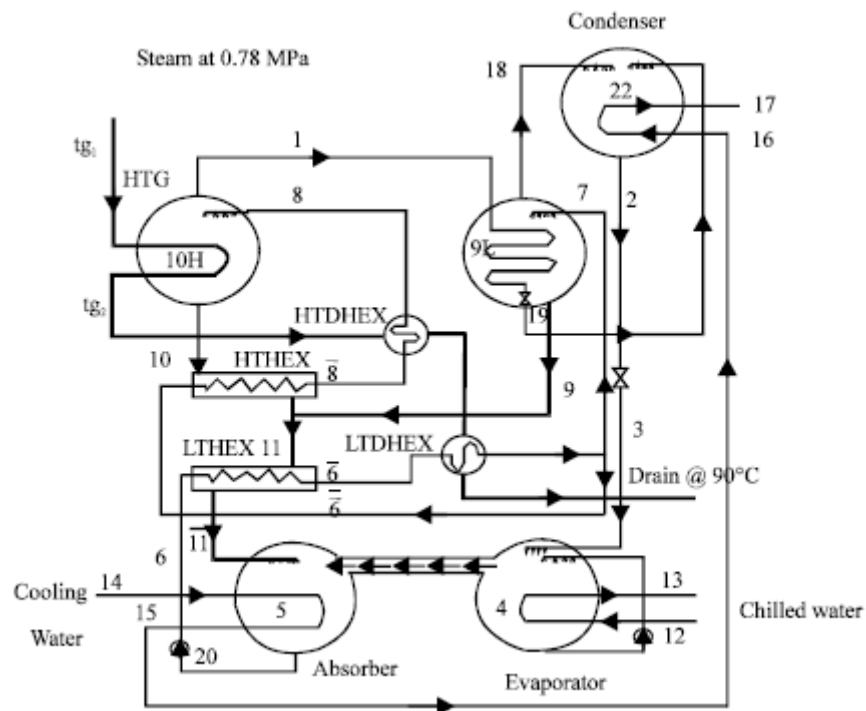
1 INTRODUCTION

VAS is a substitute to vapor compression cycle. There are two major working pairs on which cycle works they are namely NH₃/H₂O and LiBr/H₂O. Here in this paper work on LiBr/H₂O is done. A vapor absorption refrigeration system working on LiBr/H₂O, H₂O is used as refrigerant and a solution of lithium bromide in water is used as absorbent. Since water is used as refrigerant, using these systems it is not possible to provide refrigeration at below zero temperatures. Hence it is used only in applications requiring refrige C. Since these systems run on low-grade thermal energy they are

Preferred when low-grade energy such as waste heat or solar energy is available. Absorption systems use natural refrigerants such as water and lithium bromide. They are environment friendly unlike Vapor compression cycle.

An extensive literature review has been done on the vapor absorption refrigeration system working on LiBr/H₂O as a working pair. There has been continues effort made in the various papers for the better design and working of the VAS components so that optimum efficiency of the cycle working on this working pair can be achieved. This literature review provides clear insight of the studies and development made in the field of VAS working on LiBr and water. There are numerous papers on energy and energy analysis. Energy analysis tells the total losses associated with the components. Energy helps in finding the work potential of the component. It indicates the irreversibility associated within the components. In order to understand the various losses in the major components of VAS many approaches has been made with help of energy analysis, performance of the major components has been analyzed using concept of energy loss and major losses are found to occurs in the Absorber and Generator. Absorber and Generator are more sensitive to variation in the temperature. Considering the fact an optimum

Generator temperature can be found out which will produce optimum COP of the cycle



1.1 Energy analysis of VAS and its effect on Generator

The basic thermodynamic analysis is the Energy analysis for any system. Energy analysis helps to find out the major loss incurring component. In order to reduce those losses many attempts have been made so that COP of the cycle can be increased. Energy from external source is given in Generator so generator temperature is found to play an important role in COP of the cycle. The literature reviews incorporating energy analysis and its effect has been discussed below.

A. Bell et al (1) they developed an experimental absorption cooling system working on LiBr/H₂O, driven by solar energy. All the components of the VAS were placed in evacuated glass cylinders to observe all the processes. They found the thermodynamic performance of the system incorporating energy balance for all the components. They arrived to the result that the performance of the cycle depends on generator temperature and so there exist an optimum generator temperature at which COP is Maximum. They also concluded that when the system was operated at low condenser and low absorber temperatures a reliable COP is obtained at a generator temperature as low as 68°C. Rivera et al (1999) Experimental evaluation of a single-stage heat transformer (SSHT) operating with the water/Carrol mixture. The experimental work was done using the water and Carrol mixture (LiBr and ethylene glycol [(CH₂OH)₂]) in the ratio 1:4.5 by weight. Flow ratios, gross temperature lift (GTL), useful heat, COP was plotted Vs temperature and concentration. The water/Carrol mixture has higher solubility than water and lithium bromide. High experimental values are obtained for the gross temperature lift, it is a preferred mixture.

Shun-Fu Lee and S. A. Sheriff (2) have done the thermodynamic analysis of a lithium bromide/water absorption system for cooling and heating applications. Performance and simulations have been carried out. The effect of only heat source temperature was evaluated on COP and Exergetic efficiency. In the parametric analysis of the absorption system for cooling with varying operating conditions, it was clear that a low cooling water temperature yields both a higher cooling COP and

higher exergetic efficiency as expected. Increasing the heat source temperature can improve the COP of the system, but as the heat source temperature increases beyond a certain limit COP of the system decreases. This is the negative effect of increasing the heat source temperature.

M.B Arun et al (3) they did the Performance comparison of double effect parallel flow and series flow LiBr and H₂O absorption systems. Their analysis was based on the concept of equilibrium temperature at low generator pressure. COP and its sensitivity to operating conditions was compared with those of series flow cycle. COP of parallel flow system is more sensitive to evaporator temperature variation and less sensitive to condenser and absorber External heat input at the LP generator has greater impact on the parallel flow system than on the series flow.

G.A Florides et al (4) done the modeling and simulation of solar absorption cooling system is done. The system is modeled with TRNSYS simulation program. System optimization is carried out in order to select the appropriate type of collector, optimum size of storage tank, optimum collector slope and area. The collector area is determined by performing the life cycle analysis of the system. Although all the findings are done for a particular conditions but the similar result can be obtained with higher solar availability.

Y. Kaita (5) Simulation results of triple-effect absorption cycles was analyzed. Simulation analysis was done for three kinds of triple-effect absorption cycles they are: parallel flow, series flow, reverse

G.A Florides (6) they designed and constructed a setup of a LiBr and absorption machine. The necessary heat and mass transfer equations and appropriate equations describing the properties of the working fluids are specified. These equations are employed in computer program, and a sensitivity analysis is performed. The analysis shows for greater difference between the absorber LiBr inlet and outlet percentage ratio, the smaller will be mass circulation in the absorber. COP of the unit is lowered when the generator temperature is increased resulting in increases in the generator pressure.

Antonio De Lucas et al (7) Experimental investigation of a vapor absorption refrigeration system is done. The Performance evaluation and simulation of a new absorbent for an absorption refrigeration system was done. New absorbent used is a mixture of lithium bromide and potassium formate (HCO₂K) in the ratio of 2:1 w/w. They concluded that the energy requirement in the generator was less. The waste heat at temperature of 328K is sufficient to boil the diluted absorbent mixture. Using a simulation program COP, maximum pressure and maximum temperature of each cycle were calculated. The sensitivity analysis of each component was also done. The results show that parallel flow cycle had maximum COP. The maximum pressure and temperature in the reverse flow cycle are lower than other cycles. **G.A Florides (2003)** they designed and constructed a setup of a LiBr and absorption machine. The necessary heat and mass transfer equations and appropriate equations describing the properties of the working fluids are specified. These equations are employed in computer program, and a sensitivity analysis is performed. The analysis shows for greater difference between the absorber LiBr inlet and outlet percentage ratio, the smaller will be mass circulation in the absorber. COP of the unit is lowered when the generator temperature is increased resulting in increases in the generator pressure.

Antonio De Lucas et al (8) Experimental investigation of a vapor absorption refrigeration system is done. The Performance evaluation and simulation of a new absorbent for an absorption refrigeration system was done. New absorbent used is a mixture of lithium bromide and potassium formate (HCO₂K) in the ratio of 2:1 w/w.

They concluded that the energy requirement in the generator was less. The waste heat at temperature of 328K is sufficient to boil the diluted absorbent mixture.

Marina Donate et al (9) thermodynamic evaluation of new absorbent mixtures of LiBr and organic salts of sodium and potassium (formate, acetates and lactates) for absorption refrigeration machines was done. The objective was to overcome the limitations of LiBr, improve its characteristics and increase the efficiency of the cycle. The properties such as Density, viscosity, enthalpies of dilution, solubility and vapor pressure are the data for the proposed mixtures have been measured. A Simulation program was developed to evaluate temperatures, heats exchanged in the different sections and the efficiency of the cycle. **Omer Kaynakli et al (10)** Theoretical study on the effect of operating conditions on performance of absorption refrigeration system was completed. With the help of first and second law of thermodynamics analyzed the performance of a single stage lithium bromide and water absorption refrigeration system on varying certain working parameters. Analysis on LiBr and water absorption refrigeration cycle is performed. The influences of operating temperature and effectiveness of heat exchanger on the thermal loads of components, COP and efficiency ratio are investigated. The thermal loads on the absorber and generator decrease, as the generator and evaporator temperature Increases .The decrease of the generator thermal load increases the COP.

Francis A Gyenim et al (11) They Designed and done the Experimental testing of the performance of an outdoor LiBr and H₂O thermal absorption cooling system. A domestic scale prototype experimental solar cooling system was developed based on a LiBr/H₂O absorption system and tested. The system consisted of a 12m² vacuum tube solar collector, 4.5 kW LiBr/ H₂O absorption chiller, a 1000 Liter cold storage tank and 6 kW fan coil. The system performance as well as the performances of the individual components of the system was evaluated based on the physical measurements of the daily solar radiation, ambient temperature, inlet and outlet fluid temperatures, mass flow rates and electrical consumption by component. Experimental results prove the feasibility of the new concept of cold store at this scale, with chilled water temperatures as low as 7.4°C demonstrating its potential application in cooling domestic scale buildings.

L. Garousi et al (12) they did the Analysis of crystallization risk in double effect absorption refrigeration systems. A computational model was developed using EES software to study and compare the effects of operating parameters on crystallization phenomena in three classes of double effect lithium bromide and water VAS they are: series parallel and reverse parallel with identical refrigeration capacities. They concluded that the range of operating conditions without crystallization risks in the parallel and the reverse parallel configurations is wider than those of the series flow system. In other words, series flow systems are more prone to crystallization. It is found that, in series flow systems, the possibility of crystallization increases with increasing THPG, TEVA and effectiveness of the LTHE and decreasing TCOND.

Saed Sedigh et al (13) Thermodynamic analysis of triple effect absorption refrigeration system is done. The cycle was analyzed based on the first and second laws of thermodynamics. The Triple effect cycles have not yet been utilized in industries and the research continues on these cycles. In this paper, a triple effect parallel flow LiBr and water absorption chiller is thermodynamically analyzed. It is seen that with the increase of the temperatures of evaporator, condenser, absorber and HTG, COP of the system increases and with the decrease of condenser temperature, COP decreases. The triple effect LiBr absorption chiller has a higher

COP compared to the single and double effect chillers.

Zeyu Li, Jinping Liu (15) this paper mainly deals with the appropriate heat load ratio of generator of air cooled LiBr and H₂O double effect absorption chiller. Four type systems named: series, pre-parallel, rear parallel and reverse parallel flow configuration were considered. The corresponding parametric model was developed to analyze the comprehensive effect of heat load ratio of generator on COP and risk of crystallization. The result shows that COP goes up linearly with the decrease of heat load ratio of generator. The risk of crystallization also rises slowly at first but increases fast gradually.

A.A.V. Ochoa et al (16) Dynamic study of a single effect absorption chiller using the pair LiBr and H₂O. A mathematical model was developed based on conservation of mass, energy, and Species, which considers the correlations of the convective coefficients of absorption refrigeration process. The implementation of this mathematical model was built on the Mat Lab platform. The model has the ability to simulate and predict the behavior of internal and external parameters such as temperature, concentration and pressures when these are subjected to disruptions in the power supply and thermal load. The model makes it possible to understand and deduce other information about its behavior. Like increasing the temperature of the hot water in the chiller not necessarily lead to, increase in the COP of the system.

2 ENERGY ANALYSIS OF VAS AND ITS EFFECT ON GENERATOR

Energy analysis approach has been adopted in many research papers. It helps in finding the work potential of the components of VAS. It measures the amount of irreversibility occurring in the components. Energy analysis had been done to major components such as absorber and generator. It is found that major irreversibility occurs in the absorber and the generator. Generator is most sensitive to change in the temperature. The design and optimization of an absorption refrigeration system operated by solar energy. The effect of variation of temperatures on different component of VAS for a given Refrigeration capacity has been studied. Flow ratios, gross temperature lift (GTL), useful heat, COP was plotted Vs temperature and concentration. Energy analysis of solar assisted double effect absorption refrigeration system. Detailed study of energy variation in the solar assisted absorption system is analyzed. Cycle parameters are analyzed on the basis of first law and second law of thermodynamics. The quality of the devices decline the availability of the device varies linearly. The availability across Evaporator, Condenser and Absorber changes the cycle condition and produces a corresponding change in the generator availability. Exergy analysis of a single effect lithium bromide and water absorption refrigeration system was done. They calculated the Energy losses in the system components. The effect of heat source temperature on COP and Exegetic efficiency was computed. They concluded that the cooling and heating COP of the system increases slightly when increasing the heat source temperature but the Exegetic efficiency of the system decreases, when the heat source temperature increase for both cooling and heating applications. The condenser and Evaporator heat loads and energy losses are less than those of generator and absorber. This is due to heat of mixing in the solution which is not present in the pure fluid. Second law-based thermodynamic analysis of water-lithium bromide absorption refrigeration system. Calculated single effect and series flow double effect vapor absorption systems using energy analysis approach. The effect of different parameters such as generator temperature, absorber temperature, condenser temperature, solution circulation ratio and solution concentration etc

had been investigated by these researchers on COP. The results show that COP of the cycle increases with increasing generator and Evaporator temperatures, but decreases when condenser and absorber temperature increases. To simulate the refrigeration system by using a computer, a new set of computationally efficient Formulations of thermodynamic properties of LiBr and water solution developed is used. The exergy analysis is carried out for each component of the system. All exergy losses that exist in double Effect LiBr and water absorption system are calculated. In addition to this COP and the exergetic efficiency of the system are also calculated. Result shows that performance of the system increases with increase in low pressure Generator (LPG) temperature, but decreases with increasing high pressure generator (HPG) temperature. The maximum exergy loss occurs in absorber and in the HPG, which makes the absorber and HPG the important components of the double effect refrigeration system.

Analysis of the behavior of an experimental absorption heat transformer for water purification for different mass flux rates in the Generator. The first and second laws of thermodynamics have been used to analyze the performance of an experimental absorption heat transformer for water purification. Irreversibility's, COP and exergy coefficients of performance (ECOP) were determined as function of Mass flow of hot water supplied to the generator and as function of the overall thermal specific energy consumption (OSTEC) parameter defined in this paper. The results showed that the system irreversibility increase meanwhile the COP and the ECOP decrease with an increase of the mass flow of hot water supplied to the generator. It was also shown that the system performance is better when the production of purified water increases due to the increment of the heat recycled to the generator and evaporator

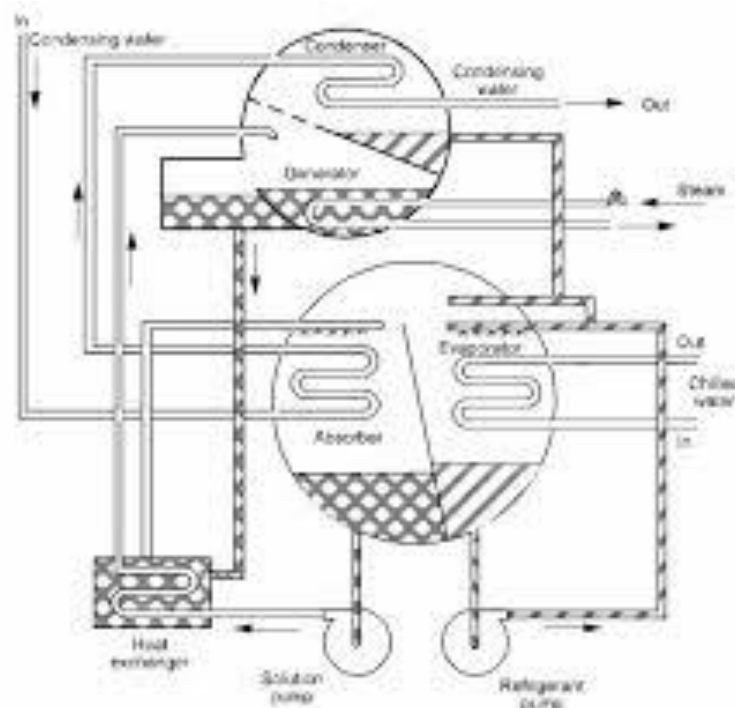


Fig. 1 Vapour absorption refrigeration system

Table -1 Summary of Literature Review on Energy analysis

Alizadeh, S.Bahar, F.Geoola	Design and optimization of an absorption refrigeration system operated by solar energy.	1997	The effect of variation of temperatures on different component of VAS for a given Refrigeration capacity.	Higher generator temperature causes high cooling effect for smaller surface area.
Ravi kumar, T.S., Suganthi L,	Exergy analysis of solar assisted double effect absorption refrigeration system	1998	Detailed study of exergy variation in the solar assisted absorption system. Cycle parameters are analyzed on the basis of basis first law and second law of thermodynamics.	When quality of device declines, the availability varies linearly. The result shows the effect of maximum temperature of solar collectors on the system
Arzu Sencana, Kemal A. Yakuta, Soteris A. Kalogiro	Exergy analysis LiBr/H ₂ O VAS was done for cooling and heating application. The exergy loss, Enthalpy, Entropy was calculated for each component of the system.	2005	Calculated the Exergy losses in the system components. The effect of heat source temperature on COP and Exergetic efficiency was computed.	COP increases slightly when increasing the heat source temperature but the Exergetic efficiency of the decreases, when the heat source temperature increase for both cooling and heating
Muhsin Kilic, Omer Kaynakli	Second law-based thermodynamic analysis of water- lithium bromide absorption refrigeration system	2007	The effect of different parameters such as generator temperature, absorber temperature,	COP of the cycle increases with increasing generator and Evaporator temperatures,
Ribah Gomri, Riad Hakimi.	Second law analysis of double effect for VAS. The system consists of a second effect generator including two solution heat exchangers between the absorber and two generators.	2008	To simulate the refrigeration system by using a computer, a new set of computationally efficient Formulations of thermodynamic properties of LiBr and water solution developed is used.	Performance of the system increases with increase in low pressure Generator temperature, but decreases with increasing high pressure and TG.
Armando Huicochea , Wilfrido Rivera , Hiram Martinez , Javier Siqueiros, Erasmio Cadenas	Analysis of the behavior of an experimental absorption heat transformer for water purification for different mass flux rates in the Generator.	2013	Analyze the performance of an experimental absorption heat transformer for water purification. Irreversibility's, COP and exergy coefficients of performance (ECOP)	The irreversibility's Increases meanwhile the COP and the ECOP decrease with an increase of the mass flow of hot water supplied to the

T. Avanesian M. Ameri	Energy, exergy and economic analysis of single and double effect LiBr-H ₂ O absorption chillers.	2014	This absorption systems under different operating and climatic conditions are analyzed and compared, the effect of considering the chemical exergy of the LiBr and H ₂ O solution on the second law analysis	Energy efficiency increases with increasing the Generator or ambient air temperature decreases with increasing the evaporator temperature and changes slightly with relative
Omer Kaynakli, Kenan Saka Faruk Kaynakli	Energy and exergy analysis of a double effect absorption refrigeration system based on different heat sources.	2015	The VAS runs on various heat sources such as hot water, hot air and steam via High Pressure Generator (HPG). A parametric study done to find the effect on heat capacity and energy destruction of the HPG, (COP) of the system, and mass	With the increase of heat sources temperature, the energy destruction also increases. The energy destruction of the HPG increases when the condenser and the absorber temperature
Akhilesh Arora, Manoj Dixit, S. C. Kaushik.	Computation of optimum parameters of a half effect LiBr and H ₂ O absorption refrigeration system.	2016	The effect of low and high generator temperature, evaporator temperature, effectiveness of solution heat exchangers and difference between low and high pressure generator temperatures have been considered in	There exists a specific generator temperature below which a half effect system ceases to work. The COP and exergetic efficiency are zero corresponding to this value.
R. Maryami, A.A. Dehghan	An exergy based comparative study was done on LiBr/H ₂ O Absorption refrigeration systems from half effect to triple effect.	2017	The exergy analysis of all system components was done. The five classes are: half	The COP and exergetic efficiency both increases from the half, single,

3 METHODOLOGIES

In cooling applications, different types of sorption systems can be employed. Among them one is the adsorption cycles. Adsorption refrigeration is a thermal driven refrigeration system, which can be powered by solar energy as well as waste heat. The use of thermal driven systems helps to reduce the carbon dioxide emission from combustion of fossil fuels in power plants. Another advantage for adsorption systems compared with conventional vapor compression systems is the working fluid used. Adsorption systems mainly use a natural working fluid such as water and ammonia, which have zero ozone depletion potential.

Adsorption is the process by which molecules of a fluid are fixed on the walls of a solid material via connections of the Vander Waals type. The general principle of the basic adsorption refrigeration cycle is given in fig.1. The refrigeration circuit usually consists of three main components; a solid adsorbent bed, a condenser and an evaporator. Some system employ isolating valves between the various components and some utilize expansion valves between the condenser and the evaporator. The adsorption refrigeration cycle relies mainly on the natural affinity of

the adsorbent bed (when at low temperature) to attract the refrigerant vapor from the evaporator thus creating a lower pressure in the evaporator. Once the adsorbent bed is close to the saturation point, the valve between the evaporator and the absorber is closed and heat is applied to adsorbent bed, thus releasing the refrigerant vapor which then gets collected and condensed in the condenser before returning to the evaporator. Once this cycle is completed the heat on the adsorbent bed is removed and in some cases forced cooling is introduced onto the adsorbent until the adsorption conditions are established then the valve between the evaporator and the adsorbent is reopened. In the present study, we have designed, fabricated and tested a single stage adsorption chiller.

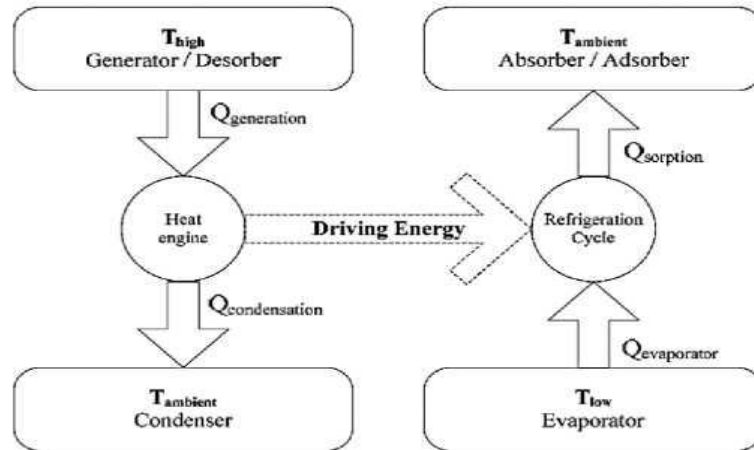
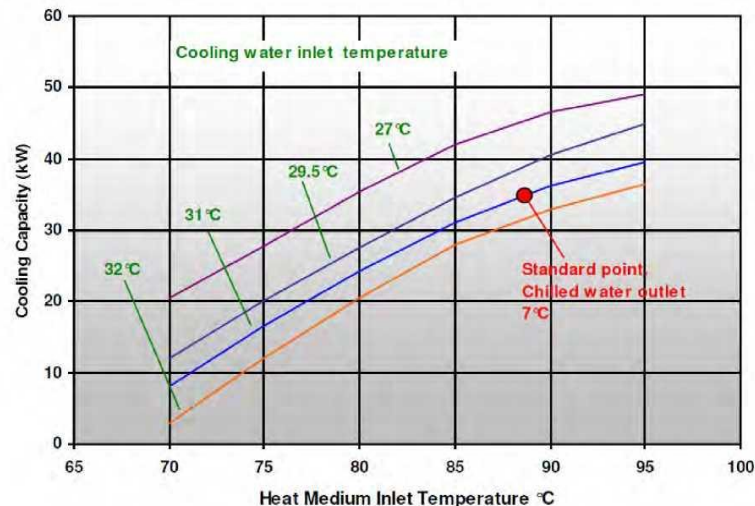


Fig. 2. Basic adsorption cycle

3.1 Absorption Chiller

The Yazaki WFC-SC10, 35kW chiller with a LiBr-water working pair was used for both the Net care Bhabha College and The Vodacom World installations. The chiller’s performance characteristics are given in Fig below



The chiller used in these case studies has a nominal capacity of 35kW, with the specifications given in table. The absorption cycle is driven by hot water at 70-95°C. Cooling of the condenser and absorber is achieved through use of a cooling tower. Crystallization is prevented in the generator by utilizing a solution pump and gravity drain-back system. The chilled and hot water outlet temperature control is carried out by a microprocessor that controls a 3-way valve and a separately supplied hot water temperature supply pump. If the hot water supply temperature exceeds 95°C the chiller will shut down and require manual reset

Generator:	
Inlet Temperature	88°C
Outlet Temperature	83°C
Flow Rate	1.52l/s
Condenser and Absorber:	
Inlet Temperature	31°C
Outlet Temperature	35°C
Flow Rate	5.11/s
Evaporator:	
Inlet Temperature	12.5°C
Outlet Temperature	7°C
Flow Rate	2.41/s
Electrical Energy Consumption	210W

4 RESULTS

4.1 Absorption chiller performance

According to the design information provided by Voltas Technologies, this system was designed with the intention that it will provide the amount of cooling energy provided in Figure 6.2 The chiller was supposed to be switched on at 9:00 and provide an hourly average of 20% or 7kW of its nominal capacity; this would increase to 80% or 28kW at 10:00, and then reach 100% or 35kW at 12:00. It would continue providing 35kW of energy for five hours until 17:00, when 28kW for two hours until 19:00 when it would then provide 7kW for an hour before being switched off. The absorption chiller is considered as a black box, a component that simply outputs chilled water when supplied with hot water. These design values were arbitrarily chosen, as the amount of the building cooling load that the absorption cooling system was supposed to cover

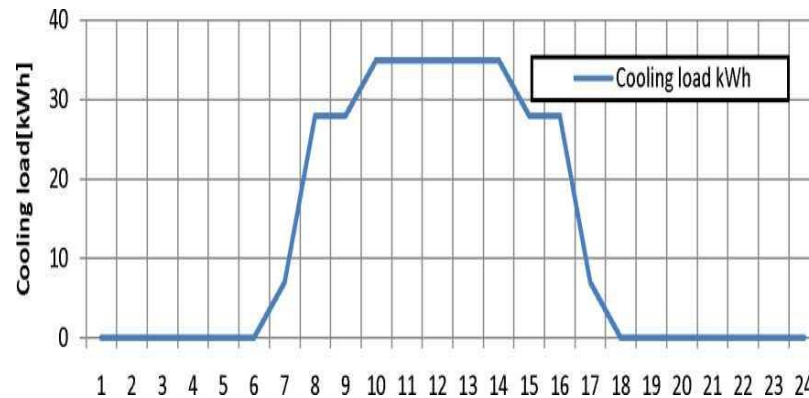
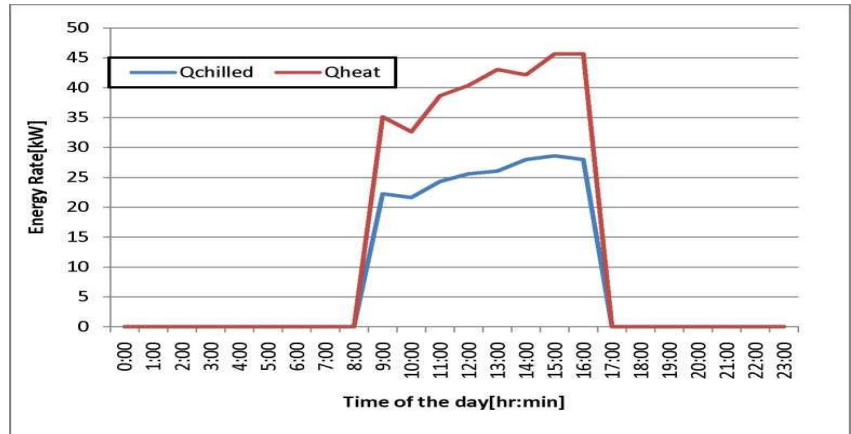


Fig. 3 Time of the (hr; min) Chiller energy distribution: Summary of Energy Produced by the Chiller in July 2019

Table 2 for Summary of Energy Produced by the Chiller in July 2019

Energy produced by YAZAKI chiller between 01/11/2010 and 4/12/2010	4.097 MWh
Extrapolated Energy for the year	43,983 MWh
Maximum power reached (kW)	31 kW
Average power	20.5 kW
Lowest chilled supplied temperature	6.6 °C
Average temperature of chilled supplied water	8.4 °C



Cop= heat absorbed / work done
COP= Q_h / W

Using equations (6.1) and (6.2) and the energy distributions shown in Figure 6.4, we get the distribution shown in Figure 6.5. The COP of the chiller has an average value of 0.63, which is comparable to the manufacturer's value of 0.7. The solar coefficient of performance has an average

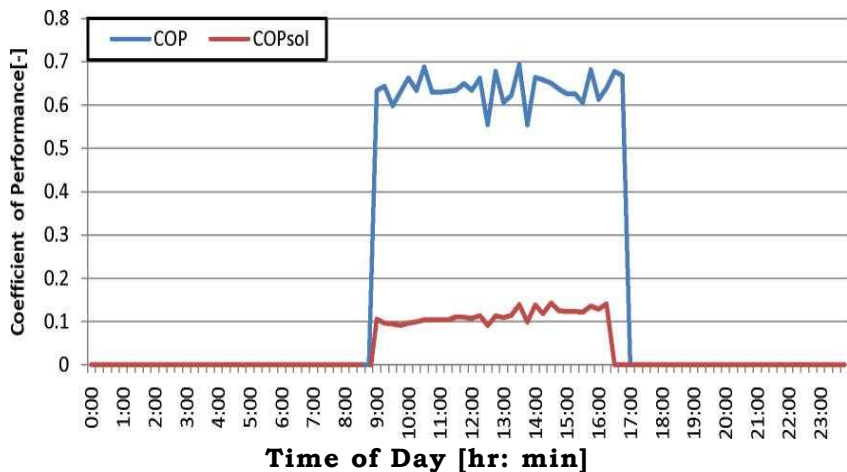


Fig. 4 distribution of chiller

4.2 AGNOS College of technology Site Solutions Innovation Center

The second case study is located at the Vodacom Campus in Bhopal. This is an autonomous solar thermal heating and cooling system to maintain room temperature at comfort level around the year. The Vodacom Campus is located at a latitude of 25°58"14"S and a longitude of 28°7'37". This area receives on average 3128.3 hours of sunshine a year. The key weather parameters for Johannesburg are presented in Table 6.3.

Table 3: Bhopal Climatic Data

Variable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Insolation, kWh/m ² /day	6.70	6.10	5.46	4.77	4.21	3.80	4.08	4.78	5.69	5.98	6.29	6.62
Clearness Index	0.57	0.55	0.56	0.59	0.64	0.65	0.66	0.65	0.64	0.58	0.55	0.56
Temperature °C	22.23	22.11	21.1	18.66	15.3	11.6	11.5	14.61	18.5	20.20	20.9	21.4
Wind speed, m/s	3.62	3.50	3.37	3.54	3.74	4.04	4.18	4.74	4.95	4.73	4.31	3.77

5 CONCLUSIONS

An extensive literature review has been done on LiBr and H₂O vapor absorption system. The whole study has been divided into two broad areas as mentioned above to understand the effect of different parameters on its working. The detail understanding of the entire component is required in order to increase the COP of the system and to reduce the irreversibility associated with it. The energy and energy analysis was done for the whole cycle. It was found that the generator was more sensitive to the COP of the system. There is an optimum generator temperature at which the COP and energy efficiency of VAS is Maximum. The result shows that the COP of the cycle increases as the generator temperature increases but to a certain limit afterwards it tends to decrease. In order to improve the performance of the system the best design of the components are necessary. This review paper will be very much helpful for the further work on the VAS working on the LiBr and Water.

REFERENCE

1. **Bell, I.A., Al-Daini, A.J., Al-Ali, Habib., Abdel-Gayed, R.G., and Duckers:** The design of an evaporator, absorber and thermodynamic analysis of a vapour absorption chiller driven by solar energy, World Renewable Energy Congress, (1996), pp. 657-660.
2. **W. Riveraa,, R. J. Romero, R. Best, C. L. heard :** Experimental evaluation of a single-stage heat transformer operating with the water/Carrol mixture. Energy 24 (1999) 317-326.
3. **Lee, S.F., Sherif, S.A:** Thermodynamic analysis of a lithium bromide/water absorption system for cooling and heating applications, International Journal of energy Research, Vol.25, (2000), pp.1019-1031.
4. **M.B Arun, M.P Maiya, S. Srinivasa Murthy:** Performance comparison of double effect parallel flow and series flow LiBr and H₂O absorption systems, applied thermal engineering (2001)1273-1279.
5. **G.A Florides S. A. Kalogiru, S. A. Tassou, L. C. Wrobel:** Modeling and simulation of an absorption solar cooling system. Applied thermal engineering 21(2002) 1273-1279.
6. **Y. Kaita:** Simulation results of triple-effect absorption cycles, International Journal of Refrigeration 25 (2002) 999-1007.
7. **G.A. Florides, S.A. Kalogirou, S.A. Tassou B, L.C. Wrobel:** Design and construction of a LiBr-water absorption machine, Energy Conversion and Management 44 (2003) 2483-2508.
8. **Antonio De Lucas, Marine Donate, Carolina Molero.:** Experimental investigation of a vapor absorption refrigeration system, International Journal of Refrigeration, Vol. 27, (2004), pp.10-16.
9. **M arina Do Nate, Lui Ro Driguez, Antonio De Lucas, J uan F. Ro Dnguez:** Thermo dyn ami c evaluation of new abs orb ent mixtures of lithium bromide and organic salts for absorption refrigeration machines. International Journal of Refrigeration 29 (2006) 30-35.
10. **Omer Kaynakli, Muhsin Kilic;** Theoretical study on the effect of operating conditions on performance of absorption refrigeration system, Energy Conversion and Management, Vol. 48, (2007), pp. 599-607.
11. **Francis Agyenim, Ian Knight, Michael Rhodes:** Design and experimental testing of the performance of an outdoor LiBr/H₂O solar thermal absorption cooling system with a cold store, Solar Energy 84 (2010) 735-744.
12. **Garousi Farshi, L., Mahmoudi, S. M. S., Rosen:** Analysis of crystallization risk in double effect absorption refrigeration systems, Applied Thermal Engineering, Vol. 31(10), (2011) pp.1712-1717.
13. **Saeed. Sedigh, Hamid. Saffari:** Thermodynamic analysis of triple effect absorption refrigeration systems, International Journal of Energy & Technology 4 (7) (2012) 1-8.
14. **Zeyu Li, Jinping Liu:** Appropriate heat load ratio of generator for different types of air cooled lithium bromide-water double effect absorption chiller.(2015)pp.264-273.
15. **A.A.V. Ochoa, J.C.C. Dutra, J.R.G. Henrfquez , C.A.C. dos Santos:** Dynamic study of a single effect absorption chiller using the pair LiBr/H₂O, Energy Conversion and Management 108 (2016) 30-42.
16. **Zeyu Li, Liming Liu, Jinping Liu:** Variation and design criterion of heat load ratio of generator for air cooled lithium bromide-water double effect absorption, Applied Thermal Engineering (2015).
17. **Salem M. Osta-Omar and Christopher Micallef:** Determination of Concentration of the Aqueous LiBr Solution in a Vapor Absorption Refrigeration System by Measurement of Electrical

Conductivity and Temperature (2017).

18. **Alizadeh, S. Bahar, F. Geoola**,: Design and optimization of an absorption refrigeration system operated by solar energy, *Solar Energy*, Vol. 22, (1997), pp. 149-154.
19. **Ravi kumar, T.S., Suganthi, L., and Anand, A. Samuel**; Exergy analysis of solar assisted double effect absorption refrigeration system, *Renewable Energy*, Vol. 14(1-4), (1998), pp. 55-59.
20. **Sencan, A., Yakut, K.A., Kalogirou, S.A**; Exergy analysis of lithium bromide/water absorption systems, *Renewable Energy*, Vol. 30, (2005), pp. 645-657.
21. **Kilic, M. and Kaynakli**,: Second law-based thermodynamic analysis of water- lithium bromide absorption refrigeration system, *Energy*, Vol.32, (2007), pp. 1505-1512.
22. **Gomri, R., Hakimi**,: Second law analysis of double effect vapour absorption cooler system, *Energy Conversion and Management*, Vol. 49(11), (2008), pp. 3343-3348.
23. **Armando Huicochea, Wilfrido Rivera, Hiram Martinez, Javier Siqueiros, Erasmo Cadenas**: Analysis of the behavior of an experimental absorption heat transformer for water purification for different mass flux rates in the generator, *Applied Thermal Engineering* 52 (2013) 38-45.
24. **T. Avanesian, M. Ameri**: Energy, exergy, and economic analysis of single and double effect LiBr-H₂O absorption chillers, *Energy and Buildings* (2014).
25. **Omer Kaynakli, Kenan Saka, Faruk Kaynakli**: Energy and exergy analysis of a double effect absorption refrigeration system based on different heat sources, *Energy Conversion and Management* 106 (2015) 21-30.
26. **Akhilesh Arora, Manoj Dixit, S. C. Kaushik**.: Computation of optimum parameters of a half effect water-lithium bromide vapour absorption refrigeration system, *JTEN* (2016).
27. **R. Maryami, A. A. Dehghan**: An exergy based comparative study between LiBr/water absorption refrigeration systems from half effect to triple effect. (2017) 103-123.

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AUTONOMIC COMPUTING: THREATS AND SECURITY ISSUES

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Abstract - Autonomic Computing frameworks are the self overseeing frameworks as indicated by the objectives outlined by the administrator of the system. Incorporation of new elements in framework supported by Autonomic Computing happens as simple as in human body a new cell recreates itself. Autonomic Computing Systems (ACS) are relied upon to accomplish an indistinguishable level of self-direction and inescapability from human autonomic frameworks. Due to the highlights of ACS, the customary security model cannot be connected to ACS any more. The objective of our exploration is to build up a setting based security model and engineering for ACS. Our attention is on self-security highlight of ACS. The self-assurance include is implemented through security settings that we characterize. By considering security settings, security arrangements would dynamic be able to change so as to adapt to new condition.

Index Terms - Autonomic Computing, Security threats, Self-Healing.

1. INTRODUCTION TO AUTONOMIC SYSTEM

The autonomic idea is propelled by the human body's autonomic sensory system. The human body has great instruments for repairing physical harms. It can viably screen, control, and manage the human body without outer intercession. An autonomic framework gives these offices to a vast scale complex heterogeneous framework. An ACS is a framework that oversees itself. As indicated by Paul Horn's definition [1], an ACS is a self-administration framework with eight components. Self-arrangement implies that An ACS should powerfully design and reconfigure itself under changing the conditions. Self-recuperating implies that An ACS must distinguish fizzled segments, dispense with it, or supplant it with another segment without disturbing the framework. Then again, it must foresee issues and forestall disappointments. Self-advancement is the capacity of amplifying asset designation and usage for fulfilling client demands. Utilization of resources and administration of work load are two huge issues in self-improvement.

An ACS must distinguish and identify attacks and cover all parts of framework security at various levels, for example, the stage, working framework, applications, and so forth. It should likewise anticipate issues in view of sensor reports and endeavor to prevent them. It is called as Self-assurance. An ACS has to know itself. It must know about its segments, current status, and accessible assets. It should likewise know which assets can be acquired or lended by it and which assets can be shared. It is Self-mindfulness or Self-information property. An ACS must be likewise mindful of the execution condition to respond to ecological changes, for example, new strategies. It is called as setting mindfulness or condition mindfulness. Transparency implies that An ACS must work in a heterogeneous situation and must be versatile over different stages. At last, An ACS can envision its ideal required assets while concealing its unpredictability from the end client view and endeavors to fulfill client demands.

Self-arrangement, self-mending, self-enhancement, and self-assurance are considered as real qualities and the rest as minor attributes. As said over, the point of AC is to enhance the framework capacities. Hence, AC attributes influence different estimations of value, for example, ease of use, usefulness, unwavering quality, viability, and convey ability.

The cost and risk in preserving important resources of an organization such as hardware, data and network is also increased due to the increased complexity of the computer systems. The system in autonomic computing is designed in such a way to make the necessary decisions autonomously for protection so as to reduce

the human intervention. The mechanism for self-protection must be designed to defend and protect the system and it should be flexible enough to adapt changes in the system. This paper introduces an calculation for tending to the insurance of the autonomic components of autonomic processing frameworks.

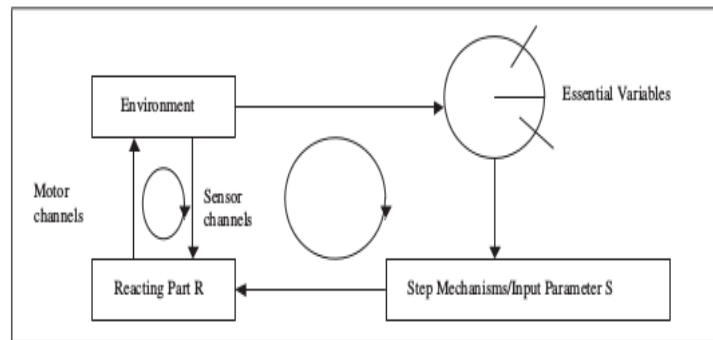


Fig. 1 Stable architecture of Autonomic System

2 SECURITY CONCERN OF AUTONOMIC SYSTEM

The expanding complex architecture of coomputer systems has required a consistently expanding interest in assets [2]. Present day computer frameworks have a tendency to be exceptionally organized and along these lines subjected to survive attacks in a huge amount. The owners of the systems up to some extent started to adopt the self-healing features of autonomic computing to reduce the complexity in management of the system. Building secure and dependable autonomic frameworks remains a testing assignment [3] on the grounds that these frameworks have a lessened dependence on human intercession and check since such frameworks are for the most part determined by policies already defined in literature [4], [5]. Knowledge of surrounding environment and internal state is must for autonomic systems to protect themselves properly. These systems can protect themselves by using the in-built policies defined by their proprietors with a specific end goal to guarantee appropriate operations, this feature is termed as self-awareness and context-awareness. The correct service to the correct client at the right time is gauranteed by the context-aware and self-aware features of the autonomic computing systems. Detection of intrusive hostile behavior and protection of operational level and integrity of the system is performed. Secure environment and their policy requirements are also correctly satisfied by autonomic systems[6]. Trusting is necessary for the system owners to accept and apply the decisions of the autonomic systems. As discussed by numerous [3], [7-9] an important success factor for autonomic systems is Trust. On the off chance that clients of autonomic processing frameworks don't believe them, they won't utilize them paying little mind to the esteem that they add to their market requirement. Today, still we lack in designing a suitable procedure to design and construct a trustworthy autonomic system, in spite of the unmistakable consciousness of trust as a fundamental supporter of grasping autonomic processing [7]. The conduct of autonomic processing frameworks is fundamentally determined by abnormal state strategies set up by their proprietors. Assailants that can get entrance and are equipped for altering such strategies can possibly harm the system more severely as compared to when attacks are acted upon systems with non-autonomic nature. The framework proposed by this paper ensures that the policies for security of an autonomic system are secure enough.

Networks and system security are essential parts of any autonomic processing arrangement. The capacity of a framework to respond reliably and effectively to circumstances going from kind however unordinary occasions to through and through assaults is vital to the accomplishment of the objectives of self-security, self-recuperating, and self-improvement. Since they are frequently worked around the interconnection of components from various administrative spaces, autonomic frameworks raise extra security challenges, including the foundation of a

dependable framework character, consequently dealing with changes in framework arrangement and interconnections, and incredibly expanded design unpredictability. Then again, the procedures of autonomic figuring offer the guarantee of influencing frameworks more to secure, by viably and naturally authorizing abnormal state security approaches. In this paper, we examine these and other security and protection challenges postured via autonomic frameworks and give a few proposals to how these difficulties might be met.

3. PROPOSED APPROACH

Network security and system security are key parts of any autonomic computing arrangement. The capacity of a framework to respond reliably and accurately to circumstances going from kind however irregular occasions to inside and out assaults is vital for achieving the aims of self-construction. In this paper, a well ordered algorithmic way to deal with create Self-Protection in Autonomic Computing Systems. Is proposed.

3.1 Algorithm for execution Self-Protection:

1. Selection of the high-level policies for security.
2. Initializing the Operation Record.
3. Approve the operations/transactions to be performed on the Autonomic component.
4. The Autonomic Element perform transactions and operations which is maintained in a log record refreshed at a particular time period.
5. Analysing the behavior of the node (Continuously observing of the node by the Autonomic Manager).
6. Separate the Node typical conduct with anomalous conduct by watching the node log file.
7. In the event that in-suitable conduct recognized, at that point
 - 7.1 Separation of Autonomic framework and the element.
 - 7.2 Proper analysis of the issue is done.
 - 7.3 The node is combined with the Autonomic framework again.

Related to the above algorithm following are the necessary key components of the system:

Elements of Self Protection: The processing components are intended to shield themselves from security dangers. The components act according to the abnormal state arrangements characterized by the System admins or the clients.

Policies for Security: The Admin or the owner of the system define some high-level security policies, which determine the rights to acces the resources and also define the permission to perform any action on Complex computing elements.

System Manager: The responsibility of the system manager is to monitor the behavior of the node periodically, to determine any unauthorised access to the System. It also helps to perform suitable mechanism for communication between Autonomic elements. If any fraudulent action is identified by the system manager then it communicates with the human incharge and the other autonomic elements to take suitable action.

Operation Record: All the operations which are performed are stored in this file. Threats can be identified with the help of this file. This record is maintained at high level of security with restricted access.

Log Record: All the data related to any operation performed is stored in log record, such as resources used in an operation, user details of that operation and also the timings of that operation.

Anomalous Behaviour: The element which is responsible for monitoring any inappropriate behaviour in the node and reporting it.

Corrupted Autonomic Elements: The autonomic elements can identify the corrupted elements by communicating with each other about the behavior of the element through which the attacks done can be identified.

Separation: Remove the affected autonomic elements from the system so as to ensure that they will not affect the overall computing.

Reason Identification: Log records of autonomic components are scanned periodically which carrying on an improper way to recognize the main driver/assault made by the assailant for this mistaken conduct.

Analyse the issue: In this stage, analyse the issue recognized in the autonomic component. That is if any product or equipment parts are tainted, at that point correct the issue. On the off chance that aggressor plays out any assault on the component, at that point distinguishing the damage caused by the attack and the type of attack is important. Then the operation record is searched for any changes which are performed by the attacker and all the changes must be removed.

Re-establish: After the repairing is done, proper checking for the restoration of the element is done. And then restore the element back in to Computing System by building up associations with this component from different components of Computing framework.

3.2 Confirmation: signature conduct of owners of the system, clients, and potential hackers

In order to confirm that the changes made to the policies are done by the authenticated person, a component must be introduced to verify the legitimacy of the system owner. Also the policies themselves should be designed in such a way to identify the users by analysing the behavior of the users.

A few cases of recognizable client conduct are:

- It should be defined that on which day of the week and at what time the changes are permitted. When the policies are created initially, a timeslot or a time-window is defined according to which the changes can be done. Any modification beyond the defined time period would not be allowed provided a proper information for identification of the authorized personal by the system owner. As an example, forcefull shutdown of the system by the policies during standard operation time is not permitted.
- The Lifetime of a policy parameter value. At the beginning the owner of the system would define the starting of the lifetime of a parameter value.

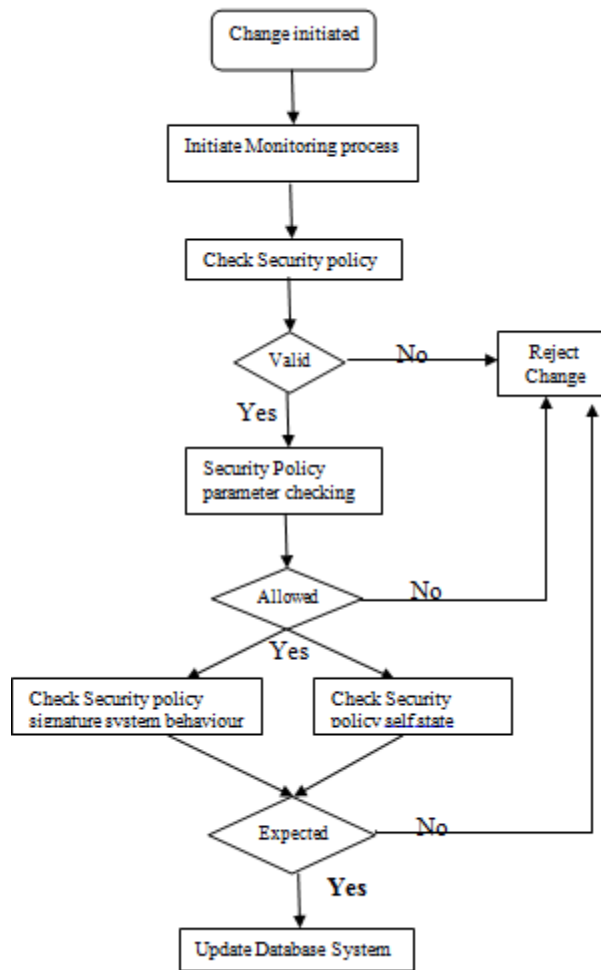


Fig. 2 Flowchart of the proposed algorithm

The lifetime of the parameter value rises as the time increases, and it will be treated as “normal state” and will be remembered as a permanent setting. Modification by a hacker to such a variable would result in easy identification of attack. Thusly, the framework proprietor would need to give a succession of individual data that recognizes him/her as the genuine framework proprietor before changes are permitted.

- The arrangement gathers data identified with the framework clients. This data is characterized by two classifications. The 'derived conduct data' and the 'volunteered conduct data'. The previous is consequently gathered by the framework after some time, in view of client activities and their result. The last mentioned, then again, is asked for of the client or the framework proprietor as methods for appropriate distinguishing proof. The framework demands data, for example, an individual recognizable proof number, secret key, individual inquiries, for example, place of marriage, age at marriage, first possessed auto, most loved games, and so forth., and perhaps the last four digits of the government disability number. The framework stores this data, and additionally any client collaboration designs, for use in future distinguishing proof of occasions or demands.

3.2.1 Awareness: enrichment of context and self-awareness

All together for any security approach to have the capacity to defend itself from the attacks which are malicious, it must know the changes that take place in the environment and the normal state of the system. It makes the policies proactive for

securing the elements which are critical. To the other side an autonomic framework should likewise know about its setting keeping in mind the end goal to protect against surprising or irregular client conduct. The mindfulness and setting mindfulness approaches have been utilized as a part of the security setting of autonomic frameworks yet not with regards to securing the security strategies themselves. In our system, the security policy have context-awareness as an inseparable part of itself. Consequently the autonomic system have security policies as an inseparable part, which are meant to secure the system.

3.2.2 Inspection: For self-protection initiating a Inspecting agent

The initiation of the inspecting agent is also included in the proposed framework that fills in as a fundamental component in the self-security system. Every security strategy is wrapped with an implanted checking operator that is charged, in conjunction with different segments of the approach, with conjuring self-insurance measures when it sees a specific activity as a risk. The checking specialist enrolls all demands that endeavor to change security arrangement settings and screens the reaction of the approach to such demands. On the off chance that the operator identifies horrible conditions, it captures the correspondence and renders it insufficient.

4 CONCLUSIONS

In this paper we provided the introduction of an autonomic system along with the major aspects of it. We proposed an algorithm for approaching self-protection in an autonomic system. The main focus of the proposed approach is essentially on the Autonomic Manger and Log File. The start of our structure depends on two main establishments. The first is to make the security approach an essential and indistinguishable piece of the autonomic framework that it should secure. The second is to segment the security arrangement in a way that builds the trouble of assaults. Our system outfits the security strategy with various barrier instruments that enable it to comprehend its ordinary state and the setting in which it works, and to incite it to examine suspicious exercises and straightforwardly and in a roundabout way question suspicious clients contrasting their conduct with what it thinks about piece of its ordinary state. A framework can be designed with this algorithmic way to deal with make the framework as self securing framework. The appropriate calculation/system can be composed solely to address a specific sort of assaults in Autonomic Systems.

REFERENCES

1. Horn, P.: Autonomic computing: Ibms perspective on the state of information technology, (available via [http://www.research.ibm.com/autonomic/manifesto/autonomic computing.pdf](http://www.research.ibm.com/autonomic/manifesto/autonomic%20computing.pdf))
2. Fink, G. and D. Frincke, Autonomic Computing: freedom or threat? ;LOGIN, 2007. 32(2).
3. Chess, D.M., C.C. Palmer, and S.R. White, Security in an autonomic computing environment. IBM Systems Journal, 2003. 42(1).
4. Bahati, R.M., et al., Using Policies to Drive Autonomic Management. Proc. IEEE 2006 International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM'06), 2006.
5. Badr, N., A. Taleb-Bendiab, and D. Reilly, Policy- Based Autonomic Control Service. Proceedings of the Fifth IEEE International Workshop on Policies for Distributed Systems and Networks (POLICY'04), 2004.
6. Wan, K. and V. Alagar, Security Contexts in Autonomic Systems. IEEE, 2006.
7. Duez, P.P., M.J. Zuliani, and G.A. Jamieson, Trust by Design: Information Requirements for Appropriate Trust in Automation. Pierre Guez, Greg Jamieson and IBM Canada Ltd., 2006.
8. Telford, R., et al., Usability and design considerations for an autonomic relational database management system. IBM Systems J., 2003. 42(4).
9. Lee, J.D. and K.A. See, Trust in Automation: Designing for Appropriate Reliance. Human Factors, 2004. 46: p. 50-80.
10. Jabbour, G. and D.A. Menasce, Securing Security Policies in Autonomic Computing Systems. The international conference on security and management, July 14-17 2008.
11. Jabbour, G. and D.A. Menasce, Policy-Based Enforcement of Database Security Configuration through Autonomic Capabilities. The Fourth International Conference on Autonomic and Autonomous Systems (ICAS 2008), March 16-21, 2008, 2008.
12. Menasce, D.A. and J.O. Kephart, Autonomic Computing, Guest Editor Introduction. IEEE Internet Computing, 2007. 11(1)

13. Wang, M., et al., Autonomic Element Design Based on Mind Agent Model. IJCSNS International Journal of Computer Science and Network Security, 2006. VOL. 6(No.9B).
14. Nami, M.R. and K. Bertels, A Survey of Autonomic Computing Systems. Proceedings of the Third International Conference on Autonomic and Autonomous Systems (ICAS 07) 2007.
15. Vassev, E. and J. Paquet, Towards an Autonomic Element Architecture for ASSL. International Workshop on Software Engineering for Adaptive and Self-Managing Systems (SEAMS'07), 2007.
16. Parashar, M. and S. Hariri, Autonomic Computing: An overview. Lecture Notes in Computer Science, Rutgers University, 2005.
17. Parashar, M., et al., AutoMate: enabling autonomic applications on the Grid. Cluster Comput (2006) 9, 2006: p. 161-174.
18. Fuad, M.M. and M.J. Oudshoorn, System Architecture of an Autonomic Element. Fourth IEEE International Workshop on Engineering of Autonomic and Autonomous Systems (EASE'07), 2007.

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IMPACT OF WEB TECHNOLOGIES ON LIBRARY USERS AND DOCUMENTATION CENTERS

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Abstract - Information is an indispensable entity for human development as air is essential for the survival of all living organisms on earth, including human beings. The pace of change brought about by new web technologies has a key effect on the way people live, work, and play worldwide. The increasing role played by web technology in the development of library services is an active reaction to the challenges posed by communication. This paper attempts to discuss the fast development of Web Technology and its application in the library and documentation centers. Today libraries are equipped to accomplish the newly web technology based services. Web technology enabled services fulfill the information needs of the users at the right, place, person. The emerging technology such as, Instant Messaging, Podcast, Vodkas, blog, RSS and their application has been discussed in this paper.

Keywords: CAS, SDI, Web OPAC, Blog, Podcasting, RSS, IM, Tagging, Cloud computing, Semantic web.

1 INTRODUCTION

Revolution of web-based and web-enabled products and services conceptualized by Tim-Orally during the beginning of the millennium has made a great momentum in experiencing and pioneering research in contextualizing web-technologies for societal benefits. This has been a great challenge and opportunity for in delivery of various products to the end-user in all industries. Web access and digital port-folio on web has become determining factor for business research and industrial organization all over the world. Even the government services and e-governance has been making use of web media including developing libraries. It accelerates with higher rate in coming year as the internet usage data is on galloping height. Higher education sector is being the prime segment in shaping the human resource potentials by adopting newer technologies. It has given great opportunity for Library and Information Science professionals to provide new forms of information in products and services.

