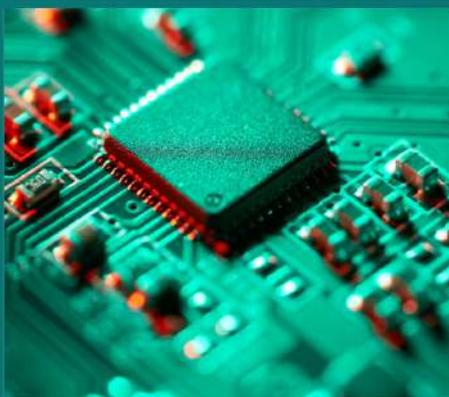


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Contents

| S. No. | Title of the paper | Author/s | Page No. |
|--------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------|
| 1 | DOES PAY PERKS DRIVE THE EMPLOYEES JOB SATISFACTION AND MOTIVATION? | Jyoti, Amit Kumar | 1-8 |
| 2 | ROLE OF TECHNOLOGY IN TAXATION SYSTEM IN INDIA | MANISH GUPTA | 9-13 |
| 3 | IMPLEMENTATION OF FEATURE EXTRACTION ON EDGE DETECTION ALGORITHM WITH ACO TO ANALYSE BOUNDARIES OF REAL IMAGE | Anshu Mehta, Saurabh Charaya | 14-28 |
| 4 | Simulation of Adaptive Noise Cancellation on 100 Hz signal | Deepanjali Jain, Poonam Beniwal | 29-35 |
| 5 | Historical Development of Solar Cells (Traditional to Nanowires Based) | Devi Prassan Manoj Kumar | 36-39 |
| 6 | A Comparative Analysis of Different Modelling Software to Determine the Best 3D Modelling Technique | Himanshu Malik | 40-46 |
| 7 | ROLE OF TECHNOLOGY ON CIVIL STRUCTURES AND STRUCTURAL HEALTH MONITORING | Jai Dutt | 47-54 |
| 8 | The Impact of Service Aging on the Dielectric Properties of Transformer Insulating Liquid | Mahavir Vishavdeep Jindal | 55-60 |
| 9 | AVERAGE THE ENHANCEMENT OF ACCURACY PARAMETER DURING IDS DETECTION USING LSTM MODEL | Manju bala | 61-68 |
| 10 | APPLICATIONS OF GRAPH THEORY | Monika | 69-72 |
| 11 | Graphene Grounded Nano Materials and Nano Devices- Review | Neha, Manoj Kumar | 73-80 |
| 12 | Distributed Generation Allocation and Planning in Deregulated Electricity Market | Pooja Sharma, Gagandeep Khajuria, Rakesh Dhiman | 81-86 |
| 13 | PREDICTING STUDENTS' DROP OUT USING DATA MINING TECHNIQUES-A LITERATURE REVIEW | Poonam Kumari, | 87-94 |
| 14 | Educational Data mining for Prediction of Students' Performance Using Clustering Algorithm: a literature review | Rajinder Singh | 95-100 |
| 15 | ROLE OF PARTICLE SWARM OPTIMIZATION AND MULTIVERSE OPTIMIZATION IN SHARE PRICE OPTIMIZATION | Ritu | 101-112 |
| 16 | A new fangled parallel search technique for optimization | Vedatrayee Chatterjee, | 113-119 |

| | | | |
|----|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------|
| | | Parveen Sehgal, Dhiman Roy | |
| 17 | The Many Facets of a Woman: Love, Friendship and Identity in Chitra Benerjee's "Sister of My Heart" | Kiran | 120-124 |
| 18 | Changing Paradigms of Education during Covid-19 Pandemic: An Analysis | Mukesh Yadav | 125-129 |
| 19 | Reflection of Indian Society and Social Microcosm in the Selected Works of Mulk RajAnand | Nidhi Yadav | 130-132 |
| 20 | सामाजिक विज्ञापनो में महिला ब्रांड एम्बेसडर की भूमिका | Jyoti | 133-137 |
| 21 | "जयपुर की ब्लू पॉटरी के वर्तमान स्वरूप का अध्ययन" | Sumeet Kumar | 138-146 |
| 22 | TELEHEALTH AND TECHNOLOGY TOWARDS TRANSFORMATIONAL HEALTH SYSTEM IN ABU DHABI, UNITED ARAB EMIRATES | Kanika Vats | 147-153 |
| 23 | माधव कौशिक का साहित्य व तकनीकी प्रयोग | बजरंग लाल | 154-159 |
| 24 | Harnessing Technological Advancements in Hospitality Industry – An Overview on Cloud Kitchen | Arajit Kumar Das | 160-165 |
| 25 | STUDY OF ANTIOXIDANT ACTIVITY OF SOME MEDICINAL PLANTS: A REVIEW | Pinki Phougat, Hitesh Kumar | 166-170 |
| 26 | Development of Heat resistant Aromatic polymers | B Sabitha, B Chandramouli, B Sanjeeva Rao, D Shireesh, and Renu Sharma | 171-179 |
| 27 | Pleotropy of curcumin | Vibhor* and Harpreet Kaur | 180-184 |
| 28 | ROLE OF MASS MEDIA IN AGRICULTURE DEVELOPMENT: A CASE STUDY OF NABARANGPUR DISTRICT IN ODISHA | Mahendra Kumar Nayak | 185-199 |
| 29 | ASPECT OF DHARMA IN KARMAYOGA | Sanjay Kumar | 200-202 |

DOES PAY PERKS DRIVE THE EMPLOYEES JOB SATISFACTION AND MOTIVATION?

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DOES PAY AND PERKS DRIVE THE EMPLOYEES JOB SATISFACTION AND MOTIVATION?***Abstract***

The importance of job satisfaction has been widely accepted in the literature reviewed for this purpose. It is found that the job satisfaction of a worker is directly or indirectly connected with the organizational productivity and many problems related to human resource management. The entry of foreign companies has increased competition notably in the Indian corporate sector. It has also widened the opportunity of making more choice to the investors. Thus, the companies have been running their business operations in a complex situation that requires adjustment with the environment at a very fast pace hence creating ample opportunities of developing the organization in a new working style for which the employee motivation is highly pre-required. Hence, it becomes more important to study the various factors affecting the motivation of the employees. The present study uses a sample of 398 respondents for collecting a data from medium and large scale industry working during 2019-20. The findings of the study revealed that pay and perks has a major role while shaping the job satisfaction and employee motivation of the sample under study. The study strongly recommends the corporate sector to frame pay and perks policies that induce the job satisfaction of the employees.

Keywords: Job Satisfaction, Employee Motivation, Job involvement.

1.1 INTRODUCTION

Job satisfaction is always been considered necessary for higher productivity. The level of job satisfaction is the basic reason for many things like productivity, workers' turnover, participation in management, absenteeism, attrition rate, workers performance, innovation, creativity, organizational development, retention etc. and many others. The importance of job satisfaction has been widely accepted in the literature reviewed for this purpose. It is found that the job satisfaction of a worker is directly or indirectly connected with the organizational productivity and many problems related to human resource management. L.M. Prasad, 1989 mentions in his book as "Job satisfaction is the amount of pleasure or contentment associated with a job. If you like your job intensely, you will experience high job satisfaction. If you dislike your job intensely, you will experience job dissatisfaction.

The present study is aimed at examining the contribution of the organizational factors of the job satisfaction of the workers, which is the basic reason behind most of the problems in Human Resource Management. Based on the definition of the Job Satisfaction the researcher feels that if the job satisfaction of a worker were a mental or emotional state of mind, it must be on certain emotional criteria. Out of those criteria, the management does not have control over the personal issues. However, the organizational issues can be studied for knowing the

Composition of organizational factors in the job satisfaction of workers. The present study believes that the

composition of these organizational factors is strongly affecting on the level of job satisfaction. Thus, it is necessary in the initial stage to know the behaviour of the organizational factors in the construction of job satisfaction of any worker.

1.2 REVIEW OF LITERATURE

The following section covers the various studies conducted abroad and in India.

Theorists such as Maslow (1954), Herzberg et.al (1959), and Alderfer (1972), have sought to explain employee motivation by holding on to the assumption that all individuals possess the same set of needs and therefore prescribe the characteristics that ought to be present in the jobs. These theorists have afforded opportunities to managers to design motivational schemes to influence performance. What need to be answered are the factors of motivation which drive the performance of employees in the mining sectors of Ghana. Though managers and organisations have applied motivation theories to the same behaviour in different countries and institutions, the growing realisation that traditional models of motivation do not explain the diversity of behaviours found in organisational settings have brought to fore the need for a socially sensitive approach in the Ghanaian context.

McShane and Von Glinow (2007) point out that Herzberg's ideas brought about new ways of thinking of the potential of motivation from the job itself. Herzberg's hygiene factors can roughly be related to the lower-level needs of Maslow while the motivators to the higher-level needs (Mullins, 17 2010). The simplicity and intuitiveness of Herzberg's theory is said to appeal to many managers.

According to Kreitner and Kinicki (2010), there are various kinds of rewards and non can be said to be the best in motivating employees because according to the need theories and the different kinds of individuals at the workplace, people are motivated by varying and different rewards. Thus the challenge to the manager is to establish what works for whom. For this to happen, the manager has to understand and appreciate the different needs that employees try to meet.

According to Cole and Kelly (2011), the idea behind creation of autonomous work groups (work teams that have delegated responsibilities for a certain part of organizational activities and have the freedom of organizing their own resources, work pace, and allocation of duties within the group), is to ensure that job satisfaction and consequently employee morale is enhanced when employees work in a group towards achieving their production goals.

According to Kinicki and Fugate (2012), the perspective of total rewards include compensation such as pay increases, base pay, promotions, incentives and merit pay; benefits

such as health, welfare, retirement and paid time off benefits; and personal growth such as through career development and training. Phillips and Gully (2012) also concede that rewards are among the "most powerful motivational tools managers have at their disposal" (p. 230), adding that for one to accept a job offer and decide how much effort to exert, the rewards being offered play a big role in the final decision. Phillip and Gully therefore agree that rewards motivate employees.

Colquitt, et al. (2013) also concur that pay satisfaction in reference to the feelings that employees have about their pay including if it's what they feel they deserve, whether it is secure and adequate for both luxury and normal expenses tops the list of overall job satisfaction values. The authors note that to get the pay satisfaction, many employees related to the content of a task that is being performed and this is related to Psychologist

Frederick Herzberg's content theory known as Herzberg's Two Factor Theory/ motivation-hygiene theory (Robbins and Judge, 2010). Employees generally compare what they are paid in comparison with their colleagues and also based on their job duties. However Quick and Nelson (2013) also point out that pay is just marginally relative to job satisfaction as it does not always follow that those who are well paid are automatically satisfied with their jobs.

While McShane and Von Glinow (2014) acknowledge that a study on money shows that it generates varying emotions mostly negative such as depression and anxiety, they also note that many experts are of the opinion that because of its symbolic value today, money is a more important motivator than it was before. In view of this, the authors believe that it is important for employers while giving out financial rewards to remember that money can influence emotions, and shape people's self-concept since it is more than just a means of exchange between an employer and an employee.

According to Bukusi, (2017) "managing people is not just about pay rewards and benefits. It is more about developing people you need to run your organization's business. Managing people is about developing HR to access the resources the leader knows they have and empowering them to do what they can to contribute to the success of the organization".

Rotter (2019) suggests that the occurrence of a particular behaviour is dependent not only on an individual's objective reinforcement history (the behaviourist view), but also on the individual's expectation that the behaviour will result in a particular consequence and the subjective assessment of the costs and benefits associated with the consequence which supports the cognitivist view.

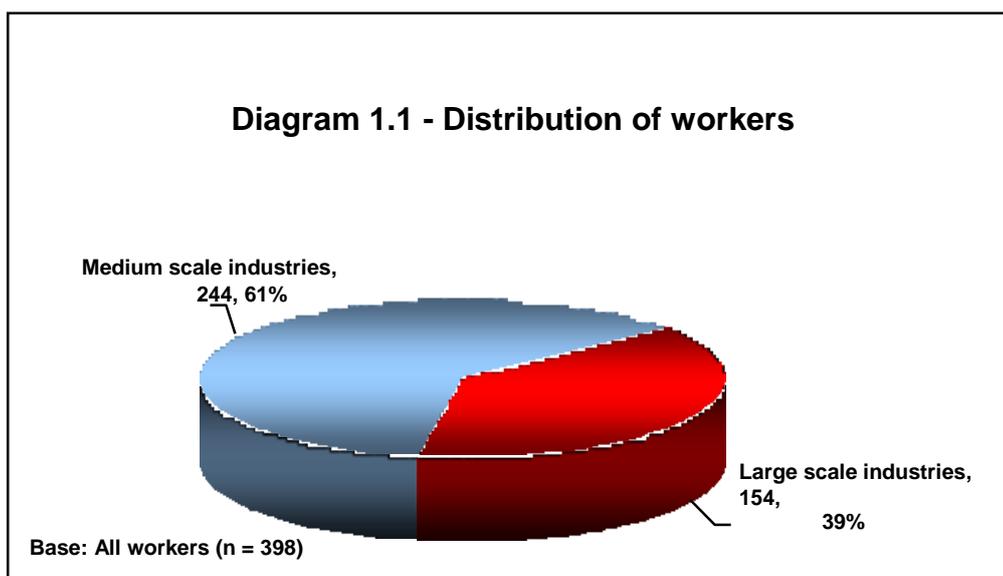
After studying the related reviews, it is found that a large number of studies have been conducted to explain motivational aspect of corporate employees. Motivated and energetic

workforces can help to organization to accomplish the vision and mission of the future oriented organization. So, it is an issue of great concern for almost all business sectors, hence poses a significant area of research. Moreover, Looking at the major effects of recession of the year 2008 in India has led to the companies to operate in a new economic environment altogether. Many foreign players have started moving more rigorously in the domestic market to fetch the benefits of larger market. The entry of foreign companies has increased competition notably in the Indian corporate sector. It has also widened the opportunity of making more choice to the investors. Thus, the companies have been running their business operations in a complex situation that requires adjustment with the environment at a very fast pace hence creating ample opportunities of developing the organization in a new working style for which the employee motivation is highly pre-required. Hence, it becomes more important to study the various factors affecting the motivation of the employees. By considering the research gap and to fulfil this gap, the proposed study on the title of "What drives the employee job satisfaction and motivation" is taken as a topic for current study.

1.3 RESEARCH METHODOLOGY

The present study is analytical and exploratory in nature. This study focuses on the examination of the impact of motivation over selected companies in Indian corporate sector. More specifically, the present study makes an assessment of the influence of various factors related to employee motivation on the organizational development of the selected companies. The study is being conducted by considering the chief objective of finding the influence of pay and salary over the job satisfaction and motivation level of employees working in corporate sector.

The study is based upon manufacturing companies which are operating in the city Gurugram



being the chief industrial hub for manufacturing companies in the state Haryana. The source of data is primary in nature and has been collected through structured questionnaire. The employees working on different levels in the sample companies are selected as respondents for the purpose of data collection.

The above diagram 1.1 represents the distribution of respondents from medium and large scale industries. A total of 398 respondents have been selected on convenience sampling based method and out of this 61 per cent were from medium scale industry and 39 per cent from large scale industries. Data collected from the respondents has been analysed by descriptive statistics using SPSSsoftware.

1.4 DATA ANALYSIS AND FINDINGS

The following table 1.1 gives a clear explanation about the monthly wages of the respondents under study. The table clearly exhibits that the monthly wages of workers, 136 (34.2%) workers had monthly wages less than 8000, 47 (11.8%) workers had monthly wages 8000 to 10000, 139 (34.9%) workers had monthly wages 10000 to 15000, 54 (13.6%) workers had monthly wages 15000 to 20000 and remaining 22 (5.5%) workers had monthly wages more than 20000.

Table 1.1 - Monthly Wages of Workers (in Rs.)

| Monthly wages | | | Industries Groups | | | |
|----------------|-------|--------|-------------------|--------|-------------|--------|
| | | | Medium Scale | | Large Scale | |
| | Total | % | Total | % | Total | % |
| Less than 8000 | 136 | 34.20% | 120 | 49.20% | 16 | 10.40% |
| 8001 to 10000 | 47 | 11.80% | 26 | 10.70% | 21 | 13.60% |

| | | | | | | |
|-------------------|-----|---------|-----|---------|-----|---------|
| 10001 to 15000 | 139 | 34.90% | 69 | 28.30% | 70 | 45.50% |
| 15000 to 20000 | 54 | 13.60% | 19 | 7.80% | 35 | 22.70% |
| more than 20000 | 22 | 5.50% | 10 | 4.10% | 12 | 7.80% |
| Base: All workers | 398 | 100.00% | 244 | 100.00% | 154 | 100.00% |

In particular medium scale industries, 120 (49.2%) workers had monthly wages less than 8000, 26 (10.7%) workers had monthly wages 8000 to 10000, 69(28.3%) workers had monthly wages 10000 to 15000, 19 (7.8%) workers had monthly wages 15000 to 20000 and remaining 10 (4.1%) workers had monthly wages more than 20000. In particular large scale industries, 16(10.4%) workers had monthly wages less than 8000, 21(13.6%) workers had monthly wages 8000 to 10000, 70(45.5%) workers had monthly wages 10000 to 15000, 35 (22.7%) workers had monthly wages 15000 to 20000 and remaining 12 (7.8%) workers had monthly wages more than 20000.

The table 1.2 explains that out of 398 workers, 6(1.5%) have Strongly Agreed whereas 140 (35.2%) have agreed and 15 (3.8%) have Strongly Disagreed whereas 61 (15.3%) have disagreed and the remaining 176 (44.2%) have neutral opinion (i.e. neither agreed nor disagreed). The average score given by workers is 3.15 with standard deviation 0.83. Out of 244 workers from medium scale industries, 3(1.2%) have Strongly Agreed whereas 80 (32.8%) have agreed and 1 (0.4%) have Strongly Disagreed whereas 23 (9.4%) have disagreed and the remaining 137 (56.1%) have neutral opinion (i.e. neither agreed nor disagreed).

Table 1.2 - My pay and perks are commensurate with my competence.

| Responses | Industry wise groups | | | | | |
|-------------------|----------------------|---------|--------------|---------|-------------|---------|
| | | | Medium scale | | Large scale | |
| | Total | % | Total | % | Total | % |
| Strongly Disagree | 15 | 3.80% | 1 | 0.40% | 14 | 9.10% |
| Disagree | 61 | 15.30% | 23 | 9.40% | 38 | 24.70% |
| Neutral | 176 | 44.20% | 137 | 56.10% | 39 | 25.30% |
| Agree | 140 | 35.20% | 80 | 32.80% | 60 | 39.00% |
| Strongly Agree | 6 | 1.50% | 3 | 1.20% | 3 | 1.90% |
| Base: All workers | 398 | 100.00% | 244 | 100.00% | 154 | 100.00% |
| Mean | 3.15 | | 3.25 | | 3 | |
| Std. Dev. | 0.83 | | 0.65 | | 1.04 | |

The average score given by workers from medium scale industries is 3.25 with standard deviation 0.65. Out of 154 workers from large scale industries, 3 (1.9%) have Strongly Agreed whereas 60 (39%) have agreed and 14 (9.1%) have Strongly Disagreed whereas 38 (24.7%) have disagreed and the remaining 39 (25.3%) have neutral opinion (i.e. neither agreed nor disagreed). The average score given by workers from large scale industries is 3 with standard deviation 1.04.

The following table – 1.3 explains that out of 398 workers, 74 (18.6%) have Strongly Agreed whereas 76 (19.1%) have agreed and 82 (20.6%) have Strongly Disagreed whereas 83 (20.9%) have disagreed and the remaining 83 (20.9%) have neutral opinion (i.e. neither agreed nor disagreed). The average score given by workers is 2.94 with standard deviation

1.4. Out of 244 workers from medium scale industries, 39 (16%) have Strongly Agreed whereas 60 (24.6%) have agreed and 29 (11.9%) have Strongly Disagreed whereas 50 (20.5%) have disagreed and the remaining 66 (27%) have neutral opinion (i.e. neither agreed nor disagreed). The average score given by workers from medium scale industries is 3.12 with standard deviation 1.25. Out of 154 workers from Large scale industries, 35 (22.7%) have Strongly Agreed whereas 16 (10.4%) have agreed and 53 (34.4%) have Strongly Disagreed whereas 33 (21.4%) have disagreed and the remaining 17 (11%) have neutral opinion (i.e. neither agreed nor disagreed). The average score given by workers from Large scale industries is 2.66 with standard deviation 1.58.

Table 1.3 – Overall Job Satisfaction

| Responses | Industry wise groups | | | | | |
|--------------------------|----------------------|---------|--------------|---------|-------------|---------|
| | | | Medium scale | | Large scale | |
| | Total | % | Total | % | Total | % |
| Not at All satisfied (1) | 82 | 20.60% | 29 | 11.90% | 53 | 34.40% |
| Not satisfied (2) | 83 | 20.90% | 50 | 20.50% | 33 | 21.40% |
| Neutral (3) | 83 | 20.90% | 66 | 27.00% | 17 | 11.00% |
| Satisfied (4) | 76 | 19.10% | 60 | 24.60% | 16 | 10.40% |
| Very satisfied (5) | 74 | 18.60% | 39 | 16.00% | 35 | 22.70% |
| Base: All workers | 398 | 100.00% | 244 | 100.00% | 154 | 100.00% |
| Mean | 2.94 | | 3.12 | | 2.66 | |
| Std. Dev. | 1.4 | | 1.25 | | 1.58 | |

The above section has discussed clearly the pay and perks related motivation and job satisfaction of sample under study. The following section is an attempt to give a brief conclusion of the topic under study.