Some of the facets that enabled the significant growth of higher education and where the libraries are having pivotal role are;

- E-Content Generation and Management
- Virtual University, Virtual Classroom, Virtual Laboratories, Virtual Libraries and Virtual Learning
- Wireless networking and remote access
- Students and teachers have more web space
- E-learning, Online discussion
- Higher level computing facility
- Every student/teacher has access to updated knowledge

- Higher rate of Information Consumption

2 APPLICATION OF WEB TECHNOLOGIES IN LIBRARY USER SERVICES

In the digital and information communication technology the application of web technologies give a challenge before the library and information professionals for storing and dissemination of information in the library services. No doubt present situation libraries are shifting from collection to access. With the increasing online applications the users are more aware about web technology and demanding libraries to be able to meet all their information needs. Before the concept of digital libraries the librarians are treated as resource supply people to share the knowledge to the needy users. Now the library and information professionals have developed their digital library system. It is necessary to develop computer programming knowledge among the library professionals. The UGC provides financial assistance to the web-based library services in the tenth five year plan to develop e-contents in higher education subjects. Its" not only provide financial assistance but also technical support to teachers and other experts based in universities and its affiliated colleges. The application of web technologies in libraries are given below:-

1. Library Websites

In the present age every library has their own websites to represent their resources. Every library and documentation Centre describing about various web library and information services and continuous process of updating from time to time. It describe various information about inception of library, working hours, holidays, layout plan of the building, rules and regulation of the library for different categories of members, rules of circulation, details about different staffs, and responsibilities. Web OPAC gives various approaches of document access in the given library viz. by author, title, publisher, accession number and collaborators etc.

2. Access To Database

Several publishers offer web-based, intranet solutions for providing local access to their databases, Springer. Large number of R&D have been taken place to develop the digital libraries and take the advantage of these developments and provide desktop access to key database and electronic publications to their own collection of CD-ROM upload on their CD server. Online database vendors such as Lexis-Nexis and ERIC are delivering their databases over internet. So a library which subscribes to these databases can now easily access them over web. NPTEL is the best example of online database which is developed by the renowned Professors from seven IITs and Indian Institute of Science, Bangalore(IISC) have developed the curriculum based video and audio courses. It is a collaborative project with Ministry of Human Resource Development, India. Each course contains the different databases of the different subjects.

3. E- Bibliographic and Cataloguing Services

A bibliography is a list of resources used or referred to by an author. This service can also be prepared from different databases available on the web. A bibliographic database is a database of bibliographic records, an organized digital collection of references to published literature, including journal and newspaper articles, conference proceedings, reports, government and legal publications, patents, books, etc. In contrast to library catalogue entries, a large proportion of the bibliographic records in bibliographic databases describe analytics (articles, conference papers etc.) rather than complete monographs and they generally contain very rich subject

descriptions in the form of keywords, subject classification terms, or abstracts. For example in physics the Los Alamos e-print archives is the more productive means of communication for Astrophysics and Quantum physics etc.

4. E- Current Awareness Services (CAS)

According to Encyclopedia Britannica the purpose of a current awareness service is to inform the users about new acquisitions in their libraries. Some libraries have adopted a practice of selective dissemination of information through the Web OPAC. A library can provide this service through e-mail, which is the easiest and common procedure. Otherwise a library can refer or link directly to some location to their web pages.

5. Electronic Selective Dissemination Of Information Service (E-SDI)

Selective Dissemination of Information refers to any system that alerts to the users about the latest publications in the different areas keeping in view the users requirements. It can be prepared search from journals, authors, subjects, and topics, publishers" wise...etc. Due to tight schedule of research activities, the researchers have no time to know the latest developments in the different activities. Different libraries have been developing SDI facilities to the users as per pre-decided procedure which may be on weekly or monthly basis. For prompt and quick service, E-SDI system has to be developed by the library itself. This provides the information to the researchers and users relating to the journals, books, articles etc. For promoting E-SDI services on the web, library should create a link from the existing library .The best example of SDI services to the users is Science Direct.

6. E-Mail Service

It is one of the most popular services of the internet. Today it is the most economical and highly used modes of communications. Electronic mail is a simple way for computer users to exchange messages among different distant computers linked with different networks service providers. It applies the laws developed by Dir. S.R.Ranganathan in their book "Five fundamental laws of Library Science "as it is cost effective, saves time, effort, money, paper and resources. E-mail provides facilities to send text messages, programs, graphics and attachments etc. in the form of audio/video to pre-defined list of users.

7. E-News Clipping Service

News clipping service is one of the Current Awareness Service provided in most of the libraries in print/photocopy form. Previously this service provides manually by selecting current news from various newspapers cut and paste on the plain paper and kept for reference to users. Presently news are available in the digital form so select the relevant portion from the newspaper and copy and paste on the web page in text, PDF(Portable Document Format),GIF(Graphic Interchange Format) or JPEG(Joint Photographic Experts Groups) provided for the purpose. All the documents should be copied to the server and homepage for news clipping service and allow access to users as and when required.

8. OPAC/WEB OPAC

The Online Public Access Catalog is also known as web online public access catalog which are the gateways to information in libraries and provide facilities to browse search and locate information. Web OPAC were developed to meet the needs of the users in two different ways:- (i)It provides access to library housekeeping operations

especially Circulation. (ii) To give the library users direct Access to the machine-readable Bibliographic records. An OPAC not only provides access to a libraries bibliographic databases but also make it searchable through variety of access points with a common command language, which may be transferred when the users moves from one library to another. Web OPAC has become more popular and easy to handle.

9. E- Reference Services

E-Reference service is one of the most important services which are provided by the library to find information. It is the personal service which includes personal assistance given to search the information on various subject areas, irrespective of size and collection of the library. Most of the traditional libraries have given much emphasized on information access within the physical boundaries of the library. But today web based reference services have got the much popularity among the library and information professionals due to the development of the web based library. It is possible to access the libraries reference services round the clock and it can be accessed from any place at any time even from the kitchen table.

10. Ask A Librarian

Ask-A-Librarian services are internet based question and answer service that connects users with individuals who possess specialized knowledge and skill in conducting precision searches. Most of these services have web based question submission form or e-mail addresses or both. Users are invited to submit their queries by using web forms or through email. Once a query is ready by service, it is assigned to an individual expert for answering. An expert responds to the query with actual information or a list of information services. The response is either sent to the users e-mail account or is posted on the web so that users can access it after a certain period of time.

11. Podcasting

A podcast is a series of audio or video digital-media files which is distributed over the Internet by syndicated download, through Web feeds, to portable media players and personal computers. Though the same content may also be made available by direct download or streaming, a podcast is distinguished from other digital-media formats by its ability to be syndicated, subscribed to, and downloaded automatically when new content is added.

Application of Podcasting in Libraries:

- The library that works hard to produce audio content such as recordings of programs or library tours, podcasting can be an effective means of making that content more widely available.
- Podcast highlights about new resources
- Podcasts enable librarians to share information with anyone at any time.
- Podcasting can be a publishing tool for users and librarians' oral presentations.
- Libraries can subscribe podcasts from lead publishers of scholarly communication for interactive learning experience to the users.

12. Vodcasting

A vodcas is a podcast that contains video content. Vodcasting is a fantastic way to communicate with your newsletter readers. Just like with podcasting, you can submit your RSS feed or blog with vodcas to special video podcasting directories.

Application of Vodcasting in libraries:

- To provide demonstrations on how to access electronic resources
- To use the library catalogue and databases more effectively.
- To find materials using library search tools such as the catalogue and electronic database.

13. BLOGS

Blogs provide commentary or news on a particular subject; others function as more personal online diaries. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. The ability of readers to leave comments in an interactive format is an important part of many blogs. In nutshell blogs are easy to manage websites.

Application of Blog in libraries:

- Blogs serve as a platform where the users can file their concerns, queries and suggestions regarding the services and activities of the library.
- Blogs can also be used for the collection development where the users request the resources.
- Blogs can be used as a tool for marketing as well as the library.
- Can be used as tool for posting Minutes of the Meetings for necessary actions.
- Blogs can serve as discussion forum.

14. WIKIS

A web site that can be edited by any reader. Wikis offer the opportunity to share knowledge and information, but they are not usually considered “authoritative” or “scholarly.” Because people can invent facts or pass off ideas as facts on a wiki, they contain a lot of suspect information. Although some larger wikis (like Wikipedia) make the effort to verify information or cite sources, these sites are still not considered reliable or trustworthy. If you find information on a wiki, you should verify that data by checking it against the information in another source, such as an encyclopedia, dictionary, or index.

Application of Wikis in Libraries:

- Wikis can be used for social interaction and discussions among the librarians & users as well.
- Promoting professional development with the creation of forums to exchange ideas on specific areas.
- An internal communication medium for sharing information amongst the library’s staff.
- Wikis can also be used by the users to share information and enhance the content, and records of all transactions is save for future reference.
- Freely accessible and open content on any given subject or concept for intermittent consultant.
- Reference resources wiki can be built.

15. RSS (Really Simple Syndication)

Real simple Syndication is the term used to refer the collection of web feed formats that provide updated or shared information in a standard way. The information could be website or blog entries news headlines, or audio or video files. RSS documents contains complete or summarized text, metadata and author publishing information.

Application in RSS in libraries-

- Announcement of the availability of new books and other resources in a given subject area.
- Librarians can subscribe to RSS from the sources for compiling their customized alerts.
- Many programs organized in library for users.
- Library user given information for different Web 2.0, Library 2.0, Blogs, Wikis, RSS, Tagging, Podcasting, IM programs/courses by integrating appropriate resources.
- Announce availability of new research and learning opportunities in various academic/ research
- Integrating library services through RSS feeds.

16. Streaming Media

Streaming multimedia is sequential delivery of multimedia content over a Computer network that is displayed to the end-user as it is being delivered by the provider. The streaming of video is an important application that existed before Web1.0 and finds its application in Web2.0. It refers to the Method of delivering of medium.

The static, text-based tutorials are being transformed to multimedia-based interactive tutorials. Several tutorials use Flash programming, screen-cast software, or streaming audio or video, and couple the media presentation with interactive Quizzing; users respond to questions and the system responds in kind. Tutorials were the first library applications to migrate into more socially rich Web 2.0.

17. Instant Messaging (IM) and Virtual Meetings

Instant messaging, also known as IM, is a form of real time, virtually instantaneous communication between two or more people. It allows users to share images, audio and video files and other attachments. IM has become very popular due to quick response time, its ease of use, and possibility of multitasking. Many user using for various purposes viz : simple requests and responses, scheduling face to face meetings, or just to check the availability of friends. Paltalk, Google Talk, Windows Live Messenger, Yahoo Messenger are some of the IM client software.

18. TAGGING

A tagging is a keyword is added to a digital object like a website, picture or video clip to describe it, that is not a part of a classification system. The concept of tagging has been far beyond website bookmarking, and services like Flickr , YouTube and Audio allow a variety of digital facts to be socially tagged.

Applications of tagging in libraries:

- Now a days a new Learning Management Systems(LMS) for editing the subject headings for the user point of view and enhancing the indexing and relevancy of the searches, and making a collection are more effective.

- Tagging would greatly facilitate the lateral searching.

19. Social Book Marks

A social bookmark is a process for Internet users to share, organize, search, and manage bookmark of web resources. Unlike file sharing, the resources themselves aren't shared, merely bookmarks that reference them.

Application of Social Bookmarks in Libraries:

- Simplifying bibliographic distribution lists, users can describe them by providing specialized knowledge.
- Elaborating link services recommended from specific fields of knowledge.
- Sharing resources with other users who are using them for research.
- Promoting participation and interactive with users.

20. Social Networks

The use of Social networks has shown a great increase in recent years. They can be classified following different criteria in accordance to their audience and purpose. The many existing networks make it difficult to maintain an updated the profile in each of them, and this is why the libraries usually choose just one. MySpace give permission to make a profile , documents are used by libraries. Face book allows individual librarian to make a profile. The use that the academic library may make of them varies.

Application of Social Networks in Libraries:

- Libraries can create a page to reach to new users
- Social networking is a platform to librarians and patrons not only share our views and change resources in to electronic form.
- For building network among the interested group in discussing the common interest.
- Library users are added material to the library catalogue, including our views or our words also.

21. Application Programming Interface (API)

Application programming interface (API) is a tools of building software application, library or service to support requests made by computer programs. API are used when programming graphical user interface. A good API makes it easier to develop a building blocks.

22. Library Tool Bars

A toolbar is a graphical user interface consisting of a panel of buttons, icons, menus or commands that are used more often in an application. Toolbars are used in common applications such as Microsoft Word, and as add-ons for web browsers such as Internet Explorer and Mozilla Firefox.

23. Cloud Computing

Cloud Computing is a new era that shows to advance information services and technology. Its gives to services. "Cloud Computing is a paradigm in which information is permanently stored in servers on the internet and cached temporarily on clients that include desktops, entertainment centers,

table computers, notebooks, wall computers, hand-held's, sensors, monitors, etc.". (IEEE, 2009). Cloud computing application uses in library

- Go for libraries, and see the main groups and go for library automation sources busy in a long time.
- Looking after all library websites, backup media collections, or storing and access bibliographic database.
- Understand converged devices are everywhere. (iphone)
- Allow unfettered access to the cloud (Secondary drive)
- Understand that the cloud may also be a valuable information resource (via facebook, blog)
- Understand the importance of personalization. (OPAC)

24. Semantic web

Semantic Web is a term coined by World Wide Web Consortium (W3C) director Tim Berners-Lee. It describes methods and technologies to allow machines to understand the meaning - or "semantics" - of information on the World Wide Web. The Semantic Web is the extension of the World Wide Web that enables people to share content beyond the boundaries of applications and websites.

Application of Semantic web in Libraries

- Build tools for discovering and navigating digital resources on the Web
- Data architecture scalable to the entire Web
- Interoperable across systems, institutions, domains

3 CHALLENGES BEFORE LIBRARY AND INFORMATION PROFESSIONALS

In the digital web library services environment, library and information professionals are required to work independently or as a team to deliver service-oriented and user-oriented applications, instructions, programs, projects and services. In addition to the academic and professional qualifications require a commitment to excellent user-friendly services, effective oral and written communications, as well as team leader must also possess additional capabilities, experience, knowledge and skills.

4 SUGGESTIONS

1. Proper budget provisions should be made available for upliftment and uninterrupted web services including tear-wear/replacement/maintenance etc.
2. Proper budget provisions for training of staff should be done for smooth functions of Library and documentation centers.
3. Libraries should be allowed to recruit library and information professionals with computer science background on priority basis.
4. Library orientation programs should be carried out for users at least once in a year to understand the entire web services available in the special library and Centers.
5. Higher authorities should co-operate and kept positive attitude for smooth functioning of the organization.
6. All library and information professionals should maintain co-ordination among various categories for the welfare of organization and staff.
7. Authorities should provide better opportunities for the working force in terms of promotion, incentives for the laborious staff, preference to internal staff dependents against the vacant posts, perquisites like provision for houses within the organization, medical facilities for the workers as well as their dependents especially cashless facilities.

5 CONCLUSIONS

Applications of web technologies in library and documentation centres have changed with the advancement of information technology. Every library and documentation centers working on library portal is called as the “Mirror of the Library”. It is the duty of library and information professionals to remain updated with the latest developments to render web-based services to their users and pay personal attention during the service tenure. Documentation centre provide special services to special users. Library and information professionals wish to provide information to their users. They have curiosity to interact with the members and utmost desire to provide required information at the least possible time. Web services can empower libraries, simpler system customization and integration. These advantages are dependent on web services being standardized. Not only Library and information professionals but users should also be provided training about the applications of web based library services from time to time.

REFERENCES

1. O'Reilly, Tim (2005): What is Web 2.0? Design Patterns and Business Models
2. for the Next Generation of Software Online: [http:// www.oreilynet.com/pub/a/oreilly/tim/news/ 2005/09/30/what-is-web-20.html](http://www.oreilynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html), retrieved: 10.07.2017.
3. “Understanding Web 2.0.” Accessed June 20,2017
4. <http://www.computer.org/portal/web/buildyourcareer/fe009>
5. Cunningham, Ward (June 27, 2002), What is a Wiki, WikiWiki Web, retrieved June 10, 2017
6. Web 2.0 Workgroup. (2006). Retrieved June 01, 2017, from [http:// web20workgroup.craom](http://web20workgroup.craom)
7. Neal, James G. and Damon E. Jagers. 2010. Web 2.0: Redefining and Extending the Service Commitment of the Academic Library. In
8. *Envisioning Future Academic Library Services: Initiatives, Ideas and Challenges*, ed. Sue McKnight, 55-69. London: Facet Publishing .
9. Casey, Michael & Savastinuk, Laura. Library 2.0: A guide to participatory library service. Information Today Press, 2007.
10. Casey, Michael & Savastinuk, Laura. Library 2.0: Service for the next-generation library, Library Journal, September 1, 2006.
11. Maness, J. Library 2.0 theory: Web 2.0 and its implications for libraries. *Webology*, 3 (2), Article 25, 2006.
12. Miller, P. Library 2.0: The challenge of disruptive innovation. *Talis*, February 2006.
13. Patterson, L. 2006. “The Technology Underlying Podcasts.” *Computer*. 39(10).
14. Robert, Scoble and Shel, Israel 2006. *Naked Conversations: Blogs Are Changing the Way Businesses Talk with Customers*. Wiley.

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IOT BASED BUS TRANSPORT MONITORING SYSTEM FOR SMART CITIES

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Abstract - In the era of digitalization and automation, not a single field is remained untouched and unaffected. Automated transport monitoring is also very popular now a day. For that, various technological developments are going on.

A system is developed which is based on transport system. It is the use for transport, daily travelers via city buses and students of colleges as well as schools for saving their time, by not standing on the road and wait for a long time for their buses.

Keywords: IOT, Smart City, Transport Monitoring, Digital System.

1. INTRODUCTION

Transportation system is the backbone of any developed city. For overall development of any city, transport system should be well developed.

2. LITERATURE REVIEW

After analysis of some existing systems, it is revealed that modernization of transport system is required for the rapid development of smart cities.

3. PROPOSED SYSTEM

This system is based on transport system. It is the use for transport, daily travelers via city buses and students of colleges as well as schools for saving their time, by not standing on the road and wait for a long time for their buses.

The main goal is to provide the students a right time of school and college buses though which they can stand to their stops on time. On the other hand whenever parents dropped their child into the bus, they receive a message from school whether the bus reached or not. Problems related to timing of buses will be managed as well the tension of parents regarding their child gets solved. If we talk about rural areas for the management of school buses or others it get solved with the help of current status of running buses and there timing.

It contains two types of user which are allowed to access this online facility in the field of checking current status and getting text to parents.

Students can search for their bus timing and current status. Parents get a text from school or colleges that they reached their safely. Bus Manager updates the report of buses which is running. Enhance customer services and facilitation in timing of buses, hospitality, travel and tourism with best practices.

Some Key point on which our Project will work:

- **Quality Control and Complaint Redressal System:** The use of project in such a manner so that if any complaints regarding the buses can be suggested through texting. Central control office for effective monitoring of the complaints and other activities get noted. Suggestions for the better improvement in village areas for the school bus facility.
- **Database server connectivity** – Database server connectivity is also the main key point through which the students get the current status of the

buses and student safety were also get managed as per parents need, how they worry about their child.

- **Monitoring** –Monitoring in the hand of manager at the current time, especially to texting a message to the parents with the help of mobile phones. City bus manager can also monitor it from the control centre/hub of the city buses.
- **Medium of internet**– This all get happened with the help of internet access. Students can check out the whole details with the help of internet, manager can also update their bus details and parents also access the information of buses and other daily travelers also checkout the remaining details.

This pilot project works in the following three phases:

- **Phase I:** Pilot program, involves connecting parents, students and bus manager through our sites.
- **Phase II:** Expanding this network to more Gov./Pvt. Schools and institutions in the country.
- **Phase III:** Expanding it further to join International Transport Network.

Actors:

An actor is a person, organization, or external system that plays a role in one or more interactions with your system

In Our app, there are about three groups of users. As shown in table 1, the student is one type of user who requests for their need. The Bus manager is responsible to register institutions as a user of the system. This information helps to inform parents.

Bus Manager gets the entry of the buses and update the details as well send the text to the parents whichever bus get entered in the school.

Actor Name	Description
Student	Can search for there bus and find out the current status of the running buses.
Parents	Receive a message whenever child reached to the school and other details.
Bus Manager	Update the data entry regarding bus and timing as well inset the data.

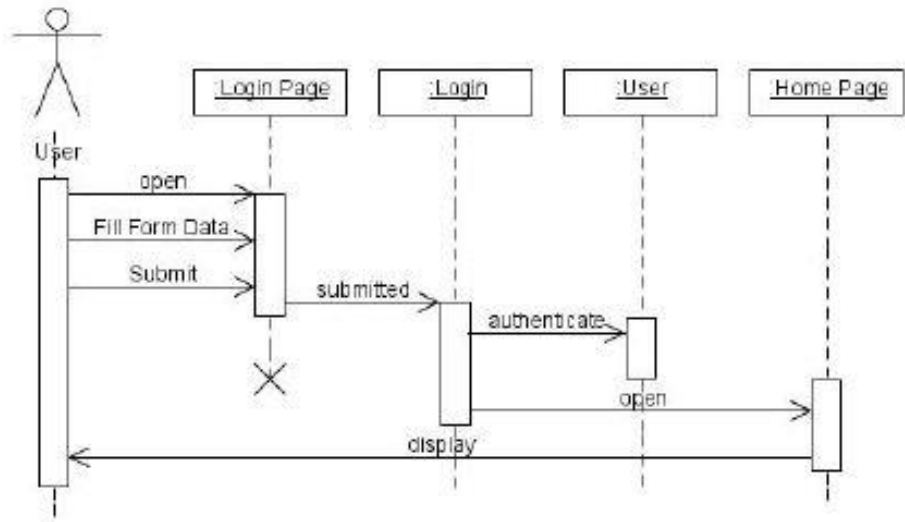
Table-1

Technology Stack:

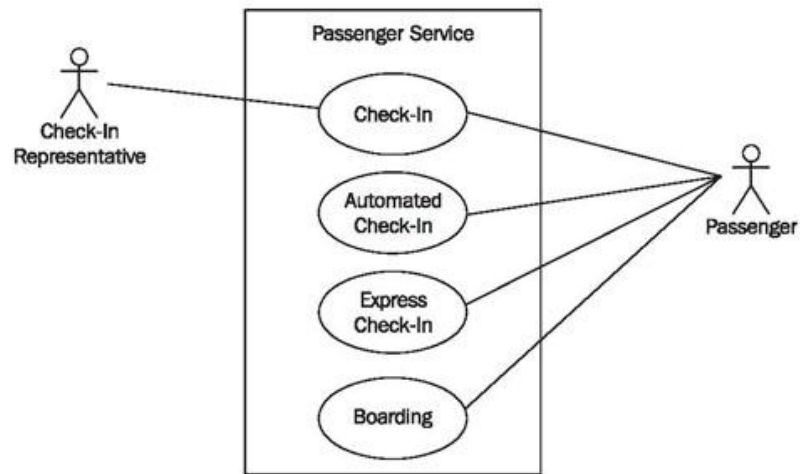
- Android studio
- AVD Manager Tools and technology.

Use case:

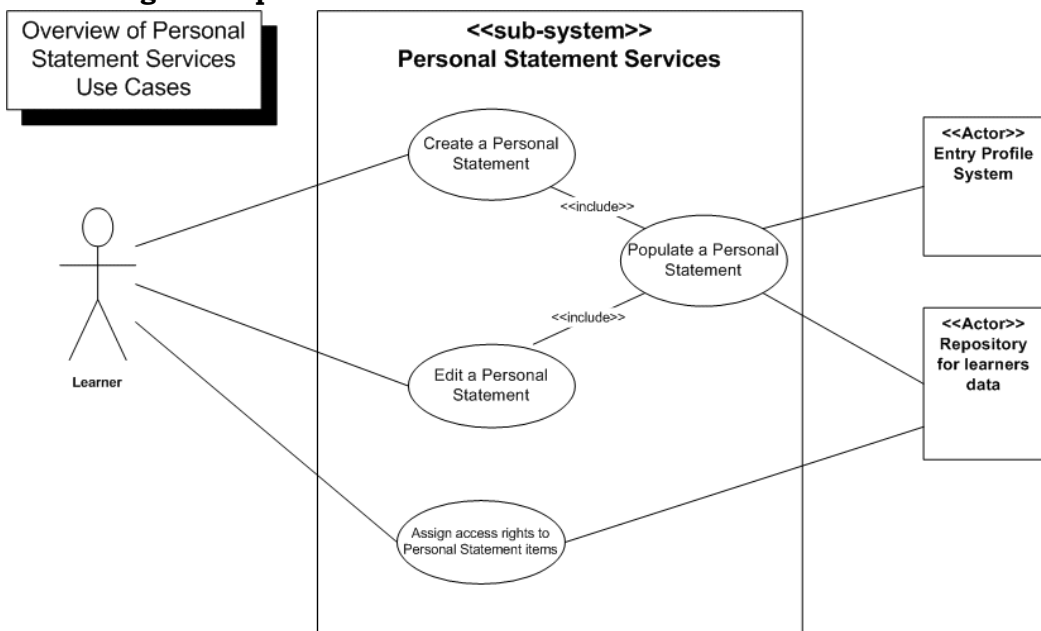
Login Page Use Case Diagram: -



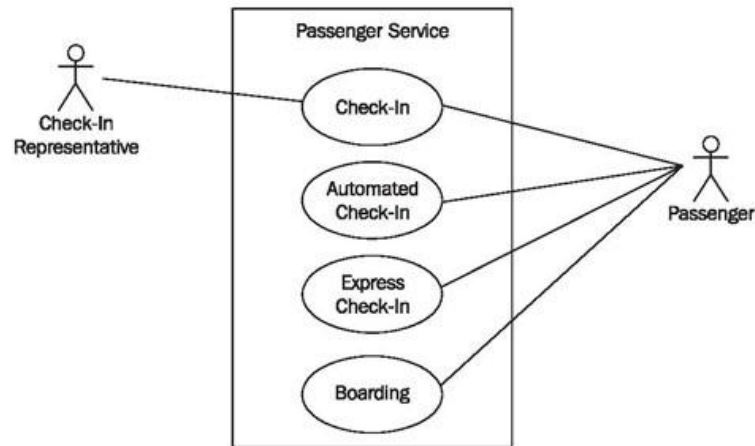
Use case diagram of Student:



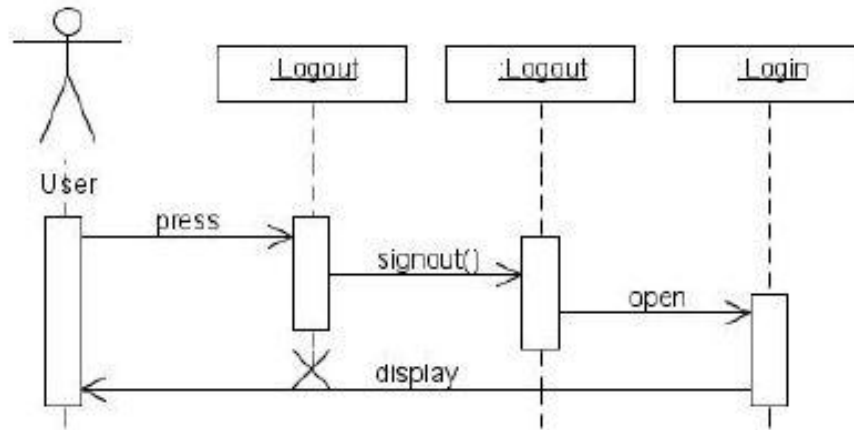
Use case diagram of parent:



Use case of bus manager:



Logout Page Use Case Diagram: -



4. CONCLUSION

This system is very useful for the smart cities of India. System is developed specially for Indian cities where present transport system is facing various challenges.

REFERENCES:

1. SeoJuLee, Girma Tewelde, Jaerock kwon, "Design and Implementation of Vehicle Tracking System using GPS/GSM/GPRS Technology and Smartphone Application", IEEE world Forum on Internet Of Things (WF-IoT), March 2014, Seoul.
2. Pengfei Zhou, Student Member, IEEE, Yuanqing Zheng, Student Member, IEEE, and Mo Li, Member, IEEE, "How Long to Wait? Predicting Bus Arrival Time with Mobile Phone Based Participator Sensing", IEEE Transactions on Mobile Computing, vol.13, no. 6, June 2014.
3. Maman Abdurrohman, Anton Herutomo, Vera Suryani, Asma Elmangoush, Thomas Magedanz, "Mobile Tracking System Using Open MTC Platform Based on Event Driven Method", 1st IEEE International Workshop on Machine to Machine Communications Interfaces and Platforms 2013.
4. [4] Minoru Sakairi, "Water-Cluster-Detectiang Breath Sensor and Applications in Cdars for Detecting Drunk or Drowsy Driving", IEEE Sensors Journal, vol.12, no. 5, May 2012.
5. Ishaq Md, D.Shekar Goud, P.J.Saritha, "Implementation of logistics managemfgent system based on wireless technologies", Global Journal of Advanced Engineering Technologies, Vol.1, Issue3-2012.
6. M. A. Hannan, A. M. Mustapha, A. Hussain and H. Basri, "Intelligent Bus Monitoring afnd Management System", Proceedings of the World Congress on Engineering and Computer Science 2012 Vol II WCECSf 2012, October 24-26, 2012, San Francisco, USA.
7. Dhivya M and Kathiravan S, "Driver Authentication and Accident Avoidance System for Vehicles", Smart Computing Review, vol.5, no.1, February 2015.

8. Ch. RamyaKeerthi, G. Shanmukh, Dr. R. Sivaram, "Various Accident Detection Technologies and Recovery Systems with Victim Analysis", International Journal of Advanced Trends in Computer Science and Engineering (IJATCSE), Vol.2 , No.3, Pages : 07-12 (2013) Special Issue of ICCSIE 2013 - Held during 24 May, 2013 Bangalore.
9. Pratiksha Bhuta, Karan Desai, Archita Keni, "Alcohol Detection and Vehicle Controlling", International Journal of Engineering Trends and Applications (IJETA) – Volume 2 Issue 2, Mar-Apr 2015.
10. Mashood Mukhtar, "GPS based Advanced Vehicle Tracking and Vehicle Control System", IJ. Intelligent Systems and Applications, 2015, 03, 1-12 Published Online February 2015 in MECS.
11. Mr. Prafull D. Patinge, Ms. N. R. Kolhare, "Smart Onboard Public Information System using GPS & GSM Integration for Public Transport", International Journal of Advanced Research in Computer and Communication Engineering, July 2012, Vol. 1, Issue V.
12. C. Prabha, R. Sunitha, R. Anitha, "Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS Modem", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, July 2014, Vol. 3, Issue 7, pp. 10723-10727.
13. Mr. Pradip Suresh Mane, Prof. Vaishali Khairnar, "Analysis of Bus Tracking System Using Gps on Smart Phones", IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727 Volume 16, Issue 2, Ver. XII (Mar-Apr. 2014), pp. 80-82.
14. Varsha Goud, V. Padmaja, "Vehicle Accident Automatic Detection and Remote Alarm Device", International Journal of Reconfigurable and Embedded Systems (IJRES), Vol. 1, No. 2, July 2012, pp. 49-54.
15. C.Vidya Lakshmi, J.R. Balakrishnan, "Automatic Accident Detection via Embedded GSaM message interface with Sensor Technology", International Journal of Scientific and Research Publications, April 2012, Volume 2, Issue 4.
16. Saurabh Chatterjee, Prof. Balram Timande, "Public Transport System Ticketing system using RFID and ARM processor Perspective Mumbai bus facility B.E.S.T", International Journal of Electronics and Computer Science Engineering, IJECSE, Volume1, Number 3, pp. 1619-1622.

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ANALYSIS OF VARIOUS METHODS USED IN E-VOTING SYSTEM INCLUDING BLOCKCHAIN

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Abstract - Voting is considered as an essential part of a democratic civilization. Ensuring high security, a voting mechanism can be designed and developed with great care. Due to paperless electronic voting system, election authorities do suffer from enough weakness. And also in centralized authorization the system election internal insiders and fraudsters can modify the election results. Therefore voting system is required which is robust and secure. And requirement is remote voting or online voting, security and all design principles is required to be considered. Therefore this review is to analyze the advantages and drawbacks with the methodology proposed considering the already existing infrastructure for elections. In this we would be discussing the various methodologies for internet voting using Aadhar, biometric, cloud computing and a revolutionary technology like blockchain which tried to cover all aspects of a transparent secure online voting system.

Keywords: Internet voting, Aadhar, Biometric, Electronic Voting Machine, Fingerprint, voting system, Blockchain, Cloud computing.

I. INTRODUCTION

Secure voting system is strength of any democracy. There are number of voting system adopted all over the world, but each of them has their own advantages and disadvantages. The remote internet voting systems still suffer many troubles. Manual voting is still in practice in many nations in this internet era also. Therefore it is insisted that a complete, easy, strongly secured „E-Voting System“ is need of time [1].

Internet usage in information and communication technologies infers that more transactions in online shopping, banking, submitting tax returns are secure. It can be done with accuracy, speed and minimizing cost. As we already know that elections are principal pillar of a democratic system. It is simply a way that enables the public to convey their views in the form of a vote. So, conducting elections online electronically, maintaining security in election process is must. It has been proposed that internet can be used as a medium for remote electronic voting which can represent as an alternative or replacement for traditional normal polling and paper ballot systems. Although currently existing electronic voting machines (EVM) has replaced the conventional and traditional ballot papers voting system. It has also disabled illegal practices of voting like vote buying and voting by poll workers for absent voters which were the most concerned major challenges in election.

The electronic commission should allow voters to vote over the internet without any geographical limitation. So there come the three important aspects to be considered which can be democracy, privacy and mobility during voting [2].

Managing electronic ballots of multiple scopes such as presidential, municipal and parliamentary etc are simultaneously required. Making it that

capable has been always an exigent task for any election body for free and fair polling. For a secure and transparent implementation, the system must satisfy all election design principles like privacy, eligibility, anonymity, reliability, verifiability etc. So this present research has deep focus on crafting and structuring voting protocols including secure mechanisms to prevent fraud voting and protecting voter's privacy.

2. LITERATURE REVIEW

S No.	Author	Methodology type	Advantages	Drawback
1	Chen et al.[4]	Secure system Centralized Authority and proxy server s used.	Eligibility, Uniqueness, Uncoercibility, Anonymity, Accuracy, Efficiency	Individual verification not possible, the proposed design for Internet only.
2	Kiayias et al.[5]	Secure system	Robustness, Trust Distribution, Ballot Privacy, Auditability And Verifiability.	ADDER is not universally verifiable, fault tolerance issues , dos attacks. Vote buying & coercion resistance issues.
3	Springall et al.[6]	Secure system	Strongly secret ballot	Range of problems exists like poor technical controls, lapse in operational security, and not enough transparency measures like video recordings etc. Also source code were incomplete.
4	Rana et al. [7]	Finger Print	Ability to improve handiness, integrity and to decrease error	Scanned image of finger prints with real time finger print scanner. Not suitable for visually impaired person Biometric related issues.
5	Zissis et al. [8]	Cloud Computing	Availability zones for data redundancy	Proper trials and plots need to be done before using it
6	Vidhya et al.[9]	Cloud Computing, Finger Print	Less expensive, scalable, saves time, Modification easy, Centralized control, Results faster.	It's expensive and transparency Suitable and fast data encryption techniques need to be studied
7	Li et al. [16]	Cloud Computing Decentralized cryptographic protocols for multi- user consensus systems(satisfying addictive homomorphism.	Scheme does not need any trust party as a dealer	The design is in-efficient for different security models
8	Kasliwal et al.[10]	Aadhar Verification	Security is high and can increase voting percentage	Successful implementation of the system is very difficult. Aadhar's biometric confidential data may be compromised.
9	Ansari.T [11]	Online voting system, high security password	Enhances the security	It can include viruses and hacking, as well physical tampering. Aadhar card number is

				only used for authentication.
10	Prasad.R.M [12]	Biometric ,finger vein image is used.	Can be done in less time	A user cannot remotely alter them, voter information is required to be more secured.
11	Hsiao.J [13]	Secret sharing scheme public key cryptosystem. Blockchain with decentralized architecture.	Privacy and verifiability	The data stored on a blockchain is not inherently trustworthy, so events need to be recorded accurately in the first place.
12	Ayed et al. [14]	Longest Chain Rule, Blockchain Technology	Number of voters will increase. Confidence of people in their governments will increase.	Authentication is an issue, Inability to change the vote,
13	Rifa et al. [15]	Voting result recorded from every place of election due to Blockchain Technology.	Database manipulation is difficult as cheating sources is reduced.	One change of data might affect other blocks. Anonymity of voter is still an issue.

3. COMPARISON IN TERMS OF NON -FUNCTIONAL REQUIREMENTS OF VARIOUS METHODOLOGIES USED IN E-VOTING

S.No	Author[Ref]	Security	Affordability	Flexibility	Efficiency	Encode/Decode
1	Chen et al.[4]	Mid	High	Low	High	High
2	Kiayias et al.[5]	Mid		Low	High	
3	Springall et al.[6]	Mid				High
4	Rana et al. [7]	Mid		Low	High	
5	Zissis et al. [8]	Mid		Low	Low	
6	Vidhya et al.[9]	High	Low		High	
7	Li et al. [16]	Low		High	Low	High
8	Kasliwal et al.[10]	High		Low		
9	Ansari.T [11]	High		High	Low	Low
10	Prasad.R.M [12]	Mid		Low		
11	Hsiao.J [13]	High	High	High		
12	Ayed et al. [14]	High	High	Low	High	
13	Rifa et al. [15]	High	High	High	Low	High

4 CONCLUSION

A comparison of various electronic voting systems has been proposed which concludes that the system can be developed using Blockchain technology and moreover can explore the feasibility of using this technology as a public board. The system does not depend on any single system as it is decentralized. This system provides the ability to vote using any device connected to the Internet to any registered user. The Blockchain will be publicly verifiable and distributed in a way that no one will be able to corrupt it. Remote voting will be the biggest advantage to increase participation of voter in a secure way as features like anonymity, end to end verification will play a vital role during voting.

REFERENCES

1. Baisa L. Gunjal, S.N. Mali, "Secure E-Voting System With Biometric And Wavelet Based Watermarking Technique In Ycgb Color Space" IET International Conference on Information Science and Control Engineering-2012, pp.1.
2. Kashif Mehboob Khan, Junaid Arshad, Muhammad Mubashir Khan, "Secure Digital Voting System Based on Blockchain Technology" International Journal of Electronic Government Research, Volume 14, Issue 1, 2018, pp.1

3. Orhan Cetinkaya¹, and Deniz Cetinkaya, "Verification and Validation Issues in Electronic Voting" Turkey Electronic Journal of e-Government Volume 5 Issue 2 2007 pp(119-120).
4. Chen Y.-Y., J.-K. Jan, and C.-L. Chen The design of a secure anonymous Internet voting system. Computers & Security, 2004. 23(4): p. 330-337.
5. Kiayias, A., M. Korman, and D. Walluck. "An Internet Voting System Supporting User Privacy" 22nd Annual Computer Security Applications Conference (ACSAC'06). 2006.
6. Springall, D., Finkenauer, et al., "Security analysis of the Estonian internet voting system". In Proceedings of the 2014 ACM SIGSAC Conference on Computer and Communications Security, 2014: p. 703-715.
7. Rana, M.F., A. Altaf, and S.Z. Naseem "Enhanced real time system of evoting using finger print". International Conference on Electronics, Computer and Computation (ICECCO). 2013.
8. Zisis, D. and D. Lekkas, "Securing e-Government and e-Voting with an open cloud computing architecture" Government Information Quarterly, 2011. 28(2): p. 239-251.
9. Vidhya, P. "Transforming Election Polling from Electronic Voting to Cloud as a Software Service in India". 2013. Berlin, Heidelberg: Springer Berlin Heidelberg.
10. Kasliwali, A., et al., "Aadhar Based Election Voting System". IOSR-JCE, 2018: p. 4.
11. Ansari, T., et al., "Online Voting System linked with AADHAAR Card". IJARCCCE, 2017. 6(9): p. 4.
12. Prasad, R.M., P. Bojja, and M. Nakirekanti, "Aadhar based electronic voting machine using arduino". International journal of computer applications, 2016. 145(12): p. 0975-8887.
13. Hsiao, J.-H., et al. "Decentralized E-Voting Systems Based on the Blockchain Technology". 2018. Singapore: Springer Singapore.
14. Ayed, A.B., "A Conceptual Secure Blockchain- Based Electronic Voting System". International Journal of Network Security & Its Applications (IJNSA), 2017. 9(3): p. 1-9.
15. Qi, R., et al., "Blockchain-Powered Internet of Things, E-Governance and E-Democracy" E-Democracy for Smart Cities, 2017. 5: p. 509-520.
16. Li, J., et al., Multi-level multi-secret sharing scheme for decentralized e-voting in cloud computing. Journal of Parallel and Distributed Computing, 2019. 130: p. 91-97.

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INVESTIGATION & DESIGN OF THERMAL ENERGY SYSTEM (TES) FOR STORAGE AT REASONABLE TEMPERATURES BASED ON PCM (PCM)

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Abstract - In this research, sensible and sluggish heat is depicted, and there is also a provision for change of material. Every day around the world, energy is being discharged from various processes. With the expansion of the population it is difficult to estimate that energy resources will be reduced, consequently the currently accessible energy should be used more efficiently. In this sense, latent heat storage (LHS) has been promoted in recent decades as it can increase the energy investment fund of the hot energy structure. The current paper contributes to displaying system results including Phase change materials (PCM) in a hot energy framework. There is a high floating tank for local use of the structure used here. Outline of the experiment using of Thermal Energy System (TES) For Storage at Reasonable Temperatures Based on PCM. The results come in a type of diagram that shows charging and release times, eliminating the amount of energy, and the temperature profile of the water tank.

A couple of properties of some Phase change materials (PCM) are presented with sub-cooling surprises. To take a Gander on the characteristics of sensible and torpedo heat deposits, the water tank is expressed in different ways in relation to the water tank with PCM module for hot charge and hot discharge system, the reenactment program By using Round and empty and round size PCM modules stand out in each other with hot charge and hot discharge method. Apart from this, three structures with the PCM module (Electric Radiator, Sun Fuel Warm Structure and Flexible Heat Battery Structure) become bankrupt given below, and the results are displayed.

Keywords: PCM, LHS, simulation, heat charging, heat discharging.

I. INTRODUCTION

Thermal Energy is the internal energy of an object which is caused by the kinetic energy of its atoms and / or molecules. The atoms and / or molecules of a hot object have more kinetic energy than a colon, which is in the form of vibrational, rotational or, in the case of gas, in the form of translational motions.

The necessary ownership for PCM: According to the requirements of the application, a small temperature difference between a melting point, high heat of fusion, large thermal conductivity, low toxicity, non-inflammability, high density and stability and melting and concrete points [1].

The following applications of thermal storage are considered in this work:

- A tank with an electric heater,
- A tank in a solar thermal application, and
- A simple heat exchanger with a PCM module inside, that might be used as a portable thermal accumulator (battery).

1.1. Thermal energy Storage

Thermal Energy is the internal energy of an object which is caused by the kinetic energy of its atoms and / or molecules. The atoms and / or molecules of a hot object

have more kinetic energy than a liquid, which is in the form of vibrational, rotational or, in the case of gas, in the form of translational motions.

The necessary ownership for PCM: According to the requirements of the application, a small temperature difference between a melting point, high heat of fusion, large thermal conductivity, low toxicity, non-inflammability, high density and stability and melting and concrete points [1].

Increasing environmental pollution during the cold start of internal combustion engines is an important problem. Cold start of internal combustion engines are characterized by various problems, such as an increase in fuel consumption that arises from heterogeneous combustion, increasing concentration of toxic emissions, the increase of lubricity viscosity and resistance to speed, and in which the accumulator and the starter are loaded. Increase in vibration that results in increase. And noise. The development of new tools to solve this problem is a requirement. Thermal energy system storage (TESS) is such a device. Thermal Energy System (TES) uses internal combustion engine PCM latent heat storage capacity for pre-heating [2].

Thermal energy Storage is a technology that accumulates thermal energy by heating or cooling a storage medium so that the stored energy can be used at a later time for heating and cooling applications or power generation. Thermal energy system (TES) systems can help balance energy demand and supply on a daily, weekly and even seasonal basis. They can also reduce peak demand of energy, energy consumption, CO₂ emissions and costs, and increase overall efficiency of the system.

There are three kinds of thermal energy system (TES) systems, namely:

Sensible heat storage – technology based on storing thermal energy by heating or cooling mostly a liquid or solid storage medium (e.g. water, sand, molten salts, rocks), where water is the cheapest option.

Latent heat storage (LHS) - using Phase change material (PCM) e.g. from a solid state into a liquid state.

Thermo-chemical storage (TCS)- using chemical reactions to store and release thermal energy [2].

2 METHODOLOGIES

2.1 Materials for Latent Heat Thermal Energy System

Materials that are used for LATENT HEAT THERMAL ENERGY SYSTEM (TES) should have a large LATENT HEAT and high thermal conductivity. These materials are expected to fulfill some requirements, such as:

- A melting temperature lying in the reasonable scope of activity,
- Low cost,
- Melt congruently with least amount sub-cooling,
- To be chemically stable,
- Noncorrosive and nontoxic.

The materials that have been considered during the most recent 40 years are hydrated salts of natural and non-natural blends, paraffin wax, unsaturated fats and eutectics. Depending on the applications, the main criteria for PCM should be their dissolved temperature. Under 15°C, liquefied materials are used to remove cold air in cooling applications, while the softening material above 90 force is used for intake refrigeration. Each other material dissolving between these two temperatures can be added to sunlight based warming and hot load leveling applications [8].

Sensible heat storage is generally modest, yet its downsides are its low vitality thickness and its variable releasing temperature [2]. These issues can be overwhelmed by PCM-based thermal energy system (TES). Softening procedures include vitality densities around 100 kWh/m³ (for example ice-water) contrasted with an average 25 kWh/m³ energy density for sensible heat storage in water.

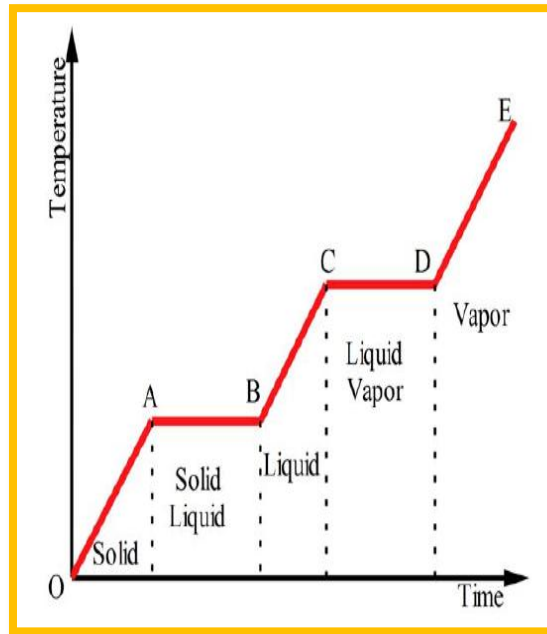


Figure 1: tempura –time relationship heat storage as latent heat for PCM

As appeared Table 1, there are two fundamental gatherings of Phase change materials (PCMs), paraffins and salt hydrates Paraffins have a fantastic dependability concerning the warm cycling, for example a high number of stage changes can be performed without a difference in the material's attributes. Then again, the disadvantage of their use arrives in a type of their combustibility and their moderately low softening enthalpy and thickness contrasted with salt hydrates. Salt hydrates will in general consume and don't have a huge the cycling steadiness, except if certain conditions are met. Another downside of salt hydrates is the purported sub-cooling. That implies that the material does not take shape at the liquefying temperature, yet at a lower temperature. The sub-cooling can be diminished by including alleged nucleates into the PCM [12].

Table 1 : Advantages and disadvantages of Phase change materials (PCMs)

Organic (paraffin's)	Inorganic (salt hydrates)
Advantages: ❖ Availability in a large temperature range. ❖ Not corrosive ❖ Chemically and thermally stable ❖ Good compatibility with other materials. ❖ No super cooling	Advantages: ❖ High melting enthalpy ❖ Low volume change ❖ High density ❖ High thermal conductivity.
Disadvantages: ❖ Lower melting enthalpy ❖ Lower density ❖ Flammability	Disadvantages: ❖ Sub cooling ❖ Corrosive ❖ Cycling stability

Table 2 shows some of the frequently used Phase change materials (PCMs) with melting temperature in unlike range with their melting enthalpy and density. Table 2: thermal storage with PCM properties

PCM	Thermal conductivity [W/mK]	Melting Temp. [°C]	Melting Enthalpy [kJ/kg]	Density [g/cm ³]
Ice	1.728	0	333	0.92
Paraffin	0.82	-5 to 120	150-240	0.77
Sodium sulphate decahydrate	0.544	32.4	254	1.48
Erythritol	0.06	118	340	1.3
Sodium Acetate + Graphite	25 to 250	56 to 60	240	1.35

The joining of small scale typified PCM materials (for example paraffin wax) into gypsum dividers or mortar can significantly expand the warm mass and limit of lightweight structure dividers. The miniaturized scale epitomized Phase change materials (PCMs) can cool and set by night and soften amid the day, therefore cooling the dividers and the room, and lessening (or staying away from) the requirement for electric chillers ("passive cooling").

2.2 Working of Phase change materials (PCMs)

Any material can remain in three basic structures such as strong, fluid and gas. One material changes its state at the cost of its latent heat. Kuznik et. al [27] has given a good explanation of how to dispose of PCM stores and passive heat . The external heat provided to the PCM is spent in breaking the inward obligations of the cross section and accordingly it assimilates a tremendous measure of passive heat at the temperature of the stage. At present, when the PCM cools down, the temperature of temperature changes (known as sub-cooling or low-cooling) goes down to beat the vitality barrier required for nucleation of the second phase. . When the phase inverse starts, then the temperature of P.C.M. Ascends (due to the advent of passive heat) and the resulting phase against the resulting phase is at the temperature, which returns the inert heat to the condition. The pre-requisite for sub-cooling or under-cooling for stage inversion is an important property of P.C.M. in particular the monitoring of its relevance of application. PCM There is many more requests than the special heat of passive heat content. In this way PCM According to the quantity 2-3 times more heat or cold or per mass can be kept in the water as a suitable heat in the temperature difference of 20oC. Since hot trading is in the thin band of temperature, Marvel can be used to make the temperature more smoothing.

2.3 Charging of process

In the after that simulation tank filled with both water and PCM is experimental. Simulation results of this casing are compare to the results of the preceding section (tank filled up only with water). The new simulation parameters are shown in Table 4.2, and all the rest parameters are taken from the previous section, and can be found in Table 3.

Table 3: Simulation parameters

PCM Total Volume	0.09 m ³ = 30% of tank storage volume
Number of nodes in PCM (radial)	4
Number of nodes (vertical)	20
PCM shape	Cylinders
Height	1.2 m
Number of modules	8
Diameter of module	109.3mm
PCM material	Sodium Acetate + Graphite

2.4 Discharging process

In the following thermal energy Storage, the tank release is recreated. Once more, two cases are watched and contrasted one with another. In the primary case, stockpiling tank contains just water, and in second case it contains 70 % of water and 30 % of PCM. The HX is utilized to discharge the heat from the tank. Tank introductory temperature in the two cases is 65 °C, and the temperature of the water let through the HX is 50 °C. All the extra parameters are equivalent to the past cases, and can be found in Table 4.

Table 4: Simulation parameters

Parameter	Value
T _{INLET_HX}	50 °C
T _{INITIAL_TANK}	65 °C

2.5 Proposed Work

In this part of the thesis, three different systems with PCM modules are analyzed. The three systems are:

- System Reasonable Temperatures Based with electric heater,
- System Reasonable Temperatures Based for solar domestic hot water,
- System Reasonable Temperatures Based with portable heat battery.

Comparison of SHS and LATENT HEAT STORAGE (LATENT HEAT S)

The objective of this theory is to explore achievability of the PCM utilization for warm capacity in three diverse specialized applications. So as to gets knowledge into the distinctions emerging in the heat stockpiling utilizing both SHS and latent heat storage (LHS), a straightforward case is examined.

3 RESULT**3.1 Solar- thermal system with PCM modules included**

Solar- thermal system simulated in this area incorporates known amount of heat gathered with sun based authority and heated water stockpiling tank with PCM modules. High temp water that is created in the funnels of solar based authority warms up the water in the capacity tank. High temp water from the authority is let in the capacity tank through an inward heat exchanger. PCM modules are available in the tank. All out volume of PCM modules compares to the amount of the heat gathered with the sunlight based authority.

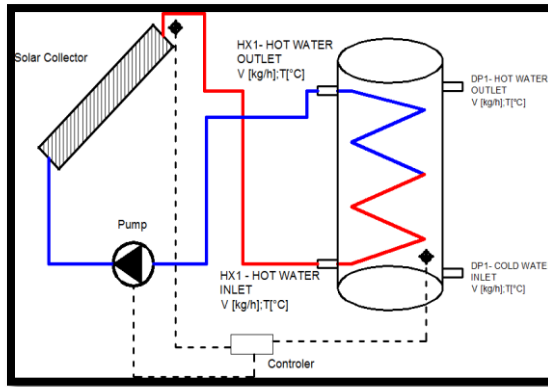


Figure 2: Solar- thermal system with water tank

The objective is to ascertain the amount PCM is expected to store a specific measure of vitality given by sun oriented authorities. So as to structure the framework the all out volume of PCM modules is determined with Eq. (1):

$$V_{PCM} = \frac{Q_{Coll}}{\Delta H_{PCM} \rho_{PCM}} \dots\dots\dots(1)$$

A few parameters of the recreation can be found in the Table 5 :

Table 5: Simulation parameters for SDHW system

Parameter	Value
Tank volume	205 l
Tank height	1.2 m
TINITIAL TANK	35 °C
Heat inlet	10.84 kWh
PCM shape	Cylinder
Diameter of module	79.15 mm
Number of modules	15
PCM material	Sodium Acetate + Graphite
VHX	200 kg/h
TIN	Sinus semi period function
Simulation time step	0.05 h
Simulation time	8 h

Results of simulation are presented below in Fig. 3 and Fig.4.

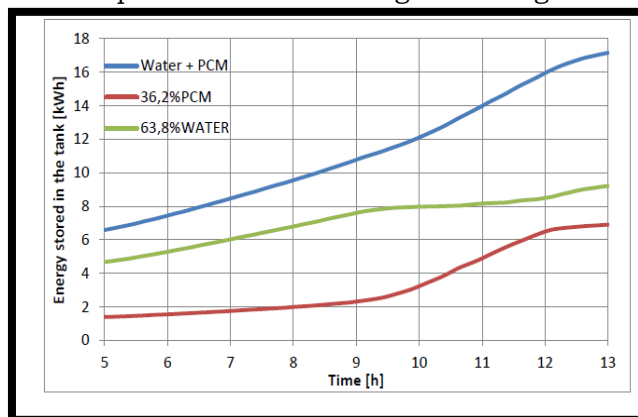


Figure 3: Energy stored in PCM modules in dependence of time

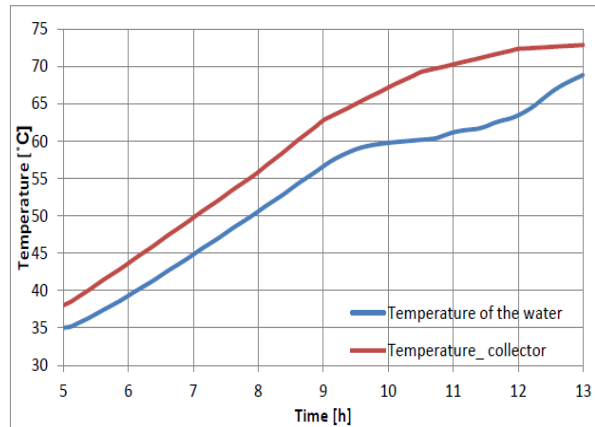


Figure 4: Temperature of the tank water and water provided with collector in time

In Fig. 3 and 4, energy and temperature change depending on time are shown. Results of simulation will be analyzed until water in the tank is reached 65 °C, as that value is taken into calculation of tank dimensions (simulation time-12:25 h).

Table 6: Comparison of analytical results and simulation results

Analytical predictions	
Energy expected to be stored	$Q_{Total}=10.84kWh$
Simulation results	
Total energy stored	$Q_{Total_SIMUL}=9.32kWh$
Energy stored with PCM	$Q_{PCM_SIMUL}=5.29kWh$
Energy stored with water in the system	$Q_{Water_SIMUL}=4.03kWh$
Heat losses to the ambient	$Q_{Losses_SIMUL}=0.15kWh$

The mismatch between the results ($Q = Q_{Total} - Q_{Total_SIMUL} - Q_{Losses_SIMUL} = 1.37 kWh$) can be clarified with disregarded heat put away in reasonable structure in PCM. Vitality is required for PCM to originate from the strong state at 35 °C, to the state where it is going to change its stage, at around 58 °C.

4 CONCLUSIONS

In the past few decades, latent heat storage (LHS) has been investigated in a grave manner so that the productivity of the hot structure can be expanded. PCM material has been broken and tried to do so that they are connected in the best frameworks. In this essence, the correlation between the appropriate and the latent heat storage (LHS) has ended. Frameworks with PCM modules were examined so that opportunities for water tank heat charging and redemption could be displayed, and the volume of Put / Discharge heat The investigation breeding program TRNSYS has been terminated. The results obtained with some cases dissected in this work can be used as a presentation in PCM behavior and possible outcomes in the thermal energy framework. The investigation of three frameworks with PCM is done without any PCM regardless of the properties of these frameworks (Charging and release

opportunities, and quantity of keeping away from heat). Apart from this, the framework is dimension that can be said to decide the quantity of PCM in the tank so that special measurement of the Bay Hottest vitality can be stored.

A general finding of this survey is the amalgamation of PCM-based hot capacity structures which could possibly suppress exhaled furnaces and give a medium frame to the energetic life force. In addition, such structures can suppress mechanical-based structures and offer free cooling condensation for structure between peak loads.

REFERENCES

1. Dobrescu Paul, Constantin Ionescu, Horia Necula, "Study of Thermal Energy Storage using Phase Change Materials" , IEEE 2017, pp-162-166.
2. Amrit Om Nayak, M.Gowtham, R.Vinod, and G.Ramkumar, "Analysis of PCM Material in Thermal Energy Storage System", International Journal of Environmental Science and Development, Vol. 2, No. 6, December 2011, pp 437-441.
3. Hong, H., Kim, S.K., Kim, Y.S. Accuracy improvement of t-history method for measuring heat of fusion of various materials. International Journal of Refrigeration 27: (2004), 360-366.
4. Zhengguo Zhang, Xiaoming Fang , Study on paraffin/expanded graphite composite phase change thermal energy storage material , Energy Conversion and Management, Volume 47, Issue 3, February 2006, Pages 303-310.
5. Lavinia Gabriela SOCACIU, "Thermal Energy Storage with Phase Change Material", Leonardo Electronic Journal of Practices and Technologies, Issue 20, January-June 2012, p. 75-98.
6. Demirbas M.F., Thermal Energy Storage and Phase Change Materials: An Overview, Energy Sources, Part B, 2006, 1, p. 85-95.
7. Zalba B., Marin J.M., Cabeza L.F., Mehling H., Review on thermal energy storage with phase change: materials, heat transfer analysis and applications, Applied Thermal Engineering 23, 2003, p.251-283.

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REGISTRATION OF INDUSTRIAL DESIGNS AND RELATED ISSUES

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Abstract - Design is a right created by the statute which is different from Trade Mark and Copyright. Without registration, the creator or owner of a design may be left without any right. In terms of Design Act, 2000, design means only the features of shape, configuration, pattern, ornament or composition of lines or colors applied to any article whether in two dimensional or three dimensional or in both forms, which in the finished article appeal to and are judged solely by the eye. It is possible to conduct an online search in the records of the Controller of Design. This record has been updated recently; hence, the search facility is getting completed. Design is one of the categories of IPR where the design system focuses on the aesthetic feature of an article derived from its visual appearance. Protection of the design by means of a design registration is therefore growing in popularity. The design act is to secure your original design and new designs is to be applicable of your modern developments and your earned objects is sometimes effected in the presence. The value of design registration is to see that the originator, creator, artisan, having their attractive look design is not applying others to their goods in some other states/Regions of the country. When a design is protected, the owner i.e. the person or entity that has registered the design is assured an exclusive right against unauthorized copying or imitation of the design by third parties. This helps to ensure that the design of the products is exclusive to the owner and the customer can at once identify the design of the product as that of the owner. This paper deals with registration related issues of Industrial Designs.

Keywords: Designs, Registration, Shape, Authorised use.

1 INTRODUCTION

Design: Design is a right created by the statute which is different from Trade Mark and Copyright. Without registration, the creator or owner of a design may be left without any right. In terms of Design Act, 2000, design means only the features of shape, configuration, pattern, ornament or composition of lines or colours applied to any article whether in two dimensional or three dimensional or in both forms, which in the finished article appeal to and are judged solely by the eye. It is possible to conduct an online search in the records of the Controller of Design. This record has been updated recently; hence, the search facility is getting completed. Design is one of the categories of IPR where the design system focuses on the aesthetic feature of an article derived from its visual appearance. Relevant aspects are the shape, configuration, surface pattern, the colour or line or a combination there of as applied to an article which produces an aesthetic impression on the sense of sight.

2 STATEMENTS OF THE PROBLEM / RESEARCH QUESTION

In India, previously the law of designs was governed by the Designs Act 1911. Since the enactment of the Design Act, 1911 considerable progress has been made in the field of science and technology. Hence the legal system for the protection of industrial design required to be made more efficient in order to ensure effective protection to registered designs. It was also essential to promote design activity in order to promote the design element in an article of production. The Designs Act,

2000, repealed the Act of 1911 and it aims at protecting the designs in India and bringing the Indian law at par with International law.

2.1 Objective

The objective of this project is:

- To know the importance of Design.
- To know its value (Brand) of the same.

2.2 Hypothesis

The researcher has made certain assumptions in the beginning of the research project which is going to be tested during the project, they are the following;

- Shape of goods can only be considered under design
- Design once registered cannot be used by others with different names.

2.3 Scope of the Study

The research is a doctrinal research. The researcher here would like to study through the judicial viewpoints by its decisions given in various cases. The researcher has tried to analyze the topic by studying various authors, experts, cases of The Indian Apex Court and High Courts, articles, etc. The researcher has strictly followed the boundary and has studied only with reference to Indian authors, experts, cases, etc.

3 METHODOLOGIES

The present research study is mainly a doctrinal and analytical. Keeping this in view, the researcher has gone through different books, journals, Web references, E-journal, reports etc.

The relevant material is collected from the secondary sources. Materials and information are collected from both legal sources like books.

The objective of The Designs Rules, 2001 is to enable protection of newly created designs applying to particular articles manufactured by the industrial process. It refers in legal definition to:

- Any mode or principle of construction or anything which is in substance merely a mechanical device;
- Any trademark which is a registered trade mark indicating connection in course of trade between the goods and some person having the right, either as proprietor or as registered user, to use the mark;
- Any trademark which denotes the ownership of moveable property belonging to a particular person; and
- Any trademark which is a painting, sculpture, drawing, an engraving or photograph or any work of architecture or any other work of artistic craftsmanship

3.1 Criteria of Design Registration

- Design should be new or original
- It should not be published in any country.
- Not contrary to public order or morality.
- Should not attract the provision of section 4 of Designs Act, 2000

3.2 Prohibition of registration of certain designs: A design shall not be registered if the design:

- Is not new or original;

- Has been disclosed to the public;
- Any where in India or in any other country by publication in tangible form or by use or in any other way prior to the filing date, or where applicable, the priority date of the application for registration; or
- Is not significantly distinguishable from, known designs or combination of known designs; or
- Comprises or contains scandalous or obscene matter
- Designs incorporating official symbols or emblems, maps, buildings, stamps, medals etc. cannot be registered under The Designs Act, 2000

3.3 Advantages of Design Registration

A design is what makes an article attractive and appealing. Hence, it adds to the commercial value of a product and increases its marketability. When a design is protected, the owner i.e. the person or entity that has registered the design is assured an exclusive right against unauthorized copying or imitation of the design by third parties. This helps to ensure that the design of the products is exclusive to the owner and the customer can at once identify the design of the product as that of the owner. Other advantages are

- Designs can make a product into a brand desired by customers and hence increase and consolidate market share
- Licensing design rights can provide a valuable income stream.
- Designs can be used as a way of raising capital, for example, as security for a loan.
- The rights to exploit a design can be sold.
- A reputation for innovative product design can add significant value to your business.

Design registration can provide significant benefits to your business, including ownership of exclusive rights to manufacture and sale of the design. This will allow you to exclude competitors from the market as well as the potential to profitably sell or license your exclusive rights to your design to others. If you believe that your industrial design is original and has commercial potential, industrial design registration is a worthwhile investment. If you would like to learn more about how to get an industrial design registration in India do not hesitate to contact us for a complimentary and confidential telephone appointment.

3.4 Design Registration

An application for the registration of design should be submitted along with four specimen copies of the design. A statement of novelty should also be submitted which refers to a statement of how the design is unique. Additional copies of the specimen design may be included. The design so represented in the 'representation of the design' submitted should be precisely similar to the design or exact copies of the design. The reciprocity application submitted in the UK or a convention country or group of countries or an inter-governmental organization means can be made with additional copies of the design according to rule 30. The Controller may or may not accept the registration of design. A statement of objections may be made by the controller to the applicant with necessary amendments. The date on which the controller's decision is dispatched is deemed as the date of appeal. Any applicant not completely and verifiably filed will be abandoned by the Controller. The particulars of the application and the representation of the article may be published in the Official Gazette.

3.5 Documents Required for Design Registration

- A certified copy of the original or certified copies of extracts from disclaimers
- Affidavits
- Declarations and
- Other public documents can be made available on payment of a fee.

The affidavits should be in paragraph form and should contain a declaration of truth and verifiability. The costs involved in the design registration process may be regulated by the Controller according to the Fourth Schedule.

3.6 General Guidelines Regarding Design Registration

The design should be registered with all essential documents including reciprocity date and maintained on diskette and floppy or any other master folder. Any request for alteration of address should be made in Form 22. Under the Rule 33, details of the name, address and nationality of the person entitled should be recorded. The evidence of the transmission of copyright in a registered design or that affecting the proprietorship should be presented to

3.7 Steps to Register a Design

It is important that complete and correct information is filed so that the application is processed faster. The application requires few information to be filed along with the application:

- Name and address of the Applicant;
- Legal Status of the Applicant i.e. whether the applicant is natural person, Company etc. If the Applicant claims to be a start-up (registered with the Government of India as a start-up), the certificate has to be filed.
- Description of article to be filled in along with identification of the class as per the classification.
- The nature of applicant determines the official fee for the application.
- The image or drawing of the article is to be filed along with the application.
- Claim of novelty is to be made in the application i.e. whether any part of the article or the entire article is novel.

The government fees for filing a design application for a natural person and start up is half of that of an artificial person like a Company. In order to encourage online filing, law provides for a 10 % discount for online filing vis-à-vis paper filing at Design office.

4 AN IMPORTANT ASPECT OF A DESIGN

Application is the image / drawing of the article. An applicant could take some precautions to avoid objections which filing the image:

- Image should be clear.
- Taken on a contrasting background.
- Image should be taken from all angles like front, rear, top, bottom, sides, perspective view.
- Entire article should be visible in all the images and no part of the article should be missing.

After filing of the application, it is examined by the Controller of Design. The Design Office conducts a formal evaluation of the application to verify the formal particulars as well as detailed evaluation of the application.

At the formal evaluation, the formal compliances are checked. For example: whether the authorization from the applicant is filed, article fall in the claimed class or not, applicant's identification and particulars are correct or nor, any column

which ought to have been filed while filing the application has been left out or not. Considering that applications are filed online by applicants directly, it makes sense to have a formal evaluation so that minor defects can be cured at the early stage itself.

The detailed evaluation, it is verified whether the applied design is registrable. The novelty statement in the application is mapped with the article. It is also seen whether other parameters of the Act are met by the article in question or not.

The applicant is given an opportunity to file a written response to the examination report / office objection and make amendments to overcome the objection. If the Controller is satisfied with the written response, the application is accepted. If the Controller has any objection, generally, an opportunity of hearing is given. If the Controller is not convinced that the design is registrable, it is rejected at the hearing.

After the design is accepted, it is published in the Official Gazette. The General public thus becomes aware that a design has been registered.

It is possible to file a convention application from the priority date of the design application filed in a country outside India.

A registered design is valid for 10 years from the date of application, which can be renewed for another term of 05 years. The Design office is completing the entire process within 10 to 12 months in some cases which are straight forward cases of registration.

BIBLIOGRAPHY

1. Catherine Colston, Principles of Intellectual Property Law, Cavendish Publishing Limited, London.
2. Article available on <http://ipindia.nic.in/ipr/design/designs.htm>
3. Uma Suthersenan ,Design Law :Creativity And Competition., Intellectual Property Rights A Global Vision, ILL,at 41

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MACHINE LEARNING ALGORITHMS IN WSNS: A REVIEW ARTICLE

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Abstract - Wireless sensor network (WSN) is one of the leading technologies for realistic applications due to its variable size, cost-effectiveness and type of deployment. Sensor nodes battery in WSN cannot be recharge and nodes also cannot be replaceable due to which nature of WSN changes dynamically. The traditional approaches in WSN cannot adopt the changes dynamically. To overcome the drawbacks of traditional approaches, machine learning (ML) techniques can be applied to react accordingly. In this article, survey of the ML techniques for WSNs is presented which covers from 2002 to 2018. In addition, drawbacks and advantages of each and every technique have been discussed. Finally, some open issues in WSN is mentioned for the future research direction.

1 INTRODUCTION

Wireless sensor network (WSN) is one of the leading technologies for some realist applications due to its variable size, cost-effective nature and type of deployment [2]. The work of WSN is to monitor a field of interest and gather the specific information, afterwards, transmit them to the base station (BS) for data analysis or for the future research[3, 4]. For some of the WSN applications require large number of sensor nodes. Therefore, scalable and efficient techniques are required to manage large number of sensor nodes. WSN nodes batteries cannot be replaceable and rechargeable due to which WSNs nature changes dynamically. Therefore, it may affect various quality parameters of WSNs such as cluster Head selection, coverage, link quality, fault detection, routing, clustering, QoS, localization, delay, cross-layer design [5], etc. As mentioned above due drastic change in the parameters traditional approaches failure to capture the desired task.

Machine Learning (ML) is the process that learn from the past experiences, and acts without being explicitly programmed [7–9]. In the competitive era, ML makes our computing task reliable, more efficient and cost-effective. ML provides the models for analyzing more complex data with the accuracy. It is mainly divide into three sections supervised, unsupervised and reinforcement learning. Power ML is to provide the solution for various complex problems, which cannot be done by traditional approaches. ML is applicable for various interdisciplinary fields, namely, medical, engineering, complex computing, etc. In the present era, ML solves various complex problems of WSNs and improves the performance. In addition, it also limits the human intervention or re-program.

Extract the vast amount of information from the deployed WSN is not et al possible without the use ML[1]. WSNs also integrated with Internet of things (IoT), cyber forensics, etc[1]. Collaborative applications WSNs with ML are: Target area coverage and connectivity problem, optimum number of sensor node deployment in the target area, energy saving schemes of sensor node in the hostile environment for the maintenance for the WSNs, ML techniques also forecast the amount of energy depletion in the target reason for the future actions.

ML techniques make accurate localization is very smooth and rapid in WSNs. ML also used to remove the non-trust worthy sensor nodes or defaulter nodes from normal sensor nodes that increases the efficiency of the network. Routing data place vital role in increasing the life time of the network. The dynamic nature of wireless sensor network requires dynamic routing techniques to improve the system performance.

The rest of the paper organization in two section mainly. First one consists of literature review, open issues and limitations, which is presented in section 2. Finally, conclusion is presented in section 3.

2 LITERATURE SURVEY

This paper authors[1] describes a novel approach for diagnosing anxiety and depression in young children. In the current era, diagnosis the population is the time consuming processes. In contrast, author proposed the use of a 90-second fear induction task during which time participant motion is monitoring using a commercially available wearable sensor. Making use of machine learning approaches which takes input data extracted from one 20-second phase of the task are used to predict diagnosis in a large sample of children with and without an internalizing diagnosis. In the simulation, the performance of a variety of feature sets and model configurations is examined to identify the best performing approach that provides a diagnostic accuracy of 75%. Obtained accuracy is comparable with the existing diagnostic techniques, but at a small fraction of the time and cost currently required. However, accuracy can be further improved making use of proper machine learning algorithm.

The sensor data[2] in wireless sensor networks are ceaselessly arriving in multiple, rapid, time varying, possibly unpredictable, unbounded streams, and no record of any historical information is maintained. These constraints make conventional Database Management Systems and their evolution unsuitable for streams. Hence, there is a need to develop a complete Data Streaming Management System (DSMS), which could process streams and perform dynamic continuous query processing. In this paper, a framework for Adaptive Distributed Data Streaming Management System(ADDSSMS) is presented, which acts as a stream control interface between arrays of distributed data stream sources and end-user clients who access and analyze these streams. Simulation results reveal that the proposed method can improvise overall system performance substantially.

Advances in hardware technologies[3] well as wireless networking paradigms have positioned us at the doorstep of a new-fangled era where undersized wireless devices will endow with access to information every time, everywhere and enthusiastically contribute in developing a smart atmosphere. The sensors in WSN's accumulate information regarding the parameters they are exploited to sense. Nevertheless these sensors have limitations in their performance due to restrictions of power and bandwidth. Machine Learning methods can facilitate them in overcoming such restrictions. During the past decade, WSNs have seen progressively more rigorous implementation of highly developed machine learning algorithms for information handing out and improving networking performance. Machine learning enthuse countless realistic clarifications that make best use of resource exploitation along with make longer the existence of the network. In particular, WSN designers have effectively agree to machine learning paradigms to deal with widespread purposeful problems associated to localization, data aggregation, fault detection, Security, node clustering, prediction models and energy aware routing, etc.

This paper introduces a machine learning approach[5] for real-time battery optimal operation mode prediction in residential PV applications. First, from the historical data, the optimal battery operation mode for each operation interval is derived. Then, a best performing algorithm for the prediction of the optimal modes is obtained. Performances are evaluated with different number of features in the training test and different training lengths. Then, the features will be used to predict future operation mode in real-time operations. A comparison on bill savings is made with the model-predictive control approach using the residential load and PV data from the Pecan Street project website under the Hawaiian electricity rate. Simulation results show a points improvement in performance.

Wireless Sensor Network (WSN)[6] has come into prominence because they hold the potential to enhance and revolutionize our economy and life, from environmental monitoring to business asset management, from transport automation and Healthcare industries. WSN is also extensively used in medical applications to monitor the activities of the human body periodically like blood pressure, glucose level, heart rate, sugar etc., Let us consider the case of a pregnant woman. The parameters such as blood pressure and heart rate of the woman and movements of fetal are periodically checked to control their health condition. There are two types of sensors, they are Wearable and Implanted. Wearable units are used on the body surface of a human or just at close proximity of the user. The implantable units are inserted inside human body to measure the needs. The existing system has no facility to update our health condition to our doctors via any applications. It also has a drawback of low speed communication between sensor nodes. In this paper we present a monitoring system that has the ability to monitor physiological parameters from patient body. The nodes which are attached on the patient's body will collect the signals from the wireless sensors and sends them to the base station. The sensors can sense the heart rate, blood pressure in real time and so on and updates to the doctor periodically via an application. To overcome the issue of communication delay between the doctor and patient, this is more beneficial and will yield a good performance in the future.

Within this Paper, a concept of machine learning[8] schemes suggested. In this investigation to address the design issues in WSNs is introduced. As can be viewed within this paper, countless endeavors have induced up to now; several layout issues in wireless sensor networks have been remedied employing numerous machine learning strategies. Utilizing machine learning based algorithms in WSNs need to deem numerous constraints, for instance, minimal sources of the network application that really needs distinct events to be tracked as well as other operational and non-operational aspects.

In this paper[9], author discussed various machine learning algorithms. These algorithms are used for various purposes such as data mining, image processing, predictive analytics, etc. to name a few. The main advantage of using machine learning is that, once an algorithm learns what to do with data, it can do its work automatically.

Wireless Sensor Network (WSN) has come into prominence [10] because they hold the potential to modify and revolutionize our economy and life, from environmental monitoring to business asset management, from automation in transport and Healthcare industries. WSN is widely used in medical applications to monitor the activities of the human body periodically like blood pressure, glucose level, heart rate, sugar etc., let's consider a pregnant woman. The parameters such as blood pressure levels and cardiac rate of the woman and movements of fetal are periodically monitored to control their health condition. There are two types of

sensors, they are Wearable and Implanted. Wearable units are used on the body surface of a human or just at close proximity of the user. The implantable units are inserted inside human body to measure the needs. The existing system has no facility to update our health condition to our doctors via any applications. It also has a disadvantage of low speed communication between sensor nodes. In this paper we present a monitoring system that has the ability to monitor physiological parameters from patient body. The nodes which are attached on the patient's body will collect the signals from the wireless sensors and sends them to the base station

Within this Paper[11], a concept of machine learning strategies suggested. In this investigation to address the design issues in WSNs is introduced. As can be viewed within this paper, countless endeavors have been induced up to now; several layout issues in wireless sensor networks have been remedied by employing numerous machine learning strategies. Utilizing machine learning based algorithms in WSNs need to deem numerous constraints, for instance, minimal sources of the network application that really needs distinct events to be tracked as well as other operational and non-operational aspects.

Target tracking[12] in wireless sensor network (WSN) is most imperative in surveillance applications. In existing work, a vintage tracking framework called Face Tracking is used. A polygon region called face is constructed. The nodes that are grouped inside a face can communicate only among them. Brink detection algorithm is used to find an edge in which two nodes are connected and has the best coverage area. An Optimal selection algorithm is used to select the nodes which can track the target with lowest energy usage. But, if the target moves out of coverage area or if energy of the tracking node becomes diminishing then the target may not be tracked accurately. To overcome this problem, a tracking scheme, called t-Tracking is anticipated with an objective to achieve quality of tracking (QoT). Distributed tracking algorithm sends queries about the energy level and coverage area, to all the nodes in the face in which the target has to be tracked next. Based on the reply from all nodes, a node with best energy level and coverage area node will be selected for target tracking. Since a best node is selected, target can be tracked with accuracy. Wireless Sensor Networks[14] consists of huge number of power constrained micro sensors nodes whose main task is to sense and report the target phenomena to the base station(BS). Hierarchical routing plays an important role for transmitting the aggregated collected data to the sink via other sensor nodes or cluster heads. Sensor nodes are organized into number of small groups called as clusters and within each cluster, cluster head is responsible for collecting the data from its sensors and to report that data to the Base Station. Machine learning algorithms play an vital role while selecting the CH based on various QoS parameters. In this paper, a hierarchical algorithm LEACH is chosen for analyzing the impact of ML algorithms such as KMeans and modified K-Means clustering on energy consumption of nodes by varying the type of input parameters. This paper covers the brief introduction of WSN, power models and ML algorithms for sensor clustering

This paper[15] focuses on the recent advances of an energy-efficient algorithm for classification of states of a WSN using ML techniques. The proposed algorithm reduces energy consumption by: 1) elimination of monitoring of parameters that do not affect the current state of the sensor network, 2) reduction of communication sessions over the network (the data are transmitted only if their values can affect the state of the sensor network). Experimental result of the proposed algorithm have shown that at classification accuracy close to 100% and the number of communication sessions were reduced by 80%.

WSN[16] is a quickly emerging area for researchers. WSN can be seen in various fields such as environmental monitoring, battle field surveillance, border security surveillance, motion tracking, hospitality, etc. A main targeted issue of research in WSN is to arrange the sensors with different capabilities such as power, sensing range, communication range in wireless network and route the collected data from the sensors to a sink or BS with dynamism. Clustering is a key technique play a vital role in lengthen the network lifetime by decreasing the energy utilization. In clustered WSN, Routing the collected data to the BS without obstacle is close to impossible. So eliminating the obstacle in the routing area or target area is essential. In this paper, grouping the sensors into small groups called as clusters by energy efficient heterogeneous clustering, that often selects the CH from the cluster. CH is selected with respect to the nodes residual energy and other important parameters, namely, transmission range and number of transmissions.

3 CONCLUSION

In this survey article, we have presented from the past to the recent published articles on ML-based algorithms for WSNs. For reader and researchers convenience various ML algorithms discussed in brief. Various issues in WSNs highlighted which was addressed by ML algorithms such as node failure detection, CH selection, routing, localization, MAC protocols, congestion, etc. In addition, some issues which still can be addressed also presented in the article i.e., open issues in WSNs or future research direction.

REFERENCES

1. Ryan S McGinnis, Ellen McGinnis, Wearable Sensors and Machine Learning Diagnose Anxiety and Depression in Young Children, 2018 IEEE EMBS International Conference on Biomedical & Health Informatics (BHI) ,4-7 March 2018 ,Las Vegas, Nevada, USA.
2. Yue-jie L. Data Stream of Wireless Sensor Networks Based on Deep Learning. International Journal of Online Engineering. 2016 Dec 27;12(11).
3. Bhanuchander, PremKumar.B, Kumaravelan ,A Analysis of Machine Learning in Wireless Sensor Network, International Journal of Engineering & Technology.
4. Kumar, D. Praveen, TarachandAmgoth, and Chandra Sekhara Rao Annavarapu. "Machine learning algorithms for wireless sensor networks: A survey." Information Fusion 49 (2019): 1-25.
5. Townsend, Larry. "Wireless Sensor Network Clustering with Machine Learning." (2018).
6. Gonzague Henri, A Machine Learning Approach for Real Time Battery Optimal Operation Mode Prediction and Control, February 2018.
7. K. Premkumar, S.Padmapriya,R.Priyadharshani, Kapaganti Priyanka,A Survey On Healthcare Monitoring System Using Wireless Sensor Network.International Journal of Pure and Applied Mathematic,2018.
8. Sukhchandan Randhawa,Sushma Jain,Performance Analysis of LEACH with Machine Learning Algorithms in Wireless Sensor Networks,International Journal of Computer Applications (0975 – 8887) Volume 147 – No.2, August 2016.
9. Zaki Ahmad Khan,AbdusSamad,A Study of Machine Learning in Wireless SensorNetwork, International Journal of Computer Networks and Applications (IJCNA) 4, July – August 2017.
10. AyonDey,Department of CSE, Gautam Buddha University, Greater Noida, Uttar Pradesh, India Department of CSE, Gautam Buddha University, 2016.
11. K.Premkumar,S.Padmapriya,R.Priyadharshani,Kapaganti Priyanka,A SURVEY ON HEALTHCARE MONITORING SYSTEM USING WIRELESS SENSOR NETWORKS (WSN) ,Department of Computer Science Engineering, SMVEC,2018.
12. Zaki Ahmad Khan ,AbdusSamad,A Study of Machine Learning in Wireless Sensor Network,International Journal of Computer Networks and Applications (IJCNA),4, July – August (2017).
13. C. Selvarathi, R.Sujatha Department of Computer Science and Engineering ,M. Kumarasamy College of Engineering, Karur.FACE TRACKING ALGORITHM FOR TRACKING TARGET IN WSN,International Journal of Pure and Applied Mathematics,2018
14. P Langley,CaliforniaResearch Papers in Machine Learning A prototype for machine learning papers,87 Kluwer Academic- Publishers, Boston Manufactured in The Netherlands,1987.

15. SukhchandanRandhawa ,Sushma Jain , Performance Analysis of LEACH with Machine Learning Algorithms in Wireless Sensor Networks,International Journal of Computer Applications (0975 – 8887) August 2016.
16. M N Yuldashev,Energy-efficient algorithm for classification of states of wireless sensor network using machine learning methods,International Conference Information Technologies in Business and Industry ,2018.
17. Dr. S. Meenakshi,K. Johny Elma,Energy Efficient Clustering for Lifetime Maximization and Routing in WSN,Research Scholar, Sathyabama University, Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai, Tamil Nadu, India,13, Number 1,2018.
18. Preetha, M., and K. Sivakumar. "An Energy Efficient Sleep Scheduling Protocol for Data Aggregation in WSN." (2018)..
19. Radhika S N , K V Chaitra ,RSSI Based Localization Using Mimo Technique in WSN, Department of Computer Science and Engineering, Jawaharlal Nehru National College of Engineering,
20. Sona Malhotra,Urmila,Multihop Energy Enhancement Protocols in WSN ,Journal of Network Communications and Emerging Technologies (JNCET),2, February (2018).

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डिजिटल ग्रंथालय : चुनौतियाँ तथा मुद्दे

राकेश सिंह लोधी

विद्यार्थी एम.लीप.

परिचय

भारत में सूचना एवं संचार तकनीक द्वारा समाज के विभिन्न क्षेत्रों में विशेषकर सूचना के तीव्र गति से प्रसारण में उल्लेखनीय परिवर्तन आया है तथा सूचना एवं संचार तकनीकी उपयोग में अल्प समय में कई आश्चर्यजनक परिवर्तन आए हैं। प्रारंभ में लोग सूचना एवं संचार तकनीकी की समता के प्रयोग के प्रति उदासीन रहे परंतु आज मानव की सोच में पूर्णता परिवर्तन स्पष्ट रूप से देखा जा सकता है। ग्रन्थाल आधुनिक सामाजिक संगठनों तथा राष्ट्र के जीवन में महत्वपूर्ण भूमिका अदा करते हैं यह समाज के जीवन में एक उत्प्रेरक की भूमिका अदा करता है क्योंकि यह जनसंचार का एक शाश्वत माध्यम है तथा सूचना के तीव्र प्रवाह के मौजूदा युग में सूचना के विस्तार में सहायता करता है डिजिटल ग्रंथ आले पद की उत्पत्ति 1970 दशक में हुई सूचना प्रौद्योगिकी के क्षेत्र में हुई प्रगति से डिजिटल ग्रंथ आले का जन्म हुआ डिजिटल ग्रंथ हाल है एक ऐसा सामान्य स्थल है जहां किसी भी शैक्षिक संस्थान के प्रयोग का शोधकर्ता तथा शिक्षक अपने स्वयं के कार्य स्थल पर वंचित सूचना प्राप्त कर सकते हैं।

डिजिटल ग्रंथालय की संकल्पना

सामान्य रूप से डिजिटल ग्रंथालय ऐसा ग्रंथालय होता है जो पर्याप्त मात्रा में यांत्रिक पाठ्य सामग्री एवं डेटाबेस जैसी सूचना सामग्री उपलब्ध होती है। डिजिटल ग्रंथालय आभासी ग्रंथालय के समान होता है। जिसमें बहुसंख्यक ग्रंथालय एक-दूसरे से जुड़े हुए होते हैं। डिजिटल ग्रंथालय बहुत से कम्प्यूटरों के समूह में सुरक्षित सूचनाओं का भंडार है जिसका उपयोग डिजिटल रूप में विश्व के किसी भी भाग में बैठकर एक ही संग्रह भंडार के रूप में कम्प्यूटर पर किया जा सकता है।

डिजिटल ग्रंथालय के उद्देश्य—

1. नई सेवा की शुरुआत करना तथा उसे उपलब्ध कराना।
2. डिजिटल सूचना संग्रहित संचित तथा व्यवस्थित एवं पुनः प्राप्त करना।
3. बार-बार किए जाने वाले कार्यों से बचना।
4. संरक्षण तथा जगह की बचत के लिए डॉक्यूमेंट को डिजिटलीकृत करना।
5. बर या ग्रंथालय रहित स्थल पर विषय वस्तु को देख पाने की क्षमता।
6. संसाधनों को साझा करने की सुविधा उपलब्ध कराना।

डिजिटल ग्रंथालय के क्षेत्र में चुनौतियां—

डिजिटलीकरण प्रक्रिया

पाठ्य सामग्री का डिजिटलीकरण काफी खर्चीला एवं अत्यधिक समय लेने वाला तथा जटिल प्रक्रिया है कुछ चीजें जैसे फ़ैले ग्राफ बिल्लो ग्राफ आदि।

कॉपीराइट

डिजिटल ग्रंथालय के संदर्भ में कॉपीराइट एक महत्वपूर्ण विषय है जिसका सामना ग्रंथ आले को करना पड़ता है।

तकनीकी सीमितताएं

इसके अंतर्गत सॉफ्टवेयर एवं हार्डवेयर आते हैं जिसमें हार्डवेयर की कार्य क्षमता काफी समय तक बनी रहती है किंतु सॉफ्टवेयर समय के साथ बदलते रहते हैं जिसमें तकनीकी रूप से जटिलता आती है।

सुरक्षा आवश्यकता

अधिकांश सूचनाओं का आदान-प्रदान ऑनलाइन प्रक्रिया के द्वारा ही किया जाता है यह अंतरण प्रक्रिया प्रकाशक उपभोक्ता जिन्हें सूचनाएं वांछित होती है किंतु कभी-कभी यह प्रक्रिया सुरक्षा संदर्भों के क्रम में घातक सिद्ध होती है।

निष्कर्ष

उपयोगकर्ता के लिए डाटा और उसकी आवश्यकता की पूर्व के क्रम में नवीन तकनीक का प्रयोग अत्यंत आवश्यक है इसलिए इन तकनीकों को अत्यधिक प्रभावशाली बनाना अति आवश्यक है यदि इन तकनीकों को प्रभावी रूप से बना लिया गया तो डिजिटल ग्रंथ आले अत्यधिक लोकप्रिय एवं उपयोगी तथा सरल हो सकते हैं।

ग्रंथ सूची

1. ग्रंथालय विज्ञान खंड 46 2015 . 12

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इंटरनेट सूचना संसाधन पुस्तकालय के संदर्भ में

श्रीमती पूजा सिंह

विद्यार्थी एम.लीप

परिचय पुस्तकालय शब्द पर जब हम विचार करते हैं तो हम इसे 2 शब्दों के मेल से बना हुआ पाते हैं पुस्तक प्लस आलय अर्थात् पुस्तक का धारा जहां विभिन्न प्रकार की पुस्तकें होती हैं और यहां सभी वर्ग के लोगों के अध्ययन के लिए होती है उसे पुस्तकालय कहा जाता है इस दृष्टिकोण से पुस्तकालय ज्ञान और अध्ययन का एक बड़ा केंद्र होता है प्राचीन काल में पुस्तकें आजकल के पुस्तकालयों की तरह एक जगह नहीं होती थी अपितु प्राचीन काल में पुस्तक के हाथ लिपिक हुआ करती थी इसलिए इन पुस्तकों का उपयोग केवल एक ही व्यक्ति कर पाता था परंतु आज के युग में कई प्रकार के पुस्तकालय हैं जैसे सार्वजनिक पुस्तकालय व्यक्तिगत पुस्तकालय शैक्षणिक पुस्तकालय विशिष्ट पुस्तकालय इसमें कई वर्गों की समस्या का समाधान है पुस्तकालय हर वर्ग के लिए उपयोगी है।

इंटरनेट का सूचना संसाधन में महत्व

इंटरनेट इंटरनेट नेटवर्क ऑ का नेटवर्क है या विश्व का सबसे बड़ा नेटवर्क है जिसमें दुनिया भर के अनेक नेटवर्क जुड़े हुए हैं अतः इस प्रकार नेटवर्क कंप्यूटर नेटवर्क्स का एक नेटवर्क है इंटरनेट को हजारों लाखों कंप्यूटर नेटवर्क्स का एक संयुक्त नेटवर्क कहा जा सकता है जिसमें प्रत्येक नेटवर्क के प्रत्येक कंप्यूटर कि कंप्यूटर से सूचनाओं का आदान-प्रदान कर सकते हैं यह विश्व भर के सचिव औद्योगिक सरकारी और गैर सरकारी संस्थाओं और व्यक्तियों को आपस में जोड़ता है। हरमू पाठ्य सामग्री – ई क्रांति ई जनरल ई चारपत्र थिसिस ई प्रतिवेदन आदि।

सूचना संसाधन पुस्तकालय के संदर्भ में

सूचना एवं संचार प्रकाशन का स्वरूप पतिव्रता है सूचना के स्रोत इलेक्ट्रॉनिक रूप में भी प्रकाशित हो रहे हैं ऐसी पाठ्य सामग्री जो इलेक्ट्रॉनिक रूप में उपलब्ध होती है एवं कंप्यूटर की सहायता से पढ़ी जाती है स्रोत कहलाती है इंटरनेट के माध्यम से यह स्रोत वैश्विक रूप में सभी को उपलब्ध हो रहे हैं आज सूचना स्रोत के रूप में उपयोग किए जाने वाले साधनों में इंटरनेट सबसे ज्यादा उपयोग किया जाने वाला और पसंदीदा साधन बन गया है इसके कुछ निम्न स्रोत हैं—

पूर्ण पाठ्य सामग्री – ई क्रांति ई जनरल ई चारपत्र थिसिस ई प्रतिवेदन आदि।

संदर्भ सामग्री— वीडियो ग्राफिक डेटाबेस शब्दकोश विश्वकोश निर्देशक आएं साइटेशन डेटाबेस एस ट्रेक्टर इन सिंह आदि।

अन्य सामग्री— वर्चुअल सम्मेलन ग्रंथ आले नेटवर्क ग्रंथ आले वेबसाइट संस्था इस डिपाजिट डिजिटल लाइब्रेरी का विषय गेटवे एवं ब्लॉक चर्चा समूह सचिन जैन आदि।

उपसंहार— इंटरनेट सूचना का अथाह भंडार है आज इंटरनेट पर मुफ्त रूप में निशुल्क इ स्रोतों की संख्या बढ़ रही है इनमें दोनों प्रकार के स्रोत जैसे पूर्ण पाठ्य सामग्री एवं संदर्भ

सामग्री के अतिरिक्त चर्चा समूह ब्लॉक बिकी गेटवे डिपॉजिटरी आदि प्रचुरता में उपलब्ध है आज इंटरनेट निश्चित रूप से सूचना प्रसारण का एक महत्वपूर्ण एवं सुविधाजनक साधन बन गया है आज आवश्यकता यह भी है कि पाठकों को जागरूक बनाया जाए जिससे पाठ्य इन सुविधाओं का लाभ ले सके इसी के साथ हमारे ग्रंथ आले व्यवसायियों को भी इनसे अद्यतन रहने की आवश्यकता है जिससे वह समय-समय पर पाठकों का मार्गदर्शन कर सके ग्रंथ आले की सेवाओं की गुणवत्ता में वृद्धि कर सके।

ग्रंथ सूची

1 ग्रंथालय विज्ञान खंड 45 (2014) 12-16

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पुस्तकालय में नेटवर्क की आवश्यकता : विभिन्न संदर्भों में

श्रीमती सीमा नेमा

लाइब्रेरी अध्यक्ष

पंडित मोतीलाल नेहरू स्मारक पुस्तकालय

मध्य प्रदेश राष्ट्रभाषा प्रचार समिति, हिंदी भवन भोपाल

1 इंद्रोडेक्शन

पुस्तकालय वह स्थान है जो वृहद ज्ञान का भंडार होता है जहां पर ज्ञान ज्योति की अविरल धारा बहती है। पुस्तकालय विज्ञान वह विज्ञान है जिसके अंतर्गत पुस्तकालयों में संपन्न किए जाने वाली कार्य प्रणालियां विशिष्ट प्रविधियां तकनीकी एवं प्रक्रियाओं का अध्ययन एवं अध्यापन किया जाता है। पुस्तकालय विज्ञान तकनीकी विषयों की श्रेणी में आता है जो एक सेवा संबंधी व्यवसाय है। यह प्रबंधन सूचना प्रवाह शिक्षा शास्त्र एवं अन्य विधाओं के सिद्धांतों एवं उपकरणों का पुस्तकालय के संदर्भ में उपयोग करता है। अतः कहा जा सकता है पुस्तकालय एक संपन्न विकासशील संस्था है।

2 पुस्तकालय नेटवर्क

पुस्तकालय नेटवर्क एवं अंतर्संबंधित पुस्तकालय पद्धति है। जिसमें दो या दो से अधिक पुस्तकालय अपने संसाधनों के द्वारा एक दूसरे से जुड़े रहते हैं, पुस्तकालय नेटवर्क पुस्तकालय सहयोग एवं सहभागिता का एक अव्यव है। पुस्तकालय नेटवर्क की परिभाषा **विलियम के कॉटेज के अनुसार** जब दो या अनेक पुस्तकालय अपने संसाधनों की साझेदारी स्थापित करने का निर्णय करते हैं पारस्परिक अधिग्रहण के कार्यक्रम को विकसित करते हैं और अपने अनुभव एवं अन्य समग्रियों को एक साथ केंद्रित करते हैं। जिसमें एक प्रकार की साझेदारी की स्थापना होती है तो इसे लाइब्रेरी नेटवर्क कहते हैं।

3 पुस्तकालय नेटवर्क का उद्देश्य

सूचना तथा ग्रंथालाय के विभिन्न संदर्भों में— **उद्देश्य:** 1. पुस्तकालयों के बीच लाइब्रेरी लोन के द्वारा रिसोर्स शेयरिंग को बढ़ावा देना। 2. सूचना प्राप्ति के आदान-प्रदान के लिए क्षेत्रीय राष्ट्रीय तथा अंतरराष्ट्रीय नेटवर्क के बीच एक समान संबंध स्थापित करना। 3. पुस्तकों ग्रंथों सीरियल तथा नान बुक मटेरियल का बिल्लोग्राफिकल डाटाबेस तैयार करना ताकि ग्रंथों को सर्च कर उन्हें आसानी से प्राप्त हो सके। 4. पुस्तकालयों से संबंधित सूचना प्रसारण में गति लाने हेतु पुस्तकालयों के कार्यों तथा उसके द्वारा प्रदत्त सेवाओं को कंप्यूटराइज्ड कर इस प्रणाली को विकसित करना। 5. पुस्तकों के द्वारा ऑनलाइन सूचना सेवा प्रदान करने के लिए प्रोजेक्ट विषय स्पेशलिस्ट तथा इंस्टीट्यूशनल डाटाबेस तैयार करना। 6. इलेक्ट्रॉनिक तथा उपकरणों की सहायता से डॉक्यूमेंट डिलीवरी को बढ़ावा देना।

4 पुस्तकालय नेटवर्क की आवश्यकता

1. वर्तमान समय में कोई भी पुस्तकालय प्रत्येक वर्ग के पाठकों को सभी प्रकार की सामग्री उपलब्ध करने में सक्षम नहीं होता अतः परस्पर सहयोग से पाठकों की आवश्यकता की पूर्ति की जा सकती है। 2. पुस्तकालय नेटवर्क के जरिए सूचनाओं का आदान-प्रदान इतनी तीव्र गति से हो जाता है कि दूरस्थ पाठकों को कुछ ही क्षण में अपनी सूचना प्राप्त हो जाती है। 3. नेटवर्क के द्वारा डाटा प्रोसेसिंग का विकेंद्रीकरण किया जा सकता है। 4. पुस्तकालय नेट वर्क उपयोगकर्ताओं को एक भौगोलिक सीमा से मुक्त करता है।

5 भारत में पुस्तकालय नेटवर्क :-

S.No.	Abbreviation of Library Network	Full Title of Library Nnetwork	Place Located	Year
1	BONET	Bombay library network	Mumbai	1975
2	INFLBNET	information and Library network	Ahmadabad	1991
3	PUNENET	Pune library network	Calcutta	1992
4	CALIBNET	Calcutta library network	Ahmadabad	1993
5	ADINET	Ahmadabad library network		1994

6 नेटवर्क के लाभ

पुस्तकालय में नेटवर्क के प्रमुख लाभ निम्न अनुसार हैं-

1. सूचना तथा आंकड़ों का विनिमय।
2. लागत में कमी।
3. शीघ्रता से सूचना विनिमय।
4. लचीला कार्य वातावरण।
5. सूचना सेवाओं की गुणवत्ता में वृद्धि।

इस प्रकार ग्रंथालय में कंप्यूटर के अनुप्रयोग सीडीरोम तथा इंटरनेट ने संसाधन सहभागिता को सुलभ बनाते हुए उसके स्वरूप एवं सेवाओं में क्रांतिकारी परिवर्तन कर दिए हैं।

7 निष्कर्ष

निष्कर्ष स्वरूप कहा जा सकता है कि पुस्तकालय में कंप्यूटर तथा संचार संसाधनों की उचित सुविधा होनी चाहिए जिससे विभिन्न उद्देश्य तथा आवश्यकता की तत्काल पूर्ति कर पुस्तकालयों का भरपूर उपयोग किया जा सके।

ग्रंथ सूची

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ग्रंथालय विज्ञान

पुस्तक से साभार पुस्तक से साभार

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“माध्यमिक स्तर क विद्यालयों में कार्यरत शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन।” (बैतूल जिले के विशेष संदर्भ में)

ज्ञानदेव देशमुख

शोधार्थी

डॉ. अनामिका पाण्डेय

शोध निर्देशक, आर.के.डी.एफ. विश्वविद्यालय, भोपाल

प्रस्तावना :- मानव जीवन में शिक्षा एक अनवरत चलने वाली प्रक्रिया है जो जन्म से लेकर मृत्यु तक अनवरत चलती रहती है। शिक्षा का अर्थ, ज्ञानार्जन द्वारा संस्कारों अथवा व्यवहारों का निर्माण करना है। मानव अपने अनुभव के द्वारा सदैव कुछ न कुछ सीखता रहता है। किंतु यह आवश्यक नहीं है कि शिक्षा केवल विद्यालय या अन्य संस्थाओं से ही प्राप्त की जाए बल्कि ये किसी भी रूप में प्राप्त की जा सकती है। शिक्षा प्राप्ति हेतु अनेक औपचारिक एवं अनौपचारिक साधन उपलब्ध हैं जिनके माध्यम से मनुष्य जीवन पर्यन्त शिक्षित होता है। वहीं मानव को शिक्षा प्रदान करने में परिवार, समाज व समुदाय की अहम भूमिका है। किसी भी राष्ट्र के विकास में वहां के नागरिकों का विशेष योगदान होता है इस हेतु आवश्यक है कि देश के नागरिक शिक्षित हों। वास्तव में शिक्षा किसी भी राष्ट्र का वह बिन्दु है, जिसके चारों ओर राष्ट्र के विकास का चक्र चलता है। राष्ट्र के सामाजिक, आर्थिक, राजनीतिक, आध्यात्मिक तथा मानसिक विकास के लिये शिक्षा का महत्वपूर्ण योगदान है। शिक्षा के बिना ये सब अधूरे हैं। शिक्षा का मुख्य उद्देश्य बालक की सभी प्रकार की क्षमताओं, रुचियों, योग्यताओं में विकास कर उसे राष्ट्र के विकास के क्रम में जोड़ना है। माध्यमिक शिक्षा बालकों की सम्पूर्ण शिक्षा की आधारशिला होती है। इस हेतु यह अत्यन्त आवश्यक है कि इस स्तर के विद्यार्थियों पर विशेष ध्यान दिया जाए, क्योंकि देश की प्रतिष्ठा, आर्थिक विकास, राष्ट्रीय एकता, सांस्कृतिक विरासत का संरक्षण एवं उत्थान, लोक कल्याण की भावना, अंतर्राष्ट्रीय सद्भावना, देश की सुरक्षा का दायित्व इन्हीं भावी कर्णधारों के कंधों पर निर्भर है। अतः इस दृष्टि से माध्यमिक शिक्षा का सशक्त एवं प्रभावी होना अति आवश्यक है।

जीवन पर्यन्त चलने वाली शिक्षा में माध्यमिक शिक्षा की विशेष भूमिका है। इस हेतु विद्यार्थियों को शिक्षा प्रदान करने में शिक्षक की मुख्य भूमिका है। शिक्षक वह शक्ति है जो प्रत्यक्ष या अप्रत्यक्ष रूप से विद्यार्थियों पर अपना प्रभाव डालती है। शिक्षक ही राष्ट्रीय एवं भौगोलिक सीमाओं को लौंघकर विश्व व्यवस्था तथा मानवजाति को उन्नति के पथ पर अग्रसर करता है, अतः यह कहा जा सकता है कि मानव समाज व देश की उन्नति उत्तम व प्रभावशाली शिक्षकों पर निर्भर है। डॉ. राधाकृष्णन के अनुसार, शिक्षक ही विद्यालय पद्धति की वास्तविक गत्यात्मक शक्ति होता है। यह सत्य है कि विद्यालय भवन, पाठ्यसहगामी क्रियाएँ, निर्देशन कार्यक्रम, पाठ्यपुस्तकें आदि शैक्षिक कार्यक्रम में महत्वपूर्ण स्थान रखती हैं, परंतु जब तक उनमें अच्छे शिक्षक द्वारा जीवन शक्ति प्रविष्ट नहीं की जाती, तब तक ये निरर्थक होती हैं। शिक्षक के व्यक्तित्व से प्रेरित होकर छात्र-छात्राएँ विचारात्मक एवं व्यवहारात्मक धरातल पर उन सद्गुणों को प्राप्त करते हैं, जिनका महत्वपूर्ण योगदान उनके जीवन के विकास में परिलक्षित होता है। इस दृष्टि से शिक्षक के कार्य एवं व्यवहार का विशेष महत्व है। शिक्षा प्रक्रिया के प्रमुख अंगों में शिक्षक, शिक्षार्थी व पाठ्यक्रम सम्मिलित हैं। इनमें शिक्षक के बिना विद्यालय, पाठ्यक्रम, शैक्षणिक सामग्री सभी अपूर्ण हैं। वहीं पाठ्यक्रम के अभाव में शिक्षा के उद्देश्य को भी प्राप्त नहीं किया जा सकता, तथा शिक्षा की इस प्रक्रिया को पूर्ण करने में शिक्षार्थी का भी विशेष

योगदान है। जे. एफ. ब्राउन लिखते हैं – “समस्त बातों को ध्यान में रखकर मैं इस परिणाम पर पहुँचता हूँ कि ‘अध्यापक’ शिक्षा का महत्वपूर्ण अंग होता है। पाठ्यक्रम, विद्यालय संगठन और पाठन—सामग्री यद्यपि अध्यापन के महत्वपूर्ण अंग हैं, परन्तु वे सभी तब तक निष्प्राण रहते हैं जब तक कि अध्यापक के सजीव व्यक्तित्व द्वारा उनमें प्राण—प्रतिष्ठा नहीं कर दी जाती है।”

अतः किसी भी विद्यालय का भवन, छात्र, सहायक सामग्री आदि कितनी भी प्रभावशाली क्यों न हों, जब तक वहाँ के अध्यापक चरित्रवान तथा योग्य नहीं होंगे, उस विद्यालय का शिक्षण—स्तर उन्नत नहीं हो सकता। हुमायूँ कबीर का मत है – “शिक्षा पद्धति की कुशलता शिक्षकों की योग्यता पर निर्भर है। अच्छे शिक्षकों के अभाव में सर्वोत्तम शिक्षा पद्धति का भी असफल होना अवश्यम्भावी है। अच्छे शिक्षकों द्वारा शिक्षा—पद्धति के दोषों को भी अधिकांशतः दूर किया जा सकता है।” अतः बालक के शारीरिक, मानसिक, सामाजिक एवं नैतिक विकास में शिक्षकों की अत्यधिक महत्वपूर्ण भूमिका है। शिक्षक अपने सद्प्रयासों से बालक का सफल मार्गदर्शन कर उसके व्यक्तित्व का सन्तुलित विकास कर उसे सफल नागरिक बनाता है। इस प्रकार वह बालक के साथ—साथ समूचे समाज तथा राष्ट्र का कल्याण करता है। डॉ. राधाकृष्णन ने कहा है – “अध्यापक का समाज में बहुत ही महत्वपूर्ण स्थान होता है। वह उस धुरी के समान है, जो बौद्धिक परम्पराओं एवं तकनीकी क्षमताओं को एक पीढ़ी से दूसरी पीढ़ी तक हस्तान्तरित करता है और सभ्यता की ज्योति को प्रज्वलित रखता है।” शिक्षक समाज में प्रचलित शिक्षा का रक्षक भी होता है। कोई भी शिक्षा—व्यवस्था शिक्षकों के स्तर से ऊपर नहीं जा सकती है। जिस स्तर के शिक्षक होंगे, उसी स्तर की शिक्षा—व्यवस्था होगी। शिक्षा की गुणात्मक स्थिति शिक्षकों की स्थिति तथा उसके गुणात्मक पहलू पर निर्भर है। इस प्रकार शिक्षक का महत्व समाज तथा शिक्षा—पद्धति दोनों में ही स्पष्ट है एवं शिक्षक उन भावी नागरिकों का निर्माण करता है, जिनके ऊपर राष्ट्र के उत्थान एवं पतन का भार है। शिक्षक अपने छात्रों पर अपने प्रभावों की अमिट छाप छोड़ देता है। अध्यापक गौरवाशाली पद का स्वामी होता है। अतीत काल में उसे ईश्वर के समान माना जाता था। समाज में राजा के पद को अध्यापक के पद से नीचा माना जाता था। टेगौर के अनुसार “अध्यापक वह प्रकाश पुंज है जो स्वयं जलकर औरों को भी प्रकाश प्रदान करता है।” जॉन डी.वी. के अनुसार “शिक्षक सदैव देवता का पैगम्बर होता है। समाज सुधारक एवं समाजसेवक के रूप में उसकी महत्वपूर्ण भूमिका विद्यालय में ऐसा सामाजिक वातावरण निर्मित करना है, मित्र व पथ प्रदर्शक के रूप में वह ऐसे अवसर प्रदान करे, जिससे छात्र भाषा, धर्म, रंग, सम्प्रदाय, जाति—व्यवस्थाएं और ऐसी संकीर्णताओं से ऊपर उठकर सही अर्थों में शिक्षा के मुख्य लक्ष्य ‘व्यक्ति को इन्सान बनाना’ की प्राप्ति हेतु सक्रिय हो।” अध्यापक शिक्षा व्यवसाय में उच्च आदर्शों के साथ प्रवेश करता है, किंतु वर्तमान जीवन जटिल होने से शिक्षकों पर अत्यधिक जिम्मेदारी आ गई है, जिसके कारण वे तनावग्रस्त हो जाते हैं। यदि उनका समायोजन उचित प्रकार से नहीं हो पाता है तो उसका प्रभाव उनके शिक्षण पर भी पड़ता है अतः आवश्यक है कि शिक्षकों का समायोजन भली—भाँति हो जिससे उनका शिक्षण कार्य प्रभावी हो सके।

अध्ययन की आवश्यकता एवं महत्व :- शिक्षक ही विद्यालय तथा शिक्षा—पद्धति का वास्तविक गत्यात्मक रूप है। यह सत्य है कि विद्यालय—भवन, पाठ्यक्रम—सहयोगी क्रियाएँ, निर्देशन—कार्य, पाठ्यपुस्तकें आदि सभी वस्तुएँ शैक्षिक कार्यक्रम में बहुत महत्वपूर्ण स्थान रखती हैं परन्तु जब तक उनमें अच्छे शिक्षकों द्वारा जीवन—शक्ति प्रदान नहीं की जायेगी, तब तक वे निरर्थक रहेंगी। शिक्षक ही वह शक्ति है जो प्रत्यक्ष या अप्रत्यक्ष रूप से आने वाली सन्ततियों पर अपना प्रभाव डालता है। शिक्षक ही राष्ट्रीय एवं भौगोलिक सीमा को लाँघकर विश्व—व्यवस्था

तथा मानव-जाति को उन्नति के पथ पर अग्रसर करता है, अतः यह कहा जा सकता है कि मानव-समाज एवं देश की उन्नति उत्तम शिक्षकों पर निर्भर है। वर्तमान समय में शिक्षक शिक्षण व्यवसाय को उच्च आदर्शों के साथ अपनाता है। वह सादा जीवन उच्च विचार को ध्यान में रखकर समाज सेवा में लग जाता है, किन्तु उसके सम्मुख ऐसी समस्याएं आ जाती हैं कि वह उनमें उलझ कर रह जाता है, यदि उसका समायोजन उचित प्रकार से हो जाता है तो वह इन समस्याओं का हल निकाल लेता है और यदि वह इन समस्याओं को हल नहीं कर पाता है तो वह समस्याग्रस्त हो जाता है। इस अध्ययन को अध्ययनकर्ता ने इसलिए चुना कि माध्यमिक शिक्षा ही उच्च शिक्षा की आधारशिला होती है और इसके प्रभावी होने में शिक्षकों की भूमिका महत्वपूर्ण है, यदि इस स्तर के शिक्षकों का समायोजन ठीक प्रकार से नहीं हुआ तो उनका शिक्षण कार्य भी प्रभावित होगा जिसका असर संपूर्ण शिक्षा प्रणाली पर पड़ेगा अतः शोधकर्ता ने उपरोक्त समस्या का चयन शोध कार्य हेतु किया गया।

समायोजन :- हमारा जीवन चुनौतियों एवं संघर्षों से परिपूर्ण है। बालपन से हमें जीवन की विविध समस्याओं का सामना करना पड़ता है। जो जिस सीमा तक जितने अच्छे ढंग से जीवन संग्राम की इस लड़ाई को लड़ता जाता है, वह उतने ही अच्छे रूप से सफलता से प्रगति करता रहता है। मूलभूत आवश्यकताओं की पूर्ति के अतिरिक्त जीवन में हम बहुत कुछ चाहते हैं और यही चाह हमें पल-पल संघर्ष करने को प्रेरित करती है। परंतु बहुत बार ऐसा भी होता है कि जो हम चाहते हैं जिसके लिए हम दिन-रात परिश्रम करते हैं उस उद्देश्य की प्राप्ति हमें नहीं हो पाती। तब अपने लक्ष्य को ही परिवर्तित कर उस परिवर्तित लक्ष्य का पूरा करने के लिए जुट जाते हैं। एक क्षेत्र में असफलता के बाद दूसरे किसी क्षेत्र का चुनाव करना, अपने लक्ष्य की ऊँचाई को अपनी योग्यता के अनुसार घटा देना, इस प्रकार के संशोधित एवं परिवर्तित व्यवहार को ही समायोजन की संज्ञा दी जाती है।

अध्ययन की आवश्यकता :- इस अध्ययन को अध्ययनकर्ता ने इसलिए चुना कि माध्यमिक शिक्षा ही उच्च शिक्षा की आधारशिला होती है और इसके प्रभावी होने में शिक्षकों की भूमिका महत्वपूर्ण है, यदि इस स्तर के शिक्षकों का समायोजन ठीक प्रकार से नहीं हुआ तो उनका शिक्षण कार्य भी प्रभावित होगा जिसका असर संपूर्ण शिक्षा प्रणाली पर पड़ेगा अतः शोधकर्ता ने उपरोक्त समस्या का चयन शोध कार्य हेतु किया गया।

शोध से संबंधित सराहनीय योगदान :- व्हाय, ललीथा कुमारी (2013) ने कृष्णा एवं गुन्टूर जिले के माध्यमिक विद्यालयों में कार्यरत प्रधानपाठको के समायोजन, कार्य सन्तुष्टि एवं प्रशासनिक समस्याओं का अध्ययन किया। इस अध्ययन का प्रमुख उद्देश्य माध्यमिक विद्यालयों में कार्यरत प्रधानपाठको के समायोजन, कार्य सन्तुष्टि एवं प्रशासनिक समस्याओं का तुलनात्मक अध्ययन करना था। इसके लिए न्यादर्श कृष्णा एवं गुन्टूर जिले में स्थित माध्यमिक विद्यालयों में कार्यरत कुल 200 प्रधानपाठको का चयन स्तरीकृत न्यादर्श विधि द्वारा किया गया। इस शोध में प्रदत्त संकलन के लिए उपकरण के रूप में श्रीवास्तव एवं तिवारी की “ एडजस्टमेंट इन्वेन्ट्री ” का प्रयोग किया। कार्य सन्तुष्टि के लिए इन्ट्रीशन, प्रमोद कुमार एवं मुथो डी.एन.(1976) का “ जॉब सेटीसफेक्शन क्वेश्चनार ” का प्रयोग किया। इनमें “काई परीक्षण ” ;X² का प्रयोग किया। इस अध्ययन के निष्कर्ष ज्ञात हुआ कि माध्यमिक विद्यालयों के प्रधानपाठको के समायोजन, कार्य सन्तुष्टि एवं प्रशासनिक समस्या का स्तर भिन्न-भिन्न रहा।