1.5 CONCLUSION

The importance of job satisfaction has been widely accepted in the literature reviewed for this purpose. It is found that the job satisfaction of a worker is directly or indirectly connected with the organizational productivity and many problems related to human resource management. The present study has successfully attempted to attribute the pay and perks as the major concern for the job satisfaction and motivation level of the employees. The study clearly indicates the low job satisfaction level in the low income group whereas comparatively high job satisfaction level among those employees which receive more income than former one. However, a lack of high job satisfaction still can be felt but as far as the pay and perks are concerned, this play a major role in facilitating the job satisfaction among employees. Further, if the employees are satisfied from their job, it leads to more involvement in the work they are engaged into. Not only this, but also their need to be more motivation upon successful completion of any job with high involvement. The present study puts an implication to various corporate units to consider better pay and perks related aspect and to frame such a pay policy that may induce high job satisfaction as well as motivation to do more work among employees.

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ROLE OF TECHNOLOGY IN TAXATION SYSTEM IN INDIA

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ABSTRACT

There has been an increased use of technology by the tax authorities and taxpayers alike. Technology will have on the Indian tax environment and how Indian taxpayers can use it to simplify their tax procedures. Technology will play a significant role in bringing in more transparency in the Indian tax environment and will be a strong deterrent to unfair practices on the part of any stakeholder in the tax environment. It will also encourage voluntary compliance by making tax compliance and reporting an easy activity. While it is certain that the tax world will use technology to greater extent, the pace of its implementation as compared to changes in the tax policies and procedures need to be gauged so that the taxpayer as well as Tax Authorities are equipped with appropriate technology at the appropriate time.

KEY WORDS: TAX PAYER, TAX AUTHORITIES, TDS, TAX COMPLIANCE, ASSESSEMENTS

INTRODUCTION:

Technology will play a significant role in bringing in more transparency in the Indian tax environment and will be a strong deterrent to unfair practices on the part of any stakeholder in the tax environment.

It will also encourage voluntary compliance by making tax compliance and reporting an easy activity. While it is certain that the tax world will use technology to greater extent, the pace of its implementation as compared to changes in the tax policies and procedures.

Automation in the tax division started with TDS compliance, which was thrust pursuant to TDS process automation by the government. Things gradually changed thereafter, and tax departments started looking at off-the-shelf tax solutions to meet compliance requirements, especially around tracking and reporting.

While these solutions were useful in meeting some of their needs, over time the realization is setting in that customization is needed to meet specific compliance requirements, which is leading tax departments to opt for Robotic Process Automation (RPA) and for significant usage of BOTs.

Filing of tax returns, receiving queries from tax authorities and submitting responses have now moved towards the electronic mode of communication. The use of technology will further increase in the years to come, making almost the entire interaction through the electronic means. For instance, queries raised by the Tax Authorities and the submissions made during a scrutiny assessment (revenue audit) proceedings may soon be carried out online.

The pilot project on electronic scrutiny assessments launched by the government is a step in this regard

1.1 All Taxpayers – Gross Total Income (AY 2018-19)

| Range (in INR) | No. of Returns | Sum of Gross Total Income (In Crore INR) | Average Gross Total Income (In Lakh INR) |
|------------------------------------|--------------------|------------------------------------------|------------------------------------------|
| < 0 | - | - | - |
| = 0 | 10,60,699 | - | - |
| >0 and <=1,50,000 | 32,78,464 | 23,913 | 0.73 |
| >1,50,000 and <= 2,00,000 | 15,14,259 | 26,790 | 1.77 |
| >2,00,000 and <= 2,50,000 | 40,66,014 | 95,288 | 2.34 |
| >2,50,000 and <= 3,50,000 | 1,46,01,109 | 4,45,031 | 3.05 |
| >3,50,000 and <= 4,00,000 | 51,14,649 | 1,90,744 | 3.73 |
| >4,00,000 and <= 4,50,000 | 42,34,753 | 1,79,769 | 4.25 |
| >4,50,000 and <= 5,00,000 | 38,53,282 | 1,82,931 | 4.75 |
| >5,00,000 and <= 5,50,000 | 30,56,165 | 1,59,874 | 5.23 |
| >5,50,000 and <= 9,50,000 | 1,13,85,025 | 8,03,439 | 7.06 |
| >9,50,000 and <= 10,00,000 | 6,18,506 | 60,275 | 9.75 |
| >10,00,000 and <=15,00,000 | 31,07,334 | 3,71,710 | 11.96 |
| >15,00,000 and <= 20,00,000 | 10,48,557 | 1,80,129 | 17.18 |
| >20,00,000 and <= 25,00,000 | 5,39,765 | 1,20,097 | 22.25 |
| >25,00,000 and <= 50,00,000 | 8,08,991 | 2,73,501 | 33.81 |
| >50,00,000 and <= 1,00,00,000 | 2,59,026 | 1,77,374 | 68.48 |
| >1,00,00,000 and <=5,00,00,000 | 1,37,858 | 2,64,859 | 192.12 |
| >5,00,00,000 and <=10,00,00,000 | 14,128 | 98,072 | 694.17 |
| >10,00,00,000 and <=25,00,00,000 | 8,416 | 1,30,074 | 1,545.56 |
| >25,00,00,000 and <=50,00,00,000 | 3,032 | 1,05,669 | 3,485.14 |
| >50,00,00,000 and <=100,00,00,000 | 1,564 | 1,09,374 | 6,993.20 |
| >100,00,00,000 and <=500,00,00,000 | 1,498 | 3,04,119 | 20,301.70 |
| >500,00,00,000 | 364 | 8,30,050 | 2,28,035.75 |
| Total | 5,87,13,458 | 51,33,084 | |

Notes

1. Gross Total Income is the income before chapter VI-A deduction as computed in the "Computation of Total Income" schedule of return of income.
2. The "Sum of Gross Total Income" is the sum of Gross Total Income of all returns within the value range slab.
3. The "Average Gross Total Income" is the average Gross Total Income within the value range slab i.e. "Sum of Gross Total Income" divided by total number of returns within the value range slab.
4. Apart from the number of taxpayers who filed return of income as above, approximately 2.12 crore taxpayers paid taxes but did not file return for AY 2018-19.

The COVID-19 pandemic has not only changed the way we live but has also revolutionized the way we work - it is the catalyst for the tax function moving up the automation ladder. Due to remote working, it is imperative to have digital tax governance to help in workflow management, ease in assigning responsibilities, alerts and

notifications for tracking compliance, maker-checker concept to ensure data integrity, and tracking status on a real-time basis. The pandemic has indeed forced people to think and do things differently. Data-linkages between different arms of the government and the institutions in the financial system are enabling the Tax Authorities to capture better information about a taxpayer. In the times to come, we expect seamless assimilation of different aspects of taxpayer information such as bank accounts, incomes, expenses and investments through the key field of Permanent Account Number (PAN) and Aadhaar. This will result in particulars of a transaction and tax event becoming readily available to the Tax Authorities. A typical tax function in an organization spends a significant portion of time on data extraction, collation, analysis, reconciliation, validation, etc., followed by creating and maintaining reports and dashboards.

There is always the risk of errors creeping in when all these activities are done manually and it also involves a significant amount of time and effort. Today, there is several state-of-the-art technology solutions that can help tax functions automate repetitive and mundane processes, which eases the burden of the tax function and allows it to focus on value-added activities. Technology is helping the tax function achieve accuracy, speed, efficiency and transparency in tax processes, compliances, and reporting, and also acts as a game-changer in the transformation of the tax function.

It is interesting to note that technology is one area where, broadly speaking, tax administration is ahead of taxpayers. On the direct tax side, the automation journey started with TDS returns and graduated to tax returns, and we are now in the midst of faceless assessments and appeals.

The introduction of GST has elevated automation and technology to a higher level altogether on the indirect tax front.

The administration is making use of analytics majorly - (i) the Central Board of Direct Taxes (CBDT) launched Project Insight under which an integrated data warehousing and business intelligence platform is being rolled out, and it includes the Income Tax Transaction Analysis Centre (INTRAC); (ii) the Central Board of Indirect Taxes and Customs (CBIC) set up the Directorate General of Analytics and Risk Management (DGARM) in 2017 to further the automation foray.

Overall, the efforts of the tax administration have changed the tax compliance culture in India. It would be fair to say that today, technology, automation and analytics are the backbones of tax administration.

1.3 Contribution Of Direct Taxes To Total Tax Revenue

| Financial Year | Direct Taxes (Rs. crore) | Indirect Taxes (Rs. crore) | Total Taxes (Rs. crore) | Direct Tax As % Of Total Taxes |
|----------------|-----------------------------|-------------------------------|----------------------------|-----------------------------------|
| 2000-01 | 68,305 | 1,19,814 | 1,88,119 | 36.31% |
| 2001-02 | 69,198 | 1,17,318 | 1,86,516 | 37.10% |
| 2002-03 | 83,088 | 1,32,608 | 2,15,696 | 38.52% |
| 2003-04 | 1,05,088 | 1,48,608 | 2,53,696 | 41.42% |
| 2004-05 | 1,32,771 | 1,70,936 | 3,03,707 | 43.72% |
| 2005-06 | 1,65,216 | 1,99,348 | 3,64,564 | 45.32% |
| 2006-07 | 2,30,181 | 2,41,538 | 4,71,719 | 48.80% |
| 2007-08 | 3,14,330 | 2,79,031 | 5,93,361 | 52.97% |
| 2008-09 | 3,33,818 | 2,69,433 | 6,03,251 | 55.34% |
| 2009-10 | 3,78,063 | 2,43,939 | 6,22,002 | 60.78% |
| 2010-11 | 4,45,995 | 3,43,716 | 7,89,711 | 56.48% |
| 2011-12 | 4,93,987 | 3,90,953 | 8,84,940 | 55.82% |
| 2012-13 | 5,58,989 | 4,72,915 | 10,31,904 | 54.17% |
| 2013-14 | 6,38,596 | 4,95,347 | 11,33,943 | 56.32% |
| 2014-15 | 6,95,792 | 5,43,215 | 12,39,007 | 56.16% |
| 2015-16 | 7,41,945 | 7,11,885 | 14,54,180 | 51.03% |
| 2016-17 | 8,49,713 | 8,61,515 | 17,11,228 | 49.65% |
| 2017-18 | 10,02,037 | 9,15,256 | 19,18,210 | 52.24% |
| 2018-19* | 11,37,685 | 9,39,018 | 20,76,703 | 54.78% |

* Provisional

To sum up, automation and technology are changing the tax compliance landscape. Taxpayers have historically been reacting to changes brought about by tax administration but are now starting to have a more proactive approach around tax technology.

The COVID-19 pandemic has speeded up the transformation of tax compliance processes and highlighted the need for digital tax governance.

Although the present focus of automation and technology is on compliance in a big way, it is only a matter of time before technology and analytics support the tax function in making strategic decisions, which is eventually "the future of tax". In tomorrow's tax world, analytics would be a sine qua non; BOTs would be an integral part of the tax team, and artificial intelligence/machine learning and block chain, the new norm

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IMPLEMENTATION OF FEATURE EXTRACTION ON EDGE DETECTION ALGORITHM WITH ACO TO ANALYSE BOUNDARIES OF REAL IMAGE

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Abstract—Present research is focusing on edge detection in ant colony optimization and image processing. The role of edge detection in image processing is to highlight borders in the image using an edge detection mechanism. On other hand, the role of ACO is to find the optimum solution for a given problem. The proposed work is focusing on the integration of ACO with an edge detection mechanism. Edge detection, Ant colony optimization, and image processing has been considered in Existing researches. The issues in previous research have been elaborated in the problem statement. The need for edge detection in image processing has been defined with the requirement of ant colony optimization. The technical simulation for ACO for different cases such as ACO for traveling salesman problem, Binary Knapsack Problem, Quadratic Assignment problem has been made. Moreover, the edge detection mechanism during image processing is also implemented using the edge detection technique. Comparative analysis of normal and edge detected images has been made considering contrast, correlation, entropy, energy, variance, deviation, smoothness, skewness during feature extraction.

Keywords—Image processing, Feature extraction, contrast, correlation, entropy

Introduction

Digital Image

Image Proceeding is a method by which

unprocessed graphical samples captured via cameras or sensors are situated on satellites. Space probes and airplanes or graphics considered in a routine life for different applications have been enhanced. In previous years a lot of image processing methods were developed. Out of these methods most of them have been implemented in order to improve graphics captured from spacecraft. Such image could also be captured from the space probes and military overseeing flights. Such graphical analyzing mechanisms have become famous because of the presence of a strong personal computer. Moreover the large capacity memory devices and graphics software also make differences. Digital imaging systems include a lens and an image sensor. The lens forms an image on the image sensor plane. The image sensor contains an array of light-sensitive pixels, which produce a digital value indicative of the light photons accumulated on the pixel over the exposure time. The image captured by images by image sensors that are stored in system. The images are raster images with joint picture expert graphic or portable network file format. Different algorithms are applied on images. The edge detection would be applied on these images to eliminate useless portion and the CNN mechanism would be applied in order to train the network in order to perform prediction on the basis of trained dataset. Image processing techniques are frequently used to scale, resize, compare, and transforming graphical contents. The detection of face mask pattern from image set could be frequently made using Convolutional Neural

Network (CNN) model. But during CNN based classification, several issues are observed. There has been limited work to improve the performance of face mask detection during COVID-19. However there are many researches in the area of image processing but it is observed the time taken for prediction needs to be reduced. Moreover there is issue of space consumption by graphical content. Proposed research is supposed to minimize the prediction time and space consumption. Research has focused on study of existing image processing research and techniques and eliminating their limitation. Research proposes a methodology for face mask detection using edge-based convolution neural network algorithm. The elimination of useless content from graphical image before applying Convolutional Neural Network has reduced time consumption. Moreover it has also reduced the storage requirement for the graphical dataset. As the number of data set increases, every comparison makes a huge gap in size and comparison time. Proposed work is supposed to implement the proposed methodology using MATLAB. Comparison of proposed methodology and algorithm with the traditional algorithm is made during simulation.

Image Edge detection

An edge can be defined as a collection of connected pixels lying between boundaries of two regions. An edge is a collection of pixels that present at an orthogonal step transition in gray level. Edge detection is a process to identify points in an image where sharp changes in intensity occur. This process is required to understand the content of an image and has its applications in image analysis and machine vision. Edge detection targets to localize the boundaries of objects in an image and significantly reduces the amount of data to be processed. It is highly essential to recuperate information on the shape, structure, and other vital

characteristics of the image. The proposed approach exploits number of ants, which move on the image drive by the local variation of image intensity values, to set a pheromone matrix, which performs the edge pixel location of the image. Classical methods of edge detection involve convolving the image with an operator which is constructed to be sensitive to large gradients in the image while returning values of zero in uniform regions. There are large numbers of edge detection operators, each designed to be precise to certain types of edges. The calculation of the operator resolves a characteristic direction in which it is more précised to edges.



Fig. 1. Edge Detection

Operators can be reform to study for horizontal, vertical, or diagonal edges. An Edge is a local concept but the boundary is a global concept. An ideal edge is a group of pixels located at an orthogonal step transition in gray level. Blurry edges are also acquired by the factors like problems or imperfections happened at the time during of optics, sampling and image acquisition systems. The edge representation of an image minimises the amount of data that must be processed while preserving important information about the forms of objects in the picture. This picture explanation is simple to implement in a variety of object identification algorithms used in computer vision and other image processing applications. The capacity to extract the precise edge line with excellent orientation is a key feature of the edge detection method, and more literature on the subject

has been accessible in the last three decades. On the other hand, no standard performance directory for evaluating the performance of edge detection methods exists yet. The effectiveness of edge detection methods is always evaluated on a case-by-case basis, depending on the application. For picture segmentation, edge detection is a critical technique. The variations in grey tones in the picture help edge detection techniques, which convert original images into edge images. Edge detection is a technique used in image processing, particularly in computer vision, to locate significant changes in a grey level picture and to identify the physical and geometrical characteristics of scene objects. It is a basic technique that identifies and outlines an item as well as the boundaries between objects and the backdrop in an image. The most common method for identifying large discontinuities in intensity levels is edge detection. Local variations in picture intensity are referred to as edges. Edges are usually seen at the intersection of two areas. The major characteristics of a picture may be derived from the edges. For image analysis, edge detection is a crucial feature. Advanced computer vision algorithms make advantage of these characteristics. Object identification using edge detection is utilised in a variety of applications such as medical image processing, biometrics, and so on. Edge detection is a hot topic in study because it makes higher-level picture analysis easier. In the grey level, there are three kinds of discontinuities: point, line, and edges. All three kinds of discontinuities in a picture may be detected using spatial masks.

For picture segmentation, there are many edge detection methods in the literature. This section examines the most widely used discontinuity-based edge detection methods. Roberts edge detection, Sobel edge detection, Prewitt edge detection, Kirsh edge detection, Robinson edge detection, Marr-

Hildreth edge detection, LoG edge detection, and Canny edge detection are some of the methods available.

Ant colony optimization

The Ant colony optimization (ACO) is an algorithm influenced by the natural phenomenon that ants lay pheromone on the ground so that to indicate the same path that should be followed by other ants of the colony. It is an indirect communication in which the ants tried to contact with each other from the distance through reacting and producing with their stimuli. In this way they lay pheromone (a chemical like substance) on the ground while foraging for food. When other ants of the same colony cross through this path reacts in a particular way that made it easier for the whole colony in the searching process of food and saves time. The ideal edge detector leads to a set of connected curves that represent boundaries of objects, boundaries of markings, and discontinuities in surface orientation. Thus, applying an edge detection algorithm to an image may significantly reduce the amount of data to be processed and filter out information less relevant, while also preserve the important structural properties of an image. Search-based and zero-crossing based approaches are two major edge detection methods. Edge detection aims to localize the boundaries of objects in animate and is a basis for many image analysis and machine vision applications. Conventional approaches to edge detection are computationally expensive because each set of operations is conducted for each pixel. Unconventional approaches, the computation time quickly increases with the size of the image. Ant Colony optimizations algorithms for TSP: Travelling Salesman Problem (TSP) is the first instance of the problem definition where the first testing of the all ACO algorithms was being done. There are various reasons behind this: NP-hard optimization problem

plays very important role for various problems. In TSP the ACO algorithms can easily be used. A good performance improvement on the application on the TSP is taken as a proof for the performance improvement in all ACO algorithms. TSP implemented in ACO: The first ACO algorithm, Ant system, was introduced using the TSP as an example application. The AS acts as a source of inspiration for the development of several other ACO algorithms like Elitist AS, Rank based AS and Max-Min AS. The Ant Colony System (ACS) is the important algorithm amongst all. The three main points describes the difference between the ACS and AS.

- First, the ACS is to be considered as far better use than the AS does with the more aggressive action rule.
- Second, pheromone deposition and pheromone evaporation is taking place on the arcs that come out in the best-so-far tour.

Third, while each time an ant chooses an arc while moving from point i to point j is remove some pheromone from that arc so to enhance the exploration on the new path on the search space.

LITERATURE REVIEW

A literature survey or literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. It shows various analyses and research made in the respective field and the results already published. Various articles related to our topic appeared in various journals and websites from time to time. A brief review of some of the articles has been given below.

Meet Gandhi ,et al.[1] Preprocessing of Non-symmetrical Images for Edge Detection . Segmenting an image into many uses was a critical element of computer vision. Any segmentation

technique's primary goal was to cease the segmentation process as soon as it becomes pointless. When typical edge detection algorithms were applied on photos with an asymmetrical background, all of the background's edges are visible as well. So it was hard to tell what was going on in the photograph. They will apply preprocessing approaches in this paper to eliminate unnecessary noise and retrieve only the edges that was needed. MATLAB has been used to design and test all of the methods.

Xiao Song, et al.[2] Edge Stereo: An Effective Multi-task Learning Network for Stereo Matching and Edge Detection .End-to-end predictions of both the disparity map and the edge map were made possible by Edge Stereo, a powerful multi-task learning network that combines disparity estimation with edge detection. Edge-aware smoothness loss and edge feature embedding were proposed for inter-task interactions to properly utilize edge cues. Edge detection and stereo matching tasks benefit from one another when based on our unified model. A small module known as the residual pyramid was designed to replace the commonly used multi-stage cascaded structures or 3-D convolution based regularization modules in existing stereo matching networks. In addition towards the end of the article submission, Edge Stereo has achieved state-of-the-art performance on a number of stereo benchmarks, including the FlyingThings3D dataset, KITTI 2012 and KITTI 2015. Due to the integration of edge cues, Edge Stereo achieves similar generalization performance for disparity estimation.

Xin Xie, et al.[3] An improved industrial sub pixel edge detection algorithm based on coarse and precise location. Sub-pixel edge detection was improved in their paper by combining coarse and precise location. Considers all eight neighboring pixel information and retains the Roberts operator's advantages of high location accuracy and fast speed

in the algorithm. While there was going on, it's capable of successfully suppressing noise and getting improved detection results. With the Otsu's method, precise sub-pixel edge location may now be achieved without the Zernike moment method's low efficiency in threshold selection. The results of the experiments suggest that the proposed algorithm enhances detection efficiency and accuracy.

Maryam Gholizadeh-Ansari, et al. [4] Deep Learning for Low-Dose CT Denoising Using Perceptual Loss and Edge Detection Layer. In order to move picture data from the earliest layers to the later ones, they used residual learning by establishing shortcut connections. Untreatable edge detection, which extracts edges in all three planes, have been added to further enhance network performance. A combination of mean-square error and perceptual losses was shown to maintain numerous structural details in the CT image when optimizing the network. Per-pixel loss and grid-like distortions arising from perceptual loss was not a problem for their objective function. Studies show that adding a single node to the network reduces its complexity while still improving performance.

Roy AbiZeidDaou, et al. [5] Fractional Derivatives for Edge Detection: Application to Road Obstacles. In order to build smart cities, sensors and the Internet of Things (IoT) were essential technologies. It's been researched for a long time how to gather data, process it, and transmit it, but it's a difficult problem to solve in the present environment of huge data volumes, high mobility, and real-time processing. In [2], a variety of smart city concerns have been tackled. [3] Investigates and proposes a platform for safeguarding the delivery process of sensed data while also optimizing data delivery within constrained resources in highly dynamic topologies.

Junxiao Zhou, et al. [6] Optical edge detection

based on high-efficiency dielectric metasurface. Optical edge detection was a cutting-edge image processing technique for object detection as well as a valuable way to characterize boundaries. There was many challenges to overcome before optical edge detection with metamaterials can be realized experimentally, which was why the development of metamaterials and metasurfaces was increasing rapidly. A metasurface based on the Pancharatnam–Berry phase metasurface can be used to detect edges. To demonstrate broadband edge detection, they used dielectric metasurfaces with great optical efficiency that they built experimentally. In order to create the metasurfaces, an optically focused laser beam was focused on a glass substrate and scanned across the surface. Image processing, high-contrast microscopy, and real-time object detection on compact optical platforms, such as mobile phones and smart cameras, could all benefit from the suggested edge-detection mechanism.

Tengfeng Zhu, et al. [7] Generalized Spatial Differentiation from the Spin Hall Effect of Light and Its Application in Image Processing of Edge Detection. Mathematical operations provided by optics were powerful and easy to use. They show experimentally that the optical computing of spatial differentiation may be achieved by examining certain orthogonal polarization states of light during reflection or refraction at a single optical planar interface. Light reflection and refraction at each planar interface was accompanied by a spatially distinct variation in the spin Hall effect of light, regardless of material composition or incidence angle. In order to execute Victoria field calculation and perform edge detection for ultrafast image processing, the suggested spin-optical approach takes advantage of a basic and common structure.

Jianying Yuan, et al.[8] A Resolution-Free Parallel Algorithm for Image Edge Detection within the Framework of Enzymatic Numerical P

Systems. Edge detection using gradients and resolution-free parallel implementation was the focus of this paper's EDENP research. Enzymatic numerical P systems (ENPS) were used for the first time in our strategy to create a parallel computing algorithm for image processing. Based on a P-like cell structure with four membranes nested inside, the algorithm is proposed. The variables in the skin membrane govern the start and stop of the system. In the inner three membranes, the calculation of edge detection is done in parallel. The CUDA platform was used to test the algorithm's speed and efficiency. For EDENP, the key benefit was that it can theoretically reach $O(1)$ time complexity independent of image resolution.

Jayalakshmi Annamalai, et al.[9] An Optimized Computer Vision and Image Processing Algorithm for Unmarked Road Edge Detection. An effective approach to identify road edges has been described in their research. It was created by combining principles like HSV, thresholding, Canny edge detection, and RANSAC algorithm. The algorithm was first tested on a small set of data. Real-time video was employed for algorithm validation in the second iteration. Regardless of light conditions or vehicle speeds, the algorithm was able to correctly identify the road's edge. Calculating distance and width of road from centre line were also added to algorithm.

JUNGANG YIN, et al.[10] Edge Detection of High-Voltage Porcelain Insulators in Infrared Image Using Dual Parity Morphological Gradients. To accurately segment a porcelain insulator string in an infrared image prior to the identification and diagnosis of deteriorating insulators by the extracted thermal information, a new edge detection operator based on dual parity morphological gradients is presented. Using a combination of odd and even structural features on the double shed insulators, the suggested detector

successfully eliminates the blurred zone between the top and lower sheds and prevents over-segmentation. The algorithm minimizes the size of the maximal structural elements compared to the multistate morphological gradient algorithm. The new technique surpasses other conventional edge detectors in a quantitative evaluation utilizing PSNR, IoU, and FPR indexes. As a further demonstration of the detector's effectiveness, thousands of real infrared photos were used to test the detector's performance.

Yujing Chen, et al.[11] An image edge recognition approach based on multi-operator dynamic weight detection in virtual reality scenario. The simulation environment of virtual reality (VR) is a real-time and dynamic three-dimensional realistic image generated by a computer in real time. One of the study topics and hotspots in image detection, processing, and analysis was how to detect and extract picture edge and contour characteristics. Our proposed method was evaluated in terms of its continuity, smoothness, width, positioning accuracy, and overall system performance in comparison to the traditional method using the traditional algorithm as a foundation. They also present a VR-based system for image edge detection that incorporates our multi-operator dynamic weight method. The results show that their approach was an improvement and addition to the classic edge detection technique, which has some advantages in continuity and positioning accuracy and can quickly detect the VR picture edge, providing a theoretical framework for future study into VR image processing.

Ali Pashaei, et al.[12] Convolution neural network joint with mixture of extreme learning machines for feature extraction and classification of accident images. Deep learning was used to extract features from the accident photographs, and an expert was used to classify the images. In the

first step, the hidden feature was automatically extracted using the CNN's final max-pooling layer outputs. Extreme Learning Machine (ELM) variants, such as the basic ELM and the constraint ELM variants such as the OSELM and the kernel variants, was used for the second job. Its great precision and near-real-time processing time come from employing a gating network to integrate the best features of many ELMs. Traditional feature extraction and feature selection approaches were tested on two types of benchmarks—accident photographs' data set and some general data sets—to demonstrate the effectiveness of the various classifiers. The suggested approach was found to be 99.31% accurate in detecting accidents, recall, and F-measure. Furthermore, the accuracy rates for determining the severity of an accident and identifying the vehicles engaged in it are 90.27 percent and 92.73 percent. Unmanned Aerial Vehicles or other surveillance systems can use this technology to process accident photographs captured on-line.

Hui-huang Zhao, et al.[13] Multiple classifiers fusion and CNN feature extraction for handwritten digits recognition. When the performance of a single classifier trained using a typical learning method was varying on multiple datasets, it shows that the same technique may generate strong classifiers on some datasets but weak classifiers on other datasets. For example, it's likely that the same classifier performs differently when tested on different test sets, given the fact that picture instances can vary greatly in terms of how they're written by a variety of persons on the same digits because of their handwriting styles. Furthermore, in order to increase overall performance and stability on a variety of datasets, ensemble learning approaches have become essential. By applying feature selection to the initial feature set collected with the help of CNN, we present a framework for

the extraction of MINST dataset features and the algebraic fusion of multiple classifiers trained on separate feature sets. A classification accuracy of 98 percent has been demonstrated by the experiments using the classifiers fusion.

NedaAhmadi, et al. [14] Iris tissue recognition based on GLDM feature extraction and hybrid MLPNN-ICA classifier. People can be identified using iris tissue, which was an accurate and trustworthy method. Segmentation, normalization, feature extraction, and matching was the four key processing steps in their approach. New feature extraction and classification methods based on gray-level differences and a hybrid MLPNN-ICA classifier were presented in there paper. Datasets from the CASIA-Iris V3 and UCI machine learning repositories were used in our experiments.

ChiranjiLalChowdhary ,et al.[15] Segmentation and Feature Extraction in Medical Imaging: A Systematic Review. Medical imaging was a procedure or method used to examine the human body from the inside out. Medical diagnosis, sickness analysis, and the creation of picture data sets, both normal and aberrant, was all part of their process. Invisible-light medical imaging and visible-light medical imaging were two distinct types of medical imaging. Unlike the first sort of medical imaging, which requires a radiologist to understand, the second type may be understood by the average person. Segmentation and feature extraction are necessary for all of these. There was several medical imaging techniques available, however the authors only focus on tumors identification through mammography or MRI. Medical pictures utilized in preprocessing were subjected to a survey by the authors, who examined several segmentation and feature extraction approaches. Various segmentation and feature extraction techniques are surveyed in their work, which deals with preprocessing of medical pictures.

Sangwoo Lee, et al. [16] The exploration of feature extraction and machine learning for predicting bone density from simple spine X-ray images in a Korean population. For their study, they looked back at information from previous health exams, such as X-rays of the spine and dual energy X-ray absorptiometry (DXA). People with normal bone mineral density and those with abnormal bone mineral density were selected sequentially. Deep convolution networks were utilized to produce picture features from X-ray image regions of interest. A machine learning classification technique trained on image data was used to build prediction models for abnormal BMD. Each model's abilities were compared and contrasted. Results Only 170 pictures of aberrant (T scores 1.0 SD) or normal BMD (T scores ≥ 1.0 SD) were used for analysis from the 334 subjects. Using VGGnet to extract features and random forest classification based on the maximum balanced classification rate (BCR) provided the best AUC (0.74), accuracy (0.71), sensitivity (0.81), specificity (0.60), BCR (0.70), and F1-score (0.81). (0.73). Conclusion In their study, they used simple spine X-ray image characteristics derived by three deep learning techniques to investigate various machine learning algorithms for the prediction of BMD. Predicting high-risk populations with abnormal BMD was made easier because to the discovery of the optimal combination.

F. Orujov, et al.[17] Fuzzy based image edge detection algorithm for blood vessel detection in retinal images. They used Mandeni (Type-2) fuzzy rules to construct a contour detection-based image processing method for the detection of blood vessels in retinal fundus images. Green channel data from eye fund's pictures was used as input, and contrast-enhanced Adaptive Histogram Equalization (CLAHE) and a median filter are used

to remove background noise. It was possible to detect edges using the Mandeni (Type-2) fuzzy rules, which was applied to the gradient value of a picture. Results from trials with DRIVE, Structured Analysis of the Retina (STARE), and CHASE db datasets reveal that the suggested method is a versatile approach that can be applied to numerous edge detection/contour applications. Stable, DRIVE, and ChaseDB datasets all have an accuracy of 0.865. Aside from its superior dynamic and flexibility in linguistic threshold formulation compared to other methods, our method offers an interesting alternative to currently prevalent deep learning applications by allowing for Type 2 fuzzy rules to be used in the design of image processing systems with dynamic and flexible rule sets.

Pablo A. Flores-Vidal, et al.[18] A new edge detection method based on global evaluation using fuzzy clustering ."Segments" refer to the arcs formed when pixels are connected to form a solution to these issues. A more global evaluation inspired by real-life human vision was used to help us discover edges. Venkatesh and Rosin (Graph Models Image Process 57(2):146–160, 1995) laid the groundwork for many of the principles we present in their research. These segments have more human-like visual traits, allowing for more accurate comparisons. A fuzzy clustering technique was used to pick the important parts that should be kept. As a result, this paper concludes that the fuzzy clustering of segments have a better performance than typical edge detection algorithms.

R. Dhivya, et al. [19] Edge detection of satellite image using fuzzy logic. For hyper spectral satellite data, morphological/neural approaches and image fusion was used .Based on the special clustering of gravitational theory, a unique edge detection approach. Linear time invariant filters was one of the most conservative approaches. These filters function as a means of identifying the

edges of objects. An edge was recognized by these filters as a rapid change in the intensity of a grey scale pixel. These methods were well-known and efficient in terms of computation. A spatial differential filter based on local grade was proposed by a team led by Canny, Sobel, Robert, Kirsch, Prewitt, and LOG. These filters are more susceptible to noise since they process data in a shorter amount of time. There was no such limitations when using fuzzy techniques, which allows the edge thickness to be adjusted by modifying rules and output parameters. Fuzzy logic was used in their research to establish a new technique for edge identification in digital images that does not require the presence of a threshold value. Using a 3 x 3 binary matrix, their approach first divides the image into pieces. A planned pixel on the edge was separated by a variety of standards. The suggested method's outcomes was compared to those of the PSO and neural network approaches already in use. Using their method permanently improves the lines' smoothness and straightness, as well as their roundness, for both straight and curved lines. In addition, the curve was more defined.

SerafeimMoustakidis ,et al.[20] A novel feature extraction methodology using Siamese convolutional neural networks for intrusion detection. . However, despite the numerous studies on dimensionality reduction techniques, detecting attacks requires a vast number of carefully chosen features that was beyond the grasp of the average person's intuition. IDS data may be transformed into a single actionable and easy-to-understand risk signal to improve user trust and understanding without reducing accuracy, according to this article. As a result, a new feature extraction pipeline was developed, which included the following components: I a fuzzy allocation scheme for converting raw data into fuzzy class memberships (Vec2im); and (ii) an entirely new modality

transformation mechanism (Vec2im) for converting feature vectors into images (Vec2im). For example, a thorough comparison investigation of the suggested methodology's detection accuracy (86.64 percent testing accuracy using only one feature) on the NSL-KDD dataset revealed its efficiency over a number of well-known feature selection (FS) and extraction strategies. Feature extraction outputs could be used as indicators of malicious activity by security experts, while generated images could be used and/or integrated into existing IDS as a visual analytics tool.

Research Gaps

It is found that edge detection is a process to identifying points in a digital image at which the image brightness changes sharply. There are many problems occurring during edge detection phenomenon such as problem of clearly and sharply displaying an image arises. In the images there is a discontinuity occur in the image intensities, which makes the process of edge detection difficult. Also there is some noisy content occur in the images which overall makes the detection process even more difficult. There are lots of methods for finding the edges like the first derivative and second derivative; also gradients are used for the edge detection. Sometimes the problems of misleading and inaccurate edges comes due to various reasons, identification and localization of edges are also the problems to be faced and also the problem of more time taken to detect the edges. In my proposed work, Ant Colony Optimization technique improves the accuracy of edge detection and the final image contains a relatively complete edge profile. In practice, choosing a suitable method for image edge extraction is based on specific conditions. There is need to do work on feature extraction. Thus proposed work is considering contrast, correlation,entropy, energy,variance,

deviation,smoothness.

PROBLEM STATEMENT

Different edge detectors can produce edges in different forms of representation, while each detector can be accepted as a genuine edge detector there are problems of false edge detection, edge localization, high computational time, missing true edges and problems due to noise etc. Most of the edge detectors only produce points at the positions of edges of images. The results generally consist of a quantitative value for each pixel, and an orientation. In future the algorithm may be modified different angle and solve the illumination variations. Moreover there is need to do more work on feature extraction.

PROPOSED WORK

The Method and Steps has been defined and need to be implemented. The above given steps have been implemented sequentially so that we can understand the concepts already implemented, the tools which are used, the inbuilt functions of MATLAB which are available and we have used them in our algorithm for implementation. The edge detection technique has been implemented using MATLAB. MATLAB is a tool, used for numerical computation and visualization. The basic data element is matrix. An image is treated as a matrix in MATLAB. MATLAB is a friendly programming language and development environment. Proposed work has focused on simulation of contrast, correlation,entropy, energy,variance, deviation,smoothness,skewness.

RESULT AND DISCUSSION

The research simulated two cases. Results of comparative analysis of normal and edge detected image considering contrast, correlation,entropy, energy,variance, deviation,smoothness,skewness

has been as follow.

Simulation of Contrast

The dataset produced during the simulation of contrast has been shown in the following table

TABLE I. COMPARATIVE ANALYSIS OF CONTRAST

| Image | Normal | After edge detection |
|-------|--------|----------------------|
| 1 | 0.79 | 0.52 |
| 2 | 0.45 | 0.75 |
| 3 | 0.44 | 0.70 |
| 4 | 0.38 | 0.60 |
| 5 | 0.41 | 0.63 |
| 6 | 0.39 | 0.59 |
| 7 | 0.48 | 0.64 |
| 8 | 0.36 | 0.53 |

After simulation of above data graph shown in fig 11 is produced representing contrast.

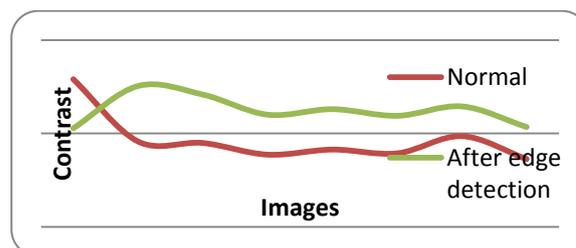


Fig. 2. Comparative analysis of Contrast

Simulation of Correlation

The dataset produced during simulation of correlation has been shown below:

TABLE II. COMPARATIVE ANALYSIS OF CORRELATION

| Image | Normal | After edge detection |
|-------|--------|----------------------|
| 1 | 0 | 0.17 |
| 2 | 0.09 | 0.07 |
| 3 | 0.12 | 0.09 |
| 4 | 0.09 | 0.16 |
| 5 | 0.08 | 0.17 |
| 6 | 0.15 | 0.08 |

| | | |
|---|------|------|
| 7 | 0.09 | 0.16 |
| 8 | 0.07 | 0.15 |

After simulation of above data graph shown in following is produced representing correlation.

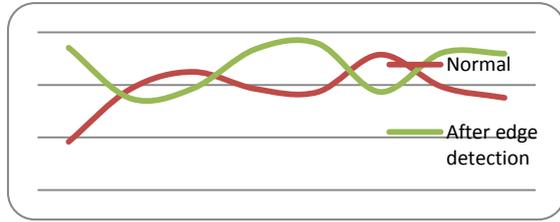


Fig. 3. Comparative analysis of Correlation

Simulation of Entropy

The dataset produced during simulation of Entropy has been shown below:

TABLE III. COMPARATIVE ANALYSIS OF ENTROPY

| Images | Normal | After edge detection |
|--------|--------|----------------------|
| 1 | 0.07 | 2.56 |
| 2 | 1.74 | 2.25 |
| 3 | 1.59 | 1.98 |
| 4 | 2.37 | 2.72 |
| 5 | 2.43 | 2.78 |
| 6 | 2.16 | 2.62 |
| 7 | 1.65 | 2.32 |
| 8 | 2.25 | 2.57 |

After simulation of above data graph shown in fig 13 is produced representing Entropy.

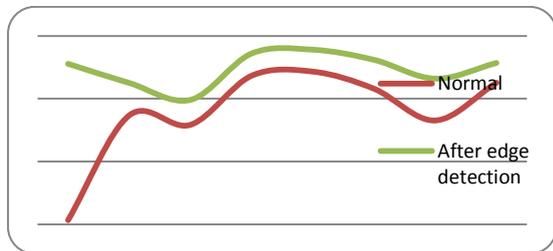


Fig. 4. Comparative analysis of Entropy

Simulation of Energy

The following is an example of the data that was generated during the Energy simulation:

TABLE IV. COMPARATIVE ANALYSIS OF ENERGY

| Images | Normal | After edge detection |
|--------|--------|----------------------|
| 1 | 0.97 | 0.72 |
| 2 | 0.86 | 0.79 |
| 3 | 0.86 | 0.76 |
| 4 | 0.84 | 0.73 |
| 5 | 0.83 | 0.70 |
| 6 | 0.83 | 0.69 |
| 7 | 0.89 | 0.75 |
| 8 | 0.81 | 0.68 |

The energy graph in fig. 14 is the result of simulating the data provided above.

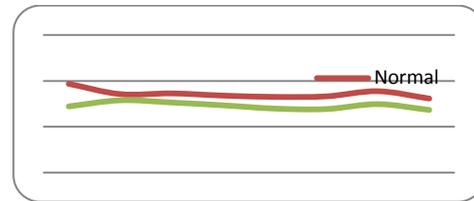


Fig. 5. Comparative analysis of Energy

Simulation of Variance

It has been illustrated below the three scenarios in which Variance was simulated.

TABLE V. COMPARATIVE ANALYSIS OF VARIANCE

| Images | Normal | After edge detection |
|--------|--------|----------------------|
| 1 | 0.0081 | 0.0138 |
| 2 | 0.0081 | 0.0138 |
| 3 | 0.0081 | 0.0139 |
| 4 | 0.0081 | 0.0138 |
| 5 | 0.0081 | 0.0139 |
| 6 | 0.0081 | 0.0139 |
| 7 | 0.0081 | 0.0139 |
| 8 | 0.0080 | 0.0139 |

Variance is shown in the graph displayed in fig 15 after performing a simulation of the aforementioned data.