कुमार, अखिलेश (2015) ने भोपाल जिले के प्राथमिक विद्यालयों में कार्यरत शिक्षकों व शिक्षिकाओं के समायोजन का तुलनात्मक अध्ययन किया। इस अध्ययन का प्रमुख उद्देश्य प्राथमिक विद्यालयों में कार्यरत शिक्षकों व शिक्षिकाओं के विभिन्न क्षेत्रों में समायोजन व समग्र समायोजन का तुलनात्मक अध्ययन था। इसके लिये न्यादर्श के रूप में भोपाल जिले में स्थित विद्यालयों में कार्यरत कुल 100 शिक्षकों (50 पुरुष शिक्षक + 50 महिला शिक्षक) का चयन साधारण यादृच्छिक न्यादर्श विधि द्वारा किया गया। इस शोध में समायोजन के मापन हेतु डॉ. एस.के. मंगल की 'मंगल टीचर एडजस्टमेंट इंडेन्ट्री' का प्रयोग किया गया एवं प्रदत्त विश्लेषण हेतु 'टी' परीक्षण का प्रयोग किया गया। इस अध्ययन के निष्कर्ष: ज्ञात हुआ कि प्राथमिक विद्यालयों में कार्यरत शिक्षकों व शिक्षिकाओं के मध्य 'सामाजिक-मनौभौतिक समायोजन', 'वित्तीय समायोजन एवं कार्य संतुष्टि' एवं 'समग्र' समायोजन में सार्थक अंतर नहीं पाया गया जबकि शिक्षकों व शिक्षिकाओं के मध्य 'संस्था के शैक्षिक एवं सामान्य पर्यावरण के साथ समायोजन', 'व्यावसायिक संबंधों में समायोजन' एवं 'व्यक्तिगत जीवन में समायोजन' में सार्थक अंतर पाया गया तथा शिक्षिकाओं में 'संस्था के शैक्षिक एवं सामान्य पर्यावरण के साथ समायोजन', 'व्यावसायिक संबंधों में समायोजन' शिक्षकों से बेहतर पाया गया परंतु शिक्षकों में 'व्यक्तिगत जीवन में समायोजन' शिक्षिकाओं से बेहतर पाया गया।

शोध के उद्देश्य : प्रस्तुत शोध कार्य के लिए निम्न उद्देश्य निर्धारित किये गए हैं— ष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी क्षेत्र के पुरुष शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी क्षेत्र की महिला शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी क्षेत्र के समग्र शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषषष शासकीय माध्यमिक विद्यालयों में कार्यरत ग्रामीण क्षेत्र के पुरुष शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। शासकीय माध्यमिक विद्यालयों में कार्यरत ग्रामीण क्षेत्र की महिला शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषषष शासकीय माध्यमिक विद्यालयों में कार्यरत ग्रामीण क्षेत्र के समग्र शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषषषष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी एवं ग्रामीण क्षेत्र में कार्यरत पुरुष शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषषषषष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी एवं ग्रामीण क्षेत्र में कार्यरत महिला शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना। षषषषषषष शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी एवं ग्रामीण क्षेत्र में कार्यरत समग्र शिक्षकों के समायोजन पर उनकी कार्य-संतुष्टि के प्रभाव का अध्ययन करना।

अनुसंधान विधि तंत्र :-

न्यादर्श : प्रस्तुत शोध कार्य में न्यादर्श के रूप में बैतुल जिले के शासकीय माध्यमिक विद्यालयों में कार्यरत शहरी एवं ग्रामीण क्षेत्र के 400 शिक्षकों [(200 शहरी (100 पुरुष + 100 महिला) + 200 ग्रामीण (100 पुरुष + 100 महिला)] का चयन साधारण यादृच्छिक विधि से किया जायेगा। न्यादर्श का विवरण इस प्रकार है—

उपकरण : प्रस्तुत शोध कार्य में प्रदत्त संकलन के लिए निम्न उपकरणों का प्रयोग किया जायेगा— (1) डॉ. एस.के. मंगल की 'शिक्षक समायोजन मापनी' खज।५, (2) प्रमोद कुमार एवं डी.एन. मुथा की 'शिक्षण कार्य-संतुष्टि मापनी'

अध्ययन के चर : प्रस्तुत अध्ययन के चर इस प्रकार हैं – स्वतंत्र चर – शिक्षक कार्य-संतुष्टि आश्रित चर – समायोजन एवं समायोजन के विभिन्न क्षेत्र

क्षेत्र	ग्रामीण	शहरी
पुरुष	100	100
महिला	100	100
कुल	200	200

नियंत्रित चर – शिक्षण का माध्यम (हिन्दी), विद्यालय का प्रकार (शासकीय विद्यालय)
भौगोलिक चर – लिंग, क्षेत्र

शोधकार्य का सीमांकन : अ. शोध कार्य बैतुल जिले के शहरी एवं ग्रामीण क्षेत्र तक सीमित है। ब. यह शोधकार्य शासकीय माध्यमिक विद्यालयों में कार्यरत 400 अध्यापकों तक सीमित है। स. यह शोधकार्य हिन्दी माध्यम के शासकीय विद्यालयों के अध्यापकों तक सीमित है। द. यह शोध कार्य समायोजन एवं कार्य-संतुष्टि के चरों तक सीमित है।

शोध विधि : प्रस्तुत शोधकार्य में प्रदत्तो के संकलन के लिए सर्वेक्षण विधि का प्रयोग किया जाएगा। इस हेतु शोधकार्य के लिए चयनित क्षेत्र बैतुल जिले के शहरी एवं ग्रामीण क्षेत्र के शासकीय माध्यमिक विद्यालयों में कार्यरत 400 शिक्षकों {(200 शहरी (100 पुरुष+100 महिला) + 200 ग्रामीण (100 पुरुष+ 100 महिला)} का चयन साधारण यादृच्छिक विधि से कर उन पर 'समायोजन मापनी' एवं 'शिक्षक कार्य-संतुष्टि मापनी' का प्रशासन किया जायेगा। इस प्रकार संकलित प्रदत्तों का शहरी एवं ग्रामीण, पुरुष एवं महिला आदि भागों में वर्गीकरण कर मास्टर सीट तैयार की जायेगी एवं उन प्रदत्तों का माध्यमान, मानक विचलन, क्रांतिक अनुपात परीक्षण, अनोवा परीक्षण आदि सांख्यिकीय विधियों से विश्लेषण कर निष्कर्ष प्राप्त किये जायेंगे एवं तदनुसार सुझाव प्रस्तुत किये जायेंगे।

शोध कार्य की योजना : प्रस्तुत शोध निम्न चरणों में पूर्ण किया जाएगा – शोधकार्य की सफलता का निर्धारण इस बात पर निर्भर करता है कि शोधकार्य की योजना को वैज्ञानिक तरीके से बनाया जाए। वैज्ञानिक तरीके से बनाई गई शोध योजना में विश्वसनीयता व वैधता का समावेश होता है यदि शोध योजना में विश्वसनीयता अथवा वैधता का समावेश नहीं होगा तो शोध से प्राप्त विभिन्न निष्कर्षों का समाज के लिए कोई औचित्य नहीं रह जाएगा अतः इस हेतु शोध योजना का विशेष महत्व है। शोध योजना में यदि वैज्ञानिक विधि का प्रयोग किया जाए तो उस योजना के सफल होने की संभावनाएँ बढ़ जाती है अतः शोध योजना शोधकर्ता को सफलतापूर्वक अपनी मंजिल तक पहुँचाने में अपना विशेष योगदान देती है। प्रस्तुत शोध के विषय और उसके विभिन्न उद्देश्यों को ध्यान में रखकर वर्तमान शोधकार्य को निम्नानुसार योजना बनाई गई है— क) सर्वप्रथम शोध निर्देशक के साथ सलाह कर शोधकर्ता ने अपनी रुचि के अनुसार शोध की समस्या को चयनित किया। ख) शोध समस्या को चयनित कर शोधार्थी द्वारा विभिन्न सम्बन्धित साहित्यों का अध्ययन किया जाएगा इस हेतु विभिन्न एनसाइक्लोपीडिया जर्नल्स, पुस्तकों, शिक्षा के विभिन्न सर्वेक्षणों का अध्ययन किया जाएगा। ग) तत्पश्चात शोधकर्ता द्वारा शोध संबंधी प्रत्ययों का परिभाषीकरण एवं शोधकार्य हेतु सीमाओं को निर्धारित किया जाएगा। घ) इसके बाद प्रस्तुत शोध से संबंधित विभिन्न उद्देश्यों को निर्धारित किया

जाएगा। ड.) शोध के विभिन्न उद्देश्यों तथा उससे संबंधित विभिन्न शोध साहित्यों के अध्ययन के विश्लेषण के आधार पर शून्य परिकल्पनाओं का निर्माण किया जाएगा। च) प्रस्तुत शोध के उद्देश्यों तथा परिकल्पनाओं के निर्धारण के पश्चात प्रक्रिया विधि और अनुसंधान प्रारूप को निर्धारित किया जाएगा। इसके अंतर्गत न्यादर्श का आकार, न्यादर्श को चयनित करने हेतु विधि, प्रदत्त संग्रहण हेतु आवश्यक उपकरण, चरों को नियंत्रित करना, आकड़ों का संग्रहण करना एवं साथ ही विभिन्न आकड़ों के सांख्यिकीय विश्लेषण हेतु उपयुक्त सांख्यिकीय परीक्षणों को निर्धारित किया जाएगा। छ) न्यादर्श के चयन हेतु मध्यप्रदेश राज्य के बैतूल जिले में स्थित शासकीय माध्यमिक शिक्षा मंडल म.प्र. भोपाल से संबद्धता प्राप्त विभिन्न विद्यालयों की सूची प्राप्त की जाएगी। ज) शोधकर्ता ने अध्ययन हेतु बैतूल जिले में स्थित 10 ब्लकों को चयनित किया जाएगा। इन ब्लकों में से उन शासकीय विद्यालयों को चयनित किया गया जिनमें माध्यमिक कक्षाएँ सम्मिलित हैं। झ) विभिन्न चयनित विद्यालयों के शिक्षकों में से कक्षा 9वीं व 10वीं में अध्यापन कार्य करने वाले 400 शिक्षकों को चयनित किया जाएगा। शिक्षकों का चयन उद्देश्यपूर्ण न्यादर्श विधि से किया जाएगा। ञ) इसी क्रम में आगे विभिन्न चयनित विद्यालयों के शिक्षकों पर विभिन्न उपकरणों को प्रशासित कर प्रदत्तों का संकलन किया गया जाएगा तथा संकलित प्रदत्तों को फलांकन कुंजी की सहायता से जाँचकर मूल प्राप्तांक प्राप्त किए जाएंगे। ट) विभिन्न मूल प्राप्तांकों को शोधकर्ता शोध के उद्देश्यों की आवश्यकता के आधार पर वर्गीकृत कर सारणीयन किया जाएगा तथा मास्टरशीट तैयार की जाएगी। ठ) मास्टर शीट में एकत्रित किए गए प्रदत्तों का विभिन्न सांख्यिकीय विधियों मध्यमान, मानक विचलन, 'टी' परीक्षण एवं अनोवा परीक्षण द्वारा विश्लेषण किया जाएगा। ड) विभिन्न प्रदत्तों के विश्लेषण एवं निर्धारित परिकल्पनाओं के सत्यापन के आधार पर प्राप्त परिणामों की व्याख्या की जाएगी। ढ) प्राप्त परिणामों की व्याख्या व परिकल्पनाओं के सत्यापन के आधार पर निष्कर्ष प्राप्त किए गए जाएंगे व संबंधित सुझाव प्रस्तुत किए जाएंगे। ण) शोधकर्ता ने जिन विभिन्न संदर्भ ग्रंथों को शोध हेतु प्रयोग किया उन्हें संदर्भ ग्रंथ सूची में प्रस्तुत किया जाएगा तथा प्रतिवेदन को मूल्यांकन हेतु प्रस्तुत किया जाएगा।

संदर्भ ग्रंथ सूची :-

1. अग्रवाल, जे.सी (1972) विद्यालय प्रशासन, (द्वितीय संस्करण) आर्य बुक डिपो, करोलबाग, नई दिल्ली, पृष्ठ क्रमांक 112
2. भाई, योगेन्द्रजीत (1974) शैक्षिक एवं विद्यालय प्रशासन, (प्रथम संस्करण) विनोद पुस्तक मंदिर, आगरा, पृष्ठ क्रमांक 84, 85
3. भारद्वाज, दिनेशचंद्र (नवीन संस्करण) विद्यालय प्रशासन एवं स्वास्थ्य शिक्षा, विनोद पुस्तक मंदिर, आगरा, पृष्ठ क्रमांक 207
4. चौबे, डॉ. सरयू प्रसाद (1958) जनतन्त्रात्मक विद्यालय संगठन, (नवीन संस्करण) भारत पब्लिकेशन आगरा, पृष्ठ क्रमांक 47
5. माथुर, एस.एस. (नवीन संस्करण) शिक्षक तथा माध्यमिक शिक्षा, विनोद पुस्तक मंदिर, आगरा, पृष्ठ क्रमांक 55, 56
6. प्रसाद, केशव (नवीन संस्करण) विद्यालय व्यवस्था, विनोद पुस्तक मंदिर, आगरा, पृष्ठ क्रमांक 16, 17
7. शर्मा, आर.ए. (1995) शिक्षा अनुसंधान, सूर्या पब्लिकेशन, मेरठ, पृष्ठ क्रमांक 47, 48
8. शर्मा, आर.ए. (2001) विद्यालय संगठन तथा शिक्षा प्रशासन, आर. लाल बुक डिपो मेरठ, पृष्ठ क्रमांक 219
9. Asthana, Dr Bipin (2007) Measurement and Evaluation in Psychology and Education, First Edition, Vinod Pushtak Mandir, Agra, Pg. No. 97

10. Chandra, Soti Shivendra and Sharma, Rajendra K. (2004) Research in Education, First Edition, Atlantic Publishers and Distributors , New Delhi, Pg. No. 102

JOURNALS:

- Atreya, Jai Shanker (1989) A study of teacher's values and job satisfaction in relation to their teaching effectiveness at degree-college level. Ph.D. , Edu, Agra Univ., in Fifth Survey of Educational Resarch, Vol – 2, Pg. No. 1435
- Bhasin, Chanchal. (1988) Teaching aptitude and its relationship with teaching effectiveness of the higher secondary school teachers in relation to the modern community. Ph.D. , Edu, Rani Durgavati Univ., in Fifth Survey of Educational Resarch, Vol – 2, Pg. No. 1437-38
- Khatoon, Saliha (2011) Emotioanl etetlignce effective teaching of D. ED & B. ED level school teachers. The CTE National Journal, Vol. IX, No. 1, Jan.- June 2011, Page No, 64-68
- Mauya, H.C. (1990) A study of the relationship between teachers attitudes and teacher efficiency of university and pre-university lectures., Ph.D. Psy, Agra Univ., in Fifth Survey of Educational Resarch, Vol – 2, Pg. No. 1455
- Morya, R.T. (1988) A study of the relationship between personality, Aptitude for teaching and effectiveness of secondary teachers. Ph.D. , Edu, Nagpur Univ., in Fifth Survey of Educational Resarch, Vol – 2, Pg. No. 1459
- Prakashaim, D.(1988) A study of teacher effectiveness as a function of school organisational climate and teaching competency. Ph.D. , Edu, Ravishankar Univ., in Fifth Survey of Educational Resarch, Vol – 2, Pg. No. 1465-66
- Reddy, Adinarayan P. (1990) A study of certain socio-psychological factors relating to adult education instructor effectiveness. Ph.D. , Adult Edu, Sri

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अध्यापक शिक्षा की गुणवत्ता

सपना शर्मा

रिसर्च स्कालर (शिक्षाशास्त्र): ज्योति विद्यापीठ महिला विश्वविद्यालय
जयपुर (राजस्थान)

1. प्रस्तावना

मानव समाज एवं देश की उन्नति उत्तम शिक्षकों पर निर्भर है और उत्तम अध्यापक का निर्माण अध्यापक शिक्षा के द्वारा किया जाता है। सम्पूर्ण संसार में अध्यापन को एक श्रेष्ठ व्यवसाय माना गया है, बुद्ध, ईसा, गॉधी, सुकरात ये सभी सच्चे अर्थ में मानव जाति के अध्यापक थे। उन्होंने अपने समय के सामान्य व्यक्तियों द्वारा जीवन में स्वीकार किए जाने वाले मानदण्डों का साहस और ईमानदारी से विश्लेषण किया और उनके उच्चतर जीवन के आदर्श एवं कल्पना को साकार बनाने में तन-मन से जुटे रहे और उन्होंने इस कार्य में विलीन होकर स्वयं अपने व्यक्तित्व की गहराईयों में लोकोत्तर शक्तियां खोज निकालीं। हमारे अबके शिक्षक भी इनके चरण-चिन्हों पर चल करके अपने राष्ट्र के लिए अधिक उज्ज्वल भविष्य का निर्माण कर सकते हैं।

अध्यापक सम्पूर्ण अध्यापन क्रिया की कुंजी है, अध्यापन व्यवस्था के अन्दर आने वाले विभिन्न कारकों जैसे-पाठ्यक्रम, पाठ्यवस्तु और उपकरणों में शिक्षक की गुणवत्ता सबसे अधिक महत्वपूर्ण है। अध्यापक की गुणवत्ता पर ही अध्यापन की श्रेष्ठता निर्भर होती है।

स्वतंत्र भारत में शिक्षक-शिक्षा

स्वतंत्रता प्राप्ति के समय से भारतीय शिक्षा अपने विस्तार के मार्ग पर अति द्रुत गति से अग्रसर हो रही है। फलस्वरूप शिक्षा के अनेक क्षेत्रों के लिए प्रशिक्षित शिक्षकों की मांग में उत्तरोत्तर वृद्धि हो रही है। सम्भवतः इसलिए हमारे देश की शिक्षा की पुनर्रचना में शिक्षक प्रशिक्षण को महत्वपूर्ण स्थान दिया गया था। उसकी कमियों और गुणात्मक उन्नति के उपायों को इंगित करने के लिए शिक्षा आयोगों की नियुक्ति की गई है। और सफल बनाने के लिए विभिन्न कार्यक्रम प्रारम्भ किये गये। उसको अधिक व्यापक बनाया और शिक्षक-शिक्षा का नया जामा पहनाया।

किलपैट्रिक के अनुसार — सर्कस में काम करने वाले नटों और पशुओं को प्रशिक्षण दिया जाता है, पर शिक्षकों को शिक्षा दी जाती है।

राधाकृष्ण कमीशन— ने कहा सच्ची शिक्षा कवल कुछ पाठों को पढ़ना और स्मरण करना नहीं है वरन् जीवन यापन के उद्देश्यपूर्ण कार्यों में भाग लेना भी है।

मुदालियर कमीशन— के सुझाव पर बहुदेशीय विद्यालयों की स्थापना एवं शिक्षकों को व्यवहारिक एवं वैज्ञानिक विषयों में प्रशिक्षण देने के लिए जुलाई 1963 में प्रादेशिक शिक्षा महाविद्यालयों की स्थापना की।

शिक्षा के राज्य संस्थान— इनकी स्थापना तीसरी पंचवर्षीय योजना के अन्तर्गत की गई और इनके द्वारा शिक्षा की गुणवत्ता पर ध्यान दिया गया।

पत्राचार पाठ्यक्रम के माध्यम से अप्रशिक्षित शिक्षकों को प्रशिक्षित किया गया।

शिक्षा आयोग व शिक्षक शिक्षा का विस्तार एवं सुधार

1. राधाकृष्णन आयोग—

1. शिक्षक शिक्षण संस्थानों में सुधार किया जाना चाहिए।

2. शिक्षा सिद्धान्त पाठ्यक्रम लचीले एवं स्थानीय वातावरण के अनुकूल होने चाहिए।
3. पुस्तकीय ज्ञान की अपेक्षा कक्षा शिक्षण में अभ्यास पर अधिक बल दिया जाना चाहिए।
4. शिक्षण के अभ्यास के लिए केवल उपयुक्त विद्यालयों को ही चयन किया जाना चाहिए।
5. छात्राध्यापकों के कार्यों का मूल्यांकन करने में उनकी शिक्षण की सफलता पर विशेष ध्यान दिया जाना चाहिए।
6. शिक्षक-शिक्षण संस्थानों के अध्यापकों को विद्यालय में पढ़ाने का पर्याप्त अनुभव होना चाहिए।
7. शिक्षक-शिक्षण संस्थानों के अध्यापकों द्वारा मौलिक कार्य अखिल भारतीय स्तर पर किया जाना चाहिए।
8. शोध (पीएचडी) डिग्री प्राप्त करने के लिए केवल उन्हीं व्यक्तियों को प्रोत्साहित किया जाना चाहिए जिन्हें कुछ वर्षों का प्रशिक्षण अनुभव हो।

2. मुदालियर आयोग-

1. छात्राध्यापकों को एक या एक से अधिक अतिरिक्त पाठ्य-क्रियाओं में प्रशिक्षण दिया जाना चाहिए।
2. ट्रेनिंग कॉलेज में अभिनतन पाठ्यक्रमों विशेष विषयों में संक्षिप्त सघन पाठ्यक्रमों कार्यशालाओं में व्यावहारिक प्रशिक्षण और व्यावसायिक सम्मेलनों की नियमित रूप से व्यवस्था की जानी चाहिए।

3. कोठारी आयोग (1964-66)

1. शिक्षा की गुणात्मक उन्नति के लिये अध्यापकों की व्यावसायिक शिक्षा का ठोस कार्यक्रम अनिवार्य है।
2. अध्यापकों की व्यावसायिक शिक्षा को प्रभावपूर्ण बनाने के लिये उसे एक ओर विश्वविद्यालयों के साहित्यिक जीवन से और दूसरी ओर विद्यालय-जीवन एवं शिक्षा सम्बन्धी नवीनतम विचारों के सम्पर्क में लाया जाना परमावश्यक है।
3. विश्वविद्यालयों में अध्यापक शिक्षा कार्यक्रम के विकास, अध्ययन एवं अनुसंधान के लिए शिक्षा विभागों की सृष्टि की जानी चाहिए।
4. सभी शिक्षक-शिक्षण संस्थाओं में प्रसार-सेवा विभाग का निर्माण किया जाना चाहिए।
5. छात्र अध्यापकों के शिक्षण अभ्यास के लिए केवल मान्यता प्राप्त स्कूलों का ही चयन किया जाना चाहिए।
6. प्रत्येक राज्य में अध्यापक शिक्षा की राज्य परिषद एवं कॉम्प्रीहेन्सिव कॉलेजों की स्थापना की जानी चाहिए, जिस पर सभी क्षेत्रों एवं स्तरों के अध्यापकों के प्रशिक्षण का उत्तरदायित्व होना चाहिए।
7. आयोग ने शिक्षक-शिक्षण की गुणात्मक उन्नति के लिए इन संस्थाओं के अध्यापकों की शिक्षा में डॉक्टर की उपाधि के अतिरिक्त दो स्नातकोत्तर उपाधियां होनी चाहिए।
8. शिक्षक शिक्षण संस्थाओं के पुस्तकालयों, प्रयोगशालाओं आदि में सुधार होना चाहिए।
9. आठवीं योजना के अंत तक 450 जिला प्रशिक्षण संस्थान के रखे गये लक्ष्य में 363 संचालित हो गये हैं। ये प्राथमिक शिक्षा के क्षेत्र में कार्य कर रहे हैं।
10. माध्यमिक शिक्षण-शिक्षा के स्तरोन्नयन हेतु 31 शिक्षक शिक्षा कॉलेज बज्जम्पस्थापित हुए।
11. 92-93 में 10 उच्च शिक्षा संस्थान की षण्णम्प की स्थापना की संस्तुति की गई।

राष्ट्रीय शिक्षक शिक्षा परिषद N.C.T.E.

राष्ट्रीय शिक्षा नीति 1986 में यह कहा गया है कि राष्ट्रीय शिक्षक शिक्षा परिषद को शिक्षक-शिक्षा संस्थाओं को प्रख्यापित करने तथा पाठ्यचर्या व पद्धतियों के बारे में दिशा-निर्देश प्रदान करने के लिए आवश्यक संसाधन तथा क्षमता उपलब्ध कराई जायेगी। राष्ट्रीय शिक्षक शिक्षा परिषद को शिक्षक शिक्षा प्रणाली के माग में सक्षम बनाने के लिए राष्ट्रीय शिक्षा नीति के कार्यान्वयन के लिए 1986 में तैयार की गई कार्य योजना (Plan of Action P.O.A.) में इसे संवैधानिक दर्जा प्रदान करने की परिकल्पना की गई। इसको संवैधानिक दर्जा प्रदान करने के लिए सन् 1993 में एक अधिनियम बनाया गया। यह अधिनियम छीम छंजपवदंस ब्वनदबपस वित ज्मंबीमत म्कनबंजपवद |बज.1993 के नाम से पुकारा जाता है। इस परिषद का मुख्यालय दिल्ली में स्थापित किया गया।

राष्ट्रीय शिक्षा परिषद का कार्य—

1. शिक्षक-शिक्षा से विभिन्न पदों से सम्बन्धित सर्वेक्षण एवं अध्ययन करना।
2. शिक्षक-शिक्षा के क्षेत्र में विभिन्न उपयुक्त कार्यक्रमों की भारत तथा राज्य सरकारों, विश्वविद्यालय अनुदान आयोग तथा स्वीकृत संस्थाओं को संस्तुति करना।
3. देश में शिक्षक-शिक्षा का विकास, नियन्त्रण तथा समन्वय करना।
4. शिक्षक की नियुक्ति, ट्यूशन, फीस आदि के सम्बन्ध में मार्ग निर्देश प्रदान करना।
5. स्वीकृत संस्थाओं की जबाबदेही के लिए मानदण्ड एवं मूल्यांकन पद्धति का निर्धारण करना।
6. शिक्षक-शिक्षा के व्यवसायीकरण को रोकने के लिए आवश्यक कदम उठाना।
7. शिक्षक विकास कार्यक्रमों के लिए नवीन संस्थानों की स्थापना करना।
8. शिक्षक-शिक्षा के विभिन्न कोर्सों के लिए प्रवेश नियमों, अभ्यर्थियों की चयन प्रक्रिया, कोर्स की अवधि का निर्धारण, कोर्स की विषय वस्तु आदि को निर्धारण करना।
9. शिक्षक-शिक्षा संस्थाओं की स्वीकृति या सम्बद्धीकरण से सम्बन्धित नियमों का निर्धारण करना आदि।

राममूर्ति समिति तथा शिक्षक-शिक्षा—

राममूर्ति समिति के अनुसार वर्तमान शिक्षक शिक्षा कार्यक्रम सिद्धान्त उन्मुख है। इसमें शिक्षक अभ्यास के लिए अधिक समय दिया जाना चाहिए। शिक्षण अभ्यास विद्यालय की वास्तविक स्थितियों से सम्बद्ध होना चाहिए। समिति ने शिक्षक-शिक्षा के शिक्षकों में नतृत्व क्षमता का होना आवश्यक माना है।

निष्कर्ष

शिक्षक-शिक्षा के क्षेत्र में सुधार लाने के लिये विभिन्न महत्वपूर्ण उपाय किये गये हैं। परन्तु पत्राचार पाठ्यक्रमों, समान्तर बी0 एड0 पाठ्यक्रमों, समर बी0 एड0 पाठ्यक्रमों आदि ने शिक्षक-शिक्षा को निम्नतम स्थिति में पहुँचा दिया है। इसके माध्यम से बी0एड0 की डिग्री बेची जा रही है। एक ओर सरकार गुणवत्ता नियन्त्रण पर बल दे रही है दूसरी ओर स्ववित्तीय श्रोतों पर बल दे रही है। विश्वविद्यालयों ने अपनी वित्तीय स्थिति को सुधारने के लिए बी0एड0 को एक साधन बना लिया है। अतः शिक्षक-शिक्षा के स्तर को सुधारने के लिए इन तथ्यों पर ध्यान देना देना होगा और वर्तमान स्थिति को नियन्त्रित करने के लिए कदम उठाने होंगे। इस क्षेत्र में

आज राष्ट्रीय शिक्षक-शिक्षा परिषद की एक आशा की किरण है सम्भवतः इसके प्रयासों से शिक्षक-शिक्षा के क्षेत्र में सुधार हो सके।

संदर्भ ग्रंथ-

1. लाल, रमन बिहारी. शिक्षा के दार्शनिक एवं समाजशास्त्रीय सिद्धान्त, रस्तोगी पब्लिकेशन
2. शर्मा, बी०एन०. शिक्षा मनोविज्ञान एवं मापन, साहित्य प्रकाशन, आगरा-2008
3. डॉ०चौबे, सरयू प्रसाद. शिक्षा के समाजशास्त्रीय आधार, अग्रवाल पब्लिकेशन-2014
4. डॉ०गुप्ता, बी०डी०. और मेजर गुप्ता जे०पी०. शिक्षा शास्त्र, अतुल पब्लिकेशन-2005

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शैक्षिक तकनीकी, उपागम, सम्प्रेषण के माध्यम

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टैक्नोलोजी शब्द ग्रीक भाषा टैक्नीकोस से बना है। तकनीकी का अर्थ वैज्ञानिक पद्धति का व्यावहारिक कार्यों में क्रमबद्ध प्रयोग करना है।

शिक्षा का अर्थ – शिक्षा की उत्पत्ति शिक्ष धातु से हुई है, जिसका अर्थ है– विद्या प्राप्त करना अर्थात् विद्या प्राप्ति के माध्यम से व्यवहारों का निर्माण करना शिक्षा कहलाता है।

शिक्षा तकनीकी को व्यावहारिक अधिगम परिस्थितियों में वैज्ञानिक एवं तकनीकी ज्ञान का विनियोग कहलाता है। 1967 में सर्वप्रथम जोनस ब्राइनमोर ने शैक्षिक प्रौद्योगिकी शब्द का प्रयोग किया था।

इस प्रकार शिक्षा में विज्ञान के नियमों एवं सिद्धान्तों का प्रयोग इस प्रकार किया जाये जिसमें शिक्षण को सरल, रोचक, सुगम, प्रभावी एवं उद्देश्यनिष्ठ बन सके।

शैक्षिक तकनीकी की परिभाषाएँ

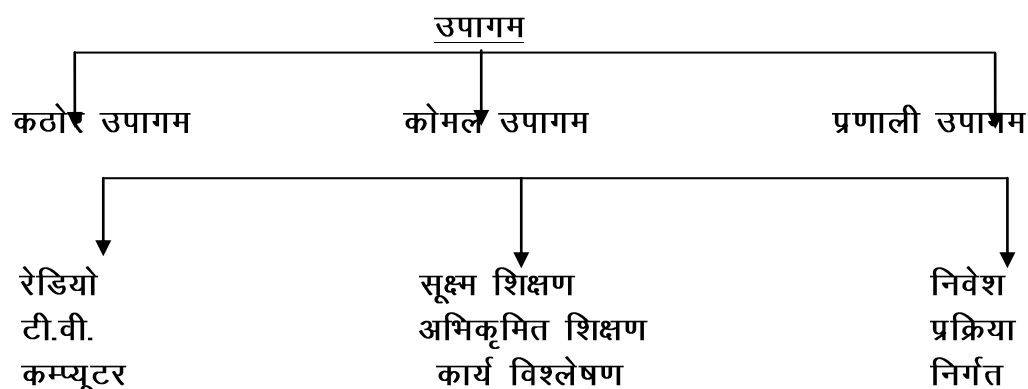
तक्शी साकामाटो के अनुसार :- शैक्षिक तकनीकी व्यावहारिक व प्रयोगात्मक अध्ययन हैं जैसे– शैक्षिक उद्देश्य, पाठ्य-वस्तु, शिक्षण सामग्री, शिक्षण विधि, वातावरण, अन्तः प्रक्रिया को नियन्त्रित करके अधिकतम शैक्षिक प्रभाव उत्पन्न करना है।

अनविन के अनुसार :- शैक्षिक तकनीकी का संबंध शिक्षा और प्रशिक्षण की आवश्यकताओं के लिए आधुनिक कौशल और तकनीकी के प्रयोग से है। इसमें निर्धारण करने एवं मूल्यांकन करने का जो मानव के सीखने एवं सम्प्रेषण पर किये गये अनुसंधानों के परिणामों पर आधारित है।

राबर्ट ए कॉक्स के अनुसार :- मानव की सीखने की परिस्थितियों में वैज्ञानिक प्रक्रिया के प्रयोग को शैक्षिक तकनीकी कहा जाता है।

राबर्ट गने के अनुसार :- तकनीकी का विकास और शिक्षा क्रम में विद्यालय के लिए परीक्षण एवं संचालन का व्यावहारिक ज्ञान है।

शिक्षा तकनीकी के उपागम



- (1) **कठोर उपागम** :- इसमें दृश्य श्रव्य सामग्री को लेते हैं जैसे – रेडियो, टीवी आदि।
- (2) **कोमल उपागम** :- इसमें शिक्षण एवं अधिगम सिद्धान्तों का प्रयोग प्रभावी अधिगम के लिए किया जाता है जैसे- सूक्ष्म शिक्षण, कार्य विश्लेषण आदि।
- (3) **प्रणाली उपागम** :-सम्प्रेषण प्रक्रिया के तत्व निहित होते हैं।

- (1) **निवेश**—इसमें वे सभी सूचनाएँ, उपकरण व सामग्री सम्मिलित की जाती हैं जो उस प्रणाली की प्रक्रिया को प्रारम्भ करने के लिए आवश्यक हैं।
- (2) **प्रक्रिया**—इसमें सामग्री को इस प्रकार सम्पादित किया जाता है जिसमें विद्यार्थियों में अपेक्षित व्यवहारगत परिवर्तन किया जा सके। इसमें छात्रों के कौशल विकसित किये जा सकते हैं।
- (3) **निर्गत (उत्पादन)**— इसमें प्रक्रिया के मूल्यांकन को सम्मिलित किया जाता है जिससे परिणाम का पता लगाया जा सके यह कला शिक्षण तथा अनुदेशन विद्यालय के कार्यक्रमों की गतिशील प्रक्रिया मानी जाती है।

कठोर तकनीकी व कोमल तकनीकी में अंतर

कठोर तकनीकी

(Hardware Technology)

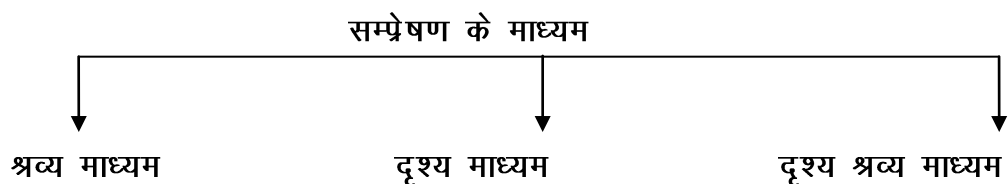
1. इसका उद्गम स्रोत भौतिक विज्ञान व अभियांत्रिकी(इंजीनियरिंग) में हैं।
- 2 इस तकनीकी में अध्यापक व विद्यार्थी का शिक्षण एवं अधिगम हेतु विभिन्न प्रकार सामग्री की दृश्य भव्य सहायक सामग्री की चेष्टा है, हैं, जिसके करता हैं।
3. इस तकनीकी में रेडियो, टी.वी., वीडियो मॉडल टेपरिकार्डर, प्रोजेक्ट व कम्प्यूटर आते हैं।
4. कठोर तकनीकी द्वारा एक ही समय में कठोर शिक्षा प्रदान की जा सकती हैं तथा अधिगम भी स्थायी रहता हैं।
5. कठोर तकनीकी शिक्षण अधिगम प्रक्रिया को अत्यधिक प्रभावशाली बनाने, शिक्षक और प्रभावशाली विद्यार्थियों की शिक्षण अधिगम संबंधी जैसे—मॉडल,ग्रॉफ,आरेख कार्यक्षमता बढ़ाने में महत्वपूर्ण भूमिका निभातेहैं। जैसे : अध्यापक प्रोजेक्टर द्वारा एक समय में विद्यार्थी समूह को अपनी शिक्षण सेवायें दे सकता हैं।

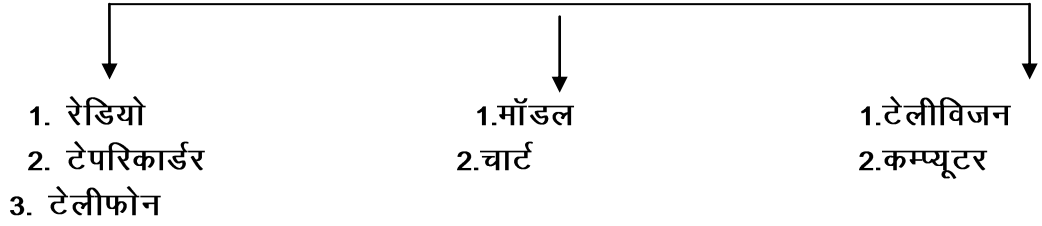
कोमल तकनीकी

(Software Technology)

1. इसका उद्गम स्रोत अधिगम मनोविज्ञान से संबंधित व्यवहार परक विज्ञान हैं।
2. इसमें अधिगम मनोविज्ञान उपयोग करते हुए प्रविधियों व का निर्माण किया जाता उपयोग से शिक्षण अधिगम प्रक्रिया को प्रभावशाली बनाया जा सके।
3. इस तकनीकी में चार्ट, चित्र, प्रविधि आदि आते हैं।
4. कोमल तकनीकी द्वारा तकनीकी में प्रयुक्त जन सम्पर्क तथा जन शिक्षा के साधनों म्प रेडियो,टी.वी. आदि की तरह सुविधाएँ प्रदान नहीं की जा सकती
5. कोमल तकनीकी भी शिक्षण अधिगम प्रक्रिया को बनाता हैं। व चार्टों के उपयोग से शिक्षण को प्रभावशाली बनाता हैं।

शैक्षिक सम्प्रेषण के माध्यम





1.श्रव्य माध्यम

- (1). **रेडियो**—1895 में मारकोनी द्वारा रेडियो के आविष्कार के बाद लोकप्रियता बढ़ी। रेडियो के माध्यम के बिना तार के दूरस्थ स्थानों पर भी आवाज पहुँचायी जा सकती हैं। भारत में सरकारी रेडियो सुविधा को “आकाशवाणी” नाम दिया गया। भारत में शैक्षिक प्रसारण 1938 में प्रारम्भ हुआ।
- (2). **टेपरिकार्डर**—टेपरिकार्डर रेडियो की तरह का ध्वनियंत्र है जिसमें कैसेट के माध्यम से किसी भी ध्वनि को रिकार्ड कर लेते हैं। कैसेट की क्षमता के अनुसार उतनी समयावधि की ध्वनि को रिकार्ड करके रखा जा सकता हैं।
- (3). **टेलीफोन**—संचार के फलस्वरूप टेलीफोन का उपयोग ग्रामीण क्षेत्रों में भी बहुतायत से हो रहा हैं।

2. दृश्य माध्यम

- (1). **मॉडल**— किसी भी वस्तु की प्रतिमा सम्प्रेषण में मॉडल के रूप में प्रयुक्त होती हैं। इस प्रतिमा को कला में प्रदर्शित किया जा सकता हैं। मॉडल के उपयोग से सम्प्रेषण में सरलता से विद्यार्थियों को आकर्षित किया जा सकता हैं। जिससे अधिगम प्रभावी होता हैं।
- (2). **चार्ट**— श्यामपट्ट के उपयोग के बाद सम्प्रेषण का दूसरा माध्यम चार्ट हैं। चार्ट कक्षा के अनुरूप होना चाहिए जिससे विद्यार्थियों को सीखने में सुगमता प्रदान हो व क्रमबद्ध व तार्किक ढंग से प्रस्तुत किया हो।
- (3). **फिल्म पट्टिका (फिल्म स्ट्रीप)**— सम्प्रेषण के माध्यम के रूप में फिल्म पट्टिका का प्रचलन हैं। फिल्म पट्टिका अचल चित्रों की एक श्रृंखला होती हैं। एक फिल्म पट्टिका में लगभग 30 से 50 चित्र होते हैं।

3.दृश्य-श्रव्य माध्यम

- (1). **टेलीविजन**— जे.एल. बेयर्ड द्वारा आविष्कृत इस यंत्र में बहुत ही कम समय में जनता में अपना स्थान बनाया। इलेक्ट्रॉनिक्स के युग में टी.वी. ने सम्प्रेषण का एक शक्तिशाली माध्यम बन गया है। शिक्षा के क्षेत्र में भी उपयोगी सिद्ध हुआ। टी.वी. के द्वारा विख्यात शिक्षकों व अनुदेशकों को सारे देश के या पूरे विश्व के श्रोतओं के सामने प्रस्तुत किया जा सकता है। टी. वी. की सेवा का प्रारम्भ 15 सितम्बर 1959 को हुआ। कृषि दर्शन कार्यक्रम को शैक्षिक कार्यक्रम अगस्त 1965 से प्रारम्भ हुआ। टी.वी. पर शिक्षा से सम्बन्धित दो पाठ दिखाये जाते थे।
- ज्ञानवर्धक पाठ** — ऐसे पाठ जिनसे विषय सम्बन्धी अतिरिक्त मिल जाती है लेकिन पाठयक्रम से सम्बन्धित नहीं होता था।
- प्रत्यक्ष पाठ** — विषय विशेषज्ञों द्वारा निर्मित व उचित सहायक सामग्री की सहायता से पाठ को प्रत्यक्ष रूप से दूरदर्शन पर प्रस्तुत किये जाते थे।

(2). **कम्प्यूटर** – कम्प्यूटर ने शिक्षा के सभी माध्यमों को पीछे छोड़ दिया है। कम्प्यूटर सम्प्रेषण में उपयोगी सिद्ध हुआ है। जिसका विवरण हम पुस्तक कम्प्यूटर आधारित शिक्षण के अन्तर्गत पढ़ेंगे।

(1) **विडियो फोन** –कम्प्यूटर के माध्यम से दूर स्थान पर बैठे व्यक्ति को भी शैक्षिक क्रियाएँ बतायी जा सकती है इसे टेलीकॉन्फ़रेन्सिंग के नाम से भी जाना जाता है।

(2) **इंटरनेट** –कम्प्यूटर के द्वारा इंटरनेट का प्रयोग पूरे विश्व में तीव्र गति से होने लगा तथा शिक्षा में भी यह पूर्ण रूप से उपयोग में आने लगा है।

(3) **ई-मेल** –कम्प्यूटर से इंटरनेट का उपयोग करके संवाद को प्राप्तकर्ता तक तत्काल पहुँचाया जा सकता है।

संदर्भ ग्रंथ सूची

1. शैक्षिक प्रौद्योगिकी एवं शिक्षण विधियाँ – शिवचरण शर्मा विष्णु स्वामी।
2. शिक्षा तकनीकी – एस.के. मंगल,पी.एच.आई. लर्निंग।
3. शैक्षिक तकनीकी के मूल आधार – योगेश कु0 सिंह।
4. शिक्षा तकनीकी – एस.पी. सिंह त्यागी,बिजेन्द्र सिंह।

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ATTACKING ROUNDS ASSESSMENT FOR FFO, PSO AND ACO DURING MULTI PATH ROUTING IN WSN FOR NODE CAPTURE ATTACK

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Abstract - Optimization is today's word of action that decides the future success of any mathematical problem and real-life problem. Energy optimization, power optimization, time optimization etc. are few among many concerns. Variety of optimization algorithms are proposed by many researchers in different contexts. This paper is a detailed comparison of optimization techniques, like, ACO, PSO and FFOA for an outbreak in detention of nodes, purely specific to WSN. In this, the whole experimental evaluation is to capture those nodes which are in association with maximum number of nodes. The simulation result illustrates that attacking rounds is least for FFO.

Keywords: FF Optimization, Node Capture.

1. INTRODUCTION

In today's world everyone and everything is increasingly connected. We are actually in the era of Ambient Intelligence [2]. It is the technology that simplifies all aspects of life. It connects all the parts of life. It captures sensor data from mobile devices and molds it into real time data for better results. It is an electronic environment which is also a part of pervasive computing environment. There are many communications like person-to-person, person-to-machine and machine-to-machine. But, prominently that emerged amongst these is WSN [25].

2. LITERATURE REVIEW

Research on this topic is noteworthy and quite a lot of them have described copious techniques using vulnerability valuation, rampant philosophy and investigation of probability functions [6]. The intruder very natively attacks the center of source, take away the cryptographic keys to distress the shield, uniformity and concealment.

3. APPLICATION OF OPTIMIZATION TECHNIQUES ON FUNCTION

The basic principle behind node capture attack [7] is to select those nodes which can be easily attacked. This is done to get hold on a node that has attachments to many other nodes and that can easily destroy the whole network. Therefore, that route is chosen which has multiple paths. This destructs the whole network easily. Optimization Techniques under consideration are 1. Ant Colony [25] Optimization (ACO), 2. Particle Swarm [25] Optimization (PSO) and 3. Fruit Fly Optimization [25] (FFO).

In order to instigate node capture attack [2] algorithm, the prominence is given on attacking individual nodes that has connection with most of the other nodes. Therefore, those arcs with different paths that have maximum connections are tried to be captured. Attacker or an assailant tries to find those sensor nodes that assure multiple objectives [6] with large contribution to vertex and maximum number of cryptographic keys associated with it.

4. EXPERIMENTAL PARAMETER, SIMULATION, RESULTS AND ANALYSIS

All the optimization techniques were implemented with the same parameters. The multi objective function for node capture attack was applied and Simulation was done. The results were compared. In simulation, 10 starting and 3 destination vertices were randomly selected in the WSN amongst 200 scattered sensor nodes. Attacking rounds were taken into consideration for multi path over the run of 200 iterations for in the range of 20 m. The performances of various optimization techniques in terms of attacking rounds [25] are calculated.

4.1 Attacking Rounds [4]

In this simulation [4], number of round [4] for attacks is calculated. The intruder wishes to outbreak the collaboration of the network [25]. Table 1 shows the experimental values of multi path routing for attacking rounds and figure 1 shows the comparative attacking rounds in multi path routing respectively. The traffic that is conceded is unswervingly correlated to Attacking rounds; therefore, the result of FFOA is best. It has reduced number of rounds needed for confronting rounds than ACO along with PSO [25].

Table 1: Simulation Values for Attacking Rounds in Multiple Path Routing

No. of keys	Ant Colony Optimization [25]	Particle Swam Optimization [25]	Fruit Fly Optimization Algorithm [25]
20	17	16	15
25	17	16	15
30	18	17	16
35	19	18	17
40	19	18	17
45	20	19	18
50	20	19	18
55	21	20	19

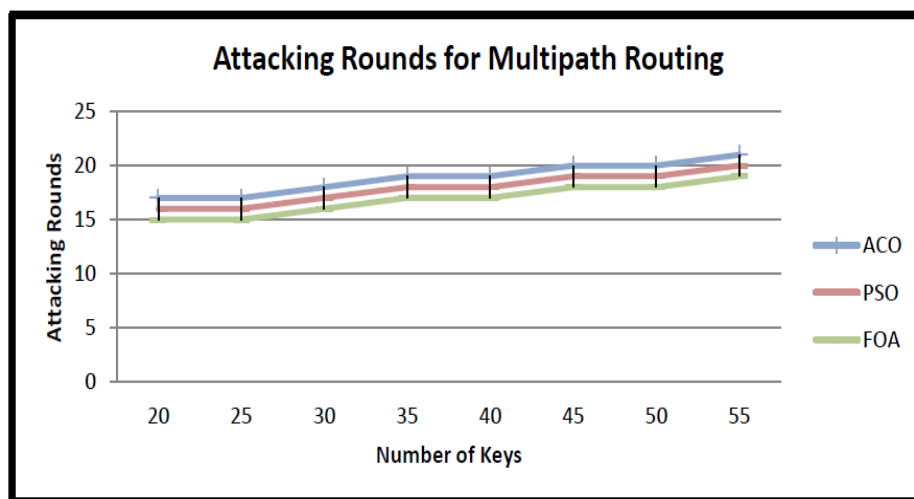


Figure 1: Attacking Round Comparison

5. CONCLUSION

This paper is a comparative analysis of FFOA with the other two contemporary optimization algorithms, like, ACO and PSO. With the help of four models named – network, key Predistribution, link and adversary models, rounds of attack are designed. It is then compared. The optimization techniques for this simulation were

FFOA, ACO and PSO. The simulation outcome demonstrates that FFOA attains smallest rounds of attack when equaled with ACO and PSO. Therefore, FFOA gives minimum number of attacking rounds as equated to all the counterpart optimization techniques by seizing lowest nodes that camouflage the whole network.

REFERENCES

1. Bhoopathy V. and R.M.S. Parvathi, "Securing Node Capture Attacks for Hierarchical Data Aggregation in Wireless Sensor Networks", International Journal of Engineering Research and Applications, IJERA, Vol. 2, Issue 2, pp-466-474, 2012.
2. Karl H., Wiig A., "Protocols and Architecture for Wireless Sensor Networks", Wiley Publication.
3. Tague P., "Modeling Node Capture Attacks in Wireless Sensor, Networks", 2011.
4. M. Shamuganapriya, S. Divakar, "Countering Smart Attack and Selective Capture in Wireless Sensor Networks Using Genetic Algorithm", International Journal of Science, Engineering and Technology, 2016, Volume 4 Issue 1, pp-274-280, 2016.
5. Amandeep Kaur and Sandeep Singh Kang, "Attacks in Wireless Sensor Network- A Review", International Journal of Computer Sciences and Engineering, IJCSE, Vol. 6, Issue 4, pp-157-162, 2016.
6. Lin C., Guowei W., "Enhancing the attacking efficiency of the node capture attack in WSN: a matrix approach", J Super Computer, Springer Science & Business Media, 2013.
7. Lin C., Guowei W., Chang W. Y., Lin Y., "Maximizing destructiveness of node capture attack in wireless sensor networks", J Super Computer, Springer Science & Business Media, Vol. 71, pp-3181-3212, 2015.
8. Chi Lin, Tie Qiu, Mohammad S. Obaidat, Chang Wu Yu, Lin Yao and Guowei Wu, "MREA: a minimum resource expenditure node capture attack in wireless sensor networks", Security And Communication Networks, Wiley Online Library, Vol. 9, pp-5502-5517, 2016. (DOI: 10.1002/sec.1713).

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A REVIEW ON ACCURACY OF A SENTIMENT ANALYSIS SYSTEM ON BRAND REPUTATION MANAGEMENT

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Abstract - With the arrival of social media into people's lives, media analysts have a greater pool of data to base for reputation analysis. In the early days of social media when it mostly constituted of the blogosphere, this was still manually feasible. Micro blogs (posts on Twitter, Facebook, etc.) are often very close to the moment the customer has contact with the brand or product. The reputation of a company is an integral part of its value. This paper discuss the scientific work flow of sentiment analysis and presents proposed workflow system tool to improved the sentiment analysis with different features and also find reputation of a product or brand for business Intelligence

Keyword: Sentiment analysis, reputation, social media, Business Intelligence.

1 INTRODUCTION

Before social media emerged on the internet, most of the communication was personal and mass communication was left to journalists, politicians, companies, or public figures. Social media now enables everyone to communicate about anything to everyone [1]. Filtering this flood of information for relevancy is vital. Unlike traditional written media, social media is transient, similar to personal conversations.

1.1 Reputation

The reputation of a company is an integral part of its value [3]. In fact, a common hypothesis in business analytics is that the reputation of a company has a direct correlation with revenue [4] and can act as a buffer from economic loss. Why is that? A bad financial reputation (e.g., due to a bad financial report) shies away investors. A company with a bad reputation for the workspace environment shies away human capital. A bad reputation for customer relations takes the wrath of potential and standing customers upon them. Measuring reputation, however, is a difficult problem. In earlier days, media analysts followed public opinion based on mentions in newspapers and polls [1].

In the commercial world, consumer's feelings or opinion towards some product or product are very significant for its sell. Therefore in decision making and in real world applications, sentiment analysis plays a major role. Reputation Generation tries to estimate the sentiment in a sentence that mentions the brand and aggregates this sentiment to measure the overall reputation. However, just using sentiment is an inaccurate proxy to measure the reputation a tweet has on the reputation of an entity. The proposed work focuses on reputation analysis on social media like twitter. We show that filtering works very well with manual assistance and that the key is to use improved sentiment analysis with different features also to find reputation of a product or brand [7].

2. BACKGROUND AND LITERATURE SURVEY

Businesses have witnessed a number of changes that have affected the competitive landscape of companies in different industries. The impressive advances of the applications of information technology coupled with the reduction of costs in infrastructure have resulted in accelerated competition among companies. The need for companies to constantly innovate products and services to achieve competitive advantage in the market is accompanied by the strong need for innovative methods in marketing their products and services. How a company preserves its brand's reputation has been highly influenced by how well a brand is shaped on the web and what customers think of the brand and how they review the brand and its products and services on the social media [11]. Thus, the ability to discover this information from social media resources using automated methods has become an essential component to the success of companies.

Now day's fast spreading usage of social media, many websites have offer reviews of items like books, cars, mobiles, movies etc. They describe the product in some detail and evaluate them as good/bad, preferred/not preferred, so it is necessary to categorize these reviews in an automated way. Sentiment analysis is one kind of computational technique of Artificial Intelligence. Sentiment analysis is a task of identifying positive and negative opinion, emotion and evaluation in text available over the social networking websites and the World Wide Web. The sentiment analysis has been gained quite popularity in the recent years. The analysis serves as an important feedback for further improvement in the offered services and user experiences. Sentiment Analysis is the thorough research of how opinions and perspectives can be relate to ones emotion and attitude shows in natural language respect to an event. Recent events show that the sentiment analysis has reached up-to great achievement which can surpass the positive vs negative and deal with whole arena of behavior and emotions for different communities and topics. In the field of sentiment analysis using different techniques good amount of research has been carried out for prediction of social opinions. Pang and lee (2002) proposed the system where an opinion can be positive or negative was found out by ratio of positive words to total words. Later in 2008 the author developed methodology in which tweet outcome can be decided by term in the tweet. Jiang (2011) and Tan (2011) have applied maximum entropy (Max-Ent), Naïve Bayes (NB) and support vector machines (SVM) as supervised classifiers [9].For this research, we have selected Twitter for experimentation as a dataset because user generated content on Twitter is produced at an enormous rate of 500 million tweets per day and more than 302 million active uses (who log at least once a month) based on official Twitter statistics [13]. According to the Arab Social Media Report, Twitter usage is booming in Saudi Arabia, in particular, with around 2.4 million users and 40% of the tweets produced in the Arab region [14]. Saudi Arabia has more than twice the number of users than second-placed Egypt.

Twitter also provides readily available data collections that are free to developers and researchers for experimentation [15]. Twitter is also widely used and most popular and is applied in many domains [12]. Another reason for choosing Twitter is that most of its tweets are public [16]. Tweets are also concise as they are limited to 140 characters. Finally, it is possible to collect text posts (tweets) of users from various social and interest groups [17] as Twitter is widely used by different audiences. Twitter gives permission to third party developers to use its public API [18].Twitter has become a popular social media service where millions of users contribute on a daily basis and which stands out as the micro blogging service par excellence. Launched in July of 2006, Twitter is today one of the top 10 most visited

Internet sites. As from February 2014, Twitter has more than 241 million of monthly active users and more than 500 million tweets are published per day. Two features have been fundamental in its success: the shortness of tweets, which cannot exceed 140 characters, facilitates creation and sharing of messages in a few seconds; and the easiness of spreading those messages to a large number of users in very little time. Throughout time, the community of users on Twitter has established a syntax for interaction, which has been later officially adopted by its developers. Most major Twitter clients have implemented this standard syntax as well. The standards in the interaction syntax include:

User mentions: when a user mentions another user in their tweet, an at-sign is placed before the corresponding username, e.g., You should all follow @username, she is always abreast of breaking news and interesting stuff.

Replies: when a user wants to direct to another user, or reply to an earlier tweet, they place the @username mention at the beginning of the tweet, e.g., @username I agree with you.

Retweets: a retweet is considered a re-share of a tweet posted by another user, i.e., a retweet means the user considers that the message in the tweet might be of interest to others. When a user retweets, the new tweet copies the original one in it. Furthermore, the retweet attaches an RT and the @username of the user who posted the original tweet at the beginning of the retweet. For instance: if the user @username posted the tweet Text of the original tweet, a retweet on that tweet would look this way: RT

@username: Text of the original tweet. Moreover, retweets can further be retweeted by others, which creates a retweet of level 2, e.g., RT @username2: RT @username: Text of the original tweet. Similarly, retweets can go deeper into 3rd level, 4th, and so forth.

Hashtags: similar to tags on social tagging systems or other social networking systems, hashtags included in a tweet tend to group tweets in conversations or represent the main terms of the tweet, usually referred to topics or common interests of a community. A hashtag is differentiated from the rest of the terms in the tweet in that it has a leading hash, e.g., #hashtag.

2.1 Process of Sentiment Analysis:

Sentiment Analysis is the process of finding the opinion of user about some topic or the text in consideration, it determines whether a piece of writing is positive or negative. The various challenges in sentiment analysis is one that the public don't always express sentiments in same way means some express in the form of ratings and some in the form of comments and second involving sentences that don't express any sentiment. The sentiment analysis process is shown in figure1 The text preparation step performs required text pre-processing and cleaning on the dataset which including removal of stop words. Sentiment identification step determines the sentiment of people expressed in the text and analyzes it. Finally, sentiment classification is conducted to get the results. Recently, sentiment analysis has attracted an increasing interest. It is a hard challenge for language technologies, and achieving good results is much more difficult than some people think. The task of automatically classifying a text written in a natural language into a positive or negative feeling, opinion or subjectivity is sometimes so complicated that even different human annotators disagree on the classification to be assigned to a given text. Personal interpretation by an individual is different from others, and this is also affected by cultural factors and each person's experience. And the shorter the

text, and the worse written, the more difficult the task becomes, as in the case of messages on social networks [19].

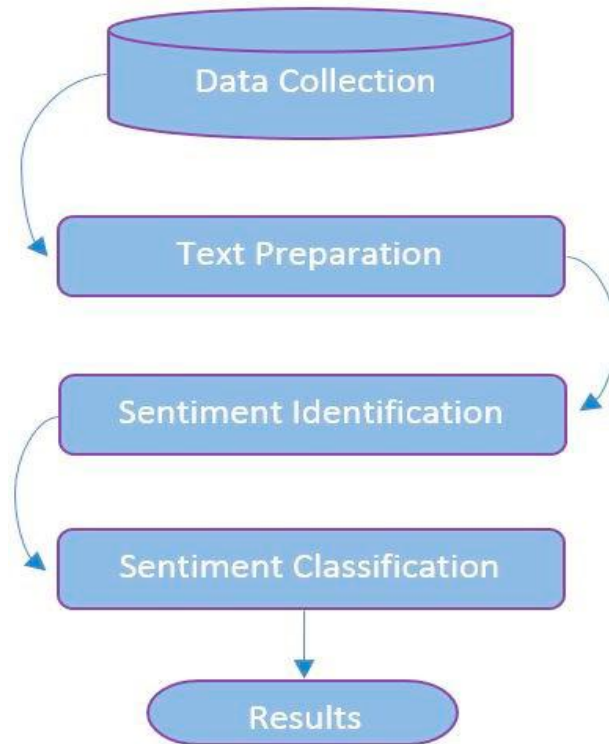


Figure 1: Sentiment analysis model.

In feature extraction, a sentence or document is broken into words to build up the feature matrix. In the matrix, each sentence or document is a row and each word form a feature as a column, and the value is the frequency count of the word in the sentence or document. Feature matrix is then passed to each classifier and their performance is evaluated [20]. In this work, we have studied the classification of sentiment using two popular algorithms, namely Support Vector Machine, and Random Forest. Text classification play an important role in many applications, it assigns one or more classes to a document according to their content. Classes are selected from a previously established taxonomy (a hierarchy of categories or classes). The text classification supports a variety of text classification scenarios like:

- Binary classification like simple sentiment analysis (positive, negative)
- Multiple class classification like selecting one category among several alternatives.

Most partitioning algorithms do not take raw text as input but numeric vectors. For this it is necessary to find a representative transformation that converts the text to digital vectors. A family of this transformation is called Bag-of-Words (BOW). The taxonomy of sentiment analysis methods are classified into different categories shown in figure2. [8].

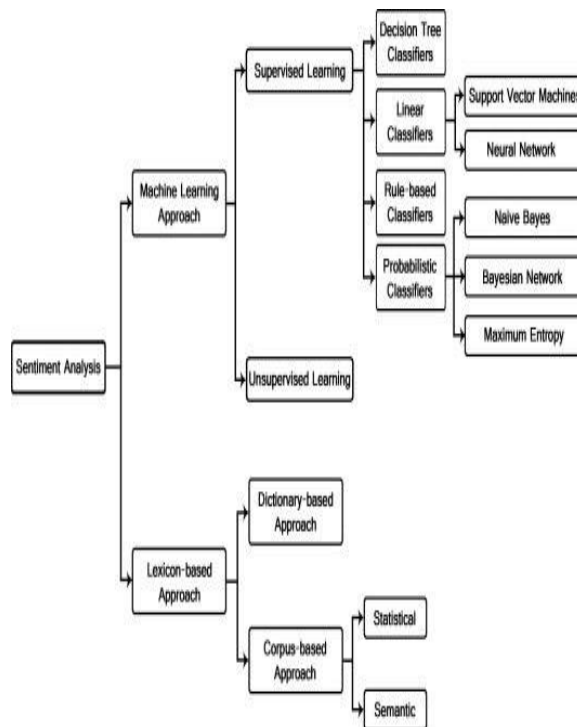


Figure 2: Taxonomy of Sentiment Analysis Methods.

2.2 Comparison based on Existing Algorithms:

Authors	Implemented Algorithm(s)	Limitations
Pranalini <i>et al.</i> (2018)	The Maximum Entropy Algorithm uses Entropy as a criterion to polarize the text into the concerned classes of Positive, Negative and Neutral with the help of the training data provided. The Maximum Entropy Algorithm is a probabilistic model, which excels in the classification of text. It also takes relatively less time to train the data when compared to other algorithms.	The essential principle of Maximum Entropy is that the probability distribution should be uniform when there is no pre-knowledge. Maximum Entropy provides the probabilities with which a document belongs to a particular class, we simply picked the most probable class as the system's guess.
Pandey <i>et al.</i> (2016)	In this paper, we will discuss the extraction of sentiment from a famous micro blogging website, Twitter where the user posts their views and opinion. We have done sentiment analysis on tweets which help to provide some prediction on business intelligence. We use Hadoop Framework for processing movie data set that is available on the twitter website in the form of reviews, feedback, and comments.	The HDFS creates the problem of De-Duplication of chunks, which will affect the accuracy. The pre-processing and data cleaning is not so well done, due to distributed nature. It is very time consuming process to analyze the huge amount of data in a short period of time.

Malik, <i>et al.</i> (2018)	The main emphasis of this research is on the classification of emotions of tweets' data gathered from Twitter. In order to improve classification results in the domain of sentiment analysis, we are using ensemble machine learning techniques for increasing the efficiency and reliability of proposed approach.	The work of proposed model has gone through pre-processing stage and classifiers learning stage. For analytical evaluation of the proposed classifier accuracy and f-measure are used. Efficiency is not so good due to its hybrid nature.
Das <i>et al.</i> (2017)	In this paper, we present a simple and robust work to gather, analyze and graphically represent people's opinion about India's new taxation system using Naive Bayes algorithm.	Naive Bayes Classifier primarily works on the conditional probability theory. It offers the assumption of a particular feature from a class of features. But not necessarily, it will come out as the accurate one. It only work if the probability that is already recorded for a particular class.
Tekchandani <i>et al.</i> (2017)	We applied supervised machine-learning algorithms like support vector machines (SVM), maximum entropy and Naïve Bayes to classify data using unigram, bigram and hybrid i.e. unigram + bigram features. Result shows that SVM surpassed other classifiers with remarkable accuracy of 84% for movie reviews.	In this paper, we have done comparative analysis on supervised classifiers like Naïve Bayes, support vector machines and maximum entropy using unigram, bigram and hybrid (unigram + bigram) feature. Naive Bayes is used for classification.

Table 1 ideas based on past research.

3. PROPOSED PROBLEM STATEMENTS

There are following issues in the sentiment analysis but sometimes the main problem is occur while opinion suitable for user group became harmful for the manufacturer or vice versus which are elaborate by Bing Liu in his book "Sentiment Analysis and Opinion Mining".

- 1. A positive or negative sentiment world may have their opposite meaning in a particular domain so it is hard to predict by its keyword meaning.**

Ex- the picture quality of this camera is **high** and the resuming time of this camera is also **high**. In this sentence the first HIGH is showing the positive sentiment for the camera but the second high is showing the negative sentiment for the camera.

b. **Interrogative Sentence** An interrogative sentence may not have neither positive nor negative sentiment but the key word used in the opinion may be positive or negative.

Ex1. Can anybody tell me **is HCL a good laptop** for an engineering student for multicore programming?

- 2 What are the good and bad functionality of hero-Honda motorcycle?**

Such kind of sentences don't have any positive or negative sentiment for analysis but the keyword used in such sentences have its precious and valuable meaning for analyzing any sentences.

- 3 Sarcastic Sentences**

Few sentences in the form of jocks may violate the meaning of the whole sentences such kind of sentence need a power full attention toward the keywords and sentences. These funny sentences not only violet the sentence of a particular

sentence but also destroy the value of the whole document. Ex-1. What a Great Car? It stopped Working in 10 days. Who is going to purchase such beautiful car?

- 4 Sentiment without sentiment words sometimes sentiments does not use any sentiment words like good, better, best, worst ,bad etc. but the sentences may have its positive or negative feedback about the product , services and policies. Ex- this car consume lot diesel from Delhi to Chandigarh then the other one. This sentence showing the negative sentiment but it is not using the any sentiment word.

5 Natural language Issues Change Place to Place

Motorola word can be used as motto, Lamia word can be used as Lummi. Such kind of sentences changes the meaning of the issue and sentences.

- 6 Conditional sentences conditional sentences are also an issue in Sentiment mining conditional sentences is also creating the same problem like interrogative sentences. Ex- If the picture quality of this camera is good I will buy it. The primary question for sentiment analysis is how to map a tweet to a correct emotion, which user tried to express.

The first problem is unstructured, ungrammatical text. Since tweet messages are restricted to 140 characters length, users may have a propensity to use abbreviations, slangs, or emoticons to shorten the text. This issue can lead to unusual messages. The second problem is the fact that tweet messages are not always correct. During fast typing, or using mobile phones as input device, user may have mistyped text and make the analysis step harder. The third problem is ambiguity. Due to the small amount of information, it is difficult to identify the corresponding objects of interest. For example: “Apple” can either be a laptop brand or a fruit. The fourth problem concerns which concrete emotion to focus on analyzing since human emotion is very diverse. The difficulty lies in the fact that there could be mixed opinions in a document, and with the creative nature of natural languages, people may express the same opinion in vastly different ways, sometimes without using any opinion words. Online Social Networks, along with the micro-blogging websites, have become the top priority for the user to express their thoughts on a particular product or an event or any activity, and that too in real time. Sentiment Analysis is used to derive inferences from diverse texts. This appealing property of the Sentiment Analysis can be used to extract reviews, to conduct election polls and to determine answers to trending questions. By studying and interpreting the user's behavior on the social online networks, the users determine as to how the customers take their products and services, and also figure out, ways and means, to better their brand reputation and exponentially increase their electronic commerce.

4. PROPOSED SYSTEM

Workflow of proposed system will be given below:

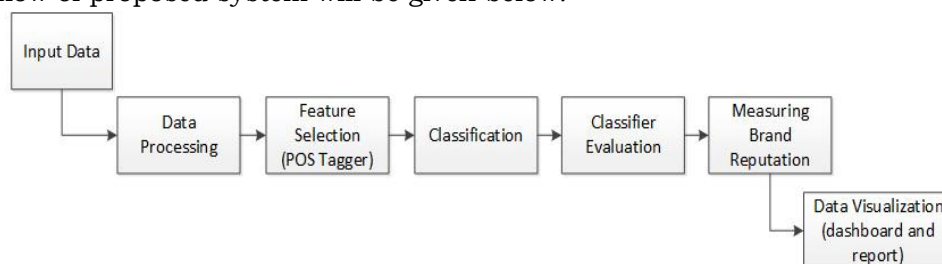


Figure 3: Proposed workflow

Firstly, we will extract data from Twitter API. Beside of the structure of the collected data, the raw elements in the dataset need to be preprocessed in order to obtain the information necessary for the analysis. The operation that was performed on the text are:

- Lowercase conversion
- URLs removal
- Retweet indication removal
- User mention removal
- Hashtag removal
- Emoticon removal
- Stop-words removal
- Tokenization

After pre-processing feature selection will be performed. In the modeling and classification step, we use various classifiers algorithm like Naïve Bayes, Support Vector Machine, and Decision Tree. We also proposed a hybrid classifier for the system to improve accuracy. In proposed system we also find sentiment on various aspects of the product. For getting brand reputation we will uses following indicators:

- Account
- No of followers
- No of profile tweets
- No of retweets
- No of likes
- Average likes
- Tweet sentiment, etc

In the evaluation step, the effectiveness of each classifier was tested with the same data sources. A classifier that gives the best accuracy was used to measure the brand reputation. Proposed system will categories sentiments on various classes like positive, strongly positive, negative, strongly negative and neutral. After feature selection a query will produces final result that will be displayed in table and chart form. Result will contains all social media indicators according to the feature selected. Performance will be also calculated.

4.1. Technical Specifications

Following are minimum specifications for development of the system:

Operating System	Any OS with Java and python installed but Windows 64-bit OS recommended.
API Used	twitter api
Database	MongoDB
Programming Language	Java/Python

Table 2 : Technical Specifications.

5. CONCLUSION

System will find sentiment analysis for a particular product or brand.

Sentiments will also be according to various features like gender, location etc. Output will be generated using optimal sentiment analysis on various tweets,

comments and posts. It will categorize sentiment into various polarity for positive, negative, highly positive, strongly negative and neutral. Final outcome will contain various social media indicators. Output will be shown in tabular as well as chart form. Performance analysis will be performed using various solutions.

REFERENCES

1. J. Van Dijck. *The culture of connectivity: A critical history of social media*. Oxford University Press, 56, 195-197, 2013
2. P. Gillin. *The New Influencers: A Marketer's Guide to the New Social Media*. Quill Driver Books, Sanger, CA, 2007
3. D. Stacks. *A Practitioner's Guide to Public Relations Research, Measurement and Evaluation*. Business Expert Press, 2010
4. C. B. M. van Riel and C. J. Fombrun. *Essentials of corporate communication*. Routledge, 2007
5. D. L. Hoffmann and M. Fodor. Can you measure the ROI of your social media marketing? *MIT Sloan Management Review*, 52, 40-49, 2010
6. P. Dyer. Blogs influence consumer spending more than social networks, 2013
7. B. Jansen, M. Zhang, K. Sobel, and A. Chowdury. Twitter power: Tweets as electronic word of mouth. *Journal of the American Society for Information Science and Technology*, 2009
8. Upma Kumari, Arvind Sharma et. al, A cognitive study of sentiment analysis techniques and tools", *International Journal of Computer Science and Technology*, IJCSST, 8, 58-61 2017
9. L. Jiang, M. Yu, M. Zhou, X. Liu and T. Zhao, "Target dependent twitter sentiment classification", *Proceedings of the 49th Annual Meeting of the Association for Computational Linguistics: Human Language Technologies*, 1, 151--160, 2011
10. Ohana, B., & Tierney, B. "Sentiment Classification of Reviews Using SentiWordNet" *Proceedings of the 9th. IT&T Conference*. Dublin: Dublin Institute of Technology. 2009
11. Bernoff, J., & Li, C. *Harnessing the Power of the Oh-So-Social Web*. MIT Sloan Management Review, 49, 36-42, 2008
12. Lidman, M. *Social Media as a Leading Indicator of Markets and Predictor of Voting Patterns* (Master's Thesis). Umea University. 2011
13. Twitter Inc. (2015). *Twitter Usage*. Retrieved May 26, 2015
14. *Twitter in the Arab Region*. (2014, March). Retrieved May 26, 2015
15. Kumar, S., Morstatter, F., & Liu, H. (2014). *Twitter Data Analytics*. Springer. 2014
16. Chen, X., Madhavan, K., & Vorvoreanu, M. (2013). A Web-Based Tool for Collaborative Social Media Data Analysis. *Proceedings of the 2013 IEEE Third International Conference on Cloud and Green Computing*, 383-388, 2013
17. Pak, A., & Paroubek, P. (2010). Twitter as a Corpus for Sentiment Analysis and Opinion Mining. *Proceedings of the International Conference on Language Resources and Evaluation LREC 2010*
18. Twitter Inc. (2014). *Documentation*. Retrieved February 6, 2015
19. Duric Adnan, Song Fei., "Feature selection for sentiment analysis based on content and syntax models", *Decis Support Syst*, 53, 704-11, 2012
20. Hemnaath, R., and Low, B.W. "Sentiment Analysis Using Maximum Entropy and Support Vector Machine." *Semantic Technology and Knowledge Engineering*, 2010
21. Prof. Pranalini A. Joshi, Garry Simon, "Generation of Brand/Product Reputation using Twitter Data", *IEEE* 2018
22. Huma Parveen, Shikha Pandey, "Sentiment Analysis on Twitter Data-set using Naive Bayes Algorithm" *IEEE*-2016
23. Megha Rathi, Aditya Malik, et. al., "Sentiment Analysis of Tweets using Machine Learning Approach", *IEEE*-2018
24. Sourav Das, Anup Kumar Kolya, "Sense GST: Text Mining & Sentiment Analysis of GST Tweets by Naive Bayes Algorithm" *IEEE*-2017
25. Rohit Joshi, Rajkumar Tekchandani, "Comparative Analysis of Twitter Data" *IEEE*-2017

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A SURVEY PAPER ON CLASSIFICATION OF SYBIL ACTIVITIES ON ONLINE SOCIAL NETWORK USING MACHINE LEARNING TECHNIQUES

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Abstract - Social networks are known to be vulnerable to the so-called Sybil attack, in which an attacker maintains massive Sybils and uses them to perform various malicious activities. So, Sybil detection is a basic security research problem. Structure-based solution methods have to be promising at detecting Sybils. Sybil detection are very important task in cyber security research. Previously last many years, various data mining algorithms have been adopted to fulfill such task. Using classification and regression for sybil detection is a very challenging task. Despite of existing research made toward modeling classification for sybil detection and prediction, this research has proposed new solution on how sybil activity could be tracked to address this challenging issue. Prediction of sybil behaviour has been demonstrated by analysing the classification and regression techniques, using various machine learning algorithms.

Keywords: Sybil attack, social network, machine learning, classification, malicious activity.

I. INTRODUCTION

A huge quantity of information is being collected and hold on in databases across the globe and its house stations, and this trend continues to extend year upon year. such a lot valuable information is hidden in these information, it's much not possible to mine them while not an automatic extraction technique. Over past years, several algorithms, known as nuggets, are created to extract this data victimization varied methodologies like classification, association rules, clustering, and lots of a lot of.

Sybil detection is a crucial topic in cyber security analysis. The evolution of sybil defense protocols have leveraged the structural properties of the social graph, with an underlying distributed system, to spot sybil identities. investigator team initial processed the deep association between sybil defense and also the theory of random walks that crystal rectifier to a community detection rule that, for the primary time, offered demonstrable guarantees within the context of sybil defense. planned analysis the sybil guard approach explains, sybil guard, could be a new protocol for defensive against sybil attacks while not looking forward to a trusty central authority. Sybil guard exploits this property to bind the amount of identities a malicious user will produce. The researchers proven the effectiveness of sybil guard each analytically and through an experiment. Network of friends contain the honest devices, and its networks of foes contain the suspicious devices. With the assistance of those 2 networks, the device is then able to confirm whether or not an unknown individual is winding up a sybil attack or not. Mining (Social) Network Graphs to sight Random Link Attacks analysis mine the social networking graph extracted from user interactions within the communication network to search out RLAs and formally outline RLA and show that the matter of finding an RLA is (theory) NP-complete. Discussing defensive sybil attacks in specific varieties of MSNs

supported the past focus researchers. analysis planned a security mechanism to sight and eliminate sybil nodes [1]. Researched on sybil attacks and their defense within the IoT planned survey sybil attack and munition in IoT. Their analysis explained concerning the kinds of sybil attacks considering sybil attacker's capabilities. Also, the analysis given some sybil defense schemes, with a social graph primarily based sybil detection, behaviour classification primarily based sybil detection and mobile sybil detection with the excellent comparisons [2]. Sybil attackers oftentimes amend their pseudonyms to cheat different users. investigator investigated the contact statistics of the used pseudonyms and detected sybil attackers by comparison the contact statistics of pseudonyms from traditional users which from sybil attackers.

II. RELATED WORK

We classify structure-based strategies into stochastic process (RW)-based strategies and kooky Belief Propagation (LBP)- based mostly strategies. Structure-based strategies aim to leverage scheme [1-10]. The key intuition is that, though Associate in Nursing wrongdoer will management the connections between Sybils haphazardly, it's tougher for the wrongdoer to control the connections between benign nodes and Sybils, as a result of such manipulation needs actions from benign nodes. Therefore, benign nodes and Sybils have a structural gap, that is leveraged by RW-based and LBP-based strategies.

RW-based strategies: Example RW-based based mostly methods embrace SybilGuard [2], SybilLimit [3], SybilInfer [4], SybilRank [1], Criminal account illation rule (CIA) [6], Integro [7], and SybilWalk [9]. Specifically, SybilGuard [2] and SybilLimit [3] assume that it's simple for brief random walks ranging from a labelled benign user to quickly reach alternative benign users, whereas arduous for brief random walks ranging from Sybils to achieve benign users. SybilGuard and SybilLimit use constant RW lengths for all nodes. SmartWalk [8] leverages machine learning classifiers to predict the suitable RW length for various nodes, and might improve the performance of SybilLimit via exploitation the expected (different) RW length for every node. SybilInfer [4] combines RWs with Bayesian illation and Monte-Carlo sampling to directly notice the bottleneck cut between benign users and Sybils. SybilRank [1] uses short RWs to distribute benignness scores from a group of labelled benign users to any or all the remaining users. independent agency [6] distributes badness scores from a group of labelled Sybils to alternative users. With a precise likelihood, independent agency restarts the RW from the initial likelihood distribution, that is appointed supported the set of labelled Sybils. Integro [7] improves SybilRank by 1st leverage victim prediction (a victim could be a user that connects to a minimum of one Sybil) to assign weights to edges of a social network so performing arts random walks on the weighted social network. Existing RW-based strategies suffer from one or 2 key limitations: 1) they'll solely leverage either labelled benign users or labelled Sybils, however not each, that limits their detection accuracies; and 2) they're not sturdy to label noise within the coaching dataset. Specifically, SybilGuard, SybilLimit, SybilInfer, and SmartWalk solely leverage one labelled benign node, creating their accuracy restricted [1] and creating them sensitive to label noise. Moreover, they're not ascendible to large-scale social networks as a result of they have to simulate an oversized range of random walks. SybilRank was shown to beat a range of Sybil detection strategies [1], and that we treat it as a progressive RW-based methodology. SybilRank will solely leverage the labelled benign users in a very coaching dataset, that limits its detection accuracy,

as we are going to demonstrate in our experiments. Moreover, SybilRank isn't sturdy to label noise, as we are going to demonstrate in our experiments.

LBP-based strategies: LBP-based methods [11-14], conjointly leverage the structure of the social network. SybilBelief models a social network as a pairwise Andre Markoff Random Field (pMRF). Given some labelled Sybils and labelled benign users, SybilBelief 1st assigns previous possibilities to them so uses LBP [15] to iteratively estimate the posterior likelihood of being a Sybil for every remaining user. The posterior likelihood of being a Sybil is employed to predict a user's label. SybilBelief will leverage each labelled Sybils and labelled benign users at the same time, and it's sturdy to label noise [11]. Gao et al. [12] and Fu et al. [13] incontestible that SybilBelief are able to do higher performance once learning the node and edge priors exploitation native graph structure analysis. However, SybilBelief and its variants suffer from 3 limitations: 1) they're not certain to converge as a result of LBP would possibly oscillate on graphs with loops [22]; 2) they're not ascendible as a result of LBP needs storing and maintaining messages on every edge; and 3) they are doing not have on paper bonded performance. the primary limitation implies that their performance heavily depends on the amount of iterations that LBP runs, however the simplest range of iterations could be completely different for various social networks. we have a tendency to note that Wang et al. [14] recently projected GANG, that generalized SybilBelief to directed social graphs (e.g., Twitter) and extended the techniques projected during this work to form GANG ascendible and focussed.

III. PROBLEM IDENTIFICATION

Suppose we are given an undirected social network $G = (V, E)$, where a node $v \in V$ represents a user and an edge $(u, v) \in E$ indicates a mutual relationship between u and v . $|V|$ and $|E|$ are number of nodes and edges, respectively. For instance, on Facebook, an edge (u, v) could mean that u is in v 's friend list and vice versa. On Twitter, an edge (u, v) could mean that u follows v . Our structure-based Sybil detection is defined as follows:

(Structure-based Sybil Detection). Suppose we are given a social network and a training dataset consisting of some labeled Sybils and labeled benign nodes. Structure-based Sybil detection is to predict the label of each remaining node by leveraging the global structure of the social network.

IV. PROPOSED WORK

Classification consists of predicting a certain outcome, based on a given set of inputs. Typically, an algorithm processes a training set, containing a set of attributes and the respective outcome, to discover the relationships between the attributes that make the outcome possible. The algorithm is then given an unseen dataset, called the prediction set, which contains a similar set of attributes without the outcome. The algorithm then analyses the input and attempts to produce a prediction.

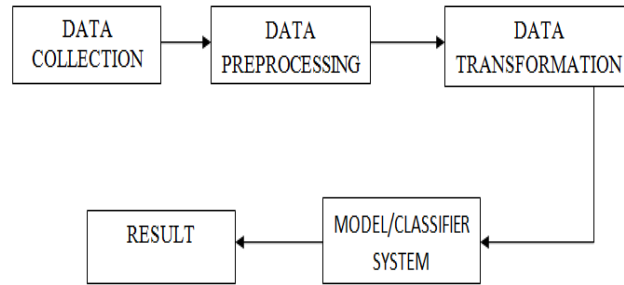


Figure 1 Flow Diagram

Classification models help to predict categorical class labels, which may be discrete or nominal. Constructed models classify data based on a training set and use the resulting class labels values as attributes with which to classify new data.

V. CONCLUSION

Modelling classification and regression for sybil detection is a very challenging task. Existing research has only made partial progress toward modeling classification for sybil detection and prediction. This research paper has discuss about how sybil activity could be tracked to address this challenging issue. Prediction of sybil behaviour of has been demonstrated by analysing the classification and regression techniques, using various machine learning techniques and described dependencies across different methods.

REFERENCES

1. Q. Cao, M. Sirivianos, X. Yang, and T. Pregueiro, "Aiding the detection of fake accounts in large scale social online services," in NSDI, 2012.
2. H. Yu, M. Kaminsky, P. B. Gibbons, and A. Flaxman, "Sybilguard: defending against sybil attacks via social networks," in ACM SIGCOMM. ACM, 2006.
3. H. Yu, P. B. Gibbons, M. Kaminsky, and F. Xiao, "SybilLimit: A near-optimal social network defense against Sybil attacks," in IEEE S & P, 2008.
4. G. Danezis and P. Mittal, "SybilInfer: Detecting Sybil nodes using social networks," in NDSS, 2009.
5. A. Mohaisen, N. Hopper, and Y. Kim, "Keep your friends close: Incorporating trust into social network-based sybil defenses," in IEEE INFOCOM, 2011.
6. C. Yang, R. Harkreader, J. Zhang, S. Shin, and G. Gu, "Analyzing spammer's social networks for fun and profit," in WWW, 2012.
7. Y. Boshmaf, D. Logothetis, G. Siganos, J. Leria, J. Lorenzo, M. Ripeanu, and K. Beznosov, "Integro: Leveraging victim prediction for robust fake account detection in osns," in NDSS, 2015.
8. Y. Liu, S. Ji, and P. Mittal, "Smartwalk: Enhancing social network security via adaptive random walks," in ACM CCS, 2016.
9. J. Jia, B.Wang, and N. Z. Gong, "Random walk based fake account detection in online social networks," in DSN, 2017.
10. J. Zhang, R. Zhang, J. Sun, Y. Zhang, and C. Zhang, "Truetop: A sybil-resilient system for user influence measurement on twitter," IEEE/ACM ToN, 2016.
11. N. Z. Gong, M. Frank, and P. Mittal, "Sybilbelief: A semisupervised learning approach for structure-based sybil detection," IEEE TIFS, vol. 9, no. 6, pp. 976-987, 2014.
12. P. Gao, B.Wang, N. Z. Gong, S. Kulkarni, and P. Mittal, "Sybilfuse: Combining local attributes with global structure to perform robust sybil detection," MIS2, 2018.
13. H. Fu, X. Xie, Y. Rui, N. Z. Gong, G. Sun, and E. Chen, "Robust spammer detection in microblogs: Leveraging user carefulness," ACM TIST, 2017.
14. B. Wang, N. Z. Gong, and H. Fu, "Gang: Detecting fraudulent users in online social networks via guilt-by-association on directed graphs," in ICDM, 2017.
15. J. Pearl, Probabilistic reasoning in intelligent systems: networks of plausible inference, 1988.
16. G.Wang, M. Mohanlal, C.Wilson, X.Wang, M. Metzger, H. Zheng, and B. Y. Zhao, "Social turing tests: Crowdsourcing sybil detection," NDSS, 2013.

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शैक्षणिक पुस्तकालयों में सूचना संचार प्रौद्योगिकी क अनुप्रयोग और उपयोग :- एक अवलोकन

फातिमा बी

पुस्तकालय एवं सूचना विज्ञान
रविद्रनाथ टैगौर विश्वविद्यालय भोपाल

प्रस्तावना :-

सूचना को रैंकिंग में मानव की पाँचवी आवश्यकता माना जाता है इस पत्र में अध्ययन को सूचना संचार प्रौद्योगिकी आई.सी.टी. के अनुप्रयोग और शैक्षणिक पुस्तकालयों में आई सी टी उपकरणों के उपयोग के लिए एक शोध किया गया है। ताकि एल आई एस पेशेवरों में आई.सी.टी. कौशल के विकास का पता लगाया जा सके और शैक्षणिक पुस्तकालयों का आधुनिकीकरण किया जा सके। मॅडिकल कॉलेज, इंजीनियरिंग कॉलेजों और कला और विज्ञान कॉलेजों में और उपयोगकर्ताओं को नवीन सेवाएं प्रदान करने के लिए आई सी टी उपकरण कैसे लागू होता है ।

की बर्द :- आई सी टी के आवेदन, शैक्षणिक पुस्तकालय, आई सी टी उपकरण ।

1.परिचय :-

सूचना किसी भी प्रकार के अनुसंधान और विकास का प्रमुख कारक है । जानकारी और जिस तरह से इसे एक्सेस किया जाता है वह सूचना और संचार प्रौद्योगिकी में विकास के कारण परिवर्तन से गुज़री है। जानकारी के अनुसार, इसे हवा, पानी, भोजन और आश्रय की रैंकिंग के बाद मानव की पाँचवीं जरूरत माना जाता है सूचना प्रौद्योगिकी ने पुस्तकालयों में प्रवेश किया, विशेषकर शैक्षणिक पुस्तकालयों और अनुसंधान पुस्तकालयों में 1960 के दशक के दौरान विशेष रूप से शैक्षणिक पुस्तकालयों में हर आवश्यक जानकारी के लिए त्वरित और आसान पहुँच एक सर्वोच्च महत्व है। सूचना प्रसंस्करण, भंडारण, संचार, सूचना स्वचालन आदि का प्रसार, इंटरनेट की आगे की उत्पत्ति और वर्ल्ड वाइड वेब के विकास ने सूचना संचार प्रौद्योगिकी में क्रांति लादी है। इसके आधार पर पुस्तकालयों में आई सी टी का अनुप्रयोगकर्ता समुदाय की सुविधाएं प्रदान करने के लिए आवश्यक हो जाता है।

2.परिभाषा :-

मंड्रपरनू और ज्व दलावी ;2005: खए2, षज को "औजारों के साथ-साथ संग्रह, कैप्चर, प्रोसेस, स्टोरेज, ट्रांसमिशन और सूचना के प्रसार के लिए उपयोग किया जाता है।" अमेरिकन लाइब्रेरी एसोसिएशन; 1983: सूचना के अधिग्रहण, संगठन, भंडारण, पुनः प्राप्ति और प्रसार के लिए कम्प्यूटर और अन्य तकनीकों के अनुप्रयोग के रूप में आई टी को परिभाषित करता है। कम्प्यूटर डेटा को प्रोसेस और स्टोर करने के लिए उपयोग किया जाता है। जबकि दूरसंचार तकनीक सूचना संचार उपकरण प्रदान करती है। जो उपयोगकर्ताओं को डेटाबेस तक पहुंचने और उन्हें अन्य कम्प्यूटर नेटवर्क को विभिन्न स्थानों पर लिग करने के लिए संभव बनाता है। "आई टी और आइ सी टी; सूचना संचार प्रौद्योगिकी कुछ हद तक परस्पर उपयोग किया जाता है।

3. अध्ययन की आवश्यकता :-

अध्ययन का मुख्य उद्देश्य आई सी टी संसाधनों को इकट्ठा करने में व्यवहार की मांग करने वाले उत्तरदाताओं की आई सी टी जानकारी की जरूरतों और उनकी जानकारी को मापना है। इसके अलावा आई सी टी जानकारी के प्रति उनके दृष्टिकोण को भी मापा गया। यह भी सबित करता है। कि आई सी टी जानकारी पेशेवर और गैर पेशेवर दोनों के उपयोगकर्ताओं के बीच पहुच पैटर्न पर कितना प्रभाव डालती है। और आई सी टी जानकारी प्रिंट संसाधनों के बजाय तेजी से उपयोग की जा रही है सूचना संचार तकनीकी दुनिया में आई सी टी सूचना के प्रति उत्तरदाताओं के बदलते रवैये को जानना बहुत आवश्यक है। इस संदर्भ में वर्तमा परिदृश्य में अध्ययन की आवश्यकता है।

4. अध्ययन के उद्देश्य :- (Objective of the study)

- पुस्तकालयों को आधुनिक बनाने के लिए ः पेशेवरो में ः कौशल के अनुप्रयोगो का पता लगाना।
- यह समझने के लिए कि आई. सी. टी. उपकरण उपयोगकर्ताओं को अभिनव सेवाएं।
- शैक्षणिक पुस्तकालयों में ई-संसाधन के संग्रह में बाधाओं का विश्लेषण करना।
- आई सी. टी. के अनुप्रयोग के बारे में उपयोगकर्ताओं और पुस्तकालयों की व्यावहारिक राय जानने के लिए।
- यह समझने के लिए कि कैसे पारंपारिक पुस्तकालय और सूचना सेवाओं को आई. सी. टी. का उपयोग करके अधिक कुशलता और प्रभावी ढंग से वितरित किया जा सकता है।
- आई. सी. टी. के नए कौशल से खुद को परिचित करना, विशेष रूप से वेब आधारित वातावरण के साथ।
- आई. सी. टी. से संबंधित विभिन्न गतिविधियों में एल आई एस पेशेवरो की भागीदारी का पता लगाने के लिए।

5. शैक्षणिक पुस्तकालयों में आई. सी. टी. अनुप्रयोग :- (Application of ICT in Academic library)

पुस्तकालय के विभिन्न हाउसकीपिंग, प्रबंधन और पशासनिक कार्यों के लिए कई सूचना संचार तकनीक है विभिन्न इलेक्ट्रॉनिक और डिजिटल मीडिया, कम्प्युटर एडेड इलेक्ट्रॉनिक उपकरण, नेटवर्क और इन्टरनेट ने सूचना की पुनः प्रप्ति और प्रसार में महत्पूर्ण भूमिका प्रदान की है आर एक महत्पूर्ण भूमिका निभाई है। मुख्य रूप से पुस्तकालयों के आधुनिकरण के लिये है।

6. पुस्तकालय स्वचालन :- (Library Automation)

लइब्रेरी ऑटोमेशन सभी पुस्तकालय सेवाओं में मानव हस्तक्षेप को कम करने की अवधारणा है ताकि कोई भी उपयोग कर्ता अधिकतम आराम और न्यूनतम लागत के साथ वांछित जानकारी प्राप्त कर सके। स्वचालन के प्रमुख क्षेत्रों को सभी पुस्तकालय डेटाबेस के दो संगठन और पुस्तकालय के सभी हाउसकीपिंग संचालन में वर्गीकृत किया जा सकता है।

7. लाइब्रेरी नेटवर्किंग :- (Library Networking)

लाइब्रेरी नेटवर्किंग का मतलब है कि पुस्तकालयों और सूचना केन्द्रों का एक समूह कार्यकुशलता में सुधार के लिए सूचना विनिमय और संचार के लिए कुछ सामान्य पैटर्न या डिजाइन के लिए परस्पर जुड़ा हुआ है।

8. पुस्तकालय प्रबंधन :- (Library Management)

लाइब्रेरी प्रबंधन में निम्नलिखित गतिविधियाँ शामिल हैं। जो निश्चित रूप से इन तेज आई. सी. टी. विकास, वर्गीकरण, कैटलॉगिंग, इंडेक्सिंग, डेटाबेस निर्माण, डेटाबेस इंडेक्सिंग के उपयोग द्वारा तैयार की जाएंगी।

9. डिजिटल लाइब्रेरी :- (Digital Library)

एक डिजिटल लाइब्रेरी डिजिटल कम्प्यूटिंग, स्टोरेज और कम्प्युनिकेशन मशीनरी का एक संयोजन है। जिसमें पेपर और अन्य भौतिक साधनों को हटाने कैटलॉग करने, खोजने और प्रचार करने के साधन के आधार पर पारंपरिक पुस्तकालयों द्वारा प्रदान की जाने वाली सेवाओं का पुनरुत्पादन, अनुकरण और विस्तार करने की आवश्यकता होती है। एक पूर्ण सेवा डिजिटल पुस्तकालय को पारंपरिक पुस्तकालयों की सभी आवश्यक सेवाओं को पूरा करना चाहिए और डिजिटल भंडारण, खोज और संचार के प्रसिद्ध लाभ का फायदा उठाना चाहिए। यह इन्टरनेट यों के माध्यम से अपने सभी संग्रह के हिस्से तक पहुंच प्रदान करता है जैसे कि सादे पाठ, चित्र, ग्राफिक्स, ऑडियो और वीडियो सामग्री और अन्य पुस्तकालय आइटम जो इलेक्ट्रॉनिक रूप से परिवर्तित हो गए हैं।

10 डिजिटल संचार :- (Technical communication)

डिजिटल संचार में डिजिटल लेखन, संपादन, प्रकाशन, डी टी पी (DTP system) सिस्टम आदि शामिल हैं।

11 आई सी टी आधारित उपयोगकर्ता सेवाएं :- (ICT -Based used service)

कुछ पुस्तकालय उपयोगकर्ता इलेक्ट्रॉनिक आदतों को अपना रहे हैं। जिससे कम्प्यूटर, इन्टरनेट, वेब, इटानेट, एक्स्टानेट और अन्य तकनीकों सहित नए आई सी टी का उपयोग बढ़ रहा है। नतीजतन, पुस्तकालय उपयोगकर्ता अपने पुस्तकालयों पर नई मांग रख रहे हैं। उन्हें नवीनतम जानकारी अद्यतन सूचना संसाधनों और आई सी टी सुविधाओं तक पहुंच की आवश्यकता होती है। जो वे अपने काम में उपयोग कर सकते हैं। पुस्तकालयों में आई सी टी का उपयोग उपयोगकर्ताओं की संतुष्टि को बढ़ाता है। यह पुस्तकालय उपयोगकर्ताओं को कई लाभ प्रदान करता है।

कुछ लाभ हैं -

1. सूचना के त्वरित और आसान पहुंच प्रदान करें।
2. उपयोगकर्ताओं के लिए दूरस्थ पहुंच प्रदान करता है।
3. विभिन्न स्रोतों से असीमित जानकारी तक पहुंच प्रदान करता है।
4. किसी व्यक्ति द्वारा उसकी आवश्यकताओं के अनुसार उपयोग की जाने वाली सूचना लचीलापन प्रदान करता है।
5. विभिन्न स्रोतों से डेटा के सुधार और संयोजन की सुविधा देता है।

पुस्तकालय अपने उपयोगकर्ता को विभिन्न आई सी टी आधारित सेवाएं भी प्रदान कर रहे हैं जिनमें निम्न शामिल हैं –

1. ओपेक के लिए वेब पहुंच का प्रावधान
2. इलेक्ट्रॉनिक दस्तावेज वितरण
3. नेटवर्क सूचना संसाधन
4. ऑनलाइन निर्देश
5. ऑनलाइन पाठक सलाहकार सेवाएँ

12. पुस्तकालयो और पुस्तकालयाक्षयक्षों पर आई सी टी को प्रभाव :- (Impact of ICT on libraries and librarian)

लाइब्रेरी और सूचना के उपयोग के लिए कम्प्युटर एक नया प्रभाव लाया है। पुस्तकालयों में, सूचना प्रौद्योगिकी ने पुस्तकालय पेशेवरों को मूल्य वर्धित गुणवत्ता सूचना सेवा प्रदान करने और अंतर – राष्ट्रीय स्तर पर उपलब्ध सूचना संसाधनों तक अधिक दूरस्थ पहुंच प्रदान करने में सहायता की है। आज की अत्यधिक परिष्कृत सूचना प्रौद्योगिकी बहुत अधिक कामपैक्ट स्पेस में डेटा या सूचनाओं के भंडारण की सुविधा के लिए। सूचना प्रौद्योगिकिया संग्रहीत सूचनाओंके तेजी से पुनर्प्राप्ति का बादा करती है और एक पारंपरिक पुस्तकालय और एक आधुनिक सूचना केन्द्र के कार्यों की हमारी अवधारण में क्रांति लाती है हाल ही में तकनीकी विकास में पुस्तकालय संचालन और सेवाओं के तरीके को नाटकीय रूप में बदल दिया है। आधुनिक आई सी टी पुस्तकालयों के विभिन्न पहलुओं और सूचना व्यवसाय पर प्रभाव डाल रहा है। आई सी टी में उन्नति और आई सी टी का व्यापक प्रसार डिजिटल सूचना स्रोतों और डिजिटल मीडिया की जगह ले रहा है। और सूचना भंडारण और पुनर्प्राप्ति का प्रमुख रूप बन गया है। प्लू भी जीवित रहता है और लाइब्रेरी साइंस के सच्चे नियम बनाता है। “हर पाठक अपनी किताब/जानकारी, पाठक का समय बचाए”। लाइब्रेरी एक बढ़ता हुआ जीव है। आई सी टी अपने जबरदस्त सूचना स्रोतों के साथ, तेजी से संचरण की गति और आसान पहुंच जटिल मांग के साथ उपयोगकर्ता की संतुष्टि सुनिश्चित करता है दूरी की बाधा को तोड़ता है और आवश्यक समय को छोटा करता है और सही समय सही पाठक को सही जानकारी सुनिश्चित करता है। यह पुस्तकालय के संग्रह विकास की मांग को भी बढ़ाता है और हल करता है यह वास्तव में पुस्तकालय सूचना केन्द्रों के लिए एक उत्कृष्ट उपकरण है।

13. पुस्तकालयों में आई सी टी के घटक :- (Components of ICT in libraries)

चिसेंगा (chisenga) ने कहा कि आई सी टी कम्प्युटर प्रौद्योगिकियों, दूरसंचार प्रौद्योगिकियों और अन्य मीडिया संचार प्रौद्योगिकियों के डिजिटल अभिसरण के परिणाम स्वरूप आया है। पाटिल, कुंबरानंद और कृष्णानंद ने सूचना प्रौद्योगिकी आई सी टी के घटकों को वर्गीकृत किया, जिनका उपयोग अक्सर पुस्तकालयों और सूचना केन्द्र में किया जाता है ।

1. संचार प्रौद्योगिकी
2. कम्प्युटर प्रौद्योगिकी
3. रिप्रोग्राफिक, माइक्रोग्राफिक और प्रिंटिंग टेक्नोलॉजी आई सी टी दो महत्वपूर्ण मकनीकों का संलयन है इलेक्ट्रॉनिक और संचार। हम चिसेंगा, पाटिल, कुंबरैड और रहुमन और कृष्णानंद की अवधारणा के आधार पर आई सी टी के घटकों का योग कर सकते हैं।

संदर्भ सूची

1. डब्ल्यू. डब्ल्यू. गूगल कॉम (www.google.com).
2. छोटेलाल ,इनफॉर्मेशन सोर्स इन साइंस एण्ड टेक्नोलॉजी नई दिल्ली 1986.
3. 3.विद्यालयीन शिक्षा मे आई सी टी पर राष्ट्रीय नीति स्कूल शिक्षा एवं साक्षरता विभाग, मानव संसाधन विकास मंत्रालय, भारत सरकार नई दिल्ली 2012.
4. वाल्मीकि, आर एच और राम कृष्णगौडा 2009 कर्नाटक में विश्वविद्यालय पुस्तकालयो में आई सी टी
5. इन्फ्रास्ट्रक्चर। एनल्स ऑफ लाईबेरी एवं इफोर्मेशन स्टडीज, 56:236-241।

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AN ANALYTICAL REVIEW OF HUMAN RESOURCE PRACTICES IN INDIA

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Abstract - This paper highlighted the state of people-management policies and practices in India and their rootedness in the country's historical background, environmental framework, institutions, contexts and styles. The analysis shows that there is a remarkable progress in the professionalization of HRM in the organized sector; this is happening despite the tendency towards a shrinking percentage of the organized sector employment in the country. Attempts towards greater professionalism can be attributed partly to the progressive policies brought along and pursued by the MNCs and the professionally managed Indian organizations including some of the public sector enterprises .

1. INTRODUCTION

This chapter presents a broad overview of the scenario of human resource management (HRM) in India. It is structured along the framework discussed in chapter one of this volume. To provide the required context, this section presents some relevant demographic details of the Indian economy and society. India is a republic in South Asia. It has the second highest population in the world after China, which reached the 1 billion mark in June 2000. As per the latest Census of 2001, the total population of the country is 1027 million, which includes 531.28 million males and 495.73 million females. India's share of the world population is 16.7 percent. The literacy rate among the population for seven years and above for the country stands at 65.38 percent. The corresponding figures for males and females are 75.85 and 54.16 percent respectively. The density of population (per sq. km) is 324 and the sex ratio (females per 1,000 males) 933.

Being the largest democracy in the world, India is governed by a Constitution that came into force on 26 January, 1950. It attained independence from the British on August 15, 1947. The country comprises of 29 States and 6 Union Territories. There are six main religious groups: Hindus (83.2 percent), Muslims (11 percent), Sikhs (2 percent), Christians (2 percent), Jains and Buddhists (less than 1 percent). There are over three thousand castes. India has 179 languages and 544 dialects. The constitution recognizes sixteen languages, 'Hindi' and English being the two official languages. India has one of the largest English speaking populations in the Asia-Pacific region (Budhwar, 2003).

As per the latest Round of National Sample Survey (NSS) of Employment and Unemployment, the total workforce in the country is 397 million. Out of this nearly 92 percent or more are engaged in the activities of the unorganized sector (including the so-called informal sector) while about 8 per cent of the workforce is employed in the organized sector. Of the total employment, 60 percent of the workforce is engaged in agriculture and the remaining 40 per cent in the non- agriculture sector. Of the non-agriculture sector employment, unorganized workforce is 82 per cent and the remaining about 18 per cent belongs to the organized segment. Only about 12 to 15 per cent of the total workforce in the country is estimated to fall in the category of wage/salary employment.

Such employees constitute 6 per cent of the workforce in the rural areas and about 40 per cent of the workforce in the urban (Economic Survey, Government of India 2002-03). The second National Commission on Labour (NCL) has estimated that only 5 per cent of the workforce in the age group of 20-24 years has acquired some kind of a formal vocational training (Government of India, 2002). This is a far lower percentage than those of developed countries, which range between 60 to 80 per cent.

2. INDIAN ECONOMY AND BUSINESS ENVIRONMENT

After independence, India put primacy on adopting self-reliance in its economic development policies and thus preferred an import-substitution model of

development for 45 years or so. It set up the Planning Commission in 1950 to formulate national plans. Since then, a 'mixed economy' approach (emphasizing both private and public enterprise) has been adopted till quite recently. This had the effect of reducing the incidence of entrepreneurship as well as global competitiveness - both necessary for national growth. Economic planning is mainly carried out through the five year plans and industrial policies. Presently, the tenth five year plan (2002-2007) and the industrial policy of 1991 are in progress.

Despite the formalities of planning, the Indian economy was perhaps in its worst state in 1991. It witnessed a double digit rate of inflation, decelerated industrial production, fiscal indiscipline, a very high ratio of borrowing to the GNP (both internal and external) and a dismally low level of foreign exchange reserves. Foreign exchange reserves had gone down so low that they were barely sufficient to meet the bill for three weeks' imports. The World Bank and the IMF agreed to bail out India on the condition that it changed to a 'free market economy' from a regulated regime. To meet the challenges, the government announced a series of economic policies beginning with the devaluation of the Rupee, followed by a new industrial policy and fiscal and trade policies. A number of reforms guided by the liberalization philosophy were made in the public sector, trade and exchange policy, the banking sector and the foreign investment policy (for details see Budhwar, 2003).

The economy has responded positively to these reforms and India is now considered as one of the largest emerging nations, having bypassed the Asian economic crisis. The World Bank forecasts that, by 2020, India could become the world's fourth largest economy. In the last few years state control and ownership in the economy have been reduced. Bold steps have been taken to correct the fiscal imbalance, to bring about structural adjustments and to attract foreign direct investment. Foreign operators can now acquire immovable property in India, employ foreign nationals in their operations in India and buy and sell shares in Indian companies. Substantial reforms have been made in the telecommunications, financial and shipping sectors, as well as in direct tax structure and industrial policy. Significant reforms have already been initiated in the insurance sector by the present government. However, India still has to go a long way before it can compete fully with some of the more economically advanced Asian nations.

Liberalization of the Indian economy has resulted in sudden and increased levels of competition for Indian firms from international firms. At the same time it has also created opportunities for resource mobilization from new sources. HRM issues have now become more important with the firms' adoption of strategies of expansion, diversification, turnaround and internationalization. These developments have direct implications for HRM in India and the Indian HR function is under severe pressure to bring about large-scale structural changes in order to cope with the challenges brought about by economic liberalization. It has to develop a domestic work-force capable of taking on the challenges thrown up by the new economic environment. In such conditions the performance of the HR function has become more important than ever (for details see Budhwar and Sparrow, 1997).

3. EVOLUTION OF HUMAN RESOURCE MANAGEMENT

The personnel function in India originated in 1920s with the concern for labour welfare in factories. The Trade Union Act of 1926 gave formal recognition to workers' unions. The Royal Commission of Labour 1931 recommended the appointment of labour welfare officers and the Factories Act of 1948 laid down the duties and qualifications of labour welfare officers. Further, the Indian judiciary played an important role in expounding the correct scope of the protection envisaged to the working class by the legislation that was enacted in several spheres of IR as per the spirit of the Constitution. Consequent to the passage of a number of labour and industrial relations laws, personnel managers began performing industrial relations as a very significant role. The IR role of personnel managers formed such an important part of their work that they came to be known as children of the Industrial Disputes Act 1947 (IDA). All these developments formed the foundation of the personnel function in India (Balasubramanian, 1994; 1995) and paralleled the

initial developments of the British personnel function. For example, provisions similar to those provided by the Cadbury in Britain were provided by the Tata group in India in the early 1920s (see Budhwar and Khatri, 2001).

After independence, in 1950s, two professional bodies emerged: the Indian Institute of Personnel Management (IIPM), a counterpart of the Institute of Personnel Management in the United Kingdom, was formed at Calcutta and the National Institute of Labour Management (NILM) at Bombay. In 1960s, the Personnel Function began to expand beyond the welfare aspect with three areas of Labour Welfare, Industrial Relations and Personnel Administration developing as the constituent roles for the emerging profession (Venkata Ratnam and Srivastava, 1991). In 1970s, the thrust of personnel function shifted towards greater organizational 'efficiency', and by 1980s it began to use and focus on terms and issues such as HRM and HRD. The two professional body's i. e. IIPM and NILM merged in 1980 to form the National Institute of Personnel Management (NIPM) at Bombay. Thus, the status of the personnel function in India has changed over the years (Amba-Rao, 1994; Sparrow and Budhwar, 1997).

4. FACTORS INFLUENCING HRM AND RELATED CHALLENGES

4.1 National Culture

The prevailing beliefs, values, traditions and behaviour patterns among Indians forms part of the national culture and can be attributed to several factors. Prominent among these are social customs and practices and the perpetration of elitist values by the British during their rule over India lasting more than a century. Perhaps the Britishers' biggest influence in this regard was through the promotion of feudalism. Their land cultivation system involved appointing feudal lords which exacerbated the values of hierarchy and subjugation. Also, their focus was on the supremacy of bureaucracy through the institution of an administrative service called the Indian Civil Service (ICS). The working of these institutions has made a lasting impact on the psyche of common people. They have strengthened hierarchy and power distance between the rulers and the governed. The civil servants and the feudals constituted elite classes in society, whose position in the social hierarchy was strengthened by the policies of the British Indian Government.

After Independence, the ICS was replaced by the Indian Administrative Service (IAS) with the projected intention of humanizing it and bringing it closer to people's aspirations. However, it inherited and sustained the culture of ICS and the state system suffered from all the vices which are attributed to bureaucracy (see Saini, 1999b). It has resulted in a two-tier system of the elites and the general public. While the law is enforced in a particular way for the former, the same law works to the detriment of the latter. Such a culture of elitism is known to have pervaded in most types of organizations. Such biases have been reflected even in the people management policies in general.

4.2 National Institutions Supporting Industrial Relations

The hallmark of the Indian IR is massive state presence in it through the Industrial Disputes Act, 1947 (IDA). This Act empowers the "appropriate Government", in its discretion, to refer an industrial dispute for adjudication either on failure of conciliation or even without any resort to conciliation. Apart from the IDA, two other laws form part of the IR law in the country i.e. the Trade Unions Act 1926 (TUA) and the Industrial Employment (Standing Orders) Act 1946 (IESOA). While the former confers on workers and unions freedom of association and immunity against civil and criminal liability for taking industrial action, the latter seeks to ensure standardization of the terms of employment and their certification by a Government officer, who is obliged to satisfy himself that they are just and fair. These set of laws were intended to facilitate realization of individual and collective rights of workers.

Promoting industrial peace with social justice has projected guided the IR policy of the government. Towards this end, apart from the legal framework, the Central Government has effectively used an institution called consultative tripartite conference - called the Indian Labour Conference - consisting of representatives of employers, labour and government, whose meetings are held annually since 1940.

One of the most notable non-legislative initiatives in IR came from the Government in 1958 as a result of the deliberations at this forum in the form of the Code of Discipline and the Joint Management Councils. These instruments were to be used as a formal basis for recognition of unions and collective bargaining. However, the impact of these bodies was merely transitory (Johri, 1999: 49). Legal means and interventions continued to dominate the IR policy in the country.

4.3 Workers' Participation in Management

Another important area of contention in IR is workers' participation in management. Today we have virtually no meaningful participation structures through law, except the works committees under the IDA, which are not fully functional (Saini, 1997). However, a bill titled Workers Participation in Management Bill 1990 is pending before the Rajya Sabha (Upper house of Parliament). The Bill is still under consideration of Parliamentary Select Committee on Labour and Welfare (Government of India, 2002: 22).

This bill seeks to give substantial voice to employees in the management. But it is unlikely that given the changed priorities of the state it will finally get enacted. This is despite the fact that the Bill has recently been approved by the Cabinet Committee of the Government of India; and the present Labour Minister has shown his commitment to the cause of ensuring employee participation in industry through law. A debate on the Bill is presently going on among the social partners. Analysts, however, opine that this is a mere election gimmick as Parliamentary elections are due in early 2004.

4.4 Urgency of IR Reforms

The above developments in Indian IR augur fairly well for developing HRM; for it is difficult to sustain it in situations of zero-sum IR; this is especially important when India's HR systems and processes have to be conducive to facilitating efficiency and productivity, and eventually the export-promotion model of development. But the Government's support can be said to be forthcoming indirectly i.e. by remaining oblivious to the legal intent. The question is whether this is enough for the country's needs to attract higher levels of FDI.

MNCs and other professional establishments need more tangible ways of state support including having the changed legal framework itself. Intriguingly, it should be appreciated that one way of tackling the problem of flexibility at the micro level is the effective adoption of HRM. It has been used even along with unions in many organizations including Reliance and Tata Steel (see Ghoshal et al., 2001). The latter one has nearly 50 thousand workers and has downsized some 20 thousand in the past few years. But most other organizations are unable to follow this. The need for reforms in IR law so as to be facilitative to the globalization policies then remains paramount.

4.5 Vocational Education and Training

Vocational education and training in India are divided into two sub-systems. At the central (federal) level, while the vocational education is under the control of Ministry of HRD, vocational training is basically regulated by the Ministry of Labour. Partly the former ministry also exercises some control even in matters of training. Further, some 35 ministries of the Central Government are involved in providing and supporting some kind of training in their respective areas of operations (Saini, 2003). Vocational education is provided at the senior secondary stage in schools. This is over and above engineering, management and other technical education that takes place under the overall supervision of the University Grants Commission (UGC) and the All India Council of Technical Education (AICTE), both of which are central statutory bodies. State Governments also exercise control in matters of accreditation of education at the engineering diploma level. Among the specialized vocational training institutions, more than 4000 industrial training institutes (ITIs) are being run today; out of these 1654 are run by Government and 2620 are run privately. Altogether, they have a training capacity of 6.25 hundred thousand students (Saini, 2003).

A part from these, the Apprentices Act 1961 has been applied to some notified industries. The Act obliges the employers covered under the Act to engage apprentices in certain pre-determined trades as well as those holding degrees and diplomas as per specified ratio. This scheme is however working much below the projected capacity for lack of proper enforcement. Various government ministries and NGOs are running vocational training schemes for the informal sector. Apart from these, companies in public and private sectors are also involved in providing skills training and their up gradation. In the "Best 25 Employers in India" survey of 2002 conducted by Hewitt Associates the average annual training hours in these organizations range from 24 to 120 (these hours are 24 in Indian Oil Corporation (a public sector organization), 47 in Infosys Technologies, 60 in Reddy's Laboratories, 64 in Smithkline Beecham, 86 in Tata Steel, 95 in Reliance, 71 in Tata Engineering, and 120 in LG Electronics).

5. SHIFTING AGENDA IN THE 21ST CENTURY: POSSIBLE DIRECTIONS FOR HRM IN INDIA

In the present competitive business environment the Indian HR function faces a large number of challenges. Many of these are discussed above. To survive and flourish in the new dispensation, drastic changes are required at the national, organizational and individual levels. Some of these seem to be taking place, though possibly not with the required rigour and not quite in the right direction. One serious problem while making such judgements and analysis is the availability of reliable empirical research evidence. On the basis of the available information and our own experiences, the following observations can be made:

5.1 The National Level

The above section highlighted some of the main national factors which significantly influence HRM in India (also see Budhwar and Sparrow, 1998; 2002a). Early indications suggest that the nature and accordingly the impact of most of the national factors (especially different institutions such as trade unions, legal framework, different pressure groups and the dynamic business environment) on Indian HRM is going to change. The legislations have to be amended so as to suit the present economic environment and help both workers and employers in the 'real' sense. The stance of unions is further expected to become more co-operative. The dynamic business environment is further going to dictate the nature and type of HRM systems suitable for the country. With the rapid developments in the software and IT enabled services (ITeS) sector and an increased emphasis on business process outsourcing (BPO), one can expect the emergence of sector-specific HRM patterns. For example, this will be the case for knowledge-based industries such as software and contact centers (see Budhwar and Singh, 2003).