Fig. 6. Comparative analysis of Variance

Simulation of Standard Deviation

Standard Deviation was simulated using this dataset, which is displayed below:

TABLE VI. COMPARATIVE ANALYSIS OF STANDARD DEVIATION

| Image | Normal | After edge detection |
|-------|--------|----------------------|
| 1 | 0.089 | 0.118 |
| 2 | 0.090 | 0.118 |
| 3 | 0.090 | 0.118 |
| 4 | 0.090 | 0.117 |
| 5 | 0.090 | 0.117 |
| 6 | 0.090 | 0.118 |
| 7 | 0.090 | 0.117 |
| 8 | 0.090 | 0.118 |

Figure 16 depicts the Standard Deviation as a result of simulating the previously mentioned data.



Fig. 7. Comparative analysis of Standard Deviation

Simulation of Smoothness

The dataset obtained during simulation of Smoothness has been displayed below:

TABLE VII. COMPARATIVE ANALYSIS OF SMOOTHNESS

| Image | Normal | After edge detection |
|-------|--------|----------------------|
|-------|--------|----------------------|

| | | |
|---|------|------|
| 1 | 0.97 | 0.91 |
| 2 | 0.93 | 0.91 |
| 3 | 0.95 | 0.87 |
| 4 | 0.94 | 0.93 |
| 5 | 0.96 | 0.93 |
| 6 | 0.94 | 0.92 |
| 7 | 0.95 | 0.93 |
| 8 | 0.94 | 0.91 |

The smoothness graph displayed in fig. 17 is the result of simulating the aforementioned data.

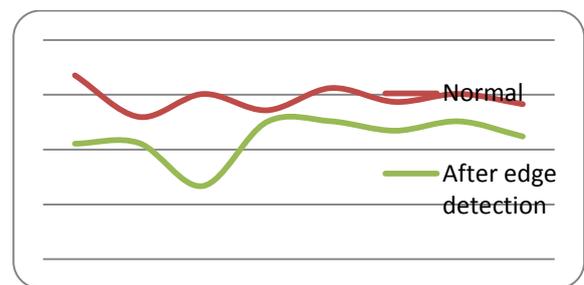


Fig. 8. Comparative analysis of Smoothness

Simulation of Skewness

Following is an example of the dataset generated during the Skewness simulation:

TABLE VIII. COMPARATIVE ANALYSIS OF SKEWNESS

| Image | Normal | After edge detection |
|-------|--------|----------------------|
| 1 | 11.00 | 0.95 |
| 2 | 4.02 | 2.00 |
| 3 | 3.37 | 1.47 |
| 4 | 2.44 | 1.26 |
| 5 | 2.76 | 1.90 |
| 6 | 2.99 | 1.06 |
| 7 | 3.58 | 1.74 |
| 8 | 1.84 | 0.89 |

The skewness graph seen in fig. 18 is the result of simulating the aforementioned data.



Fig. 9. Comparative analysis of Skewness

CONCLUSION

The current study focuses on image processing edge detection and ant colony optimization. Simulation results are presenting comparison of different features such as energy, entropy, contrast, correlation etc for normal images along with images after edge detection. The purpose of edge detection in image processing is to emphasize the picture's boundary via a technique called edge detection. The role of Ant colony optimization, on the other hand, is to discover the best solution for a given issue. The suggested research focuses on combining ACO with an edge detection method. Image processing, edge detection and Ant colony optimization research has all been taken into account. In the problem statement, the problems raised in earlier study have been expanded. The need for ant colony optimization has highlighted the need for edge detection in image processing. ACO has undergone technological simulation for a variety of situations, including ACO for the Binary Knapsack Problem, Quadratic Assignment Problem, and Traveling Salesman Problem. Furthermore, a canny-based edge detection method is used to create an edge detection mechanism during image processing and feature extraction during edge detection has been simulated.

SCOPE OF THE RESEARCH

The proposed algorithm obtains a relatively complete edge profile as compared to the traditional methods but also leaves some of the true edges as dim which should have been highlighted

otherwise. So, the future scope will be to study the reasons for this in detail and improve this Ant Colony Optimization method, so that it combines the advantages of all of these methods without affecting the highlighting of true edges.

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Simulation for Adaptive Noise Cancellation on 100 Hz signal

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Abstract:-The main goal of this paper is to present a simulation scheme to simulate an adaptive filter using LMS (Least mean square) adaptive algorithm for noise cancellation. The noise corrupted speech signal and the reference signal are used as inputs for LMS adaptive algorithm. The filtered signal is compared to the original noise-free speech signal. The result shows that the noise signal is successfully cancelled by the developed adaptive filter algorithm. Here we estimate the adaptive filter using MATLAB environment.

Keywords: Least Mean Square (LMS) algorithm, Noise cancellation, Adaptive filter, MATLAB.

INTRODUCTION

Noise is a nuisance or disturbance during communication and it is unwanted. Noise occurs because of many factors such as interference and they are random in nature. Interfered noise masks the speech signal and reduces its intelligibility. Removal of this noise [1], so as to obtain the original signal, is one of the biggest challenges now-a-days. So in this paper we are trying to eliminate noise from speech signals or technically cancel the noise signal in a speech in order to enhance the quality of the speech signal [2].

As the noise from the surrounding environment reduces the quality of speech and audio signals, it is quite necessary to suppress noise and enhance speech and audio signal quality, hence the acoustic applications of noise cancellation have become the thrust area of research.

The traditional approach for Noise cancellation uses Passive technique i.e. the use of physical objects which is installed in the system to isolate the background noise from the surroundings such as using earplugs, sound insulation walls or silencers [3]. Passive Noise Cancellation (PNC) techniques require relatively large, bulky and costly materials, and also are ineffective at low frequencies [3].

Therefore, the Active Noise Control (ANC) was proposed in the early 20th century, which has gained intensive development in the last two decades to reduce low- frequency noise [5]. The Active approach uses the ANC system to cancel the unwanted noise which is based on the principle of superposition [4]. Specifically, an anti-noise of equal amplitude but of opposite phase is generated and is actively combined with the primary noise, which leads us in achieving the cancellation of noise [6].

The basic diagram to explain the process is shown below in Figure 1:

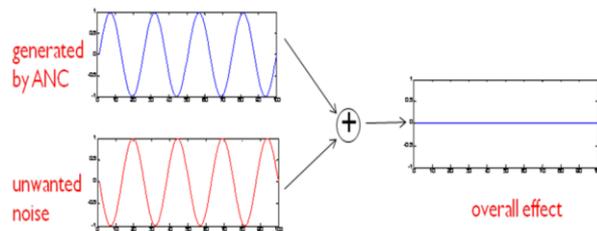


Figure 1: Signal cancellation at 180° out of phase

ANC's has greater advantages over PNC in terms of the capability to attenuate the low frequencies noise due to the presence of fixed control systems. ANC's had been used in the microcontroller and achieved the cancellation of 20dB to 25dB of the 60Hz periodic noise component in the electronics signal measurement [7]. However, the implementation of ANC is complicated although it has high reliability in cancelling noise [3].

FILTERS

Signals are carriers of information, both useful and unwanted. Signal processing is an operation designed for extracting, enhancing, storing, and transmitting useful information. The known technique used to estimate the signals distorted by noise is to pass it through the system or a filter that have a tendency to overturn the noise while leaving the signals unchanged. Filters used for filtering can be Adaptive or Non-Adaptive.

The design of Non-Adaptive filters requires a priori knowledge of both the signal and noise i.e., if the signal and noise are known beforehand; a filter can be designed that allows the frequencies contained in a signal through it and rejects the frequency bands occupied by the noise.

But, on the other hand, Adaptive filters [8,9] have the ability to adjust their impulse response to filter out the correlated signal at the input. They require no prior knowledge of the signal and noise characteristics. Moreover, Adaptive filters have the capability of adaptively tracking the signals under non-stationary conditions. In the most of practical applications, Adaptive filters are used and are preferred over fixed digital filters because adaptive filters have the property and ability to adjust their own parameters automatically [8,9]. Adaptive filters play an important role in modern digital signal processing (DSP) in areas such as Telephone echo cancellation, Noise cancellation, Equalization of communications channels, Biomedical signal enhancement, Active noise control (ANC), and Adaptive control systems. The usage of Adaptive filters is one of the most popular proposed solutions to reduce the signal distortion caused by the unwanted environmental noise. Adaptive filters have been used in a broad range of applications for nearly five decades [8]. The Adaptive filter uses feedback in the form of an error signal to refine its transfer to match the changing parameters. In this paper we have used adaptive filter for noise cancellation. The general configuration for an Adaptive filter system is shown in Fig.2 and is discussed in next section.

ADAPTIVE NOISE CANCELLATION

Fig. 2 displays the Adaptive noise cancellation setup. In this, the corrupted signal passes through a filter that tends to terminate the noise while leaving the signal unchanged. This process is an adaptive process, which means it do not require a prior knowledge of a signal or noise characteristics.

It contains 4 signals – The primary Input signal $d(n)$, which represents the desired signal corrupted with an undesired noise, Reference signal $x(n)$, which is processed by an adaptive filter. Filter output signal $y(n)$ and Error signal $e(n)$. The goal of adaptive filtering systems is to reduce the noise portion and to obtain the clean desired signal $d(n)$.

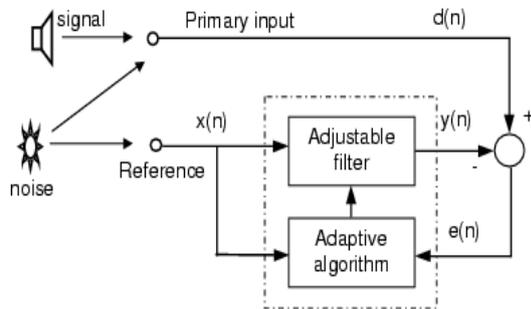


Fig 2: Adaptive Noise Cancellation [9]

In order to achieve this, The primary input receives a signal $s(n)$ from the signal source that is corrupted by the presence of noise $n(n)$ uncorrelated with the signal i.e.,

$$d(n) = s(n) + n(n)$$

The reference input receives a noise n_0 uncorrelated with the signal but correlated in some way with the noise $n(n)$. The noise n_0 passes through a filter to produce an output $y(n)$ that is as close a replica as possible of primary input noise i.e.,

$$y(n) = n(n)$$

This noise estimate is subtracted from the corrupted signal $d(n)$ to produce an estimate of the signal at $d(n)$, the ANC system output,

$$d(n) = s(n) + n(n) - y(n) = s(n)$$

which approximately gives us the clean or denoised speech signal $s(n)$.

The technique adaptively adjusts a set of filter coefficients so as to remove the noise from the noisy signal. With the use of proper adaptive algorithm, the filter readjusts itself continuously to minimize the error signal $e(n)$ during this process.

Main purpose of using adaptive noise canceller here is to produce a system output that is a best fit in the least squares sense to the signal $s(n)$. This objective is accomplished by feeding the system output back to the adaptive filter and adjusting the filter through an LMS adaptive algorithm to minimize total system output power. In other words the system output serves as the error signal for the adaptive process. Minimizing the total power at the output of the canceller, maximizes the output signal- to-noise ratio[10].

LEAST-MEAN-SQUARE ALGORITHM (LMS):

There are several algorithms that can be utilized in noise cancellation and can be implemented using MATLAB software. An adaptive algorithm is an algorithm that alters its features at the execution time depending on availability of information. The famous algorithm for the adaptive systems which works as self-adjusting algorithm is LMS algorithm i.e., Least Mean Square algorithm. The LMS algorithm [11,14] is a very straightforward approach in noise cancelling and was introduced by Widrow and Hoff in 1959. The LMS algorithm is one of the simplest and most widely used algorithms for adaptive filtering. The LMS algorithm is based on the stochastic gradient descent method to find a coefficient vector which minimizes a cost function [12]. LMS algorithm adapts the filter coefficients until the difference between the desired and the actual signal is minimized [13].

The LMS adaptive filter algorithm that has been developed is shown in Figure 3 below.

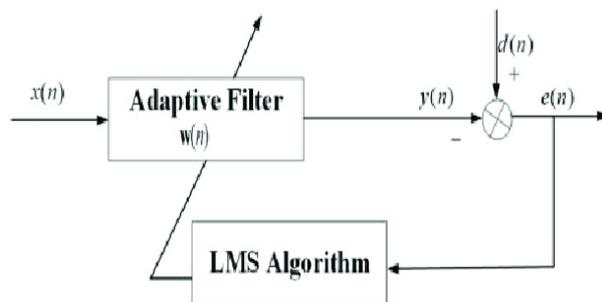


Fig 3: LMS adaptive filter algorithm

The parameters $d(n)$ and $x(n)$ are the inputs of the algorithm in the form of column vector. In this $d(n)$ is the noise corrupted signal and $x(n)$ is the reference noise signal. This algorithm uses a gradient descent to estimate a time-varying signal. The gradient descent method finds a minimum, if exists, by adjusting the filter coefficients in order to minimize the error [15]. The LMS algorithm has been accepted by many researchers because of its simplicity, low computational complexity and a fast convergence rate.

The parameter $W(n)$ is the Column Weight Vector of the filter at n^{th} time, which is used in the algorithm to update the subsequent column weight vector [15].

The error signal $e(n)$ at n^{th} time is defined as the difference between the noise corrupted signal and the weighted-noise signal as shown the equation below,

$$e(n) = d(n) - y(n)$$

With each iteration of the LMS algorithm, the filter tap weights of the adaptive filter are updated according to the following expression:

$$w(n+1) = w(n) + 2\mu e(n)x(n) \quad (10)$$

where, $x(n)$ is the input vector of time delayed input values, $w(n)$ represents the coefficients of the adaptive tap weight vector at time n , $w(n + 1)$ is the filter coefficient for the next iteration, $e(n)$ is the error value and μ is known as the step size which is introduced here to control the step width of the iteration and hence the stability and convergence or divergence rate of the algorithm [11].

One of the most important part in the design and implementation of the LMS adaptive filter is the selection of the step-size μ . This parameter must lie in a specific range, so that the LMS algorithm executes properly i.e.,

$$0 < \mu < 2/\lambda_{max}$$

If the value of μ is too small, the rate of convergence is too slow and if μ is too large the adaptive filter becomes unstable and its output diverges[14].

EXPERIMENTAL RESULTS

The adaptive noise cancellation using the LMS adaptive filtering algorithm was implemented in MATLAB as described. In this section we study the performance of the LMS algorithm as noise canceller.

Figure 4 depicts the results obtained by applying the LMS algorithm for adaptive noise cancellation. The desired signal, the signal corrupted with noise and the estimate of the desired signal along with the error signal is generated by the adaptive noise cancellation with a step-size of $\mu = 0.002$ and order filter = 25. The noise present in the sinusoidal signal is eliminated by using the LMS algorithm.

The convergence behaviour of the LMS algorithm depends on the step-size parameter μ .

For a step-size of $\mu = 0.002$, the algorithm requires more than 100 iterations to converge to its steady-state.

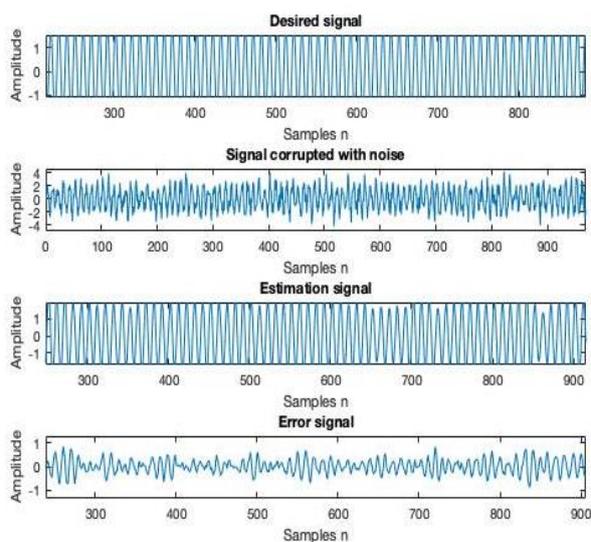


Figure 4: Results on implementation of LMS algorithm

Analysing the above results, we can say that the LMS algorithm shows very good performance in noise

cancellation.

CONCLUSION

Adaptive Noise Cancellation is an alternative way of cancelling noise present in a distorted signal. The principal advantage of this method are its adaptive capability, its low output noise, and its low signal distortion. The adaptive capability allows the processing of inputs whose properties are unknown. Output noise and signal distortion are generally lower, which makes the estimation signal much clean.

The main purpose of this paper is to simulate an adaptive filter using LMS algorithm, which shows good execution results in adaptive noise cancellation. The LMS algorithm is implemented and analysed and the results is being discussed in the previous section. LMS algorithm are shown to produce good results with low computational complexity and a faster convergence rate.

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Historical Development of Solar Cells (Traditional to Nanowires Based)

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ABSTRACT

Efficiency is one the biggest challenge with photovoltaic solar devices. Absorption, reflection, conversion and heat generation are major factors that need to be optimized to improve the efficiency of solar devices. Traditional solar devices can absorb 48 percent of solar energy out of which only half is get converted into electric current. Most of the solar cells that are in use are made up of thin crystal of silicon. Nanostructured silicon solar cells could be a game changer in the field of solar cells as nanowires and Nano cones can absorb 90 percent of energy when incident at certain angles. Coated carbon nanotubes can absorb almost 99 percent of the ultraviolet, visible, infrared and far-infrared light that strikes it. Different technologies used for developing solar cells on the basis of material used or technological development termed as crystalline silicon solar cells, thin films of Amorphous silicon solar cells, Copper indium gallium selenide, Cadmium telluride solar cells, dye sensitized solar cell and nanowires solar cells.

Keywords: Nanowires Solar Cells, Light Absorption, Charge Transport, Extremely Thin Absorber.

1 HISTORY OF SOLAR CELLS

Solar cells were first demonstrated experimentally by Edmond Becquerel in 1839. Silver chloride when placed in an acidic solution and connected to platinum electrodes produced voltage while illuminated. Charles Fritts produced the first solid-state solar cell in 1883 consisting of selenium coated with a thin layer of gold and achieved the photovoltaic efficiency

of 1%. The first practical solar cell was publicly demonstrated in 1954 at Bell Laboratories. The major turnaround took place in the field of solar cells in 1960 with the invention of integrated circuits when lost silicon crystals being produced at lower costs. For the next few decades, solar panels have steadily decreased in cost per watt and increased in power conversion efficiency. The development of solar cells are categorized into different technologies from the crystalline semiconductor solar cells (Si, GaAs, and multi-junction variants) to second generation thin-film solar cells to third generation solar cells (dye-sensitized, perovskite, organic and quantum-dot solar cells).

2 DEVELOPMENTS OF SOLAR CELLS**2.1 First Generation: Crystalline Silicon**

These are made from crystalline silicon (c-Si) with an efficiency of 25.6% for single-junction and 40% for multi-junction solar cells. But these were expensive due to the high-temperature processing require and difficulty with synthesizing pure crystalline silicon. These solar cells also require large thickness due to the low absorption coefficient of silicon.

2.2 Second Generation: Thin-film, Amorphous Silicon and Polycrystalline Silicon

Thin-film solar cells have a thickness ranging from the order of 10nm to 10 μ m made from either cadmium telluride, copper indium gallium di-selenide (CIGS) or amorphous silicon. While being cheaper but less efficient than crystalline silicon, thin film solar cells made from CdTe or CIGS have now reached 20% power conversion efficiency. Amorphous silicon (a-Si) solar cells are the third most common type of thin-film solar cells.

Amorphous silicon requires a low processing temperature compared to c-Si. Amorphous-Si is good for diffuse or weak sunlight suitable for cloudy weather. Poly-Si solar cells are made from a polycrystalline form of silicon produced using the Siemens process. This is easier to produce than single crystal boules of silicon. However, the grain-boundaries induce recombination.

2.3 Third generation: Organic Solar Cells

An alternative to using silicon or other crystalline semiconductors is to make solar cells out of semiconducting organic materials. These are cheaper to produce and require less material but degrade easily due to environmental conditions. The highest efficiency of 10% is achieved with these solar cells. Using more than one layer of organic material, efficiency can be increased.

Examples of such solar cells are bilayer organic solar cells, bulk heterojunction solar cells, hybrid organic/inorganic solar cells, dye- sensitized solar cells, solid state sensitized and extremely thin absorber solar cells.

2.4 Nanowire Solar Cells

Nanoscale columnar structures i.e. nanowires are used in the solar cells synthesized using two methods: chemical vapour deposition and patterned chemical etching. Nanowires have better anti-reflection and light trapping properties since the change in effective refractive index between the nanowire layer and the continuous layer is less abrupt than it would be in a planar interface. For example, InP nanowire solar cells can deliver 83% of the photocurrent even though nanowires covered only 12% of the surface.

If the nanowires and the hole conducting medium are not sensitive to light, they can be sensitized by coating with a thin light absorbing layer in the form of nanoparticles. For example, nanowires made from ZnO can be sensitized to light by coating with CdSe or PbS. Furthermore, by distributing the thin coating over the surface of the nanowires the optical path length is enhanced, without compromising the charge transport.

2.4.1 Development of Dye Sensitized (DSSC) and Extremely Thin Absorber (ETA) Solar Cells

The high surface area of DSSCs allows a thin dye to be used for absorbing a significant amount of light but suffers poor stability due to reactions between the electrolyte and electron transporter and degradation of the dye. These problems could be solved by replacing liquid electrolyte with a solid state hole-conductor and the dye with an inorganic semiconductor. The first solid-state dye-sensitized solar cell was created by replacing electrolyte with CuI in 1995 followed by another ssDSSC using CuSCN as the electrolyte replacement in 1998. Further improvements in solar cells leads to full solid state ETA solar cells explained in next section.

2.4.1.1 Porous TiO₂ Cells

TiO₂ is often used in DSSCs and ETA cells for the electron conductor, being n-type due to oxygen vacancies. It is usually sensitized with dye molecules or inorganic semiconductors which can absorb light. The TiO₂, consisting of nanoparticles sintered together, is porous which increases the surface area for light scattering and hence for absorption.

TiO₂ was sensitized to incident light by coating with quantum sized CdS (inorganic absorber) rather than organic dye. Due to large band gap, it leads to be transparent for most of solar spectrum and gives an efficiency of 33%.

First complete solid-state ETA cell was created in 1998. This consisted of a 6µm thick porous TiO₂ film coated with a 23nm Se thin film formed by electrodeposition and annealing. This was then filled in with 10µm of CuSCN from an acetonitrile solution. This cell has a low efficiency of 0.13% due to the high surface recombination.

2.4.1.2 ZnONanorods Cells

ZnO nanorods have been synthesized for usage in solar cells in addition to TiO₂. The advantage is the direct path to contact, increase in optical path length and the ease at which the nanorods can be coated as compared to porous TiO₂. Also, ZnO has a higher electron mobility compared to TiO₂.

ZnO nanorods had amorphous-Si deposited on them using chemical vapour deposition resulting in a uniform and conformal coating. ZnO nanorods with a CuSCN hole-conductor have been sensitized with CdTe, an annealed CdSe resulting in an efficiency of 2.3%.

ZnO nanorods have had quantum-dots deposited on them, ranging from CdTe, CdS, CuInS₂ and CdSe. These cells used a liquid electrolyte, so in that sense they are not proper ETA cells as they are not fully solid-state. In the case of the CuInS₂ and CdSe, QDs were grown before deposition. This resulted in less than a monolayer on the surface, and the lower surface area of nanorods compared to porous TiO₂ meant that they could not absorb much light.

2.1.4.3 Perovskite Sensitized ETA cells

Due to direct bandgap, large absorption coefficient and high carrier mobility of perovskites, these structures recently showed considerable promise in solar cell community. Efficiency of solar cells using perovskite as the absorber is more than 3.8%. ETA cells using a mesoporous TiO₂ or alumina scaffold and a perovskite absorber has increased efficiency from 8% to 10.9% when replacing the TiO₂ with Al₂O₃. The perovskite acts as both absorber and electron conductor while Al₂O₃ is optically and electrically inert. Lead iodide perovskite sensitized solar cells have efficiency greater than 9%.

3 CONCLUSIONS

To bring the clean power to large fraction of world's population, solar cells must become less expensive and use fewer resources. Current technologies used in the development of nanowires based solar cells based on their geometry i.e. planar and radial requires future study in order to improve the efficiency of the devices. Despite the tremendous promises made by the nanotechnology in the field of solar cells, some challenges must be addressed before benefits must be realized commercially. These challenges include surface and interface recombination, surface roughness, mechanical and chemical stability, fine morphology, doping control and nanowire array uniformity etc. Even if nanowires based solar cells able to realize efficiencies close to planar devices at much lower costs, practical issues such as rapid scaling, integration into modules and device packaging have not been yet addressed properly.

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A Comparative Analysis of Different Modelling Software to Determine the Best 3D Modelling Technique

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Abstract

With the present competitive software industry and technological advances, it is vital to examine and select the greatest accessible 3D modelling program. Advanced modelling is particularly advantageous in industries where it is not yet obvious, since it supports existing design concepts. This research served as a survey for structural engineers. The literature review will help identify the optimal balance between research and architecture. The objectives of this research were examined by employing a questionnaire technique to obtain information regarding the utilization of 3D software in the construction business. Secondary data from books, published journals, magazines, newspapers, articles, and the internet were also collected and analyzed. The software packages were compared on the basis of their functional strengths, and the structure types such as buildings and bridges, number of storeys, 3D or 2D rendering capability, analysis, design, detailing, quantities, wind analysis and seismic analysis, among others. The results reveal that ETABS is used to design and assess high-rise building systems. It can undertake nonlinear analysis on structures, allowing users to design for and evaluate the stability of structures. It also offers composite beam floor design and automated floor meshing. Users can input designs, loads, and relocation information into SAFE for a more advanced local assessment of slab structures inside larger buildings thanks to SAP 2000 and ETABS connectivity.

Keywords: 3D Modelling, Structural Software, Comparative Analysis

1. Introduction

In Civil Engineering, software for architectural design focuses on both the inside and outside of a structure, as well as the general plan. Structural software applications aid in the analysis, design, and, in certain situations, detailing of structural components, whereas project management software programs enable the planning, organization, and control of resource tools, as well as the production of resource estimations.

Several software tools are easily accessible to swiftly examine and design large-scale projects. The majority of structural engineers utilize three-dimensional analysis and design tools because of the simplicity of use and graphical user interface that they offer over two-dimensional technology. These technologies considerably increase the design of modelling, analyzing, and building structures. The bulk of these software packages execute a variety of activities that are combined, such as modeling building structures built of varied materials, structural element analysis, geometrical fault diagnosis, and report output and graphical files.

With the present competitive software industry and technological advances, it is vital to examine and select the greatest accessible 3D modelling program. This research strives to satisfy this desire. Additionally, this research will serve as a survey for structural engineers. Advanced modelling is particularly advantageous in industries where it is not yet obvious, since it supports existing design concepts. Additionally, this review will guide readers in identifying the optimal balance between research and architecture.

2. Literature Review

2.1 3D Modelling

3D modelling is the method of creating a mathematical representation of a (3D)three-dimensional object or shape[9]. Software is utilized to achieve this. A wide range of sectors are now making substantial use of 3D models. All of these sectors, including video games, motion pictures, architecture, product development, construction, and medical, rely on 3D models for visualizing, modeling, and making graphic designing. 3D modelling in architecture is rapidly gaining traction due to the numerous advantages it provides.

Schools have adopted technology that enables 3D modelling and interaction with the models, which aids to a better understanding of classroom teaching and learning. Many individuals feel that the use of ICT in higher education will help students learn more successfully, especially in course-based group learning and collaborative learning.

There is little question that virtual reality (VR) represents a huge revolution in education and training, whether in traditional classrooms or online. Virtual reality has been proved to be particularly beneficial in the classroom for teaching progressive procedures. 4D models, that is, models that combine a time element connected with 3D construction components, are used to illustrate the process of building or bridge construction[18].

2.2 3D modelling in Construction Industry

2.3 The use of creating 3d in building has a variety of benefits. Not only does 3D or reality modelling speed up the processing time, but it also lets designers and developers to test out different ideas and identify potential design issues early on. By combining all of the components, 3D modelling in construction creates a precise depiction of the end outcome[5].

Animation is now a possibility thanks to developments in 3D modeling technologies utilized in construction[7]. The consumer may examine a lot more information about a proposed project in a 3D model, of course. Clients can digitally visit the intended building. A 3D model, like a 3D movie, offers the consumer a notion of how the room will be set up. They may enter their future house from the front door, via the foyer, and even envision dinner guests in the dining room. They may review this information even before the first brick is installed!

No one can disagree that 3D modeling enhances construction design and material utilization. The 3d models may be rotated to create different viewpoints. By employing 3D modelling, you may save costly rework by spotting faults early on in the design process, learn more about surface patterns, take virtual tours via walkthroughs, build personalized representations, and increase communication between construction teams.

2.4 The BIM Approach

BIM is characterized by the National BIM Standard-United States (NBIMS-US) as "a digital representation of a facility's physical and functional properties." As so, it functions as a repository for common knowledge about a facility, giving a trustworthy foundation for decision-making throughout the facility's existence." According to the authors Muñoz-La Rivera, F., Vielma, Herrera, and Carvallo [20], this notion may be more easily grasped if three important aspects relating to information modeling and management are addressed. Informative procedures in the shape of processes are used to build an asset's data model throughout a project, assuring the integrity and precision of the information provided in it. The variables in a model will grow and change over the

duration of an asset's lifespan, just like the asset itself. A collaboration platform, on the other hand, allows all project stakeholders to work productively in the very same setting while utilising the data stored in such a model. Each major concept is discussed in further detail further down.

Information Models

BIM authoring software is used to produce an information model. Three-dimensional parametric objects may now be produced that incorporate a broad variety of data, such as mechanical qualities, cost and thermal properties. Appropriate BIM tools may be used to analyse the data included in these models in order to aid activities such as quantity take-offs, economic projections, and structural and thermal evaluations. It's also feasible to establish a centralized and integrated information model by integrating several models into a federated model. Every model is usually created by a separate project team consisting of structural engineers, architects, mechanical engineers, and warming, airflow, and air conditioning engineers (HVAC).

2.4.1 Informative Processes

2.4.2 Information from many project's fields can be stored using information models. In order to ensure the consistency and coherence of this data, it is vital to create well-conceived processes [21]. Instead, than relying on stakeholder interactions, the BIM approach focuses on known work processes and makes codified information flows more readily available utilizing proprietary and open-format software. Additionally, since the BIM approach may be applied throughout the asset's life, the company's methods start with the design stage and encourage the integration of information from several disciplines.

2.4.3 The trustworthiness of a model's information vital to 3D coordination, modelling, object tracking, and code verification, for example, may be evaluated automatically all through the project's existence using specific BIM techniques. These are enhanced and automated approaches of completing things that were originally performed only by the human eye. A additional advantage of adopting automated updating systems is the ability to create design outputs such as shop drawings, scheduling, and bills of materials from information models. The high-quality data that information models contain enables them to be utilized throughout the facility management phase, including monitoring, maintenance, and decision-making.

2.4.4 Collaboration Platforms

Structured analytical models, data modeling, papers, presentations, plans, and timetables are all included in cooperation platforms, which can be on-premises or cloud-based. The ISO 19650 family of standards emphasises the importance of using a common data environment (CDE) to gather, organise, and exchange data across BIM projects. As a consequence, a cooperation platform simplifies BIM processes and establishes the foundation for collaborative methods.

Current CDE systems create an interactive context wherein the 'information containers,' i.e. project information, move across stages per a set of rules. A work-in-progress stage precedes the shareable stage in most information containers. A lot of back-and-forth discussions between the first two stages are necessary to eventually reach to the published stage. The final step is to save the data in an archive. To advance from one stage to the next, a procedure including of checks, approvals, and authorizations must be implemented. As a consequence, today's

CDE systems all include valuable tools for process design and administration.

3. Methodology

3.1 Data Collection

The word "primary data" refers to a source from which one acquires firsthand information or original data about a subject. The goals of this research were examined employing a questionnaire technique. A questionnaire was issued to obtain information important to the research subject, including 3D modelling and design; the utilization of 3D software in the construction business; and the various problems faced. Typically, respondents worked in structural engineering as part of the design and modelling stages. Secondary data from books, published journals, magazines, newspapers, articles, and the internet were also collected and analyzed for the theoretical analysis and literature review sections of the study.

4. Results and Discussion

The software packages were compared on the basis of their functional strengths, such as the structure types they support, such as buildings and bridges, the maximum number of storeys, single-structure or multipurpose software, complete structures or individual members, 3D or 2D rendering capability, analysis, design, detailing, quantities, wind analysis and seismic analysis, among others.

4.1 Analysis

4.1.1 Interoperability

Structural engineering software today must include interoperability as a basic necessity[13]. The AEC industry's Building Information Modeling (BIM) data exchange revolves around it. Because of this, BIM-enabled software must be able to enter and export data from many sources. The Table 1 below highlights the structural engineering software programs' interoperability. When a check mark appears, it signifies a software has the capacity to perform something, but blank spaces appear to signify that it does not.

Table 1: Data Exchange among Various Structural Engineering 3D Software Applications

| Application | Import | | | | Export | | | | Link |
|-------------|--------|-----|--------------|------|--------|-----|--------------|------|---------------------------------|
| | CIS/2 | IFC | DXF / DGN | SDNF | CIS/2 | IFC | DXF / DGN | SDNF | |
| STAAD Pro | ✓ | | | | ✓ | | | | Tekla structures, Bentley |
| SAP 2000 | ✓ | ✓ | | | ✓ | ✓ | | | Revit Structures |
| ETABS | ✓ | ✓ | | | ✓ | ✓ | | | Revit Structures |
| TEKLA | | ✓ | ✓ | | | ✓ | ✓ | | |

| | | | | | | | | | |
|------------------|---|---|---|--|---|---|---|---|--------------------|
| SAFE | ✓ | ✓ | | | ✓ | ✓ | ✓ | | |
| RISA 3D | | | ✓ | | | | ✓ | ✓ | Revit Structures |
| Robot | ✓ | ✓ | | | | | | | Revit Structures |
| ANSYS | | | | | | | | | |
| ABAQUS | | | | | | | | | |
| CSI Bridge | ✓ | ✓ | | | ✓ | ✓ | | | |
| Revit Structures | ✓ | ✓ | ✓ | | | | ✓ | | Revit Architecture |

4.1.2 Software Package Functionality

The features of the software packages are explained in the Table 2 below to demonstrate how they may be utilized in a range of work contexts. Revit Structures has 15 distinct functionalities, STAAD-Pro, SAP 2000, and RISA have 14, Tekla, Robot has 13, SAFE 10, and CSI Bridge have 9, while ETABS, ANSYS, and ABAQUS all have 8.

Table 2: Various Functions of the Structural Engineering 3D Software Applications

| Function | Application | | | | | | | | | | | |
|-------------------|-------------|----------|-------|-------|------|---------|-------|-------|--------|------------|------------------|--|
| | STAAD Pro | SAP 2000 | ETABS | TEKLA | SAFE | RISA 3D | Robot | ANSYS | ABAQUS | CSI Bridge | Revit Structures | |
| Buildings | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | ✓ | |
| Bridges | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | |
| Towers | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Walls | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| 3D | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Analysis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Design | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | |
| Detailing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | |
| Wind Analysis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Seismic Analysis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Foundation Design | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | |
| Staircase Design | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | ✓ | |

The results reveal that whereas ETABS is generally used to design and assess high-rise building systems, SAP 2000 is used to study and design a range of structures such as dams, bridges, water tanks, tunnels, and retaining

walls. Unlike SAP 2000, ETABS can undertake nonlinear analysis on structures, allowing users to design for and evaluate the stability of structures exposed to creep, shrinkage, and column shortening. Additionally, users can generate a two-dimensional nonlinear layer model for the purpose of analyzing concrete cracking and shear behavior. A notable feature that ETABS gives is the ability to design shear walls, which is not available in SAP 2000. Additionally, ETABS offers composite beam floor design and automated floor meshing, which are not available in SAP 2000. SAP 2000 and ETABS interoperability[15] enables users to input models, loads, and displacement information into SAFE for more advanced local evaluation of slab systems inside greater structures. Thus, it can be said that, the comparative analysis of different modelling software revealed that ETABS can be determined as the best 3D modelling technique in the construction industry.

5. Conclusion

The multiple complex 3D modelling methodologies for structural analysis and design have been studied, and the most beneficial way has been identified by comparing the various methodology. The methods that were presented had to do with building bridges. Additionally, many aspects of structural design were explored. Several recent technology breakthroughs that are projected to have an influence on the civil and structural engineering professions are carefully addressed in this paper.

According to the findings of the study, different programs provide distinct duties, making it challenging to claim one to be superior to the other. CSI Bridge and ETABS, for example, are built for a specific structure type, while others, like Revit Structures, SAP 2000, STAAD-Pro, RISA 3D, and GT-STRUDL, are targeted towards structural work of a larger scope. Because they may accomplish wide structural engineering tasks, some software systems are both flexible and complex to administer.

5.1 Limitations

Numerous modeling systems, such as SAP 2000, ETABS, Abaqus ® 1, and ANSYS; and preprocessing programs, such as Rhino, Revit, and AutoCAD, have been assessed with reference to 3D modeling of structures, notably bridges. Attempts have been made to incorporate the majority of presently used software. However, software updates occur regularly, and users must check the current software version in use during the duration of this research. Our is a limitation of our study as software versions must be updated on a regular basis.

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ROLE OF TECHNOLOGY ON CIVIL STRUCTURES AND STRUCTURAL HEALTH MONITORING

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ABSTRACT:

There is an incredible ascent in development exercises in the field of structural designing over the period of time. Significant structures like buildings, extensions, dams and huge trusses in modern regions are prepared using various technologies and certainly are exposed to extreme stacking and their exhibition is probably going to change with time.

It is along these lines, important to check the presentation of a design through consistent observing of underlying wellbeing by structural health monitoring technology. Structural Health Monitoring is a very multidisciplinary field, where various abilities or streams and organizations can cooperate to build execution and dependability of such frameworks, whose promising points of view appear to be obviously expressed. The existence of any construction structure can be expanded by appropriate checking and monitoring.

This paper elaborates the role of technology in civil structures and essential need of doing such primary wellbeing observing in structural designing using various technologies.

KEYWORDS:•Structural Health Monitoring (SHM)•Deterioration•Damage •Maintenance•Wireless Sensor Networks• Automated Operational Modal Analysis•Technology•Civil Structures

INTRODUCTION:**Advances In Concrete Technology**

Ready-mixed concrete was first used almost 100 years ago on a construction site in Baltimore, in the US, and in many developed countries it now accounts for over half of all the cement used in construction. With an estimated worldwide annual output of 4 billion cubic metres, concrete is the most widely used construction material in the world due to its unique combination of versatility, economy and durability.

Structural Health Monitoring (SHM)¹

Observation of structural behavior is a very old discipline that has accompanied theoretical developments in structural mechanics since its origins (Benvenuto 1991), providing basic knowledge of physical phenomena and verification of computational procedures. However, in the last twenty years this discipline has also taken different roles, gradually becoming the basic tool for facing the so-called time-dependent safety problem (Mori and Ellingwood 1993) in civil engineering practice.

Structural Health Monitoring (SHM) is defined as the use of in-situ, nondestructive sensing and analysis of structural characteristics in order to identify if a damage has occurred, define its location and estimate its severity, evaluate its consequences on the residual life of the structure.

OBJECTIVE:

This study reviewed progress in the use and adoption of technology in the field of civil and aiming to summarize various technologies used and relevance of structural health monitoring that can be implemented by industry experts.

METHOD:

Foundational surveys were directed on various peer reviewed articles sourced through different web search

¹Nemade et al (2021); Structural Health Monitoring in Civil Engineering

tools like Google Scholar, articles and blogs from industry stakeholders web portals.

LITERATURE REVIEW:

How to Prepare Concrete?

Production begins with weighing process. A number of additives can be put into the concrete. They are classified by different names such as chemical, air entraining, fine-grained. Very important is given to the non-leakage of molds. After enough mixing with the mixer, the process ends. Then the shipping process begins. Ready-mixed concrete is preferred in many different areas (**A blog by Hawk Plant**).

Institute of Concrete Technology (ICT) 37th Annual Technical Symposium, April 2009; stated the focus on environmental issues and the concept of sustainability have led to changes in the way that raw materials for concrete production are manufactured and used. There has been an increase in the use of recycled and alternative materials which, together, can reduce the environmental impact of concrete, and further developments in this area are expected.

These developments have been adopted by the ready-mixed concrete industry and the nature of the products produced by the industry has changed significantly. Production units are now more sophisticated, stocking a broader range of cements, admixtures and aggregates that allow the production of a wide range of high-specification concretes engineered to meet the most demanding applications.

Chang et al (2011) stated structural health monitoring techniques can have a significant impact on the safety and reliability of space operation vehicles. Concerns about the design of structural health monitoring systems for detecting foreign-object impact and monitoring the integrity of thermal protection panels were discussed. Structural health monitoring systems for space applications must be not only capable of detecting impact and monitoring damage, but also able to predict in a timely manner the integrity of the structures with estimated damage. It is recommended that the integration of structural health monitoring techniques into space operation vehicles should be performed at the initial design phase to maximize effectiveness in detection and to provide proper protection of the system. New techniques and innovative tools are fundamentally lacking and need to be developed to support a deployable structural health monitoring system.

Shelke and Ainchwar (2018), had a study on *Structural Health Monitoring, Audit, Repair and Rehabilitation of Building in Construction Industry* and concluded, defects of structural members are due to combined effects of carbonation, corrosion & effect of continuous drying and wetting. The result of visual survey prompt to conclude the distress is widespread and is an ongoing process and so needs to be stopped at this stage so as to avoid complete collapse of the structure. The results obtained in the form of graphical representation confirms that the capacitance-based sensor effectively detect the micro cracks in the structure. This sensing device is new era technology, which is relatively cheaper but accurate. By employing this technique, we can effectively forecast the development of the cracks in the structure and will be in the state to provide remedies well before collapse of the structure.