6. CONCLUSION

The attitude towards business practice in general is changing, and people are realizing how far they need to change so as to cope with the change needs. Among others, the key problems that have adversely influenced the management of human resources in India include: lack of a vision for skill and competency development, the rigidity caused by the labour law framework, the hierarchy-driven mindsets of employers, Government's indecisiveness in matters of privatization and disinvestment, and fragility of political coalitions that adversely affects the need to take bold decisions.

Another important factor affecting the HRM policies is the deceleration in the employment growth in the organized sector and the massive under-employment in a labour surplus economy. This increases the power of employers, and enables them to shape their HR strategies towards cost reduction. Thus a greater reliance can be put on employment of peripheral than core employees. With the weakening of the employee power, the HRM practices vis-à-vis this section of employees are bound to reflect hard devices including resort to lower minimum standards of employment and commission of unfair labour practices (ULPs).

It is noticeable that the role of HRM managers is getting transformed from being the children of the Industrial Disputes Act to those responsible for culture building, communication, change management, performance management and measuring effectiveness of HR systems and interventions. Within the organized sector, however, the HRM practices are quite varied depending upon a variegated factor. Majority of management schools, however, have not yet responded to the challenges of the new environment in terms of evolving appropriate courses, even as the professionals have responded well to the challenges by using the most modern interventions. A shift is noticeable in the attitude of the government from changing its role from that of social justice dispensation to ensuring the success of the export-promotion model of development.

Interestingly, this has been possible to quite an extent despite the rigid labour law framework, for it is the governmental power which activates that framework. A rapidly growing industry of HR professionals has emerged, which is increasingly becoming sensitive to the needs of aligning HRM with business needs and strategies. Apart from the strategic performance of the traditional HR functions, new transformational themes are being identified (Saini, 2000; Varkky et al., 2001). These, among others, include concepts like “People Capability Maturity Model”, work-life balance, diversity management, six sigma and strategic leadership.

REFERENCES

1. Adams, S. and Krishnan, P. (2003) “Documentation of the Consultative Workshop on the Project SCEC” under the programme: Restructuring and Strengthening the National Vocational Training System (NVTs). Proceeding of a two-day workshop organized by GTZ (Germany) and DGET, Ministry of Labour, Government of India, India International Centre, New Delhi, 16-17 January 2003.
2. Agarwala, T (2003) “Innovative human resource practices and organizational commitment: An empirical investigation”, *International Journal of Human Resource Management*, 14: 175-198.
3. Amba-Rao. S. (1994) “US HRM Principles: Cross-country Comparisons and Two Case Applications in India”, *International Journal of Human Resource Management*, 5 (3): 755-778.
4. Balasubramanian, A. G. (1995) “Evolution of Personnel Function in India- A Re-examination, Part II”, *Management and Labour Studies*, 20 (1): 5-14.
5. Gandhi, P. N. (2019). Effect Of Differentiated Transformational Leadership . *Journal Of Current Science* , 20(01),
6. Gandhi, P. N. (2019). Analytic Research In Management : Contemporary Approaches. *Journal of Current Science* , 20(01),
7. Gandhi, P. N. (2019). A Role Of Management Concepts in Indian Economy . (2019th ed.). new delhi:jherf. p.193.
8. N.P.Gandhi, (2019). international conference on sustainable development through social science management ,smart education ,agriculture technologies & advance engineering applications in global environment . (2019th ed.). new delhi:jherf. p.128.
9. Kulkarni, D. & Gandhi, P. (2019). RIGHT TO INFORMATION AND DEMOCRACY: AN IMPACT ANALYTICAL RESEARCH. *JOURNAL OF CURRENT SCIENCE*, 20(06), p.6
10. Kulkarni, D. & Gandhi, P. (2019). UNDERSTANDING PERFORMANCE APPRAISAL SYSTEM THROUGH CASE ANALYSIS
11. Balasubramanian, A. G. (1994) “Evolution of Personnel Function in India- A Re-examination, Part 1”, *Management and Labour Studies*, 19 (4): 196-210.
12. Budhwar, P. (2003) “Culture and Management in India” in M. Warner (Ed.) *Culture and management in Asia*. London: Routledge, 66-81.
13. Business India (1998) “Clutching at Straws”, *Business India*, March 9–22.
14. Datt, R. and Sundharam, K.P.M. (1999). *Indian Economy*. New Delhi: S. Chand & Company Ltd.
15. Debrah, Y. and Smith, I. (2002) “Globalization, Employment and the Workplace: Diverse Impacts?” in Debrah, Y. and Smith, I. (eds.) *Globalization, Employment and the Workplace*. London: Routledge, 1-23.
16. Debrah, Y., McGovern, I. and Budhwar, P. (2000) “Complementarity or Competition: The Development of Human Resources in A Growth Triangle”, *the International Journal of Human Resource Management*, 11 (2), 314-335.
17. Johri, C. K. (1998) “INDIA” in *International Encyclopaedia of Laws: Labour Law and Industrial Relations* (General Editor: R. Blanpain), Kluwer Law International, Deventer, the Netherlands.
18. Kanungo, R. N. and Mendonca, M. (1994) “Culture and Performance Improvement”, *Productivity*, 35 (3), 447-453.
19. Legge, K. (1995) *Human Resource Management: Rhetorics and Realities*. London: Macmillan Press.
20. Mathur, A. (2002) Background paper on “Skill Acquisition and the Indian Labour Force” presented at the consultative Workshop on Employment and Labour market Reforms in India, organized by Institute of Human Development, New Delhi, and December 12-13.
21. Mishra, L. (2001) *Economy & Labour*. New Delhi: Manak Publications Pvt. Ltd.
22. Nadler, L. (1970). *Developing Human Resources*. Reading, MA: Addison-Wesley.

23. Sahay, S. and Walsham, G. (1997) Social Structure and Managerial Agency in India. *Organisation Studies*, 18, 415-444.
24. Saini, Debi S. (2003) "Alleviating Poverty through Skills Development: Lessons for Law-making in Developing Countries". Paper presented at Workshop on Law and Poverty V, organized by CROP programme of the International Social Science Council and the Social Science Academy of Nigeria at Abuja (Nigeria) November 24-26, 2003.
25. "Labour Organization and Labour Relations Law in India" in Lucy Williams, Peter Robson and Absjorn Kjonstad (Editors), *Law and Poverty: Poverty Reduction and the Role of the Legal System*. London: Zed Books.
26. Venkat Ratnam, C.S. (2001), *Globalization and Labour-Management Relations: Dynamics of Change*, New Delhi: Response (A Division of Sage Publication).
27. Venkata Ratnam, C. S. (1996) *Industrial Relations in Indian States*. New Delhi: Global Business Press.
28. Venkata Ratnam, C. S. and Srivastava, B. K. (1991) *Personnel Management and Human Resources*. New Delhi: Tata-McGraw-Hill Publishing Company.

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SOCIO-ECONOMIC CONSTRAINTS DUE TO FLOOD IN MAJULI

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Abstract: The river has significant influence on the people settled in the floodplain. Flood is a natural calamity that leaves the trails of misery for the people and shakes the regional economy. Frequent occurrence of floods in the recent times is also becoming an ecological crisis. Increasing flood frequency and the number of flood waves are causing damages to vast properties and lives in extensive areas and affect the socio-economic condition of the region. Majuli, the cultural hub of India is surrounded on all sides by water, i.e. the mighty Brahmaputra. In the river island, flood is the most devastating natural hazard faced by the residents, which has hindered the development of socio-economic condition there. Devastating flood visits the island every year and leaves behind it's impact on the residents there.

Keywords: Erosion, Majuli, River, Socio-economic condition.

1 INTRODUCTION

Majuli is a large riverine island in the Brahmaputra river, in Assam, India. Majuli had a total area of 1,250 square kilometres (483 sq. mi), but having lost significantly to erosion it has an area of only 421.65 square kilometres (163 sq mi) in 2001. Majuli has shrunk as the river surrounding it has grown. The island is formed by the Brahmaputra river in the south and the Kherkutia Xuti, an anabranch of the Brahmaputra, joined by the Subansiri River in the north. Majuli island is accessible by ferries from the City of Jorhat. The island is about 200 kilometres east from the state's largest city Guwahti. The island was formed due to course changes by the river Brahmaputra and its tributaries, mainly the Lohit. Majuli is also the abode of the Assamese neo-Vaisnavite Culture.

The island situates itself is in the state of Assam, mid-stream of the great male river Brahmaputra. It is a part of the vast dynamic river system of Brahmaputra basin with a total length of 2706 km and a catchment area of 5,80,000 sq. km. The Majuli island is a fluvial landform, a unique geographical occurrence and a result of the dynamic of this vast river system. The island itself extends for a length of about 80 km and for about 10-15 km north to south direction with a total area of about 875 sq. km. It is 85-90 m above mean sea level. It is formed in that stretch of the river where the largest number of tributaries drains out and forms their deltas on the Northern and the Southern banks. It is purely a region of fluvial geomorphology.

1.1 Statement of the problem:

Majuli, the cultural hub of India is surrounded on all sides by water. It being an riverine island is exposed to water in all it's sides. Therefore, flood is the most devastating natural hazard faced by the residents, which has hindered the development of socio-economic condition there. The socio-economic condition of an area reflects the standard of living of the people there. Therefore a developed socio-economic condition will undoubtedly raise the living standard of the people in an area. Thus, our study is carried out to analyse the socio-economic condition of the residents in Majuli and will being of the same.

1.2 Objectives:

To study the economic background including various demographic pattern, settlement pattern, religion and language.

To analyse the trend of river bank erosion and effect of flood and erosion on the river island Majuli.

Methodology and Database:

To fulfil the objectives of the study, collection and analysis of the data were carried out from two villages namely, Pohardia and Upper Boithamariare randomly selected from the flood affected Majuli island for studying the socio-economic condition of the villages.

Estimation of economic loss due to the effects of flood was done based on collection of primary data through a structured questionnaire.

Secondary data are collected from research papers, journals, magazines, internet etc. The data collected were tabulated and by using various quantitative techniques.

2 GEOGRAPHICAL BACKGROUND OF THE STUDY AREA

Majuli in the Jorhat district is located at the longitude 26057/0// N to 26095/ N and latitude 94010/0// E to 94016/ E. Majuli had a total area of 1,250 square km (483 sq. mi), but having lost significantly to erosion it has an area of only 421.65 sq kilometres (163 sq. mi) in 2001. Majuli shrunk as the river surrounding it has grown. It is at an elevation 84.5 m (277.2Ft.) The island is formed by the Brahmaputra river in the south and the Kherkutia Xuti, an anabranch of the Brahmaputra, joined by the Subansiri River in the north. Majuli island is accessible by ferries from the city of Jorhat. The island is about 200 kilometres east from the state's capital. The island was formed due to course changes by the river Brahmaputra and its tributaries, mainly the Lohit.

Floodplains result from the long-term cumulative action of the flow, erosion and depositional processes. In lower-energy fluvial systems, cumulative changes in channel patterns and floodplain morphology over a time scale of decades are often great enough to require their incorporation into engineering design. Geomorphological studies of floodplains have traditionally focused on the formation and evolution of landforms [Lewin (1978); Nanson and Croke (1992)]. As such, most of the attention has been directed to fluvial morphology and more particularly to the interactions between channel migration and floodplain construction/destruction [Wolman and Leopold (1957)]. Majuli, the world's largest inhabited river island, is a classic example of landform developed in such a lower energy fluvial system due to the passage of the Brahmaputra river through the state of Assam in India.

Impact:

Flood is the most common natural disaster in Majuli. In the flood season everywhere is water, water and only water. There is no communication of road to supply very essential material also. There have found no food or drinking water. Man often remain hungry due to lack of husked rice, even the houses also submerged. In this situation the cattle and tigers live together taking shelter on high patches of land. In the study area, deforestation and unwise tree felling are the important causes of flooding in that area. The absence of protective cover of vegetation, accelerates soil erosion.

The erosion history of Majuli can be divided into two eras: before and after the 1950 earthquake, Before 1950, erosion was insignificant, but after 1950, especially from 1954 onwards, erosion in Majuli has taken a serious turn. This was due to the construction of erosion protection measures in 1950 on the south bank of

the river Brahmaputra in the Kokilamukh area, leaving the north bank unprotected (Sankhua, et al. 2005). The great earthquake of 1950 brought about astounding natural and geographical changes to the Island and to the Brahmaputra river. The river bed swelled up due to deposition of silt and alluvium, resulting in severe erosion (Goswami, 2011).

The studies carried out based on satellite data by Indian Space Research Organization (ISRO) and Brahmaputra board shows that about 50.27 sq. km. area has been eroded during 1972-1994. At present, the area of the island is reported to be about 400 sq. km. During the period of 25 years from 1963 to 1988, reduction of the land area of Majuli Island was at an average annual rate of about 3.00 sq. km. from 1988 to 2004, erosion of river banks in the island had reduced substantially to an average annual rate of 0.73 sq. km, nearly same that of prior to 1949 (Sarma and Phukan, 2004).

3 ADJUSTMENT, MANAGEMENT AND STRATEGIES FOR FLOOD CONTROL

In this area every house has facilities to prepare platforms or “chang” during the flood. Besides, during the flood season, people of this region commonly adopt the various adjustments like, people generally migrate to nearby high lands, sometimes live on roof tops and store food grains above ground level. In the water logged areas and lower active flood plain, country boats and rafts made with banana trees and bamboo sticks (locally known as “Bhur”) are used for evacuation. During the flood seasons many people migrate to their relatives house or go to their own house outside the flood region. Although different adjustment measures are practised by the people to minimise the loss and damages of flood, still the flood damages are increasing year by year. Therefore, peoples adjustment to flood, bank erosion, sand deposition and channel migration hazards are accepted as an unavoidable loss. It is a traditional and common form of adjustment to flood hazard in areas of depressed economy and high hazard risk.

3.1 Government Measures:

There are found some embankment are formed which are provided by the government scheme – NREGA, These embankment are very low quality and traditional, there are no technical use of erosion protects measures. So, the soil embankment are eroded day by day. In 1996, the flood control department of the Assam Government requested to the Brahmaputra Board to prepare a Master Plan and also carry out hydraulic studies to suggest suitable anti-erosion measures. Through the implementation of various schemes by The Brahmaputra Board, land mass reclaimed the Majuli island up-to 20.52 sq. km.

3.2 NGO's and public efforts:

Various local NGO's and public efforts in the flood season but they also do not create any permanent measure. So, the local people are always try to adjustment with the flood hazards.

There is a need to develop and apply rigorous policy related to land use pattern to control the increase of run-off, erosion and water contamination and decrease of soil fertility due to frequent occurring of flood. Need to formulate economic and poverty reduction efforts should be made for the benefit of the flood affected areas. Development of a comprehensive cost effective and affordable flood mitigation strategy should taken by the relevant authority and specialists. Strengthening of dykes, erection of protective spurs, plantation of trees at the foot hills and river banks need to be taken up aggressively to stop erosion and control

the damage during flood. Farmers should be introduced to a cropping system that starts in winter season to reduce the impact of crop loss during flood and for food security in the flood affected areas. Besides agriculture, other income generating activities like – sericulture, handloom, textiles, riverine and pisciculture etc. Need to be promoted and strengthened in the flood affected areas. Practise of short duration crops such as ahu and paddy, and potatoes should be encouraged in these areas. The agricultural department should keep stocks of non-perishable goods that do not require cooling for the use during flood. Provision of transfer of woman and children to take shelter on embankments, roadway lines and foothills should be there till flood stops.

4 SUMMARY AND CONCLUSION

The study investigates the floods that occurs every year in Majuli in the monsoon season. It lays main emphasis on the devastating floods that brings havoc among the lives of both humans and the animals. Every year in Majuli the floods leave a trail of destruction, washing away villages, submerging paddy fields, drowning livestock, besides causing loss of human life and property. The river island Majuli have suffered a significant rate of erosion since historical time. Severe erosion of soil every year in the Majuli is generating considerable threats to the very existence of the island and its rich cultural heritage. Due to extensive erosion, many villages have been completely eroded. The present systems of embankments executed by Government departments have failed to check the erosion problem. i.e. threatening the existence of the island. The river bank materials on Majuli island varies from a surface layer of sandyloam soil changing to a silty loam with different sizes. Adoption of suitable remedial and restoration measures with a scientific approach to counter all these diminishing phenomenon and conservation is very important and urgent.

REFERENCES

1. Pegu A. (2013) Role of NGOs in Economic Development: A Case Study of Majuli. PhD Thesis of Assam University, Department of Economics, Silchar.
2. Sarma M. (2013) A Study on Uttar Kamalabari Sattra of Majuli, Assam. Ph.D Thesis to Gauhati University, Department of Anthoropology, Guwahati.
3. Sahariah, D., Singha K., Bora.D.K., Kundu. S., Das T., Sen S., Das K., . Mili B, Baruah J., Sarma K., Saikia M. and Saikia A. (2013). Majuli at the Crossroads: A Study of Cultural Geomorphology. Space and Culture, India, 1(2): PP. 12-20.
4. Kalita D. J. (2016). Impact of flood and riverbank erosion in Majuli, Assam (India) and its restoration measures. Dimorian Review, Vol-3, Issue-5: PP. 21-30.
5. Bhattacharyya, N.N. and Bora A.K. (1997). Floods of the Brahmaputra River in India, Water International, 22(4), PP. 222-229, DOI: 10.1080/0250806970868709

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HUMAN RESOURCES IN GOVERNMENT DEGREE/POST GRADUATE COLLEGE LIBRARIES OF UTTAR PRADESH: A CRITICAL STUDY

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Abstract - The present study conducted on human resource management in Govt. Degree/Post Graduate College Libraries of Uttar Pradesh State, India to explore the extent of human resources in the libraries of Government Degree/Post Graduate College Libraries of Uttar Pradesh State, and the necessity of human resource planning according to the nature of libraries and the workforce turnover which is unavoidable and even beneficial. Finally, the paper provided suggestions for HRM practices and future directions in the best interest of Govt. Degree/Post Graduate College Libraries of Uttar Pradesh State.

Keyword:- Human Resource, Human resource management, College libraries, Library management, Library administration, Manpower in library.

1. INTRODUCTION

Human resource management (HRM) is making the best possible use of individuals for achieving the organizational objectives. The definition was developed in late twentieth century; thereafter employee motivation and job satisfaction came under focus instead of mere rational administration (Hartel, Fujimoto, Strybosh and Fitzpatrick 2007). Human resources have been defined as the knowledge skills, creative, talents and aptitudes obtained in the population.

2. MANAGEMENT OF LIBRARIES

College librarians help students, faculty and staff with finding and recommending source materials as well as determining what type of materials they need. Librarians also instruct patrons on basic computer skills, educate them on policies and how to use library resources. Classes could also be taught on how to utilize new technology and information comprehension. Librarians must be knowledgeable about both print and electronic information sources and databases. College librarians must be able to quickly identify the needs of patrons and do so with precision. The staff, the documents and the users make up the fundamental trinity of a library.

The success of a library largely depends upon the persons who are responsible for the effective use of a good collection of documents in the hands of the users. A library having good collections cannot render the best services to its users without efficient and trained personnel. Thus for the fulfillment of desired objectives of any library, sincere and organized human effort is essential. The basic aim of the library staff should be to place the right book in the hands of the right readers at the right time. They should ensure that no reader who requires help either in the choice of documents or in getting information from documents should go without it. No library can run without human resources.

3. FUNCTIONS OF COLLEGE LIBRARY

College libraries are an integral part of colleges in fact they may be regarded as the hearts of modern institutions of higher education. The principal function of a Library is to educate the educated. A well-equipped library is not only a storehouse of knowledge and experience but also a repository of world's culture-ancient, medieval and modern. College library represents one of the most important assets in support of the instructional programmed of the college.

Based on the report of the Education Commission the functions of the college library can be outlined as follows:-

- Providing information resources necessary for teaching and research.
- Aiding the teacher in keeping abreast of current development in his field.
- Providing instruction and guidance necessary for all formal academic programmers.

- Opening the door of the wide world of knowledge, that lie beyond the borders of a teachers own field of specialization, and
- Bringing information, students and teachers together under conditions which encourage reading for pleasure, self discovery, personal growth and sharpening of intellectual curiosity.

The Library is a workshop for the entire college-students and teachers where library staffs are the conductors of this workshop. Out of the many components forming a library system, professional staff forms the most important and valuable resource because the quality of a library is judged by the service it rendered not by some idle collection and efficient library service is the result of some effective library staff. Thus, if the supplier of the information commodity is passive, frustrated, disinterested and even non-existent, the information resource becomes meaningless.

It is the library staff who can bring them together according to their tastes, interests and needs for each other thereby establishing harmonious relationship between them. Professional staff in academic libraries is expected to promote academic programmers of the institution and encourage the optimal use of library resources. So, the role of the College librarian becomes much more crucial and important. It becomes the responsibility of college librarian to educate students into library use. S/he has a significant role in the promotion of overall college education programmed.

4. STATEMENT OF THE PROBLEM

Considering the fact that libraries in Uttar Pradesh Govt. Colleges, in particular have to develop the human resources in today's complex work environment. Govt. college libraries have to gear up to meet the challenges of ever increasing volumes of information and collection development programmers in an electronic environment, growing demands of increasing number of users and the complex and multifaceted user requirements. This is possible only when a proper HRM is made to reinvent programmers and services to meet the evolving needs, skills and goals of the client. An in-depth study of different categories in human resource employed in Govt. of U.P. State College libraries, present status, promotional avenues, better service condition, training and development.

In U.P. State due to the existing Govt. policy, libraries are facing acute shortage of staff. Due to this reason we felt to conduct a critical study of human resources in government degree/post graduate college libraries of Uttar Pradesh. The Study provides current state of the art as well as gives an indication of the requirements of human resources in Govt. of U.P. State college libraries. There is no staff formula applied in govt. college libraries of U.P. There are almost 2000 students studying in each 158 govt. colleges of U.P. 158 libraries were selected for the present study.

4.1 Objectives of the Study

The main objectives of the present study are as follow:-

- To find out human resource in the selected government college libraries of U.P.
- To find out the present status of human resources in government college libraries of U.P.
- To examine the necessity of resources for libraries.
- To suggest the human resource requirements in view of the future academic programmers of the government college libraries and also for the changing scenario of information technology and automation.

4.2 Scope and Limitation of the Study

The scope of the study is limited to 158 Govt. college libraries (Post Graduate & Degree Colleges) of U.P. In order to make an intensive study, the scope of the topic has been limited to only Govt. College Libraries of U.P.

4.3 Tool for Data Collection

The Survey methods were based on the documentary proof issued on time to time by Department of Higher Education, Govt. of U.P. used in this study.

4.4 Statistical Inference

In the present study, the responses received from 158 college libraries were codified and data was feed to the computer using Microsoft Excel sheets. Techniques like frequency distribution and simple percentage have been used to analyze the data.

5. DATA ANALYSIS AND INTERPRETATION

The collected data were analyzed and tabulated by using simple percentage technique.

Table-1: Services offered by the Libraries

Type of Services offered	Status
Circulation	√
Reference services	√
Display of new arrival	√
Newspaper clipping services	√
Digital service	√
E-library services	√
Photostat services	√
Interlibrary loan service	×
Printing services	√
Media Service	√

In Table-1 the information about the services provided by the college libraries for the students and staff are listed. Here it is very clear that due the lack of human resources the libraries are not providing other additional services to the users.

Table-2: Sanctioned post of Assistant Professor/Associate Professor - Library (Formerly Librarian) in the Libraries

Status	No. of Libraries
Sanctioned	121
Non-sanctioned	37
Total	158

All the colleges in UP are not having even the post of Assistant Professor/Associate Professor - Library (Formerly Librarian). There are 37 colleges which are running their libraries without professional librarians ultimately affecting the good library services (Table-2).

Table-3: Status of Human Resources in the Libraries (Designation-wise)

Designation	No.
Assistant/Associate Professor	38
Deputy librarian	01
Assistant librarian	01
Professional Asst./Cataloguer	02
Library Assistant	00
Library Attendant	00
Book Lifter	04
Office Assistant/ Clerk/ Data entry operator	03
Peon	49

Table-3 is showing the real picture of HR in college libraries of UP State, most of the colleges are lacking the staff at each level, even the single post of Assistant Professor/Associate Professor-Library (Formerly Librarian) is not filled in 120 libraries.

Table-4: Problems Faced Related To Human Resources in Libraries

Problems	No. of Libraries
Lack of professional manpower	118
Lack of ICT literate staff	158
Improper HRD Policy	158

Table-4 reveals that all the 158 college libraries are lacking the HRD policy.

6. FINDINGS

- After study it is found that libraries are in the position of having a single Assistant Professor/Associate Professor on the staff and independently developing and administering routine working systems, classification systems, and hiring and evaluation systems. Many of them work within the personnel practices of UP state or parent institutions. While we certainly have the latitude and responsibility to manage our human resources to make the most of library performance and to recognize the worth of the individual employee, an acknowledgment by the author that there are broader systems within which most libraries operate would have added real-world credibility to his work.
- The study found that e-library services recently started by Dept. of Higher Education, Govt. of U.P. for faculty and students, but there are no additional human resource provided for this purpose. So most of the libraries facing problems how to provide better services without sufficient trained human resources.
- The study of present staff strength was found to be inadequate in the college libraries of Govt. college libraries of U.P.
- Majority of librarians/authority are not satisfied with staff strength.
- All libraries face lack of professional human resources, face lack of ICT literate staff, and improper HRD policy.
- The present study reveals that there is a great difference between the present and proposed staff strength in every library, which is responsible for the poor services of the libraries.
- None of the libraries have collection development policy to improve reading materials for providing better services.
- Study found that there is irregular budget for the library as provided by the Govt. of U.P. time to time.
- The study shows that all libraries are managed by neither staff formula proposed by University Grant Commission nor rules of manual.

7. SUGGESTIONS

On the basis of the findings of the study the following suggestions are made for better HRM practice in government degree/post graduate college libraries of U.P. :-

- The Govt. of U.P. should follow some clear cut staff formula recommended for college libraries. Without considering this, the selection of library personnel or staffing is improper.
- There should be a proper IT infrastructure for each library to equip the staff with modern technology to store, organize, retrieve and disseminate information to their users.
- Provision should be created to recruit professional staff at all levels. Educational qualification experience, skills competencies, and ICT- literacy of the potential candidate must be given emphasis in the selection and recruitment process of human resources in the libraries.
- Keeping in view the present work load, need of users and services provided to the users by college library, the researcher proposes the following staff

pattern which will be more effective to ensure smooth functioning of the library.

- **Assistant Professor/Associate Professor:** There should be 158 Assistant Professor/Associate Professor required for the libraries to supervise, organize and administer the entire library functioning and provide leadership to the fellow staff to organize the various activities of the library.
- **Assistant Librarian:** 158 Assistant Librarians are required to perform activities in different library.
- **Professional Assistant:** 2 professional assistant are required for each 158 college libraries to perform activities in different library services. So total 316 professional assistant are required.
- **Computer operator:** 158 Computer operators are required to perform activities in e-library services.
- **Library Assistant:** 2 Library Assistants are essential to assist the Assistant Librarians for smooth functioning of routine activities of the in each library. So 316 Library Assistants are required.
- **Janitor:** 158 Janitor are needed to assist the professionals in library.
- **Book Lifters:** 2 Book Lifters are needed to assist the professionals in circulation section in each 158 college libraries. So total 316 book lifter are required.
- To develop human resources, the Govt. College should undertake different HRD programmes including continuing education and training, IT-orientation, career development, organizational development etc. Libraries should create opportunities for staff training and higher studies with fellowship/ scholarship at home and abroad.

8. CONCLUSION

The success of any college library largely depends on the intellectual, physical and technical infrastructures for effectiveness of library systems. The proper management of library human resources leads to the effective and efficient library and information services to satisfy library customers. Staff recognition and reward system by involving them in decision making. Planning should be bottom-up to make them feel they contribute and belong to their library.

Therefore, the college library should have well equipped with up-to-date collection of information resources, IT facilities, handsome budget, and experience and expertise. Besides governmental assistance, as an autonomous body, a college should take as well as implement a real-life plan for manpower development within limited resources. The authorities should also take initiative to implement suggested measures on priority basis for common interest of better management in Govt. College libraries in UP, State.

REFERENCES AND BIBLIOGRAPHY

1. Amiya Kumar Das (2015). Human Resources Management Issues in the Technical College Libraries of West Bengal: a Study. *International Research: Journal of Library & Information Science*, 5(2), 255-268.
2. Baldwin, David A. (1996). *The Academic Librarian's Human Resources Handbook: Employer Rights and Responsibilities*. Englewood, Colorado: Libraries Unlimited, p. 143.
3. Chopra Kamala (1984;. Job satisfaction among the librarians of Lucknow City. *Herald of Library Science*, 23 (3/4): 156-161.
4. Dessai, Sandesh; Satpute, B.B. & Fernandez, Carlos M. (2011). Human Resource Management of College Libraries in the State of Goa. In 14th National Convention on Knowledge, Library and Information Networking (NACLIN), Jointly Organised by DELNET, New Delhi and Central Library, Visva-Bharati, Santiniketan, West Bengal November 15-17, 2011. URL: <http://www.naclin.org/material/Human%20Resource%20Management%20in%20College%20Libraries%20in.ppt>
5. Devendra Kumar, Abdul Quadir & Siddiqui, JA (2017). Human Resource Management in Government College Libraries: A Study of Uttar Pradesh. *Indian Journal of Information Sources and Services*, 7(2), pp. 9-17.
6. Devendra Kumar & Shukla, Shiva Kanaujia (2013). Human Resource Management in Degree College Libraries of Meerut District (UP): A Survey. *Pearl: A Journal of Library and Information Science*, 7 (1), 11-16.

7. Devendra Kumar & Siddiqui, Jamal Ahmad (2010). Status of Human Resource Management in Degree College Libraries of Allahabad City: A Survey. *Indian Journal of Library and Information Science*, 4 (3), 271-282.
8. Elliot, L. (1998). Professional staff in academic libraries. *Jr of Librarianship*, 8; 15 (3): 10-15.
9. Hartel, C.E.J., Fujimoto, Y., Strybosch, V.E., and Fitzpatrick, K. (2007). *Human Resource Management: Transforming Theory into Innovative Practice*, Frenchs Forest, NSW: Pearson Education Australia.
10. Hawthorne, Pat (2004). Redesigning library human resources: Integrating human resources management and organizational development. *Lib Trends*, 172-186.
11. Jordan, P. *Staff management in library and information work*. Hampshire; Gower, 1995.
12. Kinnel, Margaret (1994). Human Resources Management and the role of school of library and information studies. *British Journal of Academic Librarianship*, 9 (3): 191-200.
13. Mangi, L.D. and Gupta, S. (2014). Human resources activities in libraries and information centers in India: a study of some apex bodies. *University news*, 52 (35/36), 19-21.
14. Mathur, P.P. (1988). Staffing in university libraries in India with reference to U.P. *Libraries. ILA Bull*, 24 (3).
15. Mats`eliso, M. and Chadzingwa, M. (2010). Human resource management in Southern African libraries. *Library Management*, 31(6), 451-465.
16. Parida, B. (1999). Status of library professionals in academic institutions of Orissa: An evaluation. *Asian Libraries*, 8(8): 265-274.
17. Rubin, Richard E. (1991). *Human Resource Management in Libraries: Theory and Practice*. New York: Neal-Schuman, 430 p.
18. Sadsaniya H.P. (2012). Leadership and human resources management *International Journal of Physical and Social Sciences*, 2(4), 320-330.
19. Satarkar, S. P. *Personnel management in college libraries*. Jaipur; Rawat Publications, 2000.
20. Simmons-Welburn, Janice & McNeil, Beth, Ed. (2004). *Human Resource Management in Today's Academic Library: Meeting Challenges and Creating Opportunities*. Westport, CT: Libraries Unlimited, 200p.
21. Singh, Rajesh (1998). An assessment and evaluation of human resource management issues in the academic libraries of Lucknow: A study. *Annals of Library Science and Documentation*, 45(3): 103-115.
22. Singh, S. & Arora, M. (1995). *Handbook of college libraries; problems development, finance and other related aspects*. Delhi: Beacon Books.
23. Tadasad, P. G. & Maheswarappa, B. S. (2001). Human resources in the college libraries of Karnataka State. *Library Herald*, 39(3): 161-167.
24. University Grants Commission, Library Committee. *University and college libraries*. New Delhi: The Author, 1965.

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A REVIEW FINANCIAL INCLUSION IN INDIA WITH RESPECT TO OTHER COUNTRY

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Abstract- The chance of fiscal joining transforms into a test for the Indian economy, as the majority of the commonplace masses is up 'til now prohibited from the extensive turn of events. Since 2015, the Reserve Bank of India and Government of India have started many deliberate measures for budgetary incorporation however their effect has not yielded palatable outcomes. The paper expects to focus on the utilization of existing devices, for instance, Mobile Phones, Banking Technology, India Post Office, Fair Price Shops and Business Correspondents (BCs), therefore making it also persuasive and easy to use to help both the average folks and the most ideal locale.

Keywords: Financial Inclusion, Inclusive Growth, Bank, RBI, Finance.

1. INTRODUCTION

At the point when the Indian economy advances, especially when the accentuation is on accomplishing manageable development, an exertion must be made to incorporate the most extreme number of cooperation from all segments of society. However, the nation's rustic populace's absence of mindfulness and budgetary training is hampering fiscal advancement as a bigger piece of the people has no permission to formal credit. That is a noteworthy issue for the country's fiscal headway. The monetary zone rose with some mechanical improvements to beat such limits, for instance, electronic teller machines (ATM), credit and check cards, web banking, etc. While the execution of these money related progressions has accomplished a move in urban culture, most country individuals are as yet unconscious of those turns of events and are avoided from formal banking.

Throughout India's rural areas the penetration of financial services is still very small. It is conceivable to take a gander at the reasons liable for this circumstance from both the graceful side and the interest side and the key explanation for the low invasion of cash related organizations is, conceivably, nonappearance of adaptability. The clarifications behind low enthusiasm for money related organizations may be low level of pay, absence of budgetary education, other family financial balances, and so forth.

1.1 Objectives of the Study

1. To examine the current money related incorporation situation in India.
2. Look at the main considerations that affect admittance to budgetary administrations.
3. To investigate the impact of proportions of monetary incorporation on Indian financial turn of events.

2. METHODOLOGY

For the purposes of this analysis secondary data were used. The data is taken from journals and research papers, articles in newspapers, websites, and published reports.

3. REVIEW OF LITERATURE

In view of the business facilitators/business journalist model, Select Studies RBI (2005) proposed monetary incorporation changing the Brazilian case of beating affliction in India. In 2005, attempts were made to empower the financial administrations through credit offices to arrive at country territories. In spite of the fact that the financial system started to grow in the rustic regions, there was as yet a larger part of the provincial populace without admittance to banking administrations.

GOI (2008) inspected budgetary incorporation as a conveyance system offering money related types of assistance to immense segments of the distraught and low-salary bunches at a moderate expense.

Kamath (2008) attempted to get a handle on the effect of Micro-Finance Institution (MFI) credits on bit by bit family unit compensations by breaking down MFI borrowers' money inflow and flooding models, and separating them and non-MFI families. The Financial Diary strategy was utilized to gather information and screen 11-month spending plans (September 2008 to August 2009) of Ramanagar zone family units, Karnataka, India, and the information was investigated using the Principle Component Analysis (PCA) strategy.

CRISIL (2016) estimated, as a list, the degree of monetary incorporation in India. This uses the non-money related totals to quantify budgetary consideration. The measurements utilized by the CRISIL Inclusix considered the quantity of people utilizing distinctive budgetary administrations, rather than concentrating on the volume of the loan.

4. DEFINITION OF FINANCIAL INCLUSION

Money related joining suggests, as demonstrated by the Planning Commission (2009), to comprehensive induction to a wide group of budgetary organizations at reasonable cost. Not simply budgetary things, they do offer other cash related sorts of help, for instance, assurance and worth insurances. Admittance to fund administrations for family units incorporates admittance to possibility arranging, credit and riches creation.

GOI (2008) characterizes money related incorporation as the way toward guaranteeing admittance to budgetary administrations and a convenient and satisfactory credit at a moderate expense for weak gatherings, for example, more fragile areas and low-salary bunches where vital. The importance of money related incorporation is the arrangement of monetary administrations to low pay bunches , specifically to the rejected segments of the populace with equivalent chances. The key aim is access to financial services for enhanced living conditions and employment.

4.1 Advantages of Financial Inclusion

Some of the benefits of financial inclusion are given below-

1. Needy individuals take credits from moneylenders and rich individuals in towns where there are no banks accessible that will in general adventure these individuals by charging higher enthusiasm going from 15 to 30 percent for each year. With financial inclusion these people can take out loans through banking from banks and also from the government.
2. It'll also develop a saving habit among poor people. They can save their money in deposits if they have deposits or financial institutions nearby and can rely on that money in emergency time.
3. It will likewise be useful for the nation in general, in light of the fact that these little investment funds from rustic individuals can be channelized and can help the nation overall in capital development and development.
4. It will likewise be helpful to the legislature on the grounds that various plans implied for the poor don't arrive at the poor as a result of the center men, however these constraints can be wiped out with the banks present in these regions.

4.2 Scope of Financial Inclusion

In India at present the purpose of budgetary joining is limited to giving an outright least induction to everyone as a speculation finances monetary equalization without unsettles. The budgetary thought has been seen all around from a much more broad perspective. Having a current record/speculation account alone, isn't seen as an exact budgetary thought marker. At the very least, 'Monetary Inclusion' activities will incorporate admittance to an assortment of budgetary administrations including

stores, long haul and transient credit, protection, annuities, contracts, cash moves, and so forth., all at moderate expense.

5. DIMENSIONS OF FINANCIAL INCLUSION WITH REFERENCE TO INDIA

India's degree of monetary consideration can be determined utilizing three quantifiable and fundamental estimations. Such measurements can be discussed generally under the headings below:

5.1 Branch Penetration

A bank office entrance is determined as the number of branches per lakh populace. It applies to the extension of business bank offices and ATMs in providing the provincial network with the full formal money related administrations.

5.2 Credit Penetration

Credit Penetration makes the three strides by and large: number of advance records per lakh people, number of little borrower advance records per lakh masses and number of advances in agribusiness per lakh people.

5.3 Deposit Penetration

Passageway of store can be resolved as the proportion of store venture accounts per lakh people. The degree of the usage of a sorted out credit structure can be assessed with the help of this instrument. Credit entrance is the basic issue in the country among the three segments of budgetary thought, since the all-India ordinary positions the most diminished for acknowledge invasion differentiated for the other two estimations. These low credit entrances are a result of the provincial families losing admittance to credit. Hence the question of low penetration needs to be more thoroughly understood.

5.4 Financial Inclusion Initiatives

1. KYC norms were relaxed and streamlined.
2. Law on Simplified Business Authorisation
3. Compulsory Opening Branches necessity in Unbanked Villages
4. Opening of middle brick and mortar framework

In the regulatory side, banks were forced to open in unbanked rural centers at least 25 percent of their new branches. Numerous means were taken, considering the issues standard individuals looked for in satisfying the 'Know Your Customer (KYC)' measures for opening ledgers. For instance, RBI approved banks to acknowledge self-accreditation to open their ledgers for essential assistance. RBI urged banks to open Aadhaar Enabled Bank Accounts by interfacing Aadhaar quantities of people, any place accessible, to the Basic Savings Bank Accounts opened for them, so their record as a consumer can likewise be developed after some time.

6. FACTORS AFFECTING ACCESS TO FINANCIAL SERVICES

Money related incorporation, from one perspective, is an instrument planned for offering monetary administrations to more unfortunate areas of the populace, for example, sparing records, credit office and protection plan. While, then again, it alludes to the goal of guaranteeing monetary administrations (banks, protection, and capital market administrations) and opportune and adequate credit to each section of society just as to the economy. Admittance to monetary administrations has been perceived as a critical part of development and a more prominent spotlight has been put on extending budgetary administrations to low-salary family units, as the helpless come up short on the mindfulness and data required to comprehend the money related administrations accessible to them. The absence of budgetary introduction confines the determination of family unit and business assets and credits. While there is some proof that entrance is improving however there are as yet a few factors that have affected monetary administrations quality.

7. DISCUSSIONS

Although financial inclusion studies have approached the problem from a number of points of view, with the exception of conceptual research, the emphasis tends to be on defining the relationship between financial inclusion with knowledge, digital technologies, and access constraints. In addition, technology is found to be a determining factor in the ultimate performance of financial inclusion policy at the present global scenario, irrespective of the context or the study participants with relevance to this topic. The only hope for financial development is financial inclusion, which will lead to economic growth. It was well documented in the above-mentioned literature, which largely supports this study.

An obvious increase in addressing the population of financial exclusion needs a holistic approach for banks to raise awareness of the financial system, appropriate financial advice and an efficient credit system to highlight the full value of structured management of the financial system, for which banks need to implement cost-effective reach strategies, and also Bridging relationships with NGOs, microfinance institutions, and eligible individuals and agents allow this. Promoting the financial system should reach the person possible through technology, a viable tool which provides quick and cost-effective financial access.

8. CONCLUSION

It is turning out to be progressively certain that tending to budgetary rejection would require an all encompassing methodology with respect to the banks to bring issues to light about monetary products, training and direction on cash the executives , obligation decrease, reserve funds and reasonable credit. So as to advance budgetary incorporation, the banks would need to create explicit methodologies to extend their administration reach. One way this can be accomplished viably is by building relations with microfinance offices, NGOs and neighborhood networks. Banks will give the straightforward record office wide exposure. Innovation can be an exceptionally helpful asset for giving distant admittance to banking things. ATMs money administering machines can be reasonably changed to make them easy to understand for individuals who are ignorant, less taught or have no information on English.

BIBLIOGRAPHY

1. Kunal Samanta, "Financial Inclusion In India- An Empirical Study", February 2018.
2. Vojtěch Máca, Milan Ščasný, Iva Zvěřinová, Michal Jakob, and Jan Hrnčíř, "Incentivizing Commuter Cycling by Financial and Non-Financial Rewards".
3. Pucher, J.; Dill, J.; Handy, S. Infrastructure, "Programs, and policies to increase bicycling: An international review", 2010.
4. Brug, J., Conner, M. Harré, N. Kremers, S. McKellar, S. Whitelaw, S. "The transtheoretical model and stages of change: A critique: observations by five commentators". 2004.
5. Biehl, A.; Ermagun, A.; Stathopoulos, "A. Utilizing multi-stage behavior change theory to model the process of bike share adoption". 2019.
6. Handy, S.; van Wee, B.; Kroesen, M. Promoting cycling for transport: Research needs and challenges", 2014.

Books

1. Towards Financial Inclusion in India - K G Karmakar, G D Banerjee, N P Mohapatra.
2. Financial Inclusion of the Marginalised - Sharit Bhowmik, Debdulal Saha.
3. FINANCIAL INCLUSION, INCLUSIVE GROWTH & THE POOR -PADMAJA MISHRA.

Articles

1. Financial Inclusion in India: An Analytical Study- DR. VIPIN KUMAR AGGARWAL DEPARTMENT OF COMMERCE, SRI AUROBINDO COLLEGE UNIVERSITY OF DELHI.
2. Financial Inclusion: CAN IT MEET MULTIPLE MACROECONOMIC GOALS - SROBONA MITRA, ANNETTE KYOBE, YEN NIAN MOOI, AND SEYED REZA YOUSEFI.
3. <http://citeseerx.ist.psu.edu>
4. <https://iimb.ac.in>
5. <https://www.sciencedirect.com>

6. <https://www.ripublication.com>

Websites

1. WWW.RBI.GOV.IN
2. [HTTPS://MYGOV.IN/](https://MYGOV.IN/)
3. [HTTPS://DATA.GOV.IN](https://DATA.GOV.IN)

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A STUDY ON EMPLOYEE SATISFACTION AND WORK ENVIRONMENT

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Abstract- In this paper, discuss around the magic fill in earth parameters impacting representative fulfillment. Also, particular case research endeavor identified with Worker fulfillment starting with India bring been talked about in this paper.

Keywords: Reward & Recognition, Employee Satisfaction, Employee Motivation, Leadership.

1. INTRODUCTION

Those haul "Employee Satisfaction" for the most part utilized to describing if representatives need aid content Also their desires would met at work put. This is otherwise called work fulfillment which implies In the thing that degree an unique will be fulfilled by the exercises they would completing for their specific part. [1,2] former researches uncovered that representative motivation, zeal to attain objective Also sure representative spirit would associated for Worker fulfillment. Fill in nature's domain may be also a magic figure for representative fulfillment.

It has been observed that sometimes mediocre employee leaves organization as they are unhappy and dissatisfied with the work environment. Several researches have been done for identifying the factors impaction employee satisfaction. Factors like, treating employees with respect, reward are recognition, empowerment, industry compatible benefits and compensation, and positive management [3] with proper vision, mission and goals, is very important employee satisfaction. Also, the extent to which the employer will take employee satisfaction as important factors is varying form organization to organization.

2. MEASURING EMPLOYEE SATISFACTION

Employee satisfaction is generally done through anonymous employee satisfaction surveys that are administered time to time for measuring employee satisfaction [4, 5]. In an employee satisfaction survey, employee satisfaction is looked at majorly in the areas but not limited to as described below [6]:-

- Monetary benefits
- Reward and Recognition
- Equal Opportunity
- The feel of belongings
- A mixture of formal and informal approach
- Carrer Growth
- Work condition
- Addressing grievances
- Leadership
- Frequent changes
- Safety and security

Most of these parameters are related to work environment. The procedure of measuring employee satisfaction varies from organization to organization. There is another informal method of conducting the employee satisfaction is the focus group discussion. It is used to measure employee satisfaction is meeting with small groups of employees and asking the same questions verbally [7, 8]. The employee provides their responses, and based on the analysis outcome of the responses the action items are defined.

Depending upon the authoritative culture, solace level of the workers will give acceptable feedback, a standout amongst the technique might be chosen. Sometimes, both systems would used to guarantee the reaction integument. A few associations utilized wearing down rate retreat meetings Similarly as An alternate approach to survey representative fulfillment. It may be expected that in the associations for secondary Worker fulfillment will have low wearing down rates

retreat meeting examination will uncover similarly great remarks contrasted with chances for change concerning illustration suggested those abandoning representatives [9, 10].

3. EMPLOYEE SATISFACTION – IMPACT OF PARAMETERS

- **Monetary benefits:** It is not the primary factor but it is an important factor for employee satisfaction. It is, needless to say that everyone is looking to the compensation based on the role they are performing.
- **Reward and Recognition:** Appreciation is an important factor for the employee satisfaction as it improves the motivation level and the morale of the employee.
- **Equal Opportunity:** It is highly noticed that wherever the organization tends to be partial between employees the level of job satisfaction drastically falls down. It is not only for the employee towards whom the organization is partial but also amongst others.
- **The feel of belongings:** Researches has revealed that, when an employee feels that he is considered as an important part of the team, he belongs to the organization then there are higher chances of job satisfaction.
- **A mixture of formal and informal approach:** In an environment where everything is too formal, an employee is going to feel suffocated. Whereas on the contrary in an informal environment where there is no completion and pressure, nothing would motivate him or her. In both the cases job satisfaction would be lesser. Hence, mixed environment may be a better choice.
- **Career growth:** Employee feel satisfied if he/she thinks there is a chance for his/ her career growth in the organization. This also contributes for lesser attrition rate.
- **Work conditions:** If an organization is not keeping or providing an appropriate working condition, then it is natural for employees to feel dissatisfied and unhappy about the same. If adequate facilities are provided to each and every employee it assures that there won't be any complaint from the employees' side. Having a proper working condition adds up to the level of job satisfactions.
- **Addressing grievances:** Wherever number of people work together, the complaints are ought to rise on either of the sides. Be its management or workforce most of the time they are into tassels [7]. There are times when management cannot fulfil the demand demanded by the workforce due to numerous reasons. Whatever the case may be, if the grief of an employee is heard and addressed by the authorities, it restores the faith in the organization. This is another factor that completely contributes to the job satisfaction. In an organization where the workforce is always blamed and their grievances are never answered, chances of low job satisfaction are more amongst the employees.
- **Leadership:** Leadership plays a vital role in the development /transformation of the organization. It is very important factor for the employee satisfaction. If the leadership team has a proper employee friendly vision then there will be employee friendly policies and they will treat employee better manner. This will increase the employee motivation and the morale [10].
- **Frequent changes:** It is going to be a huge turn off for any employee if she or he has to change the place frequently. People seek for a job because they want to gain stability in their lives. Most of the time it is seen that people prefer having a fixed job, and a fixed place. Thus, if an employee is transferred every now and then, it in a way disturbs his or her routine as well as family set up. Most of the working professionals are having children and older aged parents to look after and in such cases transferring or instability at work gives a tough time [11]. Thus, when there is growth, but

not instability and frequent changes in the working style and spirit, the chance of having a higher level of job satisfaction is more.

- **Safety and security:** These days companies are taking endless measures in order to see that an employee is catered different kind of facilities like health care and medical checkups. There are a few institutions that also provide insurance policies at a little lower rate [12]. Hence, this aspect of safety and security plays a major role. If an employee doesn't feel safe and secured at the organization that he or she works in, the level of job satisfaction is ultimately going to fall. It is as necessary for an employee to have the safety and security of his career as it is to have a monthly salary.

4. STUDY DETAIL

In place to investigation those effect for fill in nature's domain representative satisfaction, a questionnaire might have been produced. Those questionnaire might have been comprises for two distinctive sorts from claiming questions, shut open finished inquiries. Those shut finished inquiries were absolute select regulate inquiries Hosting double reactions Yes alternately no. Each end wound inquiries might have been trailed by a open conclusion address for the support against those determination of reactions from double alternatives. The target of the questionnaire might have been with gather information those information will figure out those effect from claiming headway of science and advances in the taking after parameters:-

- Overall Leadership
- Clarity of Vision and Mission of organization
- Organization Policy
- Reward and Recognition
- Clarity in Job
- Grievances Address
- Transparency in evaluating performance
- Remuneration
- Safety and Security
- Reporting Manager
- Colleague
- Culture within the Organization

4.1 Hypothesis

It was decided that, if more than 50% of the respondent agrees that "Work Environment" have impact on employee satisfaction. One sample proportion test was carried out for validation of hypothesis.

The test hypothesis was:-

- $H_0: p = 0.5$
- $H_1: p > 0.5$

The significance level of the test considered as 95%. Where p is the proportion of responses saying "Yes", i.e. "Work Environment" has positive impact on a particular parameter.

4.2 Sample detail

Quota sampling technique was followed to collect the responses from three major sectors i.e. Manufacturing, Service and IT. Around 10000 people were asked to provide their feedback. The summary of responses received in given in Table No-1.

Table 1 – Sector wise Responses Count

Sectors	No of Responses
Manufacturing	2356
Services	3247
IT	2964

4.3 Procedure

Hypothesis testing as stated in the section 4.1 done for all the parameters. Also attempts were made to check whether responses from all the sectors are homogeneous or not.

4.4 Analysis and Findings

Hypothesis testing was conducted for the parameters under consideration and summary of findings is represented in Table No-2.

Table 2 – Parameters and corresponding test p values

Parameters	P value
Overall Leadership	0.047
Clarity of Vision and Mission of organization	0.007
Organization Policy	0.001
Reward and Recognition	0.016
Clarity in Job Role	0.060
Grievances Address	0.579
Transparency in performance evaluation	0.01
Remuneration	0.101
Safety and Security	0.032
Supervisor	0.002
Colleague	0.034
Culture within the Organization	0.011

Also for each and every parameter, Chi-Square test of independence performed to check if there is a difference in the response for a particular parameter for different regions. The summary of the results is represented in the Table No-3

Table 3 – Parameters and corresponding test p values

Parameters	P value
Overall Leadership	0.009*
Clarity of Vision and Mission of organization	0.528
Organization Policy	0.793
Reward and Recognition	0.542
Clarity in Job Role	0.036*
Grievances Address	0.012*
Transparency in performance evaluation	0.141
Remuneration	0.561
Safety and Security	0.711
Supervisor	0.932
Colleague	0.762
Culture within the Organization	0.982

Note: In all the cases where there are differences responses the difference is mostly due to non-agreement of the respondents from IT organizations.

The summarized result in the Table No-3, provides strong evidence to suggest that apart from three parameters there is no differences of opinions from the respondents of different sectors.

4.5 Result and Discussion

In the analysis and outcome section, it has been observed that:-

- Apart from “Grievances Address” all other parameters indicates that work environment have positive impact in the employee satisfaction
- Organization need to work on these specific parameters for improving employee satisfaction, if required
- Responses from the different sectors shows similar trend for clarity in vision and mission, organization policy, reward & recognition and transparency in performance evaluation. Also the responses from the IT sector shows different trend for the parameters like overall leadership, clarity in job role and grievances address while comparing the responses with other sectors.

Some of the key comments made by the respondents for the parameters is summarized in Table No-4.

Table 4 – Summary of Comments

Parameters
<p>Clarity of vision and mission In most of the organizations employee feel difficulties in aligning their role with the vision and mission of the organizations. Hence, alignment and integration of vision and mission with the role is suggested</p>
<p>Organization Policy Most of the respondents are of opinion that regular updation and revisit of organization policies is required to make them more effective and meaningful for the employees.</p>
<p>Reward & Recognition 1. In most of the organization “Reward & Recognition” policy is available but either these are not effective or not implemented properly 2. Periodical update is required for organizational “Reward & Recognition” policy</p>
<p>Remuneration The employee in the same grade will have similar remuneration. That is there shouldn't be huge deviation in remuneration between the employees belonging to the same grade.</p>
<p>Grievance Addressal Apart from work place harassment cases, there should be a proper mechanism to address the grievances of the employees</p>

5. CONCLUSION

A fulfillment review may be utilized toward that association with measure the preferring and endorsement of a specific gathering about stakeholders for its services, fill in environment, culture, alternately livelihood. A representative fulfillment study is the review a large portion habitually utilized instrument should catch voice of the representatives. This study comprises of arrangement about inquiries that representatives solution for illuminate those head honcho something like how they feel over alternately how they knowledge their fill in nature's domain society.

That questionnaire typically offers both inquiries that ask workers will rate a specific part of the fill in earth open-finished inquiries that permit them to express suppositions. For precisely picked inquiries that don't prompt specific answers, an head honcho might get the feel for the happiness, satisfaction, engagement from claiming workers. The point when An fulfillment overview will be utilized at particular intervals, for example, such that annually, a head honcho might track Worker fulfillment About whether should check whether it may be moving forward.

The manager who picks to utilize An fulfillment overview for representatives must make dedicated on reporting weight the effects to workers. Additionally, the boss ought to be dedicated should settling on progressions of the worth of effort environment, with the help association of workers and groups of workers. Conveying transparently around the changes, their impact, future arrangements need aid the greater part and only a sure fulfillment study procedure.

Without the transparent communication, results reporting, and employee updates, employees will not trust the employer's motives in collecting survey data. Over time, employees will cease to respond or respond only with answers that they believe the employer wants to hear. This makes the data collected on the survey useless. The involvement of employees in improving the work environment based on survey results creates an environment of shared responsibility for workplace culture and improvements.

Employers should avoid leading employees to believe that satisfaction at work is the employer's responsibility. Employee satisfaction is a shared responsibility. The outcome of the case study suggests that organizations have to work on several satisfaction factors to improve employee satisfaction. Also, they need to improve the status of the work environment, so that the employee satisfaction improves as a consequence the performance or the organization will also improve.

REFERENCES

1. Minakshi Garg, and Pardeep Jain,(2013) Implications of Labour welfare measures on Job Satisfaction and productivity: Journal: International Journal of Management & Information Technology Vol. 5, No. 2pp.536-41.
2. Navdeep Kumar, Pankaj Garg(2011),Impact of motivational factors on employee"s job satisfaction- A study on some selected organization in Punjab, India" ,Asian Journal of Management Research ,Volume 2 Issue 1, PP 672-683.
3. Pisal D.T., Dr. Ajay Kumar (2012), Corporate Social Responsibility Related To Sugar Industries, Applied Research And Development Institute Journal,V.5(5).pp.26-39.
4. R.Gayathiri, Dr. Lalitha Ramakrishnan,(2013) Quality of Work Life – Linkage with Job Satisfaction and Performance, International Journal of Business and Managemen Invention ISSN, Volume 2 Issue 1 | January. | PP.01-08.
5. Akintayo, D. (2012). Working environment, workers' morale and perceived productivity in industrial organizations in Nigeria. Education Research Journal, 2 (3), 87-93.
6. Assaf, A. M. & Alswalha, A. (2013) Environmental impacts of working conditions in paint factories workers in the Hashemite Kingdom of Jordan. European Scientific Journal, 9 (8).
7. Chaddha, V., Ravi P. G. & Noida, G. (2011) Analysis of factors influencing employees' productivity in relation to workplace environment. International Journal of Research in Commerce and Management 2.
8. Dixit, V. & Bhati, M. (2012) Astudy about employee commitment and itsimpact on sustained productivity in Indian Auto-Component Industry. European Journal of Business and Social Sciences, 1(6), 34 – 51.
9. Oludeyi, O. S. (2015) Workplace factors as determinants of job commitment among senior non-teaching staff of Olabisi Onabanjo University, Ogun State. Master's Thesis of the Department of Adult Education, the University of Ibadan, Oyo State, Nigeria.
10. Voon, M.L. Lo, M.C. Ngui, K.S. & Ayob N.B. (2011) The influence of leadership styles on employees' job satisfaction in public sector organizations in Malaysia. International Journal of Business, Management and Social Sciences, 2(1).
11. Yusuf N. & Metiboba S. (2012) Work environment and job attitude among employees in a Nigerian work organization. Journal of Sustainable Society, 1(2), 36-43.
12. Umoh, G. I., Amah, E. & Wokocho, I. H (2014) Employee Benefits and Continuance Commitment in the Nigerian Manufacturing Industry. IOSR Journal of Business and Management, 16(2), 69-74.