Sajedi and Liang (2020) stated recent advances in computer vision and deep learning have had a major impact on vision-based structural inspections. Considering an ever-growing interest in the application of deep learning models for SHM, it is necessary to develop a framework that quantifies the model's confidence such that decision-makers can make risk-informed decisions in different circumstances. In this paper, they leverage on deep Bayesian neural networks for vision-based structural inspections. The novel frameworks proposed in this paper are validated with three different datasets of real-world images, while the performance is monitored for

different metrics. It is shown that Bayesian inference can further boost the overall performance while providing an uncertainty output for the corresponding predictions. A series of sensitivity analyses were performed to investigate the effects of dropout hyperparameters on Bayesian inference. Beyond quantification, it is shown that the interpretation of uncertainty output can be challenging to manually analyze and integrate with an automated SHM system. Therefore, the concept of surrogate models is introduced to further benefit from uncertainty output. The Uncertainty-assisted segmentation method is proposed to automatically refine the prediction results from the original Bayesian model. Moreover, Prediction quality tagging is developed as a means to trigger human interventions in an efficient manner. The proposed methodology in this paper can be utilized to equip the existing vision models for inspection and monitoring with tools that can quantify and benefit from output model uncertainty. In the absence of huge datasets for training, Bayesian inference can be an effective tool to make visual inspections using deep vision models more reliable. The presented examples are the cornerstone to further expand uncertainty in other related fields of SHM for future research. For example, the uncertainty masks in the crack segmentation can be used in the calculation of crack width and heights in the postprocessing steps

Nemadeti et al (2021) stated health monitoring of structures is becoming more and more important: its ultimate target is the ability to monitor the structure throughout its working life in order to reduce maintenance requirements and subsequent downtime. Currently, visual inspection is the standard method used for health assessment of structures, along with nondestructive evaluation techniques. The result of visual survey prompts us to conclude the distress is wide spread and is an ongoing process and so needs to be stopped at this stage so as to avoid complete collapse of the structure. They summarized the main need of SHM technology to constantly monitor the structure to prevent it from failure and ultimately the effect on the economy of country. Some aspects related to the implementation of an integrated SHM system covering several structures on a wide territory has been analyzed. So overall the SHM is now become most important by considering the economy of country and increase the service life of structure by constantly monitoring it.

Sivasuriyan et al (2021) review discusses the building structural health monitoring of all parameters using static, dynamic, and finite element methods to detect or predict building damage. The whole structural health monitoring consists of four characteristics: the presence, location, and severity of the damage and the remaining service life of the building after damage. The article discusses the important approaches, processes, hardware, and sensors adopted for SHM in buildings. The following claims can be made:

- Currently available techniques can be used to implement SHM in buildings along with efforts made to enhance the technique both economically and practically for monitoring purposes.
- The Bayesian approach for SHM in buildings can predict damage and deterioration and to evaluate the variation in dynamic structural properties.
- Numerical models in SHM using Matlab, OpenSees, and other, similar software can help to determine structural responses adopting various algorithms.
- Damage severity can be predicted in the initial stiffness using piezoelectric sensor patches and electro-mechanical impedance techniques by acquiring a global dynamic technique, and medium to severe damage can be extracted through monitoring with utmost accuracy.

- The SHM approach is extremely suitable for real-time monitoring if the methods are carried out comfortably by precisely applying all techniques.
- Ambient vibration methods range from measured dynamic responses to real-time monitoring such as mode shapes, modal damping ratios, and natural frequencies.
- Various types of sensors are used for structural health monitoring such as fiber optic sensors, piezoelectric sensors, microelectromechanical system sensors, accelerometer, temperature sensors, and accelerometers.
- Predictive analysis and data acquisitions can be applied to buildings using sensors, so sensors inputs are safe and reliable in accordance with building conditions.
- SHM can be applied for different types of buildings, including multi-story buildings, commercial buildings, and heritage buildings, and various works have been discussed in detail.
- The static and dynamic behavior of buildings can be used to predict damage at an early stage by adopting SHM techniques along with finite element analysis reports.
- The in-detail analysis of software, hardware, and real-time data along with future perceptions are based on the operating principles for SHM in buildings.

RESULTS:

This review paper exhibits role of technology in civil structures and to maintain its health. At present accessible procedures can be utilized to execute SHM in structures along with endeavors made to upgrade the procedure both monetarily and essentially for observing purposes.

CONCLUSION:

Ongoing advances in technologies and profound learnings significantly affect vision-based primary investigations. Considering a consistently developing interest in the utilization of profound learning models for SHM, it is important to foster a system that measures the model's certainty with the end goal that chiefs can settle on hazard-informed choices in various conditions.

In the current situation, suggestions for future designs are important to increment the general productivity of exploration to create exact and fast information assortment.

CONFLICT OF INTEREST:

The author declares no conflicts of interest.

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The Impact of Service Aging on the Dielectric Properties of Transformer Insulating Liquid

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Abstract

The insulating system of the transformer serves as its backbone. The aging of the insulating liquid has an impact on its degradation. Thus, it is essential to keep track of its state. The insulating liquid testing for transformers is akin to blood testing for humans in that it can identify a problem, provide an early diagnosis, and improve the chances of finding the proper treatment. This paper investigates the impact of aging on transformer insulating liquid. The performance of a total of 03 nos. of the transformer of the same capacity of 2 MVA with the same voltage rating of different manufacturers which are in-service for around 16 years is compared. The dielectric properties of insulating oil samples such as breakdown voltage (BDV), water content, DDF (tan delta), and resistivity, are practically investigated. The trending curves along with their correlation between different aging indicators are presented. Such trending patterns will provide a more accurate picture of the in-service performance of oil insulation. This will aid researchers and engineers in improving the design, maintenance, and operation.

Keywords: Insulating Oil, Distribution Transformers, Breakdown voltage, Moisture Content, Tan delta, Resistivity.

1 INTRODUCTION

The transformer is an integral part of the electrical power system network and is considered to be the most strategic equipment in maintaining the voltage level and therefore, utmost priority is given to its performance. It is well known the performance of the transformer may be arbitrated by evaluating the life of its insulation system, especially in oil-filled transformers [1].

The aging of the transformer is one of the prime reasons for the deterioration of the dielectric, chemical, and physical properties of its insulation system. Aging can occur naturally, or caused by a variety of stresses such as electrical, thermal, and mechanical, all of which are highly reliant on the operating conditions and can lead to aging [2]. It is an irreparable and inevitable degradation, but its pace can be slowed down to a maximum extent to avoid malfunctions and unexpected interruptions. To avoid the repercussions of early aging, utilities usually follow a set of condition monitoring operations. As a result, comprehending these in-service condition monitoring operations will aid in determining the exact degradation process of the insulating system [3]. The insulating liquid testing for transformers is akin to blood testing for humans since it can identify a problem, provide an early diagnosis, and improve the chances of finding the proper treatment [4]. The mechanisms that cause insulating oil degradation are strikingly similar in all oil-filled equipment. The intensity of the degradation mechanisms, on the other hand, will vary significantly between pieces of equipment. This intensity is affected by the transformer's capacity, design, voltage rating, and working duration. To have the exact correlation, the performance of the similar transformers is compared in this paper. Table 1 shows the detailed specifications of three (03) transformers studied in the current paper. These transformers are of different makes, serial numbers, date of installation, etc. but have the same capacity, same voltage rating, number of phases, almost of the same aging period, etc. Changes in oil parameters such as; Breakdown Voltage (BDV), Water Content,

Dielectric Dissipation Factor (DDF), and Specific Resistance w.r.t service aging are inspected and plotted. The correlations between several aging indicators and their trending behaviours are examined.

Table 1: Specification of transformers.

| Transformer No. | T1 | T2 | T3 |
|--------------------|-------------|-------------|-------------|
| Make | Alstom Ltd. | MPT Ltd | MPT Ltd |
| Capacity (in MVA) | 2 MVA | 2 MVA | 2 MVA |
| HT/LT (in Volts) | 66kV/433V | 66kV/433V | 66kV/433V |
| Tr.'s Serial No. | D-6029 | F-1339 | F-1340 |
| No. of Phase | 3 | 3 | 3 |
| Manufacturing Year | 2004 | 2003 | 2003 |
| Type of Oil | Mineral Oil | Mineral Oil | Mineral Oil |
| Type of Cooling | ONAN | ONAN | ONAN |
| Installation Date | 01/04/2005 | 28/08/2005 | 30/08/2005 |
| Aging (in Days) | 3153 | 3004 | 3002 |

2 ANALYSIS & DISCUSSIONS

(a) Breakdown Voltage (BDV)

The breakdown voltage of the oil (measured in kV) is an important parameter that demonstrates its strength to tolerate electric stress without failure [5, 6]. The charged particles and soluble decay materials in oil produce conductive routes as a result of aging mechanisms, resulting in further oil deterioration. A low BDV value shows evidence of contaminants in the oil, such as water, cellulosic fibers, sediment, or conducting particles [7].

Figure 1 (a) shows the BDV of all three transformers (i.e., T1, T2, and T3) are decreasing gradually and bears a non-linear relationship with aging. Since T1 is more aged among the three, the BDV is more downwards and it is not necessary that this happens only because of age, there can be many other reasons like moisture, acid, sludge, temp., etc.

(b) Water (or Moisture) Content

Water Content in oil is highly undesirable because it degrades the dielectric properties of the liquid and solid insulation of the transformer. The amount of water in the insulation affects the transformer's longevity [8]. Moisture and breakdown voltage (BDV) are inextricably related and have an inverse relationship [9]. Along with aging, there are many other reasons for the generation of water in the transformer such as working temperature, location, environment. Figure 1 (b) shows how water content is increasing with age and Figure 2 shows the correlation between them which is an inverse relationship.

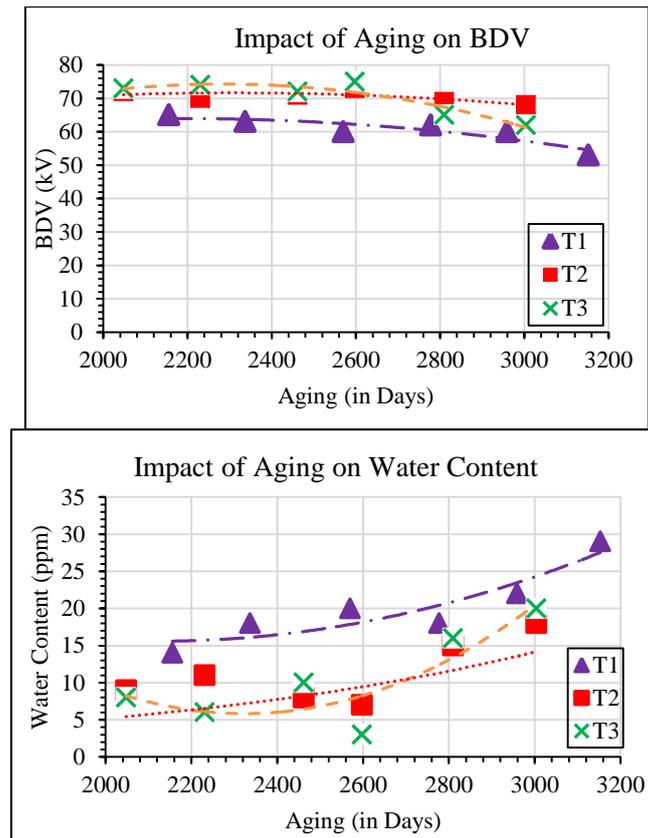


Figure 1: Impact of Aging on (a) Breakdown Voltage (b) Water Content of Transformers-T1, T2, and T3.

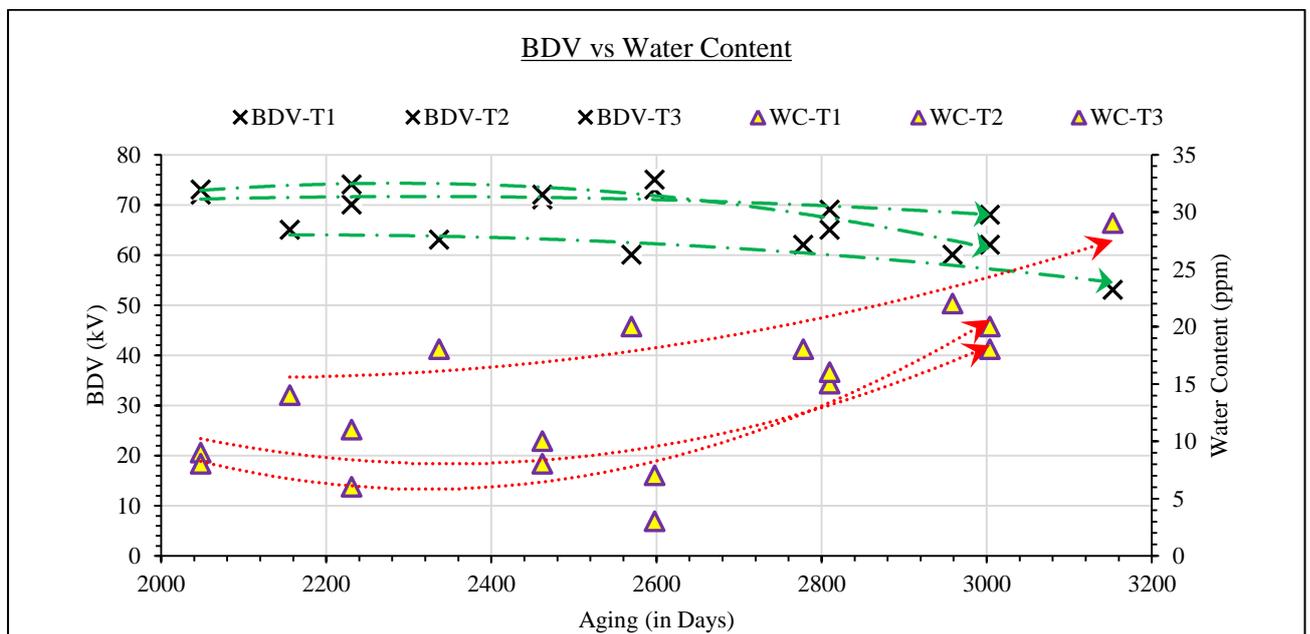


Figure 2: Correlation between breakdown voltage (BDV) and water content.

(c) Dielectric Dissipation Factor (or Tan Delta)

The DDF evaluates the power lost when an insulating liquid is exposed to an alternating current field. The power is dissipated as heat within the liquid [10]. A higher dissipation factor value indicates contamination and

degradation caused by moisture, carbon, varnish, cellulose, or other degeneration agents. Figure 3 (a) shows the impact of aging on the DDF. In general, DDF and resistivity have an inverse relationship, with resistivity decreasing as DDF increases [11, 12], and this correlation is presented graphically in Figure 4.

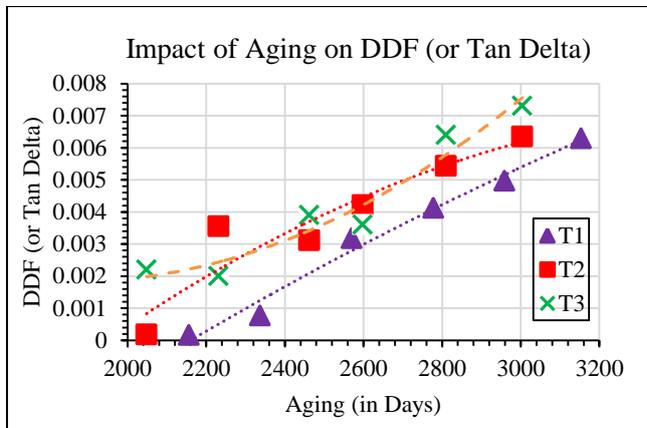


Figure 3: Impact of aging on (a) DDF (or tan delta) (b) Resistivity of Transformers-T1, T2, and T3.

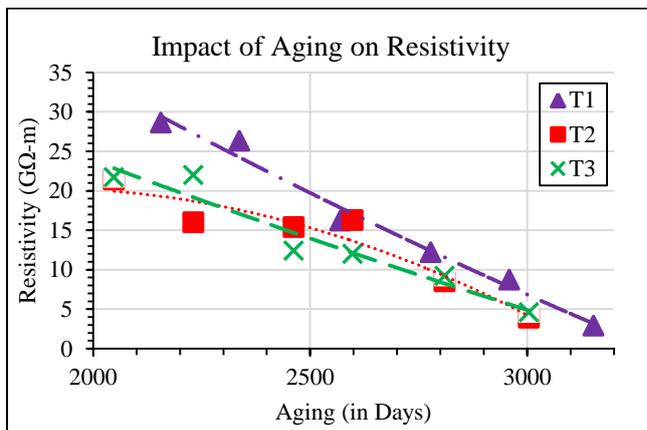
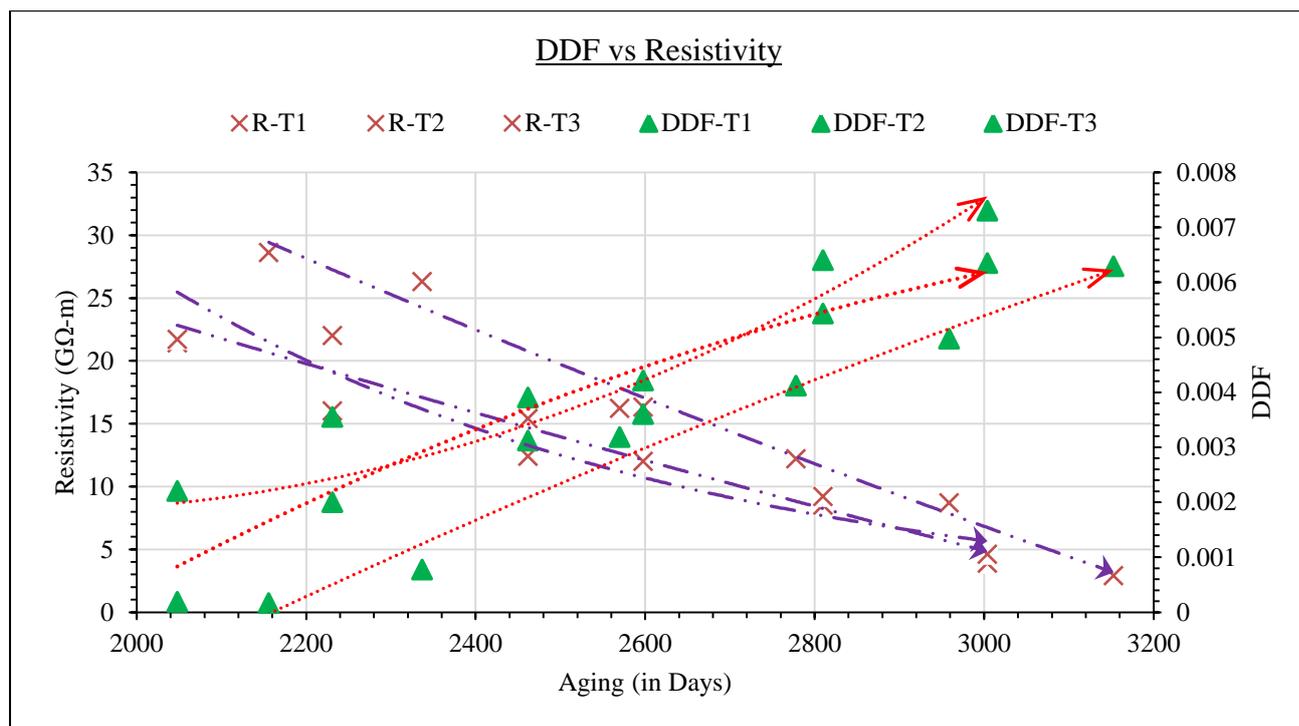


Figure 4: Correlation between DDF and resistivity.



(d) Specific Resistance (Resistivity)

The resistivity of the oil is a gauge of DC resistance between two opposite sides of the 1 cm³ volume of the oil and is expressed in GΩ-m. The resistivity of the oil decreases dramatically as the temperature increases and, consequently, the DDF increases [13]. A high value of resistivity reflects low contents of free ions and a low concentration of conductive contaminants. It is helpful to track changes in the level of contamination in used oil [14,15]. Figure 3 (b) shows the impact of aging on the resistivity of the insulating liquid of transformers (T1, T2, and T3) and also shows the resistivity of T1 is low. It might be due to the presence of higher moisture content.

3 CONCLUSION

In this paper, practical analysis from the aging of distribution transformers is reported by describing three (03) independent transformers located at different places. The changes in oil characteristics such as breakdown voltage, water content, dielectric dissipation factor (tan delta), and specific resistance concerning the aging period have been identified. Moreover, the correlations between BDV & Water Content and Tan Delta & resistivity are plotted using trending curves and it has been found that aging not only deteriorates the insulating oil but also accelerated the rise in temperature which ultimately may lead to the failure of the transformer. Therefore, regular diagnostic and monitoring of transformer oil characteristics may help utilities to keep an eye on the performance of transformers. By plotting trending curves of the transformer oil characteristics, the faults may be detected at an early stage and therefore preventive maintenance actions can be taken to avoid any unexpected failure of a prime component of the power system.