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A ROLE OF DIGITAL SIGNAL PROCESSING (DSP) FOR SPEECH SIGNALS USING SAMPLING

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Abstract- This paper gives an outline of advanced sign preparing (DSP) strategies for discourse flags its applications, benefit and weakness. Around forty years prior computerized PCs and related advanced equipment were enormous in size and more costly, additionally their utilizations were restricted. Henceforth the quick changes in this field give the benefit in computerized PCs innovation and incorporated circuit creations. Still there are a few upgrades required for all sign preparing inconveniences in DSP. DSP worries with electromagnetic signs across a transmission medium and it is first time executed in discourse preparing issues.

Keywords: Digital Signal Processing, analog signal, digital signal, sampling, systems and signals.

1. INTRODUCTION

A Digital Signal Processing is an incorporated circuit intended for fast information dealing with and it is additionally a technique for inspecting and altering a sign to improve its adequacy. It includes applying different numerical and computational calculations to create a sign that is of higher incentive than the first sign. Quick and ceaseless improvement in the field of computerized signal handling methods, give systems in numerous regions concerning simple sign preparing.

As of late DSP is utilized in numerous kinds of sign investigations, for example, discourse signal handling, biomedical sign preparing, geophysical sign preparing, and media transmission, and so on Advanced Signal Processing is the order of utilizing PCs to comprehend computerized models of the current innovation today. 1960s is known as the uprising year for DSP now it is important to the advancement of radar, sonar and space investigation and so forth DSP utilized for execution and numerous different fields that use it has created innovation with their particular procedures, explicit calculations and their number-crunching.

DSP improves the accuracy and reliability in the field of digital communication. Usually DSP first converts an analog signal into a digital signal and then be relevant signal processing techniques and algorithms; DSP also helps to reduce noise and distortion. The fundamental of DSP is that it works by standardizing the levels of a signal. As it is known that all communication channels hold some background noise whether the signal are analog or digital, and apart from what type of information is conveyed.

This noise in reference to some signal is known as signal to noise ratio for communication system and one always tress to find how it improves. Suppose that an incoming analog signal such as a television broadcast station, the signal is first converted to digital using analog-to-digital converter (ADC) and resulting digital signal has two or more levels, these levels are always knowable. Since incoming signal contains noise hence many times levels are not at the typical values, so the DSP circuits correct the values of levels and remove the noise.

And the digital signal gets converted back to analog signal by using digital to-analog converter (DAC). We can differentiate between analog and digital such as analog or continuous time method is described as analog is ancient technique used for signal processing. Analog signals for processing use some elements such as resistors, capacitors, diodes, transistors, etc. Also analog signal processing is based on natural capability of the analog system to solve differential equations that described a physical system and result is acquired in real time.

The digital signal processing leading now a days, and it works on numerical calculations. Also it is not able to provide real time solutions. However digital processing technique has two main advantages over analog signals flexibility and repeatability. This term can be defined as in digital processing the same hardware is used for more than one signal processing operations while in analog signal

processing for every type of operations one has to design a system that's why called flexible.

And repeatability means the same operation can be repeated for giving same the outcomes whereas in analog signal processing systems parameter variation because of supply voltage or temperature. So the conclusion is that what signal processing used, it depends on the requirements or applications.

2. SIGNALS AND SYSTEMS

A notable meaning of sign is that it is at actual amount that changes with reality and furthermore some other autonomous factors. For instance electrocardiogram (ECG) and electroencephalogram (EEG) are instances of normal signs. A sign can be grouped either as simple and computerized signal. Simple signs have limitless number of qualities in a reach while advanced signs have just a limited number of qualities.

By and large in correspondence are utilize either occasional simple or an intermittent advanced signs. Human voice is an illustration of simple sign, when a human expresses a wave is produced noticeable all around and this wave is a simple wave. What's more, when voice is caught by a receiver then it is changed over to a simple sign and after that when it is put away in the PC then it become advanced information, i.e., as 0s and 1s.

Further when this data is transmitted from one computer to another or transferred from one emplacement to another then this data is converted to digital signal^{7,8}. The signal processing has in many applications for example instrumentation, communication, radar and sonar signal processing, biomedical signal processing etc.

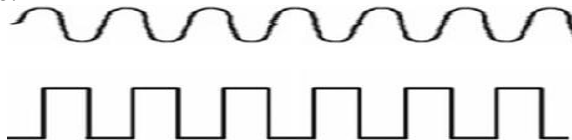


Figure 1 Analog and digital

A system can be defined as a physical device that is able to execute an operation on a signal for example a filter used to cut down noises occur in desired information bearing signal is called a system. Also system can be described by the type of operation performed on the signal and these types of operations concern to as signal processing.

Here the filter carries out a number of operations on the signal and these operations use to reduce the noise. When signal proceed through a system then performed operation is either linear or nonlinear. If the operation is linear, then system is called linear and if the operation on signal is nonlinear then system is called nonlinear.

3. DIGITAL SPEECH PROCESSING

Discourse is a correspondence medium, a discourse can be portrayed as far as sign and sign contains importance data and this data is in acoustic waveform. Discourse signal is the utilization of computerized signal handling strategy. For a discourse signal has three principle assignments, i.e., address a discourse signal in computerized structure, execution of complex method, and classes of utilizations which rely more upon advanced handling.

To address a discourse signal in computerized structure, use examining hypothesis if there should be an occurrence of testing a band restricted sign can be addressed examples which are intermittent on schedule. Portrayal of discourse sign can be delegated waveform portrayal and parametric portrayal. If there should be an occurrence of waveform portrayal simply keep out wave state of a discourse signal (simple) by utilizing testing and quantized technique while in parametric portrayal discourse signal addresses as the yield of a model for discourse creation.

Again, parametric representation classified as excitation parameters and vocal tract parameter. Excitation parameters means related to source of speech sound and vocal tract parameters are related to the single speech sounds. There are

many areas where speech processing is used, for example speaker recognition, speech recognition and synthesis, digital transmission etc.

4. PROS AND CONS OF DIGITAL SIGNAL PROCESSING SYSTEM

The most appropriate motivation to utilizing computerized signal processing methods is that the profoundly progressed signal handling capacities can be executed utilizing advanced signal handling strategies. It very well may be resolved as to discover discrete portrayals of signals. DSP is more mind boggling in nature than simple signal processing then again it has numerous benefits in overabundance of simple signal handling.

Following are the advantage of DSP technique:-

1. DSP provide the facility of reproducibility i.e. digital system allows reconfiguring the digital signal processing functions while in case of analog it is essential to redesign hardware.
2. DSP has the Capability of being changed since the digital processing can be simply changed by programming.
3. DSP make available better signal quality.
4. This processor is small in size and economical to implement.
5. In analog signal it is complex to execute accurate mathematical operations but these operations can be normally implemented on a digital computer.
6. For analog require numerous filters but in digital same DSP processor is used for many filters.
7. Storing digital data is inexpensive and also digital data can be encrypted, coded and compressed.
8. These systems more reliable and easily modify by changing software.
9. It can be implemented to linear (complex) or nonlinear algorithms.

5. APPLICATIONS OF DIGITAL SIGNAL PROCESSING SYSTEM

There are a ton of utilizations in various zones for which the Digital Signal Processor turns into an extreme arrangement and for these DSP makes accessible the best encouraging mix of execution. Mostly the DSP applications can be improved into augmentations and increments. Thus the MAC shaped a primary practical unit utilized in early DSP processors. Later on analyst/architects coordinated more highlights, for example, pipelining, SIMD, VLIW and so on, to improved execution.

Today's DSP used in too many fields for example:-

1. **Speech Recognition-** Speaker verification, voice mail and speech synthesis etc.
2. **Signal Analysis-** analysis of Audio/video signals.
3. **Space Photograph-** development and data compression.
4. **Wave form Generation-** to represent speech signal.

There are lots of areas where DSP can be used but here we have discussed only few popular applications. The main objective of DSP is to measure, filter and compress analog or digital signals. DSP basically is used for signal processing which is done on digital signal to improve the quality of signal. It is described by in the term of discrete representation such as discrete domain signals/frequency, discrete time. DSP contains some sub-fields as radar signal processing, communication signals processing, digital image processing, etc.

6. SAMPLING OF A SIGNAL

Testing is the way toward changing over a ceaseless time signal into a discrete time signal obtains by taking examples of the persistent time signal at discrete time moments. Testing rate/recurrence (F_s) can be characterized by the quantity of tests each seconds acquire from simple signal (consistent signal) to build a discrete signal. Furthermore, examining period/span is the converse of inspecting recurrence or it is time between progressive examples.

The unit of examining rate in time-area is hertz or tests each second (Sa/s). There are an inquiry that how we select the testing period T or its same and the examining rate F_s the appropriate response is that we should have regular data

concerning the recurrence substance of the sign. For instance TV flags for the most part contain recurrence segments up to 5 MHz. For examining a sign generally utilized hypothesis is Nyquist Shannon testing hypothesis.

Using this theorem a signal can be reconstructed faultless but the condition is that the sampling frequency is greater than twice maximum frequency or its equivalent. If lower sampling rate is used then may be original signal information fully not recoverable from the sampled signal. Since human hearing range is 20Hz to 20 kHz i.e. the minimum sampling frequency is 40 kHz.

Sampling rate for phonemes is between 5Hz to 4 kHz because human speech usually sampled at much lower rate i.e. all the energy is enclosed between this and allocate sampling rate 8 kHz, and this sampling rate used by telephony system. Since for voice frequency transmission bandwidth allocated for a channel is typically 4 kHz.

7. CONCLUSION

In this paper we attempt to give some fundamental properties of DSP which is helpful for new specialists in this field. DSP known as center innovation and is utilized in quickly developing territories like sound and video signal preparing, broadcast communications, instrument control and so forth. There is consistent advancement in the field of DSP and on account of this it has become a vital segment for some applications which apply signal preparing utilizing microchip.

DSPs are microcomputers/processors whose equipment, programming and guidance set are streamlined for high velocity numeric information handling applications. In most recent couple of years DSP processors have gotten more mainstream and utilized inconceivably because of different benefits as reconstruct capacity, cost viability, speed of information handling, size.

REFERENCES

1. K Mitra Sanjit, Digital Signal Processing Applications, pp. 1-85.
2. Rabiner, Lawrence, Bing Hwang Juang, and B Yegnanarayana. Fundamentals of Speech Recognition 1 st. India: Repro India Ltd, 2009. 1-483.
Doi: <http://www.xilinx.com/products/technology/dsp.html>.
3. Doi: <http://whatis.techtarget.com/glossary/Electronics>.
4. Tobin, Paul. Electric Circuit Theory, Digital Signal Processing (DSP). DIT, Kevin St. Volume DT287/2. pp 85-99.
5. Doi: http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/Digi_Sign_Pro/lecture1/images/node3.html.
6. Forouzen, Behrouz A., and Sophia Chung Fegan. Data Communications and Networking. Ed 3rd. New York: McGraw-Hill Companies, 2004. pp 49-140.
7. Proakis G. John, Manolakis G. Dimirits Digital Signal Processing, 12 India: Dorling Kindersley Pvt. Ltd., India, 2012.
8. Beliveau Paul MATLAB for Signal Processing, E E 2 7 5 Lab, January 15, 2012 pp-1-18.
9. Doi: <http://www.dsp-technology.com/index.html>
10. Rabiner R., Lawrence, and Ronald Schafer W. Digital Processing Of Speech Signals. Vol. 10. India: Dorling Kindersley Pvt. Ltd., INDIA, 2013.
11. Source: Digital Signal Processing: The New Semiconductor Industry Technology Driver, Will Strauss, IEEE Signal Processing Magazine, March 2000, pp. 52-56.
12. Doi: http://en.wikiversity.org/w/index.php?title=Digital_Signal_Processing&action
13. Doi: www.agilent.com Advantages and Disadvantages of Using DSP Filtering on Oscilloscope Waveforms Application Note 1494.
14. Doi: <http://www.differencebetween.info/scienceand-mathematics>
15. Singh Nilu; Khan R. A. & Raj Shree. Equal Error Rate and Audio Digitization and Sampling Rate for Speaker Recognition System. American Scientific Publishers, 2014, 20(5-6), pp. 1085-88.

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परिचय—

भारत एक ऐसा देश है जहाँ पर ज्ञान विज्ञान की परम्परा निरस्त रूप से पीढ़ी दर पीढ़ी चलती आ रही है। ज्ञान की इस निरन्तर प्रवाहमान धारा का परिणाम ही था कि संसार की सबसे प्राचीन पुस्तक ऋग्वेद का प्रादुर्भाव भी इस धरती पर ही हुआ। तत्पश्चात् इस धारा में वेद, उपनिषद आरण्यक इत्यादि ग्रन्थों ने भी आकार ग्रहण किया जिसके परिणामस्वरूप भारत विश्व गुरु की पदवी को प्राप्त कर सका। आज भी संस्कृत भाषा के लगभग छः लाख ग्रन्थ जी माण्डुलिपियों में ताड़पत्रों पर या अन्य पत्रों पर या कागज पर लिखित है, लंदन की विश्व प्रसिद्ध लाइब्रेरी 'ब्रिटिश लाइब्रेरी में उपलब्ध हैं जिनका अध्ययन विश्वविद्यालयों के छात्र तथा प्राध्यापक करते हैं। इसी प्रकार नासा में 60 हजार संस्कृत पाण्डुलिपियाँ तथा ग्रन्थों का विद्यमान एवं प्रयोग इस तथ्य को और अधिक पुष्ट करता है। भारतीय समाज ज्ञान विज्ञान की अन्य शाखाओं, यथा—शिल्प कला, विमान शास्त्र, धनुर्विद्या, अश्वविद्या, रथनिर्माण, वास्तु भौगोलिक अध्ययन एवं ज्योतिष में भी प्रवीण था। उपलब्ध प्राचीन मन्दिर जहाँ पर भारत की वास्तुकला के परिचायक हैं वहीं पर उपलब्ध वेधशालायें, ज्यामितीय, वास्तु एवं विज्ञान के चरमोत्कर्ष के द्योतक हैं।

इस समाज का निर्माण वेदों के आधार पर ज्ञान विज्ञान की इन्हीं शाखाओं को अध्ययन द्वारा जानकर प्रायोगिक निरूपण के माध्यम से श्रेष्ठ सुख को प्राप्त करना था। इसमें किस प्रकार से भारतीय समाज अपना निर्माण इन सभी ज्ञान की सरणियों को सार्थ करने के लिए करता था? इसका अध्ययन साथ ही इस पाठ का प्रमुख उद्देश्य है, तथा किस प्रकार के भारतीय समाज का व्यावसायिक क्रम में विभाजन किया गया था ये भी एक गौण प्रयोजन है।

वैदिक वर्ण व्यवस्था—

वेदों में सभी सत्यविधाओं का मूलरूप से लेकर विस्तृततम रूप तक अध्ययन उपलब्ध है। इसमें ज्ञान को सभी सरणियों का दिग्दर्शन प्राप्त होता है अर्थात् ज्ञान की अभी तक उपलब्ध एवं रिसर्च के माध्यम से प्राप्त होने वाली अन्य विधाओं को भी वेदों में ऋषियों द्वारा अपने विचारों की गम्भीरता में प्रतिपादित किया है तथा स्पष्ट आदेश भी दिया है—

कुर्वन्नेवेह कर्माणि जिजीविषेच्छतं समाः।

एवं त्वयि नान्य थेतोऽपि न कर्म लिप्यते नरे ॥

यजुर्वेद— 40—1

अर्थात् हे मनुष्य इस संसार में तुम कर्म करते हुए ही सौ वर्षों तक जीने की इच्छा करो स्वयं के तथा समान राष्ट्र एवं विश्व के कल्याण हेतु किए गये कर्मों के द्वारा ही तुम इस संसार में सभी सुखों को प्राप्त करोगे तथा कर्मों के बंधन से भी बच सकोगे।

यहाँ पर कर्म की प्रधानता ही मनुष्य की उन्नति का मुख्य कारण है। कर्मों के द्वारा ही संसार के भोगों को भी समाज, राष्ट्र एवं परिवार में रहने वाले व्यक्ति भोग सकते हैं। वैदिक काल को मुख्यतः विद्वानों ने एक समय सीमा में बाधा है। जहाँ पर मतभेद प्रायशः परिलक्षित होता है। वैदिक काल का निर्धारण उस काल की सामाजिक, आर्थिक, सांस्कृतिक स्थिति एवं सामाजिक परिवेश का वर्णन निम्नलिखित है।

वैदिक काल निर्धारण

वैदिक काल निर्धारण मुख्यतः पाश्चात्य विद्वान मैक्समूलर 1200 ई० पूर्व किया परन्तु बाद में उन्होंने स्वीकार किया कि पृथ्वी पर कोई ऐसी शक्ति नहीं है जो निश्चित रूप से बता सके कि वैदिक मंत्रों की रचना 1000 ई.पू. में हुई थी या कि 1500 ई. पू. में या 2000 या 3000 अर्थात् वेदों के समय निर्धारण में जहाँ प्रो० मैक्समूलर अनिश्चित मत प्रकट करते हैं वही श्री बाल गंगाधर तिलक ई.पू. 6000 वर्ष, मि. विंटरनिल ई.पू. 3000 वर्ष बताते हैं। इसका आधार सर्वमत से कोई प्रतीत नहीं होता है। अतः वेदों के काल निर्धारण को भारतीय मनीषी स्वामी दयानन्द एवं मनुस्मृति के आधार पर स्वीकार किया जाय उपयुक्त प्रतीत होता है।

वेदों का समय, वैदिक काल गणना के आधार पर—

हमको सामान्यतः वैदिक ग्रन्थों में उपलब्ध साक्ष्यों के आधार पर ही वेदों का समय निर्धारण करना चाहिये।

इसका आधार सृष्टि संवत् है। जिसके अनुसार वेदों का समय 1 अरब 97 करोड़ 29 लाख 49 हजार 1 सौ 21 वर्ष निश्चित होता है। इसका प्रमाण यजुर्वेद में उपलब्ध होता है।

सहस्र प्रमासि सहस्रस्य प्रतिमासि।

यजुर्वेद

अर्थात् चार युगों की एक गणना, 71 चतुर्भुगियों की 1 मन्वन्तर के रूप में गणना तथा 14 मन्वन्तरों की एक ब्रह्मदिन के रूप में गणना ही मुख्य आधार है जिसकी गणना वैदिक मानव अपने धार्मिक अनुष्ठानों से पूर्व संकल्प के रूप में करते हैं—

ओं तत्सत् श्री ब्राह्मणों द्वितीय परार्धे वैवस्वत मन्वन्तरे

अष्टाविंशति तमे कलियुगे कलिप्रथम चरणे

यह पद्धति अपनी परम्परा को अद्यतन अपने आप में संजोये हुए वेदों के सदृश श्रुति के रूप में अपने आपको भारतीय परम्परा में जीवित रखे हुए हैं। जिसको वैदिक शास्त्रों से प्रमाण रूप में संकलित किया गया है। सृष्टि के प्रारम्भ में आदित्य, अग्नि, वायु एवं अगिरा नामक ऋषियों के हृदय में इस शाश्वत ज्ञान को परमशक्ति ने प्रदान किया था। जो धार्मिक न होकर संपूर्णतः वैज्ञानिक है।

वैदिक वर्ण व्यवस्था—

काल निर्धारण के पश्चात् वैदिक सामाजिक संरचना में समाज के चार मुख्यतः आजीविका एवं उत्थान हेतु क्षेत्र निश्चित किये गये थे। जिसमें अज्ञान, अन्याय, अभाव तथा सहयोग को समाज के चार स्तम्भों के रूप में परिलक्षित कर व्यापारिक रूप से विभाजन किया गया जो जन्म से न होकर कर्म के माध्यम से निश्चित थी।

जन्मना जायते शूद्रः कर्मणा द्विज उच्यते।

क.स्मृ.

अर्थात् जन्म से सभी समान थे तथा कर्मों के माध्यम से व्यवसायों को चुनकर सामाजिक उत्थान में प्रेरित थे। अज्ञान को अपने अध्ययन से मिटाने वाले वर्ण को ब्राह्मण, अज्ञान को शक्ति संचय कर मिटाने वाले वर्ण को क्षत्रिय, अभाव को व्यावसायिक गतिविधियों एवं व्यापारिक क्षेत्रों के माध्यम से मिटाने वाले वैश्य वर्ण में गिने जाते थे तथा इनको अपने कुशल सहयोग से प्रबन्धन में ढालने वाले वर्ण शूद्र वर्ण में स्थापित होते थे। जो अपने कर्म की कुशलता से पुनः—पुनः परिवर्तित भी होते रहते थे। अतः इनको Division of Labour के रूप में वैदिक शास्त्र प्रस्थापित करते हैं।

उपसंहार—

उपयुक्त अध्ययन इस विषय को स्पष्ट करता है कि संसार में सर्व—प्राचीन पुस्तक जिसको वेद कहते हैं के माध्यम से भारतीय समाज एक सुसंस्कृत, सुसम्पन्न समाज था, जिसको भारत के उपलब्ध पुरातात्विक प्रमाणों में भी देखा जा सकता है। अभी पुरातात्विक खुदाई में बागपत उ.प्र. के ग्राम सोनौली में रथ का मिलना तलवारों तथा आभूषणों का मिलना भी इसी बात को सिद्ध करता है। इसका अध्ययन अभी प्राध्यापक, वैज्ञानिक कर रहे हैं परन्तु यह उपलब्ध प्रमाणों के आधार पर लगभग ई. पू. 5000 वर्षों का प्रतीत होता है। जिससे यह स्पष्ट होता है कि वैदिक ग्रन्थों का अस्तित्व उससे उत्पन्न सामाजिक संरचना उनकी आर्थिक सामाजिक एवं सांस्कृतिक उन्नति का मूल है।

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REMOVAL OF Cu (II) FROM WASTE WATER USING PEANUT SHELL

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Abstract - Peanut shell has been used for the removal of copper (II) from an aqueous solution. The effects of different parameters such as contact time, adsorbate concentration, pH of the medium and temperature were examined. Optimum removal at 20°C was found to be 98.6 % at pH 6.6, with an initial Cu (II) concentration of 100 mg L⁻¹. Dynamics of the sorption process and mass transfer of Cu (II) to sorbent were investigated and the values of rate constant of adsorption, rate constant of intraparticle diffusion and the mass transfer coefficients were calculated. Different thermodynamic parameters viz., changes in standard free energy, enthalpy and entropy were evaluated and it was found that the reaction was spontaneous and exothermic in nature. The sorption data fitted the Langmuir isotherm. The data were subjected to multiple regression analysis and a model was developed to predict the removal of Cu (II) from an aqueous solution.

Keywords: Adsorption, Cu (II), Peanut shell, Exothermic, Multiple regressions, Isotherm.

1 INTRODUCTION

Nowadays heavy metals are among the most important pollutants in water, and are becoming a severe public health problem. In order to reduce pollution, contaminated waters need to be cleaned. Sorption of heavy metals by bacterial fungal or algal biomass (live or dead cells) and agricultural waste biomass^[1-12] has been recognized as a potential alternative to existing technologies such as precipitation, ion exchange, solvent extraction and liquid membrane for the removal of heavy metals from industrial wastewater because all these processes have the limitations of technical and/or economical viability.

The literature reveals two distinct approaches to use of living organisms and biomass^[13-14]. There are practical limitations to systems, which employ living microorganisms. The most significant limitation is that microbial growth is inhibited when the concentrations of metal ions are too high or when significant amount of metal ions are sorbed by microorganisms^[13]. Dead cells or agricultural wastes accumulate heavy metal ions to a greater extent than living cells^[13-15]. For metal removal applications, the use of dead biomass or agricultural waste may be preferable as large quantities are readily and cheaply available as a byproduct of various industries^[16]. Therefore, Peanut shell was used for the removal of Cu (II) from waste water.

2 MATERIALS AND METHODS

2.1 Physico-chemical analysis of the biosorbent

Peanut shell is a byproduct of peanut milling plant. It was collected from M/s Shivam peanut milling plant, Chunar, Mirzapur. It was washed twice with double distilled water to remove soluble lighter materials. Thereafter, it was dried in an oven at 70 °C for an hour. After that, it was crushed by mortar and pestle and sieved to less than 178 µm size. The surface area of Peanut shell was determined by a three point N₂ gas adsorption method using a Quantasorb Surface Area Analyser (model Q5-7, Quantachrome Corporation, USA). The bulk density was determined by densitometer. Porosity was determined by Porositometer (model: M7V, NGRI Hyderabad, India). X-Ray diffraction of the adsorbent was obtained using X-ray Diffractometer (model: ID-3000W, Rich Siefert and Company, Ahrensberg, Germany). Infrared spectra of the biosorbent were recorded using Infrared Spectrophotometer (model: FT/IR-5300, JASCO Corporation, Japan) in the range 4000 to 400 cm⁻¹. Percentage of volatile matter, ash and moisture were determined as given in the "Vogel's Text Book of Quantitative Chemical Analysis", 5th Edition, Bath Press Ltd, U.K.

Various physicochemical properties of Peanut shell thus obtained are given in **Table 1**. X-ray diffraction and IR studies (values given in **Table 2**) of Peanut shell show that apart from various organic functional groups Peanut shell also contains metal oxides.

Table 1 Physical and Chemical properties of biosorbent Peanut shell

Surface area (m ² g ⁻¹)	425.00
Bulk density (g cm ⁻¹)	0.2438
Particle size (µm)	<178
Porosity	0.36
Proximate Analysis (%)	
Volatile matter	42.38
Moisture	7.75
Fixed carbon	31.52
Ash (Oxides of Al, Mn, Si, Fe and others)	18.43

Table 2 IR bands of Peanut shell along with their possible assignment

Band position (cm ⁻¹)		Assignment
3416	vw	-OH str.
2952	w	-C=C-H str.
1744	w	-C=O str.
1556-1516	s	Aromatic ring
1485	w	>N-H str.
948	vw	Fe-O
844	m	Mn-O
774	m	-C-H str.
748	m	Al-O
682, 554	vw	Si-O str.
496	m	Fe-O
474	s	Si-O-Ca bend
454	s	Si-O bend

2.2 Batch Sorption Experiment

Batch experiments were conducted by adding 1 g sorbent in 50 mL aqueous solution of copper nitrate of desired concentration (100, 125 and 150 mg L⁻¹) at different temperatures (20, 30 and 40 °C) and pH (3.2, 4.0, 5.0, 5.5, 6.0, 6.6, 7.0, 8.0 and 9.0) in different glass bottles in a shaking thermostat set at 20, 30 and 40 °C at a constant speed of 125 rpm. The pH of the adsorbate solution was adjusted by adding 0.1M HCl or 0.1M NaOH. The progress of the adsorption process was observed at different time intervals till the attainment of saturation. At the completion of predetermined time intervals, the adsorbate and adsorbent were separated by centrifugation at 15000 rpm and the supernatant liquid was analyzed by AAS to determine the residual concentration of copper ion. Blanks solutions were run under similar conditions of concentration, pH and temperature without the adsorbent in all the cases to correct for any adsorption on the internal surface of the bottles.

3 RESULTS AND DISCUSSION

3.1 Effect of contact time and concentration

A series of experiments were performed at different adsorbate concentration viz., 100, 125 and 150 mg L⁻¹ and time interval. The Cu (II) removal was found to be 96.98, 92.42 and 86.25 % respectively, at 30 °C and pH 6.6. The extent of adsorption increased rapidly in the initial stages and became slower at later stages until the attainment of equilibrium. Equilibrium time for the adsorption of Cu (II) on Peanut shell at various adsorbate concentrations was found to be 110 minutes, which indicated that equilibrium time was independent of the initial adsorbate concentration. The following correlation had been developed between percentage removal and initial adsorbate concentration (C₀) to predict the percentage removal of Cu (II) by Peanut shell at any initial concentration.

$$\text{Percentage removal of Cu (II)} = 33.8 C_0^{0.62}$$

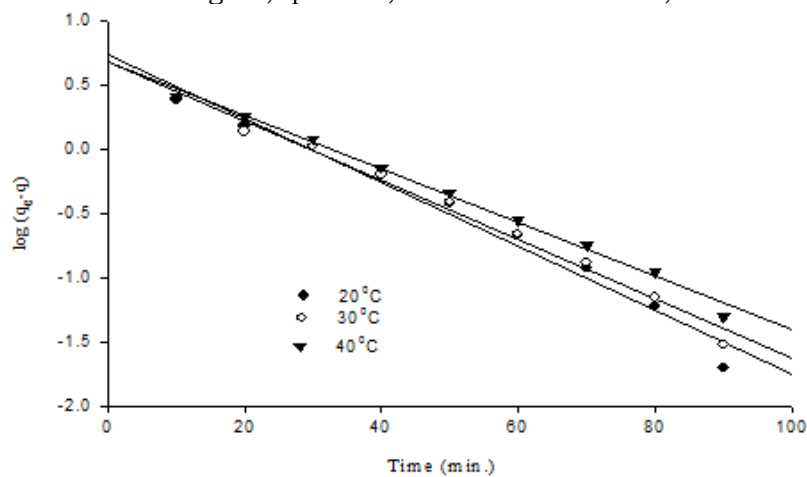
3.2 Adsorption dynamics

The rate constant k_{ad} (min^{-1}) for Cu (II) adsorption on Peanut shell was determined by using the Lagergren equation^[21].

$$\log (q_e - q) = \log q_e - \frac{k_{ad}}{2.303} \cdot t \quad (1)$$

Where q (mgg^{-1}) and q_e (mgg^{-1}) are the amounts of adsorbate at time t (min.) and at equilibrium respectively. The linear plots of $\log (q_e - q)$ versus t (Fig. 1) suggest the first order kinetics of the uptake of Cu (II). The values of k_{ad} (5.682×10^{-2} , 5.158×10^{-2} and $4.676 \times 10^{-2} \text{ min}^{-1}$) at different temperatures were calculated from the slopes of these plots.

Fig.1 RATE CONSTANT PLOT FOR ADSORPTION OF Cu (II) ON Peanut shell AT DIFFERENT TEMPERATURES CONDITIONS: PARTICLE SIZE: < 178 μm ; CONCENTRATION 100 mg L^{-1} ; pH: 6.6; TEMPERATURE: 20, 30 and 40°C.



The data was also tested for pore diffusion using the following equation^[22].

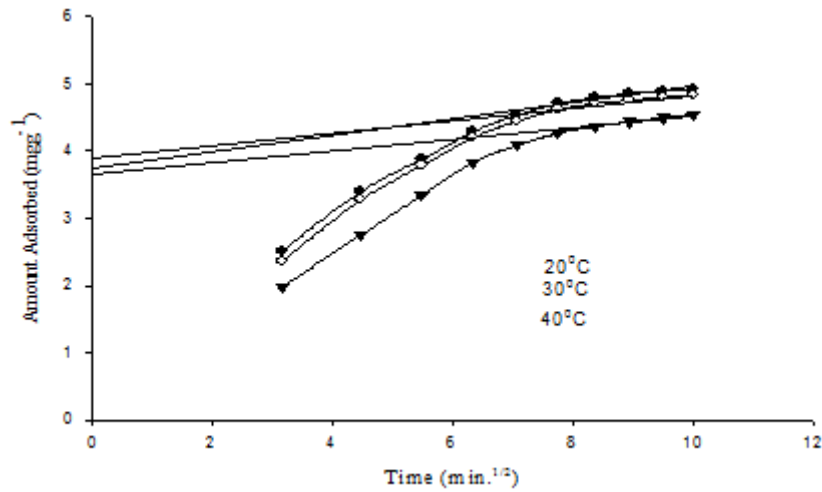
$$q = k_{id} t^{1/2} \quad (2)$$

Where, q is the amount sorbed at time t and $t^{1/2}$ is the square root of the time. The values of k_{id} (3.596×10^{-2} , 3.256×10^{-2} and $2.844 \times 10^{-2} \text{ mgg}^{-1}\text{min}^{-1/2}$) at temperatures 20, 30 and 40°C respectively, were calculated from the slopes of respective plot q versus $t^{1/2}$ (Fig. 2) at later stages. The dual nature of the curves was obtained due to the varying extent of sorption in the initial and final stages of the experiment. This can be attributed to the fact that in the initial stages, sorption was due to boundary layer diffusion effect whereas, in the later stages (linear portion of the curve) was due to the intraparticle diffusion effects. However, these plots indicated that the intraparticle diffusion was not the only rate controlling step because it didn't pass through the origin. This was further supported by calculating the intraparticle diffusion co-efficient (\bar{D} , $\text{cm}^2 \text{sec}^{-1}$) using the following equation^[23].

$$\bar{D} = 0.03r^2 / t_{1/2} \quad (3)$$

where r (cm) is the average radius of the sorbent particle and $t_{1/2}$ (min.) is the time for half of the sorption. According to the Michelsen et al. a \bar{D} ($\text{cm}^2 \text{sec}^{-1}$) value of the order of 10^{-11} is indicative of intraparticle diffusion as rate determining step^[24]. In this investigation, the values of \bar{D} (8.148×10^{-9} , 7.266×10^{-9} and $5.788 \times 10^{-9} \text{ cm}^2\text{sec}^{-1}$ at 20, 30 and 40 °C respectively) obtained was in order of $10^{-9} \text{ cm}^2 \text{sec}^{-1}$ which was more than two order of magnitude higher, indicated that the intraparticle diffusion was not the only rate controlling step. It was concluded that both boundary layer and intraparticle diffusion might be involved in this removal process.

Fig.2 INTRAPARTICLE DIFFUSION PLOT FOR ADSORPTION OF Cu (II) ON Peanut shell AT DIFFERENT TEMPERATURES CONDITIONS: PARTICLE SIZE: <178 μm , CONCENTRATION: 100 mg L^{-1} , pH: 6.6, TEMPERATURE: 20, 30 and 40°C.



3.3 Mass Transfer Study

The uptake of pollutant species from liquid phase (sorbate) to solid surface (sorbent) is carried out by transfer of mass from the former to the latter. A number of steps can be considered participating in the process and out of various models tried for the present studies, overall sorption process is assumed to occur using a three-step model^[25]:

1. Mass transfer of sorbate from the aqueous phase on to the solid surface.
2. Sorption of solute on to the surface sites, and
3. Internal diffusion of solute via either a pore diffusion model or homogeneous solid phase diffusion model.

During the present investigation, step (2) has been assumed rapid enough with respect to the other steps and therefore it is not rate limiting in any kinetic study. Taking in to account these probable steps, Mckay et al. model has been used for the present investigation^[25]:

$$\ln\left(\frac{C_A}{C_{A_0}} - \frac{1}{1+mK}\right) = \ln\left(\frac{mK}{1+mK}\right) - \left(\frac{1+mK}{mK}\right)\beta_1 S_s \cdot t \quad (4)$$

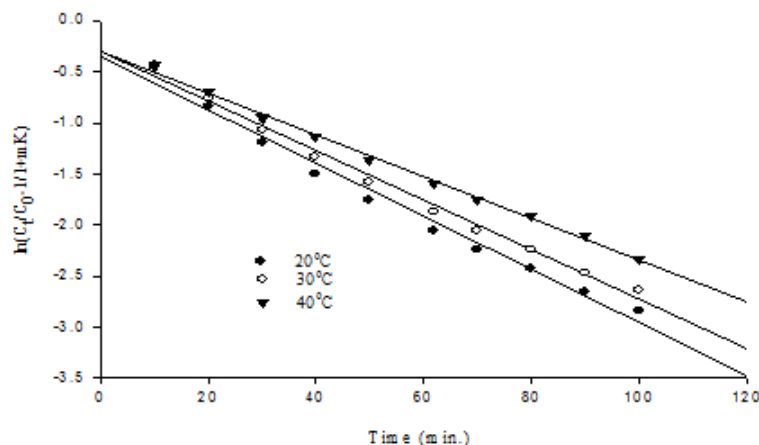
where, m is the mass of the biosorbent per unit volume, K is the constant obtained by multiplying Q^0 and b (Langmuir's constants), β_1 is the mass transfer coefficient, S_s is the outer specific surface of the biosorbent particles per unit volume of particle-free slurry. The values of m and S_s were calculated using the following relations:

$$m = \frac{W}{V}, \quad (5)$$

$$S_s = \frac{6m}{d_p \delta \rho (1 - \epsilon_p)}, \quad (6)$$

where, W is the weight of the adsorbent, V the volume of particle-free slurry solution, and d_p , $\delta \rho$ and ϵ_p are the diameter, density and porosity of the adsorbent particles, respectively. The values of β_1 (5.596×10^{-5} , 4.982×10^{-5} and 4.152×10^{-5} cm sec^{-1}) calculated from the slopes and intercepts of the plots (Fig. 3) of $\ln(C_t/C_0 - 1/1+mK)$ versus t (min.) at different temperatures (20, 30 and 40 °C). The values of β_1 obtained show that the rate of transfer of mass from bulk solution to the biosorbent surface was rapid enough so it cannot be rate controlling step^[26]. It can also be mentioned that the deviation of some of the points from the linearity of the plots indicated the varying extent of mass transfer at the initial and final stages of the sorption.

Fig.3 MASS TRANSFER PLOT FOR THE ADSORPTION OF Cu (II) ON Peanut shell AT DIFFERENT TEMPERATURE CONDITIONS: CONCENTRATION: 100 mg L⁻¹; PARTICLE SIZE: < 178 μm; pH: 6.6; TEMPERATURE: 20, 30 and 40°C.



3.4 Thermodynamic evaluation of the process

This was again confirmed by thermodynamic parameters such as free energy (ΔG^0 , k cal mol⁻¹), enthalpy (ΔH^0 , k cal mol⁻¹) and entropy (ΔS^0 , cal mol⁻¹ k⁻¹) changes during the process. These parameters (**Table 3**) were calculated at 20, 30 and 40°C temperatures^[27]. The negative and small values of free energy change (ΔG^0) were an indication of the spontaneous nature of the adsorption process. The negative values of standard enthalpy change (ΔH^0) for the intervals of temperatures was indicative of the exothermic nature of the adsorption process and the negative values of ΔS^0 for the corresponding temperature intervals suggested the probability of favourable adsorption.

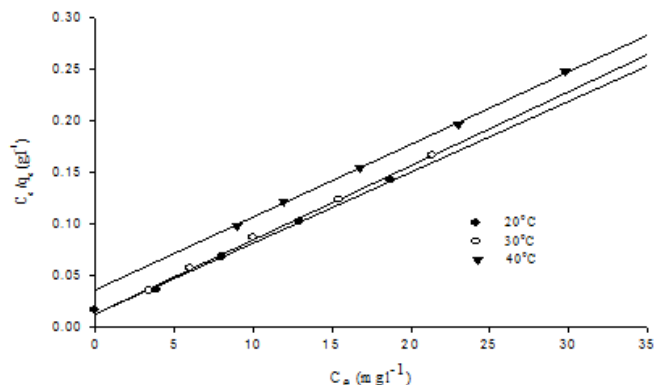
3.5 Adsorption isotherm

The experimental data was found to fit the Langmuir isotherm. The basic assumption of Langmuir adsorption isotherm is based on monolayer coverage of the adsorbate on the surface of adsorbent. The saturated monolayer is represented by the following equation.

$$\frac{C_e}{q_e} = \frac{1}{Q^0 b} + \frac{C_e}{Q^0} \quad (7)$$

Where, C_e (mg L⁻¹) is the equilibrium concentration of the adsorbate, q_e (mgg⁻¹) is the amount of adsorbate adsorbed at equilibrium; Q^0 (mgg⁻¹) and b (lmg⁻¹) is the Langmuir constants related to the capacity and energy of the adsorption respectively. The linearity of the plots C_e/q_e versus C_e (Fig. 4) showed the applicability of the Langmuir isotherm for the present system. Q^0 and b were determined from the slopes and intercepts of the respective plots. The decrease in their values (**Table 3**) with temperature increase also supported that removal of Cu (II) on Peanut shell was exothermic in nature^[8,26]. High Q^0 values (Table 1) also showed that the adsorbent had a good capacity to remove Cu (II).

Fig.4 LANGMUIR ISOTHERM PLOT FOR THE ADSORPTION OF Cu (II) ON Peanut shell AT DIFFERENT TEMPERATURES. CONDITIONS: PARTICLE SIZE: <178 μm; TEMPERATURE: 20, 30, 40°C; pH: 6.6; CONCENTRATION: 100, 110, 125, 140 and 150 mg L⁻¹.



The equilibrium parameter R_L which is defined as $R_L = 1 / (1 + bC_0)$ in the range $0 < R_L < 1$ reflects a favourable adsorption process^[28] where b ($l\ mg^{-1}$) is the Langmuir's constant and C_0 ($mg\ L^{-1}$) is initial adsorbate concentration. In the present investigation the equilibrium parameter (**Table 3**) was found to be in the range $0 < R_L < 1$ indicating that the adsorption process was favourable and the Langmuir isotherm was applicable^[28].

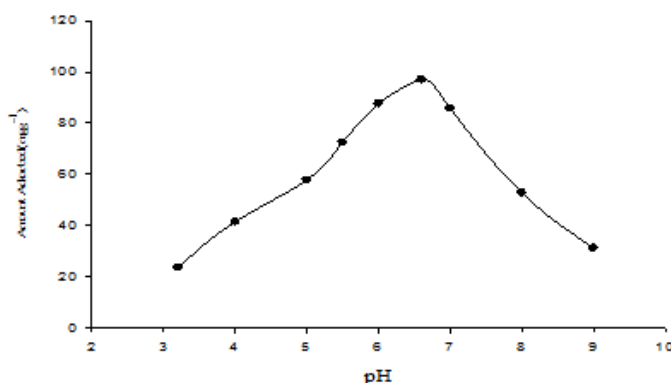
Table 3 Values of thermodynamic parameters, Langmuir constants and R_L values of Cu (II) adsorption on Peanut shell at different temperatures

Temp. °C	$-\Delta G^0$ (k cal mol ⁻¹)	$-\Delta H^0$ (k cal mol ⁻¹)	$-\Delta S^0$ (cal mol ⁻¹ k ⁻¹)	Q^0 (mg g ⁻¹)	b (l mg ⁻¹)	R_L
20	1.472			142.92	0.966	0.0113
30	1.069	18.352	57.024	140.88	0.548	0.0186
40	0.496			136.94	0.212	0.0472

3.6 Effect of pH

Experiments were performed at different pH values (3.2, 4.0, 5.0, 5.5, 6.0, 6.6, 7.0, 8.0 and 9.0). The percentage removal increased from 23.6 to 96.98 % with an increase of pH from 3.2 to 6.6 and thereafter removal decreased from 96.98 to 31.2 % with an increase of pH from 6.6 to 9.0, at 30°C and Cu (II) concentration of 100 mg L⁻¹. The optimum pH for the removal of Cu (II) on Peanut shell was found 6.6 (Fig. 5). Furthermore, the adsorption process can be explained on the basis of the nature of adsorbent used which contained several metal oxides. These oxides when mixed up with adsorbate solution undergo surface hydroxylation and form hydroxyl compounds on the surface which gives positively or negatively charged surface as a result of subsequent acid base dissociation^[29]. It can be seen that adsorption increased in the pH range 3.2-6.6 and beyond pH 6.6, it started to decrease. The increase in adsorption correlated with the presence of Cu (II) ions up to pH 6.6. Beyond pH 6.6, the formation of hydroxide of Cu (II) occurred which resulted in a decrease in adsorption. This fact was supported by the distribution of copper species at different pH values^[30].

Fig. 5 EFFECT OF pH ON THE REMOVAL OF Cu(II) BY Peanut shell. CONDITIONS: CONCENTRATION: 100 mg L⁻¹; PARTICLE SIZE: <178 μm; TEMPERATURE: 30°C; pH: 3.2, 4.0, 5.0, 5.5, 6.0, 6.6, 7.0, 8.0 and 9.0.



4. MULTIPLE REGRESSION ANALYSIS

The effect of initial adsorbate concentration, contact time, temperature and pH of the system on Cu (II) removal by Peanut shell had been examined. The cumulative effect of all these independent variables (copper removal) is given by the following relation:

$$Y = 6.5598 + 0.6386a_1 + 0.5172a_2 - 0.4674a_3 + 0.2838a_4 - 0.0952a_5 \quad (14)$$

Where, Y is the predicted value of Cu (II) removal, a_1 , concentration of adsorbate, a_2 , contact time; a_3 , temperature; a_4 , pH; a_5 , agitation rate of the system. The model values calculated with the help of equation (14) and the experimental values are given in **Table 4**. It may be seen that predicted values were pretty close to the experimental values. From these results it is concluded that all independent variables have cumulative effect on copper removal by Peanut shell.

Table 4 Percentage removal at different conditions (experimental and predicted values at equilibrium time, pH 6.6 and agitation rate 125 rpm).

Initial Cu (II) concentration (mg L ⁻¹)	Percentage removal		Temp. (°C)	Percentage removal	
	Exp. value	Predicted value		Exp. value	Predicted value
100	96.96	97.52	20	98.84	99.65
125	92.54	93.18	30	96.96	97.52
150	86.48	86.88	40	91.46	92.84

5. CONCLUSION

The dead biomass of Peanut shell was found to be an effective biosorbent for the removal of Cu(II) from an aqueous solution. The study showed that the temperature and pH of the solution strongly influenced the adsorption process. Adsorption in the initial stages was very rapid due to the boundary layer diffusion whereas in the later stages became slower due to intraparticle diffusion. Thermodynamic studies confirmed that the process was spontaneous and exothermic. The fit of the adsorption data into the Langmuir isotherm confirmed monolayer adsorption. Mass transfer studies confirmed that the rate of mass transfer from sorbate to adsorbent was rapid enough. The data thus obtained would be useful in designing and fabricating an efficient treatment plant for Cu (II) rich effluents.

REFERENCES

- YG Bermudez; ILR Rico; OG Bermudez; E Guibal. *Chem. Engg. J.*, **2011**, 166, 122 – 131.
- X Li; Hao Yu; X Zhang; K Wu; Y Yuan; S Zhang. *J. Haz. Mater.*, **2017**, 330, 1-8.
- H Wang; X Wang; J Ma; P Xia; J Zhao. *J. Haz. Mater.*, **2017**, 329, 66-76.
- S Wang; T Vincent; C Faur; E Guibal. *Bioresource Technol.*, **2017**, 231, 26 -35.
- MMM Rahmati; P Rabbani; A Abdolali; AR Keshtkar. *J. Haz. Mater.*, **2011**, 185, 401- 407.
- X Xie; R Deng; Y Pang; Y Bai; Y Zhou. *Chem. Engg. J.*, **2017**, 314, 434-442.
- D Mohan; CU Jr Pittaman. *J. Hazard. Mater.*, **2006**, B137, 762-811.
- PYR Suzaki; MT Munaro; CC Triques; MRF Klen; LMM Jorge; R Bergamasco. *Chem. Engg. J.*, **2017**, 313, 364-373.
- N Feng; X Guo; S Liang; Y Zhu; J Liu. *J. Haz. Mater.*, **2011**, 185, 49-54.
- R Dobrowolski; M Czemińska; AJ Wilolazka. *Bioresource Technol.*, **2017**, **225**, 113-120.
- AJ Munoj; F Espinola; E Ruiz; *J. Haz. Mater.*, **2017**, 329, 166-177.
- Y Niu; K Li; D Ying; Y Yang; J Jia. *Bioresource Technol.*, **2017**, **229**, 63-68.
- SG Tuncel; S Tugrul; T Topal. *Water Res.*, **2007**, 41, 365 – 372.
- SH Hasan; KK Singh; O Prakash; M Talat; YS Ho. *J. Hazard. Mater.*, **2008**, 152, 356- 365.
- HT Nguyen; KH Kim. *Atmos. Environ.*, **2008**, 42, 5015 – 5031.
- H Yin; B He; X Lu; H Peng; J Ye; F Yang. *Water Res.*, **2008**, 42, 3981 – 3989.
- DW Darnall; B Green; M Hosea; RA McPherson; M Henzl; MD Alexander. R.Thomson, editor. Ind.Div.Royal Soc. Chem. Congress, UK, **1986**, 1- 24.
- D Khummongkol; GS Canterford; C Fryer. *Biotech. Bioengg.*, **1982**, 24, 2643- 2660.
- M Nourbakhsh; Y Sag; D Ozer; Z Aksu; T Kutsal; AA Caglar. *Process Biochem.*, **1994**, 29, 1- 5.
- JM Tobin; B L'homme; JC Roux. *Biotech.Tech.* **1993**, 7, 739- 744.
- S Lagergren. *Handlingar*, **1898**, 24, 1- 39.
- WJ Weber; JC Morris. *J. San. Eng. Div. Proc. Anal. Soc. Civil Engr.*, **1963**, 89, SA2, 31- 38.
- AK Bhattacharya; C Venkobachar. *J. Environ. Eng.*, **1984**, 110, 110 – 120.
- LD Michelsen; PG Gideon; EG Pace; LH Kutsal, . *USDI, Office of Water Res. and Tech. Bull. No. 74*, **1975**.
- G McKay; MS Otterburn; AG Sweeny. *Water Res.*, **15**, 327- 339 (**1981**).
- DB Singh; DC Rupainwar; G Prasad; KC Jayaprakas. *J. Hazard. Mater.*, **1998**, 60, 29-40.
- DB Singh; DC Rupainwar ; G Prasad; VN Singh. *Water Air Soil Poll.*, **1988**, 42, 373- 380.
- GN Manju; MC Gigi; TS Anirudhan. *Indian J. Chem. Tech.*, **1999**, 6, 134-141.

29. KK Pandey; G Prasad; VN Singh. *J. Chem. Technol. Biotechnol.*, **1984**, 34A, 367-374.
30. GE Jean; GM Bancroft. *Geochimica et Cosmochimica Acta*, **1986**, 50, 1455- 1463.

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CHEMISTRY OF SUPEROXIDE ANION RADICAL

Dr. Ajay Kumar Shukla

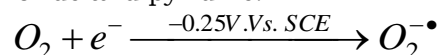
Associate Professor Chemistry, T.D.P.G. College, Jaunpur

1 INTRODUCTION

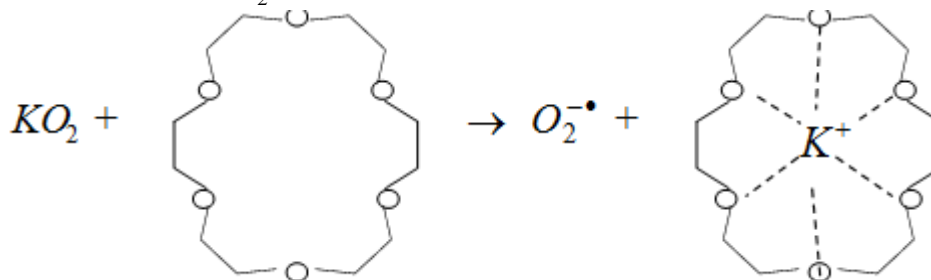
The oxygen plays a key role in sustaining life while its metabolites present a constant and serious threat to living organism. These metabolites are reactive oxygen species i.e. $O_2^{\bullet-}$, HO_2^{\bullet} , HO^{\bullet} , H_2O_2 etc generated *in vivo*. Recently it is observed that they are responsible for various pathologies, such as heart attack, diabetes, Cancer inflammation, acute lung injury, perkinsons disease, renal diseases, aging etc. The chemistry and reactivity of $O_2^{\bullet-}$ have been the subject of considerable interest to chemist and biochemist. Also the discovery that $O_2^{\bullet-}$ is a respiratory intermediate of aerobic organism has prompted widespread and intense interest in the chemical properties and reactivity of $O_2^{\bullet-}$ with organic functional group.

Generation of Superoxide Ion: KO_2 is readily formed by burning potassium in air and has been recognized as a source of $O_2^{\bullet-}$ since 1934 under biological solution condition significant fluxes of $O_2^{\bullet-}$ can be produced by the reduction of molecular oxygen with Xanthine/Xanthine oxidase system. Reduced flavins (riboflavin FMN, FAD) also yield $O_2^{\bullet-}$ when combined with O_2 in aqueous media.

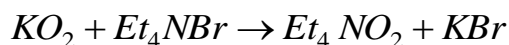
Presently, two practical methods are in use for preparing $O_2^{\bullet-}$ in aprotic media. The first in method involves one electron potentiostatic reduction (cathode: Au, Ag, Pt, C etc.) of molecular oxygen at -0.85 V Vs. SCE using R_4NX as supporting electrolyte. The solvents generally employed are. DMF, DMSO, acetonitrile, methylene chloride and pyridine.



This approach offer as *in situ* and continuous generation of pure and stable solution of $O_2^{\bullet-}$, although the concentration of $O_2^{\bullet-}$ resulting is too small ($<10^{-2}M$) for efficient product studies. The electrochemical equipment required for such work are also not common. The second method uses superoxide salts. Which are commercially available and serve as a convenient and well-defined source of $O_2^{\bullet-}$, KO_2 is generally insoluble in aprotic solvents, yet its solubility increases with the increase in polarity of the medium. The solubility restriction can, however, be bypassed by the use of crown ethers for the complexation of superoxide salt and the unencumbered 'naked' $O_2^{\bullet-}$ is readily free in aprotic solvents



This approach given high enough concentration of $O_2^{\bullet-}$ (~ 0.1 mole) suitable for product studies and synthesis. Both KO_2 and crown ethers are commercially available though the high cost of crown-ethers limits its application for multigram reaction. In lieu of the KO_2 /crown ether combination, the use of Et_4NO_2 , obtained by the reaction of KO_2 and Et_4NBr has been recognised as a useful and inexpensive alternative

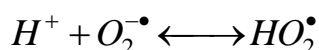


2 PHYSICAL PROPERTIES

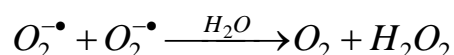
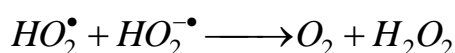
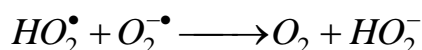
Electronic structure of $O_2^{\bullet-}$ paramagnetic (one-unpaired e^-).

Structure: Single and three e^- bond $O-O = 1.28 \overset{0}{\text{Å}}(KO_2)$

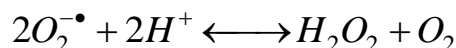
Chemical reactivity: The kinetics and thermodynamics for the protonation and disproportionation of $O_2^{\bullet-}$ in water confirms that protons promote a rapid bimolecular processes
Acid/Base – Equilibrium



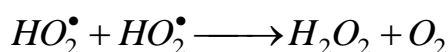
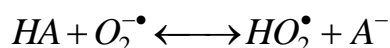
Natural Disproportionate:



The equilibrium in aqueous media at neutral pH is far to the right and even at pH 14 disproportionation of $O_2^{\bullet-}$ by water is complete.



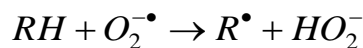
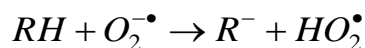
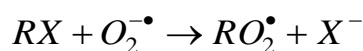
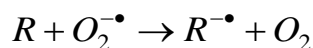
In the absence of an acidic substrate (HA) a self-consistent mechanism for proton induced disproportionation of $O_2^{\bullet-}$ in aprotic media has been proposed.



The tendency of $O_2^{\bullet-}$ to disproportionate via abstraction of proton from substrate and solvent in its most dominant reaction characteristics.

2.1 Modes of superoxide Action:

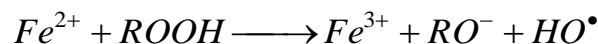
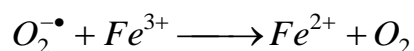
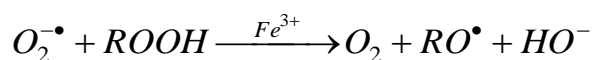
$O_2^{\bullet-}$, as the name indicate has dual characteristics. Being a negatively charged species, it displays basicity and nucleophilicity whereas the unpaired electron accounts for its ability to function as an electron transfer agent i.e., free radical reaction. The research on superoxide ascribes four basic modes of its reactivity in aprotic media viz., electron transfer, nucleophilic substitution, deprotonation and H-atom abstraction.



However, subsequent to each of these primary modes, generally secondary follow up oxidative reactions do take place. These primary modes of superoxide reactivity are given below.

2.2 Electron Transfer:

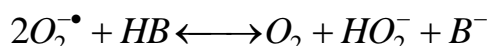
This is perhaps the most important mode of $O_2^{\bullet -}$ action in biological systems and the essence of disproportionation process. Superoxide behaves as reductant with metals. The metal catalysed Haber-weiss reaction is, in, fact, a superoxide driven Fenton process:



Superoxide reduces metal cation (Fe^{3+}) to the lower oxidation state (Fe^{2+}) which in turn oxidises to the peroxide in Fenton in reaction thereby acting as a reductant with metals.

Superoxide does not react with simple olefins or aromatic compounds, nor does it reduces peroxide directly. It, however, transfer electron to good electron acceptors such as quinones, diketones, chalcones, nitrobenzenes along with cyano- and nitro-olefins. The superoxide mediated cis-trans isomerisation of 1,3-di-tert-butyl-propenone also occurs via electron-transfer.

Nucleophilicity: In aqueous/protic solvents, $O_2^{\bullet -}$ is a weak nucleophile owing to its rapid solvation and disproportionation.



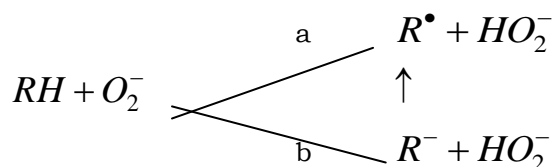
Kinetic data suggest that $O_2^{\bullet -}$ is quite a potent SN^2 nucleophile having a second order rate constant of the order of $10^{-2} M^{-1} Sec^{-1}$ for the reaction of KO_2 with alkyl bromide in DMSO.

Superoxide reacts with halides and sulfonates by SN^2 process producing hydroperoxides, peroxides, alcohols or carbonyl compounds depending upon the substrate, reaction conditions and work up. Similarly, esters and acyl halides undergo nucleophilic attack by $O_2^{\bullet -}$ yielding corresponding diacyl peroxides or carboxylic acids.

Basicity: Superoxide is capable of deprotonating weak acidic substrates such as n-alkyl alcohol and substituted diphenyl methanes. A variety of substrates such as ketones, enones, enols, steroids, phenols and ary methylamines undergo facile auto oxidation induced by $O_2^{\bullet -}$ basicity.

Radial Reaction: It is generally unreactive to olefins, does not initiate free radical chain polymerisation, inhibits styrene polymerisation and rarely undergoes radical-radical coupling the exception being superoxide anion radical coupling with certain

cations. In a re-investigation of the systems originally assumed to be hydrogen atom abstraction induced by $O_2^{\bullet-}$, have all turned out to be $O_2^{\bullet-}$ initiated proton abstraction followed by oxidation of resulting anion either by hydroperoxyl radical or by molecular oxygen.



3 REACTION OF $O_2^{\bullet-}$ IN DIFFERENT FUNCTIONALITIES

a. Alkyl halide and sulfonate Aliphatic halides and sulfonates on reaction with $O_2^{\bullet-}$, undergo rapid nucleophilic substitution giving peroxides, hydroperoxides alcohols, aldehydes or acids depending upon reaction conditions and work-up.

b. Acid Chloride, Anhydrides & Esters. acid chloride and anhydrides react with $O_2^{\bullet-}$ to produce diacylperoxide which on further reaction to give acids carboxylic esters on reaction with $O_2^{\bullet-}$ give carboxylic acid and alcohol.

c. Aldehydes and Ketones: Aldehydes undergo oxidation with $O_2^{\bullet-}$ to carboxylic acids. Ketones havin no α -hydrogen like benzophenone are unreactive towards $O_2^{\bullet-}$. Those having acidic hydrogens undergo base catalysed auto-oxidative processes.

d. Sulfur Compounds The reaction of $O_2^{\bullet-}$ with variety of thiols generally result in disulfides, which are further converted to corresponding sulfinic and sulfonic acids.

e. Conjugated ketones: Diketones and keto acids are cleaved to carboxylic acids by $O_2^{\bullet-}$ α -hydroxy or α -haloketones also afford carboxylic acids.

f. Olefins: Simple olefins are unreactive towards $O_2^{\bullet-}$. However, electron poor nitro and cyano-olefins are susceptible to cleavage by $O_2^{\bullet-}$

g. Aryl system: Unsubstituted aromatic hydrocarbon like, benzene, naphthalene etc do not react with $O_2^{\bullet-}$. However when the ring is activated by electron with drawing groups, nucleophilic aromatic substitution is observed.

O-H Bond: alcohols, in general, are gets oxidised to corresponding aldehydes and finally carboxylic acids on reaction with $O_2^{\bullet-}$.

N-H Bond: The reaction of $O_2^{\bullet-}$ with aromatic amines yields azobenzene. Dialkyl aminess are oxidised to dialkyl nitroxide. Primary amine converted to nitro compounds using Ti superoxide radical.

C-H Bond: The reaction with labile C-H linkage occurs via initial proton transfer. Various diaryl methane are oxidised to their corresponding ketones. Methyl pyridines are oxidised to carboxylic acids. Ketones are converted to either α -diketones or acids.

4 RECENT DEVELOPMENTS

Recent progress in the area of superoxide research has been so rapid that it is quite difficult to review the subject adequately and pertinent to the present dissertation have been selected.

5 CONCLUSION

The chemistry and reactivity of $O_2^{\bullet-}$ has been the subject of considerable interest to chemist and biochemist for some time.

The possibility that $O_2^{\bullet-}$ might be an important intermediate in aerobic life provided a new impetus to the studies of $O_2^{\bullet-}$.

Ultimately organic chemist were curious to explore the synthetic potential and versatility of this novel species in organic synthesis thereby broadning the knowledge of the reactivity pattern of this multipotent reagent.

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CONCEPTUAL RESEARCH BASED ON ENGLISH LANGUAGE TEACHING

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Abstract- English is considered a common language in the world. Language behavior (syntactically and semantically) has many characteristics. Without understanding the basic characteristics of a language, it is very difficult for anyone to master it, even if they are not. Therefore, we need to learn some of the very important aspects of the language. Basic language skills are listening, speaking, reading and writing. Listening and reading are called receptive skills. Speaking and writing are productive skills. We need to learn some of the highly influential factors associated with each of these skills that determine the process of learning and using a language for a variety of academic and professional purposes. English has become a possible language. A relatively high level of English proficiency and good communication skills will improve student employability. Given the increasing importance of English for professional purposes, the government. Andhra Pradesh and State University introduce hands-on experience teaching English undergraduate to improve communication skills between learners as a "Listening and Speaking Course" and "Listening and Speaking Course" for first graders Did. II for sophomores as part of a general English course. These course books enable students to use English accurately, properly, and fluently for both personal and telephone communication in academic, social, and professional situations. The purpose is to feed.

Keywords: English, education, methodology, language skills.

1 PRONUNCIATION AND NEUTRALIZATION OF ACCENT AND LISTENING SKILLS

This research article is divided into three parts. All three parts are a good combination of listening and speaking activities. The first part is intended to pronounce and neutralize the accent. It becomes familiar with the 26 letters of the English alphabet, which represent 44 sounds. The five pure vowel letters a, e, i, o, u represent 20 sounds (vowels and diphthongs), and the remaining letter (21) consonants represent 24 sounds and their symbols in English. All of these sounds deal with the terms word stress, sentence stress, and intonation. Most of the units in this part deal with English sounds. Each unit contains several listening exercises.

In the first part, phonological symbols and their syllables and theirs in relation to various parts of the word stress, such as pronunciation problems, syllables, word stress, sentence stress, tone rise and fall, intonation, compound word stress. Almost all questions remain about sound. This part also seeks to neutralize student accents by making students aware of the common mistakes made by Indian language speakers regarding English sounds not found in Indian languages.

As you know, listening is the first of four basic skills. Listening is the technique of listening carefully to something being spoken by someone else in a given situation, understanding, interrupting, analyzing, and processing the presented data. Everyone seems to know the importance of effective listening. Many factors determine the listening process.

All activities integrate multiple language skills. Writing activities may follow listening activities, and reading activities may precede speaking activities. Language

skills are integrated into advanced level English lessons and are not unobtrusive. In this part, the learner will introduce a series of carefully selected, controlled, and systematically presented listening activities. This allows learners to gradually improve their listening skills. Writing and sometimes reading are integrated into the activities of listening and speaking. Learners should listen to the CD that comes with the textbook. All tasks must perform the next phase before listening (set specific goals, emphasize the purpose of listening, discuss probabilities), listen and listen (discuss difficulties, prepare for follow-up activities). I will do it). The teacher must reassure the students that they do not have to understand everything they are listening to. They should be able to answer even if they don't understand all the words. This is the actual method of communication. In general, we hear a lot of people every day at home, at work, on the radio, on TV, on the bus, on the street, and so on. But we don't listen to everyone in the same way. This is because we usually listen for reasons. You may need specific information, such as the name of specific details. We are waiting for this information and are listening very carefully. Sometimes we listen to get a general idea of what someone is saying. When you're not interested in what the person is saying, you may not hear it at all. Just listen without understanding the speaker's words.

2 COMMUNICATION AND SPEAKING SKILLS

In India, most of us only touch English in writing or in print. In this language, English uses various characteristics such as stress, weak form, rhythm and intonation. These are indistinguishable in written English. Part II pays attention to these aspects, the problematic noise of Native Indian speakers, and the reduction of Native American speaker interference. As we know, many words are not pronounced the way we write them. In other words, spelling and pronunciation do not match in many words. There are many reasons for that. Of all the reasons given, the following are considered very important.

- Because of Alphabet –sound mismatch
- Many words that had made an entry into the language did not undergo many changes. Their spellings and pronunciation contribute heavily to the peculiarity. E.g.: resume
- In many of Indian languages, sounds are represented by separate letters. In other words, a particular letter represents a particular sound. But in English, there is a letter-sound mismatch. E.g.: 26 letters represent 44 sounds.

Communication skills aim to familiarize learners with the basics of oral communication and develop the ability to use English for some of the most common communication functions in academic, social, and professional situations. This part aims at students' ability to speak English fluently and accurately. In this part, you can assess how fluent your students are and how fluent they need to improve their learning process.

This part describes different types of greetings and introductions. H. How do you greet people? Greetings on different occasions, role-playing yourself and others in different situations, how to make appropriate requests in different situations, the importance of learning to seek permission, and getting permission Withdraw or withdraw permission in the most appropriate way as you can, or deny permission from different people in a fun way. When someone provides us with help, we accept or reject it. It also helps you find out how to be very polite when asking for help on a variety of issues. This will give you an idea of how to give instructions and instructions, and will remind you of situations where it was difficult to give instructions or instructions to someone.

There are many role playing activities in this part. In some of them, students need to pair with a partner and play two roles in the dialogue. Teachers need to divide the entire class into pairs and make sure everyone has a partner. When someone does not have a partner, the teacher must offer to be his partner. Students must study dialogue carefully. There should be a deadline. While students are role-playing, teachers should avoid interruptions in conversation and monitor their role while observing common mistakes.

There is a flow chart role-play activity that tells students what to say in each discussion group. Such activities give students ample time to study and prepare the diagram before they begin the conversation. If necessary, they can be helped. The third type of role-playing activity gives them their role card explaining their role, and students are expected to engage in conversation for the purpose set in the role card.

3 TELEPHONE SKILLS

Part 3 describes your phone skills. This part helps students understand the phone as a means of communication and prepares them to use the phone for basic communication functions such as making, asking for and providing information. During telephone communication, the speaker and listener cannot see each other unless they use a videophone. Therefore, to simulate the situation, the teacher should ask the two partners of each couple to sit back to back and try the conversation. The A and B role cards are on two different pages of the book. Each student can team up with a partner to study their role and, when ready, ask them to practice face-to-face conversations.

By understanding telephone communication, students are ready to make a call. The various stages of telephone conversation and the difficulty of communicating over the phone are subtopics described in the unit to allow learners to make phone calls. To be an effective communicator over the phone, it is important to have a good understanding of this means of communication. In contrast to face-to-face communication, participants usually cannot see each other over the phone. Telephone conversations lack body language and facial expressions, which are central to face-to-face communication. Helps to prepare before using the phone. This is even more important for business or professional phones. The call lasts only a few seconds, but it helps you understand the different phases of the call. Whether it's a formal or informal phone, the stage exists in some way. The phone has its own problems. Telephone communication is generally difficult for many reasons. In many cases, you will need to ask the caller to turn up, down, or slow down the volume. Handling calls is a difficult task. We call for personal and formal or business purposes. When using the phone for different purposes, it is important to be aware of differences in language, etiquette and etiquette. When someone answers our phone, we need to say who he/she is and who he/she wants to talk to.

Leaving a message on an answering machine is used when the person you are calling is absent. You may need to leave a message for that person. In such situations, both the caller and the person answering the call need to be very clear about ending and accepting the message. At the end of the conversation, either the sender or the recipient needs to verify that the message arrived correctly. To complete this activity, the learner must be instructed to sit back to back with the partner and play a conversational role. Teachers need to switch roles and have students do it again. If the called party is unreachable, the handset may hear you make a call to your answering machine. The caller is expected to say whatever he wants to say to the other party and the message is recorded on the device. This will

help the person listen to the recorded message when he/she returns and take appropriate action.

Telephone inquiries help learners distinguish between direct and indirect inquiries. It is also useful to use direct and indirect requests to communicate, listen, and identify requests. As with face-to-face communication, it is important to make inquiries in the appropriate language when making a call. It's hard to say "no" to a request in a face-to-face conversation, but it's easy to do when talking on the phone. Indirect inquiries are considered more polite than direct inquiries in communication. In real-life conversations, we usually use a combination of indirect queries and questions. To complete this activity, participants must sit back to back with their partner, play A and B roles, and practice conversation. When complete, they reverse their roles and repeat the same.

Learners are accustomed to requesting and providing information. He/she is confident in checking his willingness to provide accurate information, spelling word names, asking for repetition, and asking for information. Often you need to provide information to the caller over the phone. In some cases, listeners may want to write down the information we provide. You may need to spell a word on the phone. If it is difficult for the listener to understand the sound of a particular letter, it is useful to give a word that begins with that letter that we believe is known to the listener. To complete this activity, students will be instructed to sit back to back and play a role with their partner in a given situation.

4 IMPRESSIONS

All three parts contain many activities that each learner is expected to speak and practice. In Part I, most speaking activities require students to hear and repeat words, phrases, and short sentences. In such exercises, students can first listen to and read the recordings of the relevant sections. Students are also instructed to focus on listening to the recording and need to practice as often as they have completed.

At the end of each activity, the teacher should identify the strengths and weaknesses of the student and provide feedback on the strengths and weaknesses that the student has noticed. You also need to make suggestions to correct and improve your mistakes. Teachers need to address common mistakes in plenary sessions, talk to students individually, and provide feedback on specific issues. Teachers must maintain a separate enrollment dedicated to English practice classes in order to record daily performance and student feedback.

The main purpose of introducing all three parts of accuracy, fluency and listening comprehension is to excite learners and familiarize them with English. English has become an essential skill in overcoming global challenges. Because English is a semi-speech language, English elites around the world are faced with understanding each other's pronunciation and accents (different native languages) due to the influence of their native language. Also, although their mother tongue is the same, there are differences in accents between British and Americans. Therefore, people in one local language may be understood in another local language/region. For example, Americans have difficulty understanding Indian accents and vice versa. Indians tweet to understand the English accent and vice versa. Even South Indian accents differ from North Indian accents due to the influence of their native language.

In light of all these difficulties faced by English speakers around the world, English accents have been neutralized to standard pronunciation and standard accents for ease of understanding. This system gives students better opportunities

to increase their employment potential, especially at multinational companies in India and abroad.

REFERENCES

1. Adrian Doff, (2003), Teach English, A training course for teachers, Cambridge University Press.
2. Damodar. G, Prema Kumari. D, Ratna Shiela Mani. K, Sai Lakshmi. B, (2006), A Course in Listening and Speaking- II, Foundation Books Pvt. Ltd., Cambridge House, New Delhi.
3. Dhanappa M Metri, (2013), Teaching Functional English to the Indian Undergraduates: Challenges and Opportunities, University News, March 11-17.Vol. 51, No.10.
4. Editorial (2006), Teaching English Effectively, (ELTAI), The Journal of English Language Teaching, Vol. 44 (4).
5. Eliah. P, (2009), A Handbook of English for Professionals, BS Publications, Hyderabad.
6. Krishna, (2008), English Language Communication Skills, Duvvuri Publications, Machilipatnam.
7. Sasikumar. V, Kiranmai Dutt. P & Geetha Rajeevan, (2005), A Course in Listening and Speaking- I, Foundation Books Pvt. Ltd., Cambridge House, New Delhi.
8. Seema Jain, Farha Hashmi (2013), Web Quest: A Fresh Approach to English Language Teaching, University News, February 11-17. Vol. 51, No.06.
9. Sharma, Y M, (2006), (ELTAI), The Journal of English Language Teaching, Vol. 44/5.

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DEGRADATION OF FRESHWATER BODIES IN URBAN AREAS AND THEIR EFFECTS ON AQUATIC LIFE AND HUMAN HEALTH

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Comprising over 70% over the earth's surface, water is undoubtedly the most precious natural resource that exists on our planet. Without the seemingly invaluable compound comprises hydrogen and oxygen, life on earth would be non-existent. It is essential for everything on our planet to grow and prosper. Although we as human recognize this fact, we disregard it by polluting our rivers, lakes and oceans. Subsequently, we are slowly but surely harming our planet to the point where organisms may extinct. Water pollution is a large set of adverse effects upon water bodies such as lakes, rivers, oceans and groundwater caused by human activities.

1 WATER POLLUTANTS

Water is used for various purposes including bathing, excretion, washing, food preparation, cleaning of floors and equipments, industrial operations, agricultural needs and many more. After using it is discharged as waste water which is contaminated by various pollutants. The various types of water pollutants can be broadly classified into following categories:

- Organic Pollutants
- Inorganic Pollutants
- Radioactive Pollutants
- Suspended Solids and Sediments

2 ORGANIC POLLUTANTS

Organic chemical compounds are of great importance to the human beings and other life forms on this planet. Most of the substances of which living things are composed of are organic compounds. In Addison, the main foodstuffs (such as proteins and carbohydrates) as well as a number of materials and substances necessary for modern living (such as cotton, petroleum, rubber, plastics, antibiotics etc.) are all organic compounds. But their presence in water is not desirable as they not only impart taste, odour and colour of water, but some of the chemical compounds discharged by industries are toxic and carcinogenic too. The organic pollutants may further be categorized as follows:

- a. Natural organic pollutants
 - b. Sewage and industrial effluents
 - c. Synthetic organic contaminants
 - d. Microbial pollutants
 - e. Oil
- a. **Natural Organic Pollutants:** natural organic contaminants in water come from the breakdown of naturally occurring organic materials, such as, decay of leaves, plants, dead animals etc. Micro-organisms are another source of organic compounds in water. In addition to cellular matter many plants and micro-organisms release organic matter into water body through their metabolic processes. Various type of algae and vegetation flourishing into lake or reservoir can also be source of objectionable organic compounds in water, for example, if there is a sudden die off of the vegetation, water quality can become extremely bad.

- b. **Sewage and Industrial Effluents:** Organic pollutants are also discharged as municipal sewage and industrial effluents (such as food processing units, paper mills, tanneries, slaughter houses etc.)
- c. **Synthetic Organic Contaminants:** These are the man-made (anthropogenic) materials which may enter the water bodies along with sewage and other wastes. Synthetic organic contaminants include both (SOCs). The most organic pollutants in VOCs category are industrial solvents, such as- Carbon tetrachloride (used as fire extinguisher and cleaning agent) and tetrachloride (used as fire solvent and raw material). In SOCs category, the most common organic pollutants are pesticides and herbicides and many other chemicals used in industrial processes. Presently the most controversial organic pollutants are poly chlorinated biphenyls (PCBs) and dioxin, which are very toxic and known to cause cancer even at low concentrations.
- d. **Microbial Pollutants:** Many different micro-organisms (such as bacteria, virus, protozoa, algae etc.) are found in polluted/untreated water. Most of these do not pose a health hazard to humans. The organisms that can cause sickness in human are called pathogenic organisms or pathogens. Even though modern water treatment removes or inactivates known disease causing organisms to safe levels, still it is best if the source water is as free of contamination as possible.

2.1 Inorganic Pollutants

Inorganic pollutants are mainly heavy metals found in the effluents of industries. Sodium, copper, cadmium, chromium, cadmium, mercury, lead, arsenic and cobalt are the main heavy metals discharged from industries. The main water pollutants are present in effluents of breweries, tanneries, dyeing textiles mills, paper and pulp mills, steel industries and mining operations. Sulphuric acid as waste from coal mines is a serious pollutant that increases the hardness of water.

2.2 Radioactive Pollutants

Radioactive pollutants are found in water due to natural source, but there is also a threat of radionuclide, contamination from various industrial and medical processes. The main human activities which are responsible for radioactive pollution are use of radioactive materials in power plants and nuclear weapons: use of radioactive isotopes in medical, industrial and research applications and mining and processing of ores to produce usable radioactive substances. Though all of the radioactive contaminants are carcinogenic, the radionuclides that are found in water and are of concern are uranium, radium 226 and 228 radon and thorium 230 and 232. Out of these radon is generally found in public water supplies.

2.3 Suspended Solids and Sediments

Soil sand and other solids washed into water bodies due to soil erosion (by natural processes, mining, agricultural, constructional activities etc.) and disposal of sewage and industrial effluents into water bodies result in contaminating the water with suspended solids as well as sediments. These solids are in the form of organic inorganic particles or immiscible liquids (oils and greases). The presence of these solids increases the turbidity in water, thereby, reducing the amount of sunlight available for photosynthesis of the aquatic plants. Other effects include suffocation

of aquatic habitats (fishes etc.) silting of rivers and reservoirs, erosion of pumping equipments and power turbines etc.

2.4 Composition of Industrial Waste Water

Industrial waste water produced from industrial processing operations. The composition of industrial waste water is industry specific and varies from industry to industry. In fact, the biggest problem with industrial waste water is one of extreme variability in characteristic strength as well as volume: whereas in domestic waste water, the pattern is quite predictable throughout. Therefore, it is easier to handle domestic waste water. On the basis of character, industrial waste waters are classified as:

1. Plant producing oxygen consuming waste (high BOD waste). These include beat sergeant waste, breweries, canneries, dairies, distilleries, laundries, packing houses, pulp mills, tanneries and textile mill waste.
2. Plants producing waste with high suspended solids. These include waste from tanneries, canneries, packing houses, meat and fish, tanneries, cold washeries, coke and gas plant, paper mills etc.
3. Plants producing high dissolved solids. These include chemical plants. canneries, water softening plants, tanneries etc.
4. Plants producing waste with oil and grease. They generally include canneries, packing houses tanneries, metal finishing wastes, oil-fields, petroleum refineries, wool scouring waste, dairies etc.
5. Plants producing coloured waste include electroplating shops, paper mills, textile dye houses and tanneries.
6. Plants producing taste and odour waste include chemical plant waste, petroleum refineries, coke and gas plants sugarcane processing tanneries etc.

3 EFFECT OF SEWAGE POLLUTION ON SURFACE WATER BODIES

3.1 Organic Pollution

All organic materials or wastes can be broken down or decomposed by microbial and other biological activity (biodegradation). Although some inorganic substances are included in this category, most are organic compounds that can exhibit a biochemical oxygen demand (BOD) because oxygen is used in the degradation process. Oxygen is a basic requirement of almost all aquatic life except anaerobic microbes. If sufficient oxygen is not available to the aquatic life, the ecosystem will be adversely affected. Typical sources of organic pollution include sewage from domestic and animal sources; industrial wastes from food processing, paper mills, tanneries, distilleries, sugar and other agro-based industries.

This category of pollution becomes a problem when the oxygen required for biodegradation due to organic pollution is greater than the available oxygen in the water body. Natural systems do have a limited capacity to accommodate self-purification through biodegradation by employing re-oxygenation processes. However, in many situations the anthropogenic pollution overwhelms the given system.

3.2 Effect of Nutrients

The nutrients are always present in water and therefore it supports aquatic life. The primary focus is on fertilizing chemicals such as nitrates and phosphates. They are important for plant growth, but too much of nutrients encourage the excess of plant life and can cause environmental damage called eutrophication. This can occurs at both microscopic (in the form of algae) or macroscopic

position in form of large aquatic weeds. The diurnal change in dissolved oxygen is the serious affair. During day time oxygen supersaturated due to photosynthetic production of oxygen but during night the oxygen is depleted as the algal mass consumes significant quantum of oxygen. Nitrates and phosphates contributed through anthropogenic sources such as sewage agrarian runoff and effluents from un-sewered domestic areas.

3.3 Effects of High Dissolved Solids

As water is best solvent, it can dissolve variety of substances to which it comes in contact during hydrological cycle. In natural waters, the dissolved solids substantially composed of bicarbonates, sulphates, chlorides, nitrates and phosphates of calcium, magnesium sodium, potassium with traces of manganese, iron and other minerals. The quantum of dissolved solids is important in determining its suitability for irrigation, drinking and other uses. In general water with a total dissolved solids <500 mg/l are most suitable for drinking. Higher dissolved solids may lead to damage in physiological processes in the human body. For irrigation total dissolved solids of water are very important due to their accumulation which causes salinization of soil resulting agricultural land non-productive. Dissolved solids are undesirable in industrial water due to many reasons. They form scales, causes foaming in boilers, increase corrosion and interfere with the colour and taste of many products.

3.4 Effects of Toxic Pollutants on Water Quality

The toxic pollutants are mainly heavy metals, pesticides, herbicides and other industrial pollutants. Some trace elements such as manganese, zinc, copper are present in water are important for aquatic life. They help in regulating many physiological activities of body. These heavy metals, however, cause severe toxicological effects on human health and the aquatic ecosystem. Water pollution by heavy metals resulting from anthropogenic impact is causing serious ecological problems in many parts of world.. This situation again increased by the lack of natural elimination processes of metals. These metals accumulate in biota through food chain and have detrimental effects on aquatic life. Due to this food chain transfer they are also increasing risk for man. The toxicity of metal in water depends upon the degree of oxidation of a given metal ion together with the form in which it occurs. As a rule, the ionic form of a metal is the most toxic form. However, the toxicity is reduced if the ions are bound into complexes with for example natural organic matter. Under certain conditions, metallo-organic, low-molecular compounds formed in natural waters are more toxic than the uncombined forms for example the Minamata disease of Japan in fifties occurred due to the consumption of fishes contaminated by methyl mercury. Thousands of organic compounds enter water bodies as a result of human activities.

3.5 Health impacts of water Pollution

It is well known fact that clean water is absolutely essential for healthy living. Adequate supply of fresh and clean drinking water is a basic need for all human beings on the earth but millions of peoples are bereaved of it all over the world. Freshwater resources in the world are threatened by overexploitation, poor management and ecological degradation. The main cause of freshwater pollution is discharge of untreated waste, disposal of industrial effluents and discharge from agricultural fields. Commercial growth, urbanization and increased use of synthetic organic substances also have serious harmful effects on freshwater

bodies. The developed countries have problem of chemical discharge into water sources mainly groundwater, while the developing countries are facing the problem of agricultural discharge in water sources. Polluted water causes problems to health and leads to water-borne diseases which can be prevented by taking measures even at household level.

Untreated or incompletely treated municipal sewage is a major source of groundwater and surface water pollution world over. The organic material of this sewage comes into freshwater bodies and use large amount of oxygen for biological degradation and thus disturbs the ecological balance of freshwater lakes and rivers. Sewage also carries microbial pathogens which cause several diseases.

Domestic sewage, agrarian runoff and industrial effluents contain phosphorus and nitrogen, fertilizer runoff, manure from livestock operations increase the level of nutrients in freshwater bodies. The heavy use of fertilizers cause nitrogen contamination of groundwater thus increase the level of nitrate in drinking water above safety levels. Good agricultural practices can help in reducing the amount of nitrates in the soil and lower its contents in water.

Thousands of synthetic compounds are used by man mainly in the urban areas. They come into aquatic environment and accumulate in food chain. Persistent organic pollutants are the most harmful elements for the ecosystem and human health. Agricultural pesticides, herbicides and industrial chemicals can accumulate in fish and cause serious damage to human health. Today the pesticides are used on large scale and cause contamination of groundwater resulting the chemical contamination of drinking water. Air pollutants such as sulphur dioxide from power plants, other heavy industries and motor vehicles also cause acidification of surface water. This problem is more severe in developed countries.

4 CONCLUSION

In view of the above discussion the restoration of aquatic ecosystems is most important requirement of the present time. The best method of preventing degradation of water bodies is recycling of various types of wastes and pollutants. It is particularly necessary for agricultural and agro-industrial wastes. Several useful wastes can be utilized for welfare of human beings. An integrated and accelerated effort towards aquatic restoration and preservation is essential to prevent further degradation of these fragile ecosystems. The aquatic ecosystems which are not yet degraded should be conserved and that of degraded ecosystems should be remediated to some level of stability. Effective restoration can be achieved through collaboration among scientists, economists, policy makers, managers and local people.

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ENVIRONMENTAL PROTECTION AND LEGISLATION OF COAL MINES OF INDIA

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Abstract - The exploitation of natural resources through mining activities has caused adverse impact on environment along with ecological imbalances. The use of more and more mining natural resources for fulfillment of man's increasing need with the pace of modernization and technological advancement has led to land degradation, deforestation, decreasing quality and area of agricultural land, disposed of solid and liquid wastes along with various other problems. The country's first legislation having a direct environmental bearing, (a) Shore Nuisance (Bombay and Kolaba) Act was passed in 1853. Subsequently both in pre-independence and post-independence era, a number of Acts having direct or indirect bearing on environmental deterioration and protection were passed by central and state legislatures.

Increasing population and poverty is the fundamental cause which makes people over exploit the natural resources of the country for meeting their basic needs, for employment, shelter, fuel and fodder for their cattle. The present paper indicated some grey area which should be covered in the future Environmental law and legislation pertaining to mining.

Keywords: Environmental deterioration, protection, regulation act.

Objective:

1. To study the environmental legislation and act regarding coal mining of India.
2. To critically examine to conduct mining and associated operation in an environmentally responsible manner to comply with applicable law & regulation and other requirements related to environmental aspects.

1 INTRODUCTION

The Industrial Revolution that was shared in the last quarter of 18th century and progressed at an ever increasing pace 19th& 20th century proved to be a vital factor in the upgradation of consumerism and consequent deterioration of environment. The knowledge gained in regard to green house effect and global warming, acid rain and ozone hole etc., has made man realize the danger that he is bringing to himself. After the first global conference organized by **United Nation in 1972at Stockholm**, which was attended among other by our late Prime Minister Smt. Indra Gandhi, the Indian policy planners and Environmentalist become conscious of the environmental issue and this become evident when Indian Constitution was amended to incorporate environmental protection in the Directive principle, and subsequently number of legislation were enacted. Firstly, because of the special nature of environmental problems created by mining, there is necessity to enact specific and definitive laws which should take care of problems of surface mining, subsidence, lowering of ground water, deforestation, reclamation and related issues.

The present law does not provide for any safeguard against breach of promise made by the mine operators at the time of approval of project., The Indian policy planner should devise some ways and means in the future Environmental legislation to put some safeguard against any breach of promise. Conduct mining and associated operation in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects. Implement Environment Management plans in all over coal mines/projects effectively to

mitigate pollution, conservation of natural resources and restoration of ecology & bio-diversity and also taking measures to render productive post mining land use.

2 HISTORICAL PROSPECTIVE AND ENVIRONMENTAL LEGISLATION

Environment has turned out to be a subject of global concern after two United Nations Conferences were held in 1972 in Sweden and in 1992 in Brazil (Rio de Janeiro). In consonance with the world trend, environmental problems are receiving a lot of attention in India also. But it will not be correct to say that in earlier days, the Government was totally devoid of environmental concern. Even before the passage of specific Environmental Protection Acts during the last six decades, there were many Central and State enactments which were having direct and indirect bearing on protection of environment. These include Forest Act, the Factories Act, the Motor Vehicles Act, the Insecticides Act, the Criminal Procedure Code, the Indian Penal Code, and the Police Act.

2.1 Before Independence:

The country's first legislation having a direct environmental bearing:

- (1) Shore Nuisance (Bombay and Kolaba) Act, 1853.
- (2) The Bengal Smoke Nuisance Act, 1905 followed by similar acts passed in Bombay in 1912.
- (3) A few acts on pest control, land utilization and land erosion and even reclamation of waste land were passed even before India gained its independence in 1947.

2.2 After Independence:

After Independence, a number of acts which have some direct or indirect bearing on environmental degradation and protection were passed by Central and State Legislatures. Notably among the State enactments were:

- (a) Orissa River Pollution and Prevention Act, 1953.
- (b) Maharashtra Water Pollution Act, 1968.
- (c) Central enactments, Radiation Protection Rules in 1971.
- (d) The Wild Life Protection Act of 1972, and amended in 2003.

But all these enactments were rarely enforced, because of lack of appreciation and initiative which was definitely contributed by people's apathy towards the environmental issues.

After the first global conference on environment organized by United Nations in 1972 which was attended among others by our late prime Minister Smt. Indira Gandhi, the Indian policy planners became conscious of the environmental issues and this became evident when Indian Constitution was amended to incorporate environmental protection in the Directive Principle. The article 48(a) of the Directive Principle of the Constitution states that it will be duty of the state to protect and preserve the natural environment, in particular be the forests and wild life. Article 51(a) in the Chapter of Fundamental Duty enjoins the individual to preserve and promote the natural environment including the forests, wild life, lakes, rivers etc.

The cases which went to the judiciary seeking environmental protection till seventies were mostly moved by citizens.

The Indian Courts have taken these public interest litigations regarding environment very seriously and have tried to protect the right of the Society to have a pollution free environment. But the absence of specific standards and guidelines have been an impediment for the Court as well as the Government and therefore the

Legislature passed a number of specific Legislations regarding the environmental protection.

3 ENVIRONMENTAL LEGISLATION AND ACT

After the first global conference on environment organized by United Nations in 1972 at Sweden. Consequently, a National Committee on environmental planning and coordination (NCEPC) was established as an advisory body on all environmental matters. On recommendation of Tiwari committee, a separate department of environment was established at the centre on 1st November, 1980.

- The specific environmental laws started coming into operation much later. The Water Prevention and Pollution Control Act came into operation in 1974, and subsequently was amended in 1988 & 2003. As per these acts, Pollution Control Boards in the States and the Central Pollution Control Board was constituted to take care of the pollution of water. The act gave the State Pollution Control Boards power of entry and inspection in an industrial establishment and also authorized them to take samples. The discharge of polluted effluents to stream or well was restricted and the State Pollution Control Board was empowered to lay down standards of effluents which may be permitted to discharge effluents to water sources.
- The **Air Prevention and Pollution Control Act** was passed in 1981. By this act, persons who would be establishing any industry in any air pollution control area, was enjoined not to discharge emission of any air pollutant, in excess of the standard laid down by the State Board. Prior permission was made necessary for starting any industry or Mining operation which will release pollutants in atmosphere. Power to inspect and collection of samples as in case of water act was vested with Central and State Pollution Control Boards.
- A comprehensive act entitled "**Environment Protection Act**" was promulgated in 1986. The act widened the scope of environmental protection activities of the Central and State Boards. Unless prior to environmental clearance has been accorded in accordance with objectives of 'National Environmental Policy', 2006. All sorts of environmental pollution in excess of standard laid down were prohibited. The establishment of environmental laboratories and their recognition was also stipulated. In the same year i.e. 1986 the environmental protection rules were also framed and it gave in its schedule the detailed guidelines regarding pollutants vis-a-vis different industries. Environmental audit was also made mandatory as per number of other acts and rules which impinges directly on environmental protection.
- **Mines and Minerals Regulation and Development (MMRD) Act:** The principal act is of 1957 and was amended in 1972, and was further amended in January 1987. The Government by this act has assumed powers to prevent a licensee or lease holder from damaging environment. The MMRD amendment Act 1987 has given a prominent place to damages to vegetation. The mining plan is required to be submitted along with environmental management plan (E.M.P. & E.I.A.).
- **Mineral Conservation and Development Rules, 1988:** The Mineral Conservation and Development Rules, 1988 is administered by the Indian Bureau of Mines, a Department of the Central Government under the Ministry of Mines. As per the rules, every mining operations in any area has to be in accordance with the mining plan and there is provision of review of approved mining plan at the interval of 5 years from the date of commencement of

mining operations. Every mine operator is required to take all possible precautions for protection of environment and control of pollution while conducting prospecting, mining, beneficiation or metallurgical operations in the area. It will be further ensured that the air, water and noise pollution levels are within the permissible limits.

- The **Mineral Conservation and Development** Rules is not applicable to petroleum and natural gas, coal, lignite sand for stowing, prescribed substances under Atomic Energy Act and Minor minerals.
- The **Forests Conservation Act, 1980** is administered by the Union Ministry of Environment & Forests. The Legislation was enacted to check deforestation. The act stipulates that no use of forest land for any non-forest purpose including mining will be permitted without the prior approval of the Central Government. Consequently afforestation is one of the important conditions while approving proposals for diversion of forest land for non-forest purpose.
- The Enactment of National Disaster Management Authority in 2006, it may be mentioned that **Disaster Management Act** has now Institutionalized disaster management and co-ordination of pre and post measures of disaster preparedness, mitigation, prevention, rescue operation, relief, work, rehabilitation, reconstruction at National, State and District Levels.
- **Biomedical Waste (Management & Handling) Rules, 1998;**
- The **Municipal Solid Waste (Management and Handling Rules 2000;**
- The **Ozone Depleting Substances (Regulation and Control), Rules 2000,** for production and consumption of CFCs.
- The **Noise Pollution (Regulation & Control) Amendment Rules, 2002,** which are necessary to reduce noise level.
- **Biological Diversity Act, 2002** to provide provisions for the conservation of Bio-diversity zone.
- **Wildlife (Protection) Amendment Act,** become effective in 2006; provision for the creation of Tiger Conservation Authority and other endangered species crime control bureau.
- The **National Green Tribunal Act, 2010.**
- **E-Waste (Management & Handling) Rules, 2011;** to reduce the use of hazardous substances in electrical and electronic materials.

4 ENVIRONMENT LEGISLATION AND COAL MINING ACTIVITIES

Coal India Limited subscribed to the view of Sustainable Development can sustain all development activities; towards sustainable development and approved-

- (a) **Corporate Environmental Policy, 1995;** Amended in 2012; It is complimentary to the National Environmental Policy, 2006. This Policy has a vision of Green Mining.
- (b) Environmental Impact Assessment (E.I.A.) & Environmental Management Plan (EMP) for all mining project shall be formulated as per the approved for obtaining environmental clearance.
- (c) Measures to Mitigate Pollution regarding, Air Pollution; Water Pollution; Noise and Ground Vibration Problem; land reclamation; mine fire and regular monitoring, to assess the efficacy of the pollution control within stipulated standards.

With the passage of specific environment Legislation, the environment protection in coal mining areas may definitely get a boost. The Mineral Conservation and Development Rules specifically keep coal mining out of its purview, but there is no doubt that basic laws on water and air pollution and comprehensive

Environmental Protection Act are general in nature, and may be useful in minimising environmental damages in coal mining areas.

Mining industry creates some special environmental problems which are the damage to land by open casting and subsidence, blasting vibration and lowering of ground water table due to continuous pumping out of mine water are some of the environmental problems- the types of which are not created by any other industry. Against the background of the above, the authors feel that following grey areas deserve Governmental consideration:

4.1 Environmental Legislation Pertaining to Coal Mining:

Because of the special nature of environmental problems created by mining, there is necessity to enact specific and definitive laws which take care of environmental problems created by mining. Such Legislation should specifically take care of problems of surface mining, subsidence, lowering of ground water and related issues and may be in the nature of SMCRA (Surface Mining Control and Reclamation Act) of USA.

4.2 Participation of Peoples

In the whole process of Environmental Legislation, the Citizens, who is the central figure in the whole issue of environmental management has got very little role to play. The perusal of evolution of Environmental Legislation related to mining of countries like U.K. and U.S.A. would indicate that ultimately the Legislation had to offer a prime place to the citizens likely to be affected in the whole scheme of environmental protection. The Opencast Coal Act, 1958 of U.K. has got provision to consult multifarious interests before moving to formal application.

- Environmental initiatives and monitoring through self and third party environment audit shall be conducted for generating useful data for taking corrective action and mitigation as per guideline.
- Clean Development Mechanism will be explored for reducing emission of Green house gases by exploration, identification and preparation of projects reports for extraction of methane from Coal Bed, Coal mine, U.G. Coal Gasification, generation and utilization of renewable energy etc.
- The Bureau of Indian Standards has also prepared a number of standards on various aspects of environmental pollution caused by the industries and Mines. Some of the important standard are; IS-2488(part-1-4); IS-4733; IS-5182(part-1-20).

5 CONCLUSION

In order to achieve harmonious equilibrium between the sustainable mineral development and for the preservation of the environment. The need of the day is to bring greater awareness for harmonizing population dynamic and socioeconomic development and harnessing of natural resources with due care to see that the quality of the environment does not deteriorate. But despite of environmental legislation's and standardization, the degradation of environmental quality continues, this may be perhaps that the implementation of the various environmental laws, Acts and BIS standards is not proper. Every Endeavour will be made to minimise adverse effects of mining on the forest, environments and ecology through appropriate protection measures.

REFERENCES

1. Agarwal, S.K. 2005, Environmental Management, APH Publishing Corporation, New Delhi.
2. Bhargava, G. 1992, Pollution and its Control, Mittal Pub., New Delhi, pp. 202-220.

3. Canter, L.W., 1996, Environmental Impact Assessment, Mac Grow Hill Inc., New York.
4. Dhara, S., 2001, Natural Disaster: Minimising Risks, The Hindu Survey of Environment, pp. 19-27.
5. El-Kholy, O.A., 2001, Trends in Environmental Management in the Last 40 years in Ted Munn (ed.), Encyclopedia of Global Environmental Change (Vol. 4), Wiley, Chichester, pp. 15-20.
6. Gupta, A. and Asher, M.G., 1998, Environment and the Developing World: Principles Policies and Management, Willey, Chichester, pp. 15-20.
7. Berlin guidelines for Mining and Sustainable Development, 2002, United Nation Publication.
8. Kapoor, I., 2001, Towards Participatory Environmental Management, Journal of Environmental Management, Vol. 63(3), pp. 269-79.
9. Kumra, V.K., 1982, Kanpur City: A Study in Environmental Pollution, Tara Book Agency, Varanasi, p. 205.
10. Lohani, V.N., 1984, Environmental Quality Management, South Asian Pub., New Delhi, p. 343.
11. Singh, L.R., Singh, Savindra, Tiwari, R.C. and Srivastava, R.P., 1983, Environmental Management (ed.), Allahabad Geographical Society, Geog. Dept., Allahabad University.
12. Singh, Onkar et al., 1988, India's Urban Environmental: Pollution, Perception and Management, Tara Book Agency, Varanasi, pp. 163-181.
13. B. Babu Rao, 2000, Strategy for sustainable development for mining sector in India.

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भारतीय उच्च शिक्षा की समस्याएँ एवं सुधार

डॉ. प्रदीप गुप्ता

एसोसिएट प्रोफेसर – भौतिक विज्ञान, डी० एस० एन० स्नातकोत्तर
महाविद्यालय, उन्नाव, उत्तर प्रदेश

भारत के उच्च शिक्षा संस्थान वैश्विक जगत में अपने आप में अनूठा हैं। जहाँ चिकित्सा, अभियांत्रिकी, प्रौद्योगिकी, व्यावसायिक, तकनीकी आदि विषयों की शिक्षा दी जाती है। यद्यपि स्वतंत्रता के पश्चात भारत में उच्च शिक्षा के क्षेत्र में परिवर्तन के लिए प्रयास किए गए, किन्तु पूर्णतः तरह सफल नहीं हुआ।

उच्च शिक्षा के क्षेत्र में चुनौतियाँ

भारत में उच्च-शिक्षा चिकित्सा, अभियांत्रिकी, प्रौद्योगिकी, व्यावसायिक, तकनीकी आदि विषयों के लिए अत्यधिक महंगी हो गयी। भारतीय परिदृश्य में जहाँ सामाजिक रूप से पिछड़े गरीब परिवारों के छात्रों को 'दो जून की रोटी' नसीब नहीं होती है, वहाँ शिक्षा कितनी तर्क एवं न्यायसंगत लगती है।

उच्च शिक्षा की संवैधानिक स्थिति

भारतीय संविधान में शिक्षा समवर्ती सूची में निहित है। शिक्षा के लिए केन्द्र सरकार राज्य सरकार के कानून बनाने का अधिकार अलग-अलग है। जब केन्द्र एवं राज्य सरकारों में कानून-निर्माण में खींचा-तानी होती है तो विवाद उत्पन्न हो जाता है।

उच्च शिक्षा संस्थान में शिक्षकों पर अधिक कार्यों का उत्तरदायित्व

केन्द्रीय विश्व विद्यालय, डीम्ड विश्वविद्यालय, निजी विश्वविद्यालय के आधारभूत ढाँचे में समानता मिलती है। इन शिक्षकों को शिक्षण एवं शोध कार्यों का उत्तरदायित्व समान रहता है। जबकि राज्य विश्वविद्यालय के शिक्षकों पर शिक्षण एवं शोधकार्यों के अतिरिक्त अनेक कार्यों का उत्तरदायित्व रहता है। इस अतिरिक्त कार्यों के कारण राज्य विश्वविद्यालय के शिक्षक छात्रों को मानक एवं गुणवत्तापूर्वक शिक्षा प्रदान करने में असफल रहते हैं।

उच्च शिक्षा संस्थान के शिक्षकों का राजनीतिक क्षेत्र में सम्मिलित होना

भारत में केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय के शिक्षकों द्वारा राजनीतिक में सहभागिता करने से शिक्षण एवं शोधकार्य प्रभावित होता है जिससे उच्च शिक्षा प्राप्त करने वाले छात्रों का भविष्य अधर में लटक जाता है।

उच्च शिक्षा संस्थान की नियुक्तियों में भ्रष्टाचार

विभिन्न केन्द्रीय विश्वविद्यालय राज्य विश्वविद्यालय में शिक्षकों की नियुक्तियाँ करने में विश्वविद्यालय अनुदान आयोग के नियम-कानून को परे रखकर नियुक्तियाँ कर दी जाती हैं। जिससे उच्च शिक्षा संस्थान के छात्रों को गुणवत्तापरक शिक्षा नहीं मिल पाती है जिसके कारण अन्तर्राष्ट्रीय स्तर पर शिक्षा का स्तर प्राप्त करना कठिन हो गया है।

उच्च शिक्षा संस्थान में जड़ता

भारत के उच्च शिक्षा संस्थानों के पाठ्यक्रम में पुरातन, जड़ता के कारण छात्रों में समावेशी शिक्षा एवं गुणवत्तापरक शिक्षा की कमी देखी जाती है। इस कमी के कारण उच्च शिक्षा संस्थानों के छात्र वैश्विक शिक्षण-संस्थानों की तुलना में प्रतिस्पर्धा स्थापित नहीं कर पाते।

उच्च शिक्षा संस्थान में शिक्षकों का अभाव

भारत के उच्च शिक्षा संस्थानों में शिक्षकों की कमी के कारण छात्रों को गुणवत्तापरक शिक्षा नहीं मिल पाती है जिसके कारण छात्रों द्वारा अंतर्राष्ट्रीय स्तर की सूची में भारतीय शिक्षा-संस्थानों द्वारा अपना स्थान बनाने में विफल रहा है। कुछ भारतीय विद्वानों का विचार है कि वैश्विक उच्च-शिक्षा संस्थानों की सूची बनाने में पक्षपात किया गया। जिससे विद्वानों का विचार संकीर्ण तथा हीन भावना प्रकट करता है।

भारत में उच्च शिक्षा में सुधार

भारत में केन्द्र सरकार द्वारा सामाजिक रूप से पिछड़े गरीब छात्रों के लिए प्रौद्योगिकी, व्यवसायिक, चिकित्सा की पाप्ति के लिए भारतीय बैंक संघों को उल्लिखित किया है। कि गरीब परिवार के छात्रों को कम ब्याज पर धन उपलब्ध कराये। इस परिवर्तन से 21वीं सदी के वैश्विक जगत में उच्च शिक्षा के क्षेत्र में गरीब युवा छात्रों ने आर्थिक सहायता लेकर आई0आई0टी0, चिकित्सा, प्रौद्योगिकी शिक्षा प्राप्त करके भारत को स्वर्णिम स्थान दिलवाया है।

उच्च शिक्षा के संवैधानिक स्थिति में परिवर्तन

उच्च शिक्षा में प्रो० यसपाल समिति (2006) का गठन किया गया। समिति ने अपना सुझाव उच्च शिक्षा में शोध के लिए निकाय बनाने हेतु निर्मित-कानून बौद्धिक स्वायत्तता एवं सर्व समावेशी के परिवर्तन का सुझाव दिया गया। केन्द्र सरकार की भावी योजना यू0जी0सी0 के स्थान पर भारतीय उच्च शिक्षा संस्थान (एच0ई0सी0आई0) संस्थान की स्थापना करना। जिससे उच्च शिक्षा में गुणवत्तापरक, मानक के अनुसार सुधार किया जा सके।

उच्च शिक्षा संस्थानों के शिक्षकों का अतिरिक्त कार्य समाप्त करना

जिस प्रकार प्राथमिक स्तर पर शिक्षकों को चुनाव, जनगणना आदि कार्यों को सर्वोच्च न्यायालय ने रोक लगा दिया। इसी प्रकार उच्च शिक्षा के शिक्षकों द्वारा राज्य विश्वविद्यालय के शिक्षण एवं शोध कार्यों तक सीमित करके शिक्षा के गुणवत्ता में सुधार किया जा सकता है।

उच्च शिक्षा संस्थान के शिक्षकों द्वारा राजनीतिकरण को समाप्त करना

केन्द्र सरकार द्वारा केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय के शिक्षकों को राजनीति में प्रवेश के लिए एक उत्तरदायित्व पद के निर्वहन के लिए सीमित कर देना चाहिए। जिससे शिक्षण संस्थान के छात्रों का भविष्य उज्ज्वल हो सके। भारत अंतर्राष्ट्रीय स्तर पर अपना स्थान स्थापित कर सके।

उच्च शिक्षा संस्थान में शिक्षकों की नियुक्ति में सावधनियाँ

विश्वविद्यालय अनुदान आयोग के नियम-निर्देशों के अनुसार केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय में शिक्षकों की नियुक्ति की जानी चाहिए। जिससे अनुभवी योग्य शिक्षकों द्वारा गुणवत्तापरक शिक्षा दकर भारत को वैश्विक स्तर पर शिक्षा की स्थिति को सुधारा जा सके।

उच्च शिक्षा के पाठ्यक्रम में परिवर्तन

पाठ्यक्रम एवं पाठ्यचर्या की पुर्नसंरचना, पाठ्यक्रम की जड़ता को समाप्त करना, छात्रों में समाज एवं देश के प्रति संवेदनशीलता जागृति करना। सामाजिक सद्भाव नैतिकता की भावना जागृति करना। उच्च शिक्षा संस्थानों का लक्ष्य प्रत्येक पाठ्यक्रम में परिवर्तन करके, प्रत्येक विषय को प्रोत्साहन करने की स्वायत्ता के साथ अकादमिक मानक निर्धारित करना चाहिए।

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भारतीय उच्च शिक्षा की समस्याएँ एवं सुधार

डॉ. अंजू सोनकर

सहायक प्रोफेसर – गृह विज्ञान, लालता सिंह राजकीय महिला स्नातकोत्तर
महाविद्यालय अदलहाट, मिर्जापुर, उत्तर प्रदेश

भारत के उच्च शिक्षा संस्थान वैश्विक जगत में अपने आप में अनूठा है। जहाँ चिकित्सा, अभियांत्रिकी, प्रौद्योगिकी, व्यावसायिक, तकनीकी आदि विषयों की शिक्षा दी जाती है। यद्यपि स्वतंत्रता के पश्चात भारत में उच्च शिक्षा के क्षेत्र में परिवर्तन के लिए प्रयास किए गए, किन्तु पूर्णतः तरह सफल नहीं हुआ।

उच्च शिक्षा के क्षेत्र में चुनौतियाँ—

भारत में उच्च-शिक्षा चिकित्सा, अभियांत्रिकी, प्रौद्योगिकी, व्यावसायिक, तकनीकी आदि विषयों के लिए अत्यधिक महंगी हो गयी। भारतीय परिदृश्य में जहाँ सामाजिक रूप से पिछड़े गरीब परिवारों के छात्रों को 'दो जून की रोटी' नसीब नहीं होती है, वहाँ शिक्षा कितनी तर्क एवं न्यायसंगत लगती है।

उच्च शिक्षा की संवैधानिक स्थिति—

भारतीय संविधान में शिक्षा समवर्ती सूची में निहित है। शिक्षा के लिए केन्द्र सरकार राज्य सरकार के कानून बनाने का अधिकार अलग-अलग है। जब केन्द्र एवं राज्य सरकारों में कानून-निर्माण में खींचा-तानी होती है तो विवाद उत्पन्न हो जाता है।

उच्च शिक्षा संस्थान में शिक्षकों पर अधिक कार्यों का उत्तरदायित्व—

केन्द्रीय विश्व विद्यालय, डीम्ड विश्वविद्यालय, निजी विश्वविद्यालय के आधारभूत ढाँचे में समानता मिलती है। इन शिक्षकों को शिक्षण एवं शोध कार्यों का उत्तरदायित्व समान रहता है। जबकि राज्य विश्वविद्यालय के शिक्षकों पर शिक्षण एवं शोधकार्यों के अतिरिक्त अनेक कार्यों का उत्तरदायित्व रहता है। इस अतिरिक्त कार्यों के कारण राज्य विश्वविद्यालय के शिक्षक छात्रों को मानक एवं गुणवत्तापूर्वक शिक्षा प्रदान करने में असफल रहते हैं।

उच्च शिक्षा संस्थान के शिक्षकों का राजनीतिक क्षेत्र में सम्मिलित होना—

भारत में केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय के शिक्षकों द्वारा राजनीतिक में सहभागिता करने से शिक्षण एवं शोधकार्य प्रभावित होता है जिससे उच्च शिक्षा प्राप्त करने वाले छात्रों का भविष्य अधर में लटक जाता है।

उच्च शिक्षा संस्थान की नियुक्तियों में भ्रष्टाचार—

विभिन्न केन्द्रीय विश्वविद्यालय राज्य विश्वविद्यालय में शिक्षकों की नियुक्तियाँ करने में विश्वविद्यालय अनुदान आयोग के नियम-कानून को परे रखकर नियुक्तियाँ कर दी जाती हैं। जिससे उच्च शिक्षा संस्थान के छात्रों को गुणवत्तापरक शिक्षा नहीं मिल पाती है जिसके कारण अन्तर्राष्ट्रीय स्तर पर शिक्षा का स्तर प्राप्त करना कठिन हो गया है।

उच्च शिक्षा संस्थान में जड़ता—

भारत के उच्च शिक्षा संस्थानों के पाठ्यक्रम में पुरातन, जड़ता के कारण छात्रों में समावेशी शिक्षा एवं गुणवत्तापरक शिक्षा की कमी देखी जाती है। इस कमी के कारण उच्च शिक्षा संस्थानों के छात्र वैश्विक शिक्षण-संस्थानों की तुलना में प्रतिस्पर्धा स्थापित नहीं कर पाते।

उच्च शिक्षा संस्थान में शिक्षकों का अभाव—

भारत के उच्च शिक्षा संस्थानों में शिक्षकों की कमी के कारण छात्रों को गुणवत्तापरक शिक्षा नहीं मिल पाती है जिसके कारण छात्रों द्वारा अंतर्राष्ट्रीय स्तर की सूची में भारतीय शिक्षा-संस्थानों द्वारा अपना स्थान बनाने में विफल रहा है। कुछ भारतीय विद्वानों का विचार है कि वैश्विक उच्च-शिक्षा संस्थानों की सूची बनाने में पक्षपात किया गया। जिससे विद्वानों का विचार संकीर्ण तथा हीन भावना प्रकट करता है।

भारत में उच्च शिक्षा में सुधार—

भारत में केन्द्र सरकार द्वारा सामाजिक रूप से पिछड़े गरीब छात्रों के लिए प्रौद्योगिकी, व्यवसायिक, चिकित्सा की प्राप्ति के लिए भारतीय बैंक संघों को उल्लिखित किया है। कि गरीब परिवार के छात्रों को कम ब्याज पर धन उपलब्ध कराये। इस परिवर्तन से 21वीं सदी के वैश्विक जगत में उच्च शिक्षा के क्षेत्र में गरीब युवा छात्रों ने आर्थिक सहायता लेकर आई0आई0टी0, चिकित्सा, प्रौद्योगिकी शिक्षा प्राप्त करके भारत को स्वर्णिम स्थान दिलवाया है।

उच्च शिक्षा के संवैधानिक स्थिति में परिवर्तन—

उच्च शिक्षा में प्रो० यसपाल समिति (2006) का गठन किया गया। समिति ने अपना सुझाव उच्च शिक्षा में शोध के लिए निकाय बनाने हेतु निर्मित-कानून बौद्धिक स्वायत्तता एवं सर्व समावेशी के परिवर्तन का सुझाव दिया गया। केन्द्र सरकार की भावी योजना यू0जी0सी0 के स्थान पर भारतीय उच्च शिक्षा संस्थान (एच0ई0सी0आई0) संस्थान की स्थापना करना। जिससे उच्च शिक्षा में गुणवत्तापरक, मानक के अनुसार सुधार किया जा सके।

उच्च शिक्षा संस्थानों के शिक्षकों का अतिरिक्त कार्य समाप्त करना—

जिस प्रकार प्राथमिक स्तर पर शिक्षकों को चुनाव, जनगणना आदि कार्यों को सर्वोच्च न्यायालय ने रोक लगा दिया। इसी प्रकार उच्च शिक्षा के शिक्षकों द्वारा राज्य विश्वविद्यालय के शिक्षण एवं शोध कार्यों तक सीमित करके शिक्षा के गुणवत्ता में सुधार किया जा सकता है।

उच्च शिक्षा संस्थान के शिक्षकों द्वारा राजनीतिकरण को समाप्त करना—

केन्द्र सरकार द्वारा केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय के शिक्षकों को राजनीति में प्रवेश के लिए एक उत्तरदायित्व पद के निर्वहन के लिए सीमित कर देना चाहिए। जिससे शिक्षण संस्थान के छात्रों का भविष्य उज्ज्वल हो सके। भारत अंतर्राष्ट्रीय स्तर पर अपना स्थान स्थापित कर सके।

उच्च शिक्षा संस्थान में शिक्षकों की नियुक्ति में सावधनियाँ—

विश्वविद्यालय अनुदान आयोग के नियम-निर्देशों के अनुसार केन्द्रीय विश्वविद्यालय एवं राज्य विश्वविद्यालय में शिक्षकों की नियुक्ति की जानी चाहिए। जिससे अनुभवी योग्य शिक्षकों द्वारा गुणवत्तापरक शिक्षा देकर भारत को वैश्विक स्तर पर शिक्षा की स्थिति को सुधारा जा सके।

उच्च शिक्षा के पाठ्यक्रम में परिवर्तन—

पाठ्यक्रम एवं पाठ्यचर्या की पुनर्संरचना, पाठ्यक्रम की जड़ता को समाप्त करना, छात्रों में समाज एवं देश के प्रति संवेदनशीलता जागृति करना। सामाजिक सद्भाव नैतिकता की भावना जागृति करना। उच्च शिक्षा संस्थानों का लक्ष्य प्रत्येक पाठ्यक्रम में परिवर्तन करके, प्रत्येक विषय को प्रोत्साहन करने की स्वायत्ता के साथ अकादमिक मानक निर्धारित करना चाहिए।

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