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AVERAGE THE ENHANCEMENT OF ACCURACY PARAMETER DURING IDS DETECTION USING LSTM MODEL

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Abstract: An intrusion detection system (IDS) monitors a network for signs of unauthorized access and attempts to compromise its security. Malicious activities or policy violations may be detected by this kind of software. This study focuses on IDS threats in cloud environments. A variety of cloud security threats have been uncovered, all of which have the potential to significantly influence cloud service performance and compromise security. No resolution has been found for the problem of unauthenticated access. Previously, researchers devised a time-consuming way for training intrusion detection systems. The lack of accuracy also contributed to the lack of clarity. In order to deal with intrusions as quickly as possible, this study aims to create an intelligent system that can quickly and reliably recognize and categories them. Training and testing neural networks was used to detect different types of IDS attacks. A system intended for intrusion detection is more accurate and dependable.

Keyword: Performance, IDS, Machine Learning, Accuracy.

[1] INTRODUCTION

Since the creation of the machine, there has been a pressing need to connect machines. The security and long-term viability of these gadgets have become more important since their development. We must enhance our systems for the sake of the future. To warn an administrator or aggregate much detrimental behaviour or violations, a security information and event management system is often utilized. An intrusion detection system may identify system flaws and exploits (IDS). Systems monitoring software may be classified in this way. Some security information and event management systems (SIEM) can alert managers to a wide range of potentially harmful activities or breaches. It is the goal of this kind of technology to merge data from several sources into one. Concerns and obstacles have been examined in light of the rising demand for cloud services. In order to broaden the scope of prior research approaches, the security of cloud computing must be improved. IDS threats in cloud settings are the subject of this research. It's been discovered that a number of cloud security problems might damage cloud service performance and security. In any case, unauthorized access to the system is a concern. Intrusion detection systems have previously been trained using a time-consuming method. The lack of clarity was further exacerbated by the lack of precision. The goal of this work is to develop an intelligent system that can rapidly and efficiently identify and categories intrusions. In order to identify various IDS assaults, neural networks were developed and put to the test. The accuracy and dependability of an intrusion detection system are much higher.

1.1 INTRUSION DETECTION SYSTEM

Suspicious activity or a breach of established rules may be detected by this programme. The deployment of intrusion detection systems is critical to maintaining an organization's data security. The primary method used to identify network intrusions is very accurate. Traffic volume, IP addresses, ports used, and protocol usage may all be monitored by network-based systems, which are reliant on the Internet. Detecting suspicious behavior on

the network is the primary function of IDS. Whenever it detects movement, it also sends an alarm. This kind of software is referred to as "network monitoring software." It keeps an eye out for any violations of system regulations. Several components were used in the development of the intrusion detection system. Sensors have a part in the production of security events. We've told our intrusion detection system about this. The control panel is another component..

To identify an intruder, certain intrusion detection systems scan for signs of previously detected assaults or deviations from the norm. At the protocol and application levels, these anomalies are examined. Network IDS, host IDS, protocol-dependent IDS, application-protocol-dependent IDS, and hybrid IDS are the five kinds of IDS that exist.

1.2 LSTM

Deep learning makes use of an artificial RNN architecture known as "long short-term memory". LSTM differs from traditional feed forward neural networks in that it has feedback links. As well as single data points, it can analyse extensive sequences of data. Tasks like handwriting identification, voice recognition, and anomaly detection in network traffic may all benefit from the use of LSTM. A cell, an input gate, an output gate, and a forget gate make up a typical LSTM unit.

1.3 NEED OF RESEARCH

Detecting network intrusions is essential to securing a network. These measures have made it easier to identify and deal with suspicious activity. An intrusion detection system is essential for notifying IT staff in the event of an attack or network incursion. This strategy requires an IDS system that can accurately predict. An LSTM-based intrusion detection model would be trained in Matlab. f1 and recall data have been supplied in less than one-third of past IDS research.

[2] LITERATURE REVIEW

It was suggested by Peisong Li and Ying Zhang [1] that an improved DBN and GA-based security warning may be developed. On the basis of neurons, Yin CHUANLONG [2] presented an IDS model. According to the evidence presented, this plan was also put into practice. Xue Wang [3] and Bo Dong [4] conducted research on a variety of traffic management strategies. They used a wide variety of techniques on the free data set they had selected. A study was conducted to determine the most effective strategies for obscuring invasions. A variety of machine learning methods, including SVM, decision trees, and random forests, have been used by Imtiaz Ullah(B) [4]. IDS methods based on today's IoTID20 dataset may be tested on this most recent version. IoT networks are identified as a focus of this study. They used Sara A. Althubiti [5] to build their IDS logical records for obsurgitrusion detection. It was later discovered that LSTM and deep learning algorithms might work together. W. Li [6] has studied the most recent intrusion detection system. KNN's management strategies defined the Sachtype of systems. Information accumulation and computer technology are intertwined in the research of E. Guven and A. L. Buczak. [7] The detection of Internet invasions is now the primary focus of the Internet security alarm system. Deep learning was suggested by A. Javaid [8]. The researchers investigated network intrusion detection technologies in order to get a better understanding of them. Using these tools,

network security problems may be quickly and easily identified and patched up. [9] TA Tang invented the concept of deep learning. This strategy's goal is to detect network intrusions. SDN was the focus of the research. Intrusion detection was proven by M. Sheikhan [10]. In order to do this, they used a smaller version of the RNN. Functioning mechanisms need a combination of attributes. M Tavallaee[11] analyzed the KDD CUP 99 dataset. In recent years, academics have been interested in the notion of leveraging inconsistent identification to circumvent the shortcomings of signature-based IDS. According to S.Revathi [12], the NSL-KDD dataset should be thoroughly analyzed. It uses a broad variety of machine learning techniques. This was done only to guard against trespassers. Data preprocessing has been studied by N. Paulauskas [13]. As a consequence of their work, intrusion detection systems were examined in depth. The intrusion detection technique was invented by P. S. Bhattacharjee [14]. Data from the NSL-KDD collection is being used in the analysis. R. A. R. Ashfaq created a semi-supervised learning technique [15]. Fuzzy logic has been a focus of study in recent years.

Table 1 Literature survey

| S No. | Author/ Year | Title | Methodology | Limitation |
|-------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------|
| 1 | P. Li / 2019 | Intrusion Detection Methods for the Internet of Things | IoT | Accuracy must be improved |
| 2 | CHUANLONG YIN/ 2017 | Employing a mix of deep learning and traditional approaches for network intrusion detection. | Deep Learning | Need to improve one's ability to perform |
| 3 | B. Dong /2016 | Method for Generating IoT Network Anomalous Activity Datasets. Intrusion detection using an anomaly-based approach with the help of the Canadian ICAI LSTM | Deep Learning | Only a little amount of work may be done |
| 4 | Ullah, Imtiaz / 2020 | A new intrusion detection system in a wireless sensor network is based on the KNN algorithm. | IoT | Improving one's abilities is a must. |
| 5 | Althubiti / 2018 | An exploration of data mining and machine learning techniques to cyber security intrusion detection | LSTM | A content filter is needed to eliminate unnecessary entries from the database. |
| 6 | W. Li / 2014 | A deep learning-based approach to network intrusion detection | WSN | Accuracy must be improved in tandem with performance |
| 7 | A. L. Buczak / 2016 | Software-defined networking's deep learning approach detects network intrusions | Machine Learning | There has been no technical work done at all. |
| 8 | A. Javaid/ 2016 | Features must be grouped together in order to shrink an RNN for intrusion detection. | Deep Learning | The research is broad and restricted in scope. |

| | | | | |
|----|-----------------------|----------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------|
| 9 | T. A. Tang / 2016 | Intrusion Detection Methods for the Internet of Things | Deep Learning | Specialized training and testing mechanisms need to be included into the job. |
| 10 | M. Sheikhan / 2012 | employing a mix of deep learning and traditional approaches for network intrusion detection. | RNN | Accuracy must be improved |

[3] PROBLEM STATEMENT

Several studies have made significant contributions to IDS. There have been earlier studies using fuzzy logic, genetic algorithms, machine learning, KNN [9] classification, and the LSTM model. NDL-KDD [12] has also been used in prior studies for training purposes. However, there are several problems with the accuracy of these research. In addition, network models take longer to train. As a result, a model that can be trained far more quickly than earlier models was developed. Recent research has also led to the development of a two-layer LSTM model with a hidden layer, which has enhanced accuracy. Dataset training and prediction should be faster and more accurate thanks to the suggested study, according to the researchers.

[4] PROPOSED WORK

We've spoken about some of the current research problems and presented some fresh studies in this section. Following that, the study objectives are outlined. Both the LSTM technique and the two implementation models utilised in this research have been described. This section outlines the data set that was used to train the categories and subcategories that were utilised in the research process. To conduct the suggested research, the LSTM algorithm has been used. Recurrent neural network architecture for long-term memory has been suggested. It is often used in the field of deep learning as a teaching and learning method. Classification and processing tasks are suited for this kind of network. In addition, it performs predictions based on time-series data. Gaps in a time series might arise between important events that occurred at previously unknown periods of time. An LSTM is quite similar to a rnn in terms of control flow. Analyzing and disseminating data in preparation for future usage is what this procedure entails. In the LSTM's cells, operations may be used to keep or discard data. ILSTM is preferable to RNN because it provides a greater number of control options. To put it another way, they're a system for balancing input and output weights. In this way LSTM delivers the highest degree of control and the finest results. It is, on the other hand, more time consuming and costly. LSTM is a valuable method for Time Series Forecasting. Time-series forecasting and sequence prediction could be helped by this kind of modelling. The IoTID20 data set contains 80 network characteristics and three labels attributes. Binary, category, and sub-category labelling possibilities are all included in the label feature set. The dataset from the article "A Scheme for Generating Anomalous Activities in IoT Networks" was used to train the network using Matlab scripts: 70% of the data was utilised for training and 30% for testing in this script. Future usage of "Net" training may be retrieved from the system. The LSTM was employed with two distinct models to train two independent networks. The first model uses a single LSTM layer, but the second model has a dropout layer.

4.3.4 DATASET AND CATEGORY SELECTION

As many as 80 different types of network properties and three different kinds of label information are provided in the IoTID20 collection. It's the labels that have categories and sub-categories. The dataset comes from a paper titled "Anomalous Activity Detection in IoT Networks.". Conference on Artificial Intelligence and Robotics in Canada... Springer will begin publishing in Cham in 2020.

[5] RESULT AND DISCUSSION

The training process for the proposed model is shown in the following image.. In this scenario, the dataset was trained using LSTM in order to predict the IDS using the trained set. The LSTM model was used to determine the accuracy rate in this case. Accuracy may be affected by the LSTM layer's dataset, number of hidden layers, and batch size. During testing, a confusion matrix like the one shown below is generated to determine the network's accuracy. This confusion matrix may be used to calculate the overall accuracy, precision, F1 score, and recall value.

5.1 Comparison of Accuracy

| Accuracy of Previous model | Accuracy of Proposed model |
|----------------------------|----------------------------|
| 92.02% | 94.16% |



Fig 3 Comparison of Accuracy

5.2 Comparison of Precision

| Precision of previous work | Precision of proposed work |
|----------------------------|----------------------------|
| 0.8 | 0.852 |

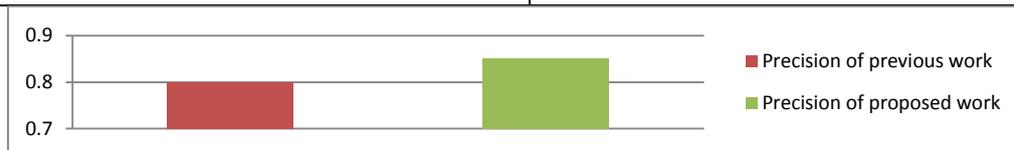


Fig 4 Comparison of Precision

5.3 Comparison of Recall value

| Recall value of previous work | Recall value of Proposed work |
|-------------------------------|-------------------------------|
| 0.802 | 0.85 |

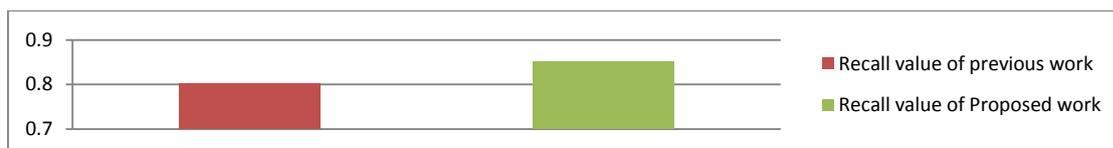


Fig 5 Comparison of recall value

5.4 Comparison of F1 Score

| F1 score of Previous work | F1 Score of proposed work |
|---------------------------|---------------------------|
| 0.796 | 0.848 |



Fig 6 Comparison of F1 Score

[6] CONCLUSION

It was found that Deep LSMT IDS was more accurate than the standard IDS. The LSTM approach used in training, according to the study, is scalable and versatile. Long-term memory (LSTMs) makes it feasible to train a network with high efficiency. The minimum batch size and the number of hidden layers have an impact on overall accuracy. Increasing the hidden layer's precision improves the system's accuracy. The minimum bath can only be raised so much before it loses its effectiveness.

[7] SCOPE OF RESEARCH

Predictions of IDS based on the findings of this investigation are possible. A scalable and adaptive IDS detection system has been created, according to the suggested research. The suggested model has a lower risk of error since it was trained on a large dataset and utilizes an LSTM model with several layers. Future studies may find it beneficial to use a more rapid training regimen. A characteristic that was omitted from the current study had no effect on the training model's accuracy. As a consequence of the suggested strategy, the model may be trained for future prediction while removing characteristics that have a little influence on the results. Detection of IDS may be improved in the future by using a similar method. The IDS may be unable to accurately identify some attacks, in which case an anomalous tag may be applied. These kinds of assaults may be rearranged in the future.

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APPLICATIONS OF GRAPH THEORY

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ABSTRACT

Graph theory is sub-field of Mathematics and Computer Science which deals with graphs that contains points and line and which often pictorially represents the mathematical truths. Graph theory is the study of relationships in any field. Given a set of nodes and connections between them, which can represent anything from city layouts to computer data or any social network, graph theory provides a helpful tool to simplify these systems in an optimized way.

This paper throws some light on the areas where graph theory is used extensively and have made human beings' life easier, areas like in mathematics it's used in operational research, in computer science used for communication networks, data organization, google maps etc., in electrical engineering used for designing electrical circuits, in social sciences used to study the influences of people on each other in a group using trees.

Keywords: Graphs, Trees, communication network, Directed Graph, Undirected Graph, Weighted Graph, Biological Graph.

1. INTRODUCTION

The basic idea of graphs was first introduced in the 18th century by the Swiss mathematician Leonhard Euler. His work on the famous "seven bridges of Konigsberg problem" is commonly quoted as origin of graph theory. Graph can be used to model many types of processes and relationships in computer science, physical, biological, and social systems such as finding communities in networks like social media (finding friends of friends for recommendation or recommending the products a person may like based in her/his search patterns etc.) or in recent days finding the people contacted a COVID +ve person and their further asymptotic personal. We all are using maps (e.g., google map) whenever we land up at a new place, so these GPS uses shortest path algorithms to provide us the most suitable path according to the means we are travelling with i.e., by bus, by personal vehicle or by walk.

Graph theory has revolutionized the way we use our resources as we can find the optimal solutions for a system according to our requirements using graph theory e.g., in transport system we can find the best possible path between two places which cost us less in terms of money and time both or we can take one factor into consideration (time or money) depending on what is the most desired factor. In 5g infrastructure deployment graph theory can be used to decide the position of cell tower deployments based on the number of users in that area and the coverage of the cell towers. In biological systems, e.g., to find the possibility of a disease transmitted hierarchically, in the early diagnosis of neurological disorders through detecting abnormal patterns of neural synchronizations in some parts of the brain.

2. LITERATURE SURVEY

Jonathan Webb, Fernando Docemilli and Mikhail Bonin[1] have applied the four color theorem in wireless cell tower placement plan. They have showed how no-coverage area can be spotted and channel overlap detection so that cell phone signals are handed off to a different channel. Svetla Stoilova and Veselin Stoev [2] have explained the usages of graph theory in developing metro lines in a city depending on the size of the city, location of the different regions, density of the development etc. Kanskey, K[3] has explained the main graph

theory concepts and as well as various indicators have been introduced such as traffic flow, network diameter and other dimensional ratios. Y. Yegnanarayana[4] have explained the graph theory techniques used in detecting the biological diseases such as neurological disorders using biological graphs where molecules are representing the nodes and edges are representing molecule's interactions. Shirinivas et al.[5] have presented an overview of the applications of graph theory in heterogeneous field but mainly focuses on computer science applications.

3. REVIEW OF GRAPH THEORY TOPICS

A **graph** $G=(V,E)$ is a pair of vertices(or nodes) V and a set of edges E , assumed infinite i.e $|V|=n$ and $|E|=m$. Here $V(G)=\{v_1,v_2,\dots,v_n\}$ and $E(G)=\{e_1,e_2,\dots,e_m\}$.

An **edge** $e_k = \{v_i,v_j\}$ is an incident with vertices v_i and v_j .

A **simple graph** has no self-loops or multiple edges as below:

Simple Graph



Multigraph

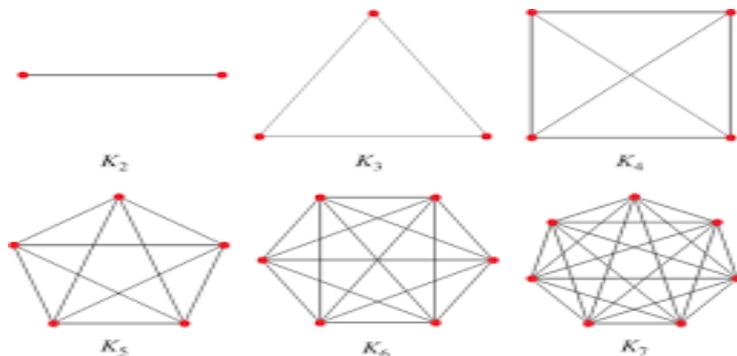


The **degree** $d(V)$ of a vertex is the number of incident edges on it. A loop counts as 2 in degree of that vertex.

The degree of an **isolated vertex** is always 0.

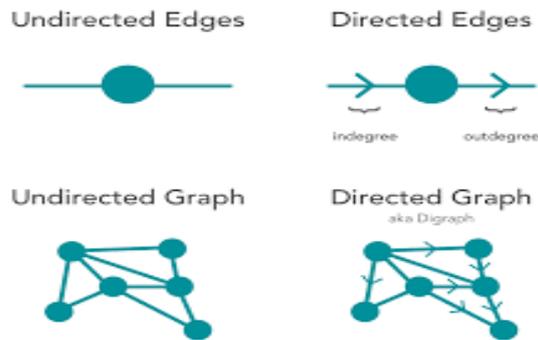
The Sum of the degrees of a graph $G=(V,E)$ equals $2|E|=2m$.

A **complete graph** K_n is a simple graph whose every vertex is connected to every other vertex in the graph.



Directed Graph have edges with direction. The edges indicate a one-way relationship, in that edge can only be traversed in one direction.

Undirected Graph have edges having no direction. The edges indicate a two-way relationship, in that edges can be traversed in both the directions.



A **weighted graph** is a graph in which each edge is given a numerical weight.

4. APPLICATIONS OF GRAPH THEORY

Graph theory is used extensively in science and technology. Some of the use cases are explained below:

4.1 Applications of graph theory in Mathematics

In mathematics, operational research is the important field. Graph theory provides many applications in the operational research such as finding the minimum cost path which is used in systems like transportation systems to find the least cost i.e., the minimum distance needs to be travelled. Scheduling problem also uses the graph theory, e.g., to schedule matches of a tournament either in round-robin fashion or elimination round fashion.

4.2 Applications of graph theory in Computer Science

In Computer Science, graph theory is used for the study of various algorithms such as Dijkstra's Algorithm (Algorithm for finding the shortest paths between nodes in a graph), which in turn used in mathematics to find the shortest route problems in transportation and in network it's used to reduce the caballing size etc.

Prim's algorithm (a greedy algorithm used to find the minimum spanning tree from a graph i.e., a subset of the edges of a connected, edge-weighted undirected graph that connects all the vertices together, without any cycles and with the minimum possible total edge weight.)

Kruskal Algorithm (algorithm to find the minimum forest of an undirected edge-weighted graph.)

Graph theory is also used in memory manipulation in operating system such as finding if the transaction is safe of not, querying of graph structured data etc.

4.3 Applications of Graph Theory in Electrical Engineering

In electrical engineering, graph theory is used to design the electrical circuits, finding faults in an existing circuit. These circuits are mainly known as topologies. Some of the topologies are series, parallel which are helpful in designing series and parallel circuits.

4.4 Applications of Graph Theory in Computer Networks

In Computer networks, the relationships among the interconnected computers within a network follows the principle of graph theory. It's also used to find an existing ethernet topology. Vertex coloring algorithm is also used in cell deployment to spot the cell covering and not covering areas.

4.5 Applications of graph theory in Social Sciences

In Social Sciences, graph theory is used to explore the rumor spreading, or the publicity of a person, e.g., when some sports person wins a big tournament, everybody starts searching for that player or say if there is any political statement is made then search will go on the statement itself and its effects on the common people.

Friendship graphs are used to identify the friend circle, it's used mainly in social sites like Facebook, WhatsApp, twitter etc.

Graph theory also used in studying the influence of some people in a group.

4.6 Applications of graph theory in Biology

In Biological graph, nodes represent any molecule, protein or gene and edges between these nodes represent the functioning, relationship, or any chemical interactions between the nodes. These graphs are helpful in the study of possible spread of any disease.

Neurological diseases are identified by studying the pattern of neural behavior in different part of the brain for different situations.

5. CONCLUSION

The applications of graph theory have proved an inevitable tool to use in multiple domains to make the human life easier and use the resources in an effective manner. The problems which look difficult to solve and visualize can easily be represented in graph form and problem can be solved using graph properties which saves time and energy. There are some standard graph problems and existing solutions for that which can be used directly and a combination of those according to the problem in hand.

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Graphene Grounded Nano Materials and Nano Devices-Review

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Abstract: In this paper, Graphene- predicated nanomaterials have arose as a fresh type of stuff with exceptional physicochemical tracts and many uses in varied areas. In this review, we encapsulate recent advances in studying intercourses between grapheme and nano technology. We first deliver a brief exordium on graphene and its outgrowths, and besides discuss on carbon nanotubes, including. the extracellular dealings between graphene. Carbon nanostructures cognate as carbon nanotubes and graphene are considered as the potentially revolutionary energy storage materials due to their excellent properties. We focus on various graphene-predicated practical applications based nano materials. Their present perspectives on challenges and coming prospects in these instigative fields are also talked over.

Keywords: Graphene, Graphene based nano materials, carbon nano tubes.

1. INTRODUCTION

Graphene is the abecedarian structure element of numerous carbon allotropes including graphite, etches, carbon nanotubes (CNTs) and bucky balls. Since its discovery in 2004 [1], graphene has fleetly surfaced as a family of largely promising nanomaterials with unique electronic, optic and catalytic parcels that can be exploited for multitudinous operations in energy, terrain, and biomedicine.

Graphene is the well- known two-dimensional carbon monolayers composed of all-sp²-hybridized imitations with some of the most interesting parcels, i.e., featherlight, high electrical and thermal conductivity, largely tunable face area(up to 2675 m² g⁻¹), strong mechanical strength (1 TPa) and chemical stability [2] These outstanding parcels enable graphene and graphene- grounded accoutrements to find operations in high performance structural nanocomposites, electronics, and environmental protection and energy bias including both energy generation and storehouse [3]. The combination of these outstanding physical.mechanical and chemical parcels make graphene- grounded Accoutrements more seductive for electrochemical energy storehouse and sustainable energy generation, i.e., Li-ion batteries, energy cells, supercapacitors, and photovoltaic and solar cells [4].

Due to their large face areas, superior physical and chemical parcels, graphene- grounded nanomaterials has surfaced as an seductive seeker to act as nanoscale structure blocks for natural inquiries. The strong van der Waals force between graphene nanosheets grease incorporating motes or nanomaterials (e.g., polymer or nanoparticles) to form multifunctional nanocomposites, which is effective to ameliorate their parcels and enhance their performance toward biosystems. Also importantly, graphenebased nanomaterial is renewable and easy to fabricate with low cost. While several excellent reviews have appeared with the focus on some of these motifs [5-6], there has not been a comprehensive review thatsummarizes the exploration progress in graphene-grounded nanomaterials in biosystems. We first compactly describe the structures, propertiesand conflation of

graphene, graphene derivations, and graphene- grounded mixes. Successionally, we concentrate on the recent advances of graphene in nano materials, ventually, we suggest some significant prospects, further developments and openings in this arising and promising field.

To crop as the revolutionary energy storehouse bias, EC should retain the capability of advanced energy viscosity, while maintaining lower cost for large-scale product in assiduity. Basically, the performance of EC is depending on the electro-active accoutrements served as elec-trodes and collectors. So far, the colorful carbon-grounded accoutrements, including actuated carbon, ordered mesopor-ous carbon, carbon nanotubes (CNT), graphene and their mixes, are intensely employed for the fabrication of EC. Among these nanomaterials, CNT and graphene are the rising nanomaterials for electronic and energy storehouse bias due to their largely accessible face area, nano-scale structure and good electrical conductivity since they were discovered [7]. Therefore the primary focus in this paper will be on the lately developed progresses of, graphene and their compound in laboratory and assiduity.

2. GRAPHENE AND ITS DERIVATIVE

Graphene, a two-dimensional subcaste of sp²-hybridized single-atomscale carbon, has caught perceptible attention due to its extraordinary natural strength, high face area, fast electron mobility, high thermal conductivity, and strong Young'smodulus. Graphene- grounded nanomaterials contain not only "pristine" graphene, but also chemical modified graphene as graphene derivations that have been treated by chemical variations [8] for covalent cling with hanging groups, similar as graphene oxide (GO) and graphene oxide (rGO). The conflation procedures of graphene and its derivations can be classified into two main orders physical and chemical approaches.

Physical approaches use exfoliation of a grapheme subcaste from bulk graphite by dismembering the van der Waals forcesbetween the piled wastes, including mechanical exfoliation, and direct liquid phase exfoliation. Chemical approaches make up colorful graphene- grounded nanomaterials through chemical response, including epitaxial growth, chemical vapor deposit (CVD), chemical oxidation, chemical reduction, and so on. The structures of graphene, its derivations, and graphene- grounded mixes as well as their affiliated set approaches are shown in Fig. 1.

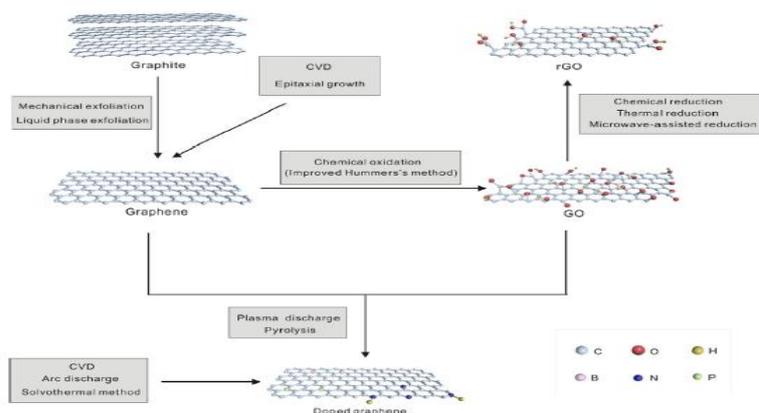


Figure 1: Graphene- grounded nanomaterials and their affiliated medication ways.

2.1 PHYSICALLY PRODUCED GRAPHENE

In graphite, the relations between conterminous graphene layers formed via van der Waals forces are extremely weak . This causes the delamination of bulk graphite into individual graphene wastes under mechanical forces.

Geim and hisco-workers first mechanically molted graphene by using tenacious videotapes in 2004 , which has been credited with the explosive growth of interest in graphene in recent times. Coleman etal. [9] developed graphene dissipations in the forms of mono-and multilayered graphene wastes, which are free from oxides and blights. The yield of monolayer graphene in N-methyl pyrrolidone (NMP) dissipations was 28, corresponding to an overall yield of roughly 1 wt. Still, the low attention of attained graphene, which was below $0.01 \text{ mg} \cdot \text{mL}^{-1}$, made it delicate to concentrate and insulate from the thick detergents.

2.2 CHEMICALLY PRODUCED GRAPHENE

CVD fashion has been extensively used to produce large-scale and high- quality graphene flicks with low/ no oxygen content and disfigurement-free hexagonal chassis. Chemical vapor deposit is a promising system to synthesize carbon nanostructures including CNT and graphene. The medium is to pyrolyze hydrocarbon coffers similar as methane or acetylene at well- controlled high temperature. Yoo etal. [10] fabricated an ultrathin ultracapacitor grounded on nonstop single and many- subcaste graphene flicks by chemical vapor deposit fashion on polycrystal- line Cu foils using liquid precursor hexane.

2.3 GRAPHENE GROUNDED COMPOSITES

Graphene is also a good seeker combining with essence oxides and conducting polymer to give advanced specific energy and electrical conductivity for the electrodes of supercapacitors. Graphene- grounded mixes as padding accoutrements where graphene is used as a base to disperse in or objectification of other nanomaterials, similar as essence nanostructures [11] and semiconductor nanostructures [12]. The graphene- grounded supercapacitors showed a advanced specific capacitance due to the fact that the graphene can physic-cally acclimatize different electrolyte ions, leading to a advanced availability of electrolyte ions and also a more effective use of the specific face area.

3. GRAPHENE GROUNDED NANO DEVICES

3.1 PHOTONIC DEVICES

Photonic bias are the factors that induce or descry the photonic flux that's developed and employed for either electronic signal or light. The P-N device in the form of a light- emitting diode, photovoltaic cell, and the ray device is the most common type of photonic device. Traditionally these bias are designed and fabricated using Si or Ge due to which limited effectiveness, broad bandwidth, high power consumption are many of the major limitations of current electronic bias. These limitations may be overcome by developing the replica of current electronic factors at the nanoscale. The main theme of bias at the nanoscale is the lower the confines, the lower the power consumption, and the advanced the effectiveness. As mentioned over, though graphene possesses a zero energy bandgap in its nanosheet form, it exhibits a finite bandgap in its nanoribbons form which varies with the range of the nanoribbon.

It's possible to further enhance electronic transport parcels of GNR with dopant adatoms [13] that may help to fabricate graphene- grounded P-N nanodevices as well as the face aural surge detectors at nanoscale. Also, it has also been proposed by several exploration groups that the doping of boron and nitrogen in graphene exhibits the possibility of negotiating the graphene- grounded p-n junction at nanoscale as well as graphene aerogels for oxygen electro-catalysis [14] wherein boron being trivalent and nitrogen being pentavalent contaminations

introduce the energy bandgap. First-principles amount transport computations of electronic parcels of boron and nitrogen- unravel armchair GNR showed that the B- unravel p- type GNR grounded device can parade high situations of performance, with high ON/ OFF rates and low subthreshold swing [15].

3.2 GRAPHENE GROUNDED PN DEVICE AND FET

The P-N device is one of the abecedarian bias of an electronic circuit that controls the charge carrier (electron) current in the circuit manufactured from semiconducting accoutrements similar as silicon (Si) and germanium (Ge). It has a positive (p) region and negative (n) region created via answer semiconductor material by trivalent and pentavalent contaminations independently. Since AGNR exhibits semiconducting parcels it's possible to design P-N device at the nanoscale using AGNR configuration. This type of P-N device will be having better electronic transport parcels compared to traditional one because armchair graphene isn't only a semiconductor but transparent and flexible also due to which it can be placed in nanoelectronic circuit. In addition to this, according to the recent composition on graphene- grounded terahertz frequency discovery, it's possible to design and fabricate graphene p-n junction grounded nano-antenna (bolometer) using the print-thermoelectric effect wherein it's reported that with the binary reopened dipolar antenna of the gap of 100 nm it's possible to concentrate the incident radiation for better photoresponse [16].

There are several reasons behind this quest similar as limited electronic transport parameters of current electronics accoutrements (Si, Ge) i.e. electron mobility and hence conductivity, poor heat dispersion rate of Si and Ge, and their tensile strength, failure of Moore's law, etc. The field effect transistor (FET) is one of the most important and abecedarian electronic device that uses electric field to control the current and possesses three electrodes source, drain, and gate. A semiconductor channel is connecting source and drain and the third one i.e. gate controls the current. Perpetration of graphene field effect transistors (GFET) in detectors has large number of benefits over the bulk FET made from Si. As the silicon is bulk semiconductor, the charge carriers at the channel interface have difficulty to access into the device which limits response perceptivity of the device. On the other hand, as the graphene possesses two dimensional structures, the sensitive channel is itself the face that eventually improves the face perceptivity. In addition to this, the carrier scattering rate through graphene is much lower than that in the case of bulk semiconductors. Thus, the carrier energy loss is also much lower than that for the bulk semiconductors.

3.3 GRAPHENE GROUNDED PHOTODETECTOR AND PHOTOVOLTAIC DEVICES

Photodetectors are significant optoelectronic bias that descry the optic flux by converting the absorbed optic energy into the electronic current. They're part of remote control, boxes and DVD players. The diapason responded by sensors is entirely depends on the bandgap of the material of sensor. The traditional photodetectors correspond of IV or III-IV semiconducting accoutrements that are suffering from long-wavelength limits because these accoutrements don't respond to the optic energy if its energy is lower than the bandgap. Hence, the particular material becomes transparent for that radiation. As a result of this problem, the perpetration of graphene is the better option as graphene absorbs from ultraviolet to terahertz range [17]. Since, the response time of a photodetector depends on the carrier mobility, graphene grounded photodetectors (GPDs) can be ultrafast because graphene exhibits veritably high carrier mobility. This is an important trait to the fields

of graphene grounded optoelectronics, print-thermocouple bias and photovoltaic operations . Graphene grounded touch screen is an arising field as well because graphene is transparent and conducting too. This is the reason why graphene transparent conducting flicks (GTCFs) are promising layers for touch defenses of electronic device displays. Graphene being mechanically strong, with high chemical continuity, non-toxic, and cheap is one of the ideal accoutrements for displays. Traditional displays correspond of ITO which is expensive, wear-resistant, brittle and has limited chemical continuity. Graphene- grounded touch panel display can be grown by screen printing by the CVD fashion . The energy conversion effectiveness of these accoutrements is limited to around 25. Also, since Si and Ge aren't flexible accoutrements it limits the flexible solar cells or panels which are important factors of futuristic wearable electronics. These limitations can be overcome by using graphene- grounded PV cells for this aspect. Graphene plays multiple places in a photovoltaic cell i.e. photoactive material, transparent as well as conducting (TC) subcaste, charge transport subcaste, and catalyst. Among all these instigative and promising operations of graphene, the terahertz (THz) photonics grounded on graphene is a promising field of exploration as well which is able to develop high- performance terahertz bias operated in the region between 300 GHz to 10 THz. at 300 K [18].

3.4 GRAPHENE GROUNDED CN FET

Carbon grounded electronic accoutrements have been considerably studied in several of its allotropic forms similar as carbon nanotubes (CNTs), infinitesimal layers of graphite (i.e., graphene), fullerene motes, and diamond for numerous times for operations similar as resistive recollections, sense bias, interconnect, biosensors, displays, solar panels, and numerous others. Also, it enables more aggressive design and enables more comprehensive testing.

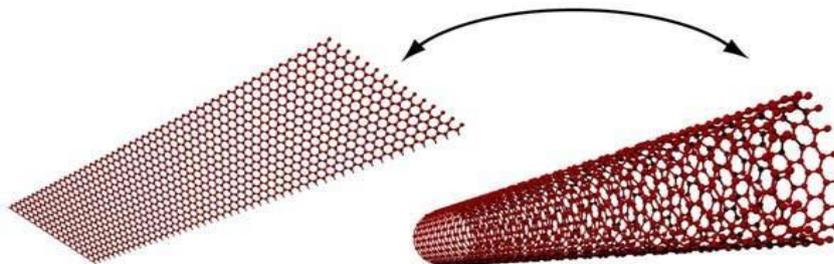


Figure 2: Schematics of a distance of graphene and a single walled carbon nanotube

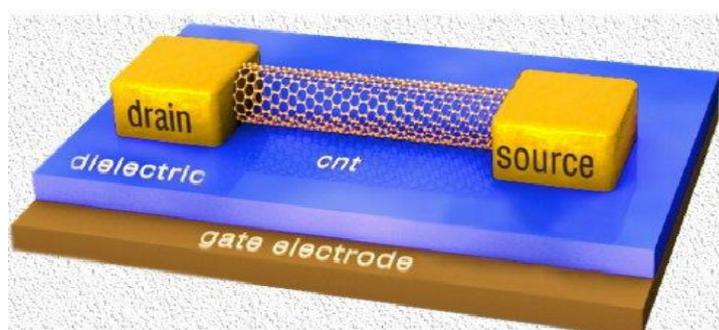


Figure 3: Schematics of a graphene grounded carbon nanotube FET

Carbon nanotubes, after they were formally plant by Sumo Lijima of NEC Japan in 1991, scientists have plant

that CNTs have exceptional current carrying capabilities of 10^9 A/cm² which makes them suitable for interconnect operations. They're one dimensional nano cables which show amount line geste with ballistic transport and hence can be used as veritabably long and thin interconnects at 12nm technology bumps and beyond. Also, the thermal trustability issues material to the ICs are another problem.

3.5 GRAPHENE GROUNDED SUPERCAPACITOR ELECTRODE MATERIALS

Graphene can be assembled into several different structures, i.e., the free- standing patches or blotches, onedimensional filaments or yarns, two-dimensional flicks and three-dimensional lathers and mixes. Recent studies concentrate on graphene- grounded electrode accoutrements according to their macrostructural complexity, i.e., zero-dimensional (0-D) (e.g. free- standing graphene blotches and patches), onedimensional (1-D) (e.g. fiber- type and yarn- type structures), two-dimensional (2-D) (e.g. graphenes and graphenebased flicks), and three-dimensional (3-D) (e.g. graphene lathers and mixes).

4. APPLICATIONS

Grounded on their essential antibacterial parcels, as well as superior physiochemical parcels, graphene-grounded nanomaterials have been employed as a novel and green antibacterial material, as well as other applications in the fields of wound addressing, tissue engineering scaffolds, drug delivery, and water purification.

5. FUTURE SCOPE

The major direction for future research in this area lies in elaborately designing, controlling and tailoring the strategy to synthesize novel carbon-based composites, and to realize and exploit their more desirable functions for VLSI application.

6. CONCLUSION

As graphene- grounded nanomaterials are applied in a wide range of fields, the directly or laterally cytotoxicity of graphene has drawn great attention about mortal health and ecosystem pitfalls. Although a great numerous studies of graphene toxin have been reported, it's still unclear whether graphene- grounded nanomaterials affect normal mammalian cells when they kill microorganisms. Due to lack of certain inconsistencies in detailed results and suppositions of the mechanisms, establishing universal acceptance criteria for toxin tests is necessary but has not yet been set up. As graphene- grounded nanomaterials are applied in a wide range of fields, the directly or laterally cytotoxicity of graphene has drawn great attention about mortal health and ecosystem pitfalls. The low cost and effective process to produce graphene- grounded accoutrements is the chemical exfoliation of graphite . Still, before the large scale operation of this facile processing system in electrochemical energy storehouse bias, the stabilization of single or many- subcaste graphene . Wastes in colorful detergents and the preservation of their natural parcels must be addressed in order to break the tailback of re-stacking of graphene wastes. This review epitomized recent development on graphene- grounded accoutrements for supercapacitor electrodes grounded on their structural complexity.

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Distributed Generation Allocation and Planning In Deregulated Electricity Market

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Abstract: Now- a - days, distributed generation (DG) is playing a vital role in power sector throughout the world. Distributed generation (DG) using sustainable energy resources are finding its way in almost every power sector. To meet future energy demands, energy policies all over the world are promoting distributed energy resources such as energy efficiency, increasing the number of DG installations and RESs planning. It can be clearly seen that the load demand rates of countries are increasing at a very alarming rate. So, to meet this increasing load demand, we can only rely on renewable energy resources (RES) in distributed generation. However, the implementation of these resources is not easy. Problems like uncoordinated management of resources, grid integration etc. needs to be tackled with. In this paper, the implementation of distributed generation in deregulated market structure has been discussed. This also covers the recent work done in this area and based on all these researches, probable solution has been put forward for implementing the distributed generation in deregulated power scenario.

Keywords: Deregulation, Distributed generation, Electric power systems, Electricity market, Grid, Renewable energy sources.

I. Introduction

Electric power scenario is changing at a very rapid rate. The load demand and flexibility from consumer point of view is increasing day by day. To meet the increasing load demand and to provide more flexibility and transparency to the consumer, Electricity Supply Industries (ESIs) had been undergoing through the process of deregulation of energy sector. Deregulation of power sector or energy sector means shifting from existing vertical power structure to more transparent and flexible unbundled power structure. This deregulated power structure will provide more transparency and flexibility to the consumer. The consumer can have the choice of buying power from one or the other company. A deregulated power structure refers to break the traditional vertical integrated structure into different sectors performing individual functions. In the traditional power structure all power or electrical energy components acts under one entity performing respective functions governed by the rules and regulations framed by the government. To provide consumer with variety of generation, transmission and distribution options, these rules are reframed and the result is a deregulated power system structure. The need for deregulation can be summarized as:

- i) Introduction of new generation techniques
- ii) Competitive market
- iii) Transparency for consumers
- iv) Introduction to digital control techniques.

In order to meet the above time changing demands, the power structure has been deregulated. The components or entities in a deregulated structure are:

- i) GENCOS

ii) TRANSCOS

iii) DISCOS

iv) RESCOS

v) ISO

i) GENCOS- GENCOS are the generation companies responsible for generation by different techniques such as hydro, thermal, wind, solar etc. to introduce competition in the generation market, these companies try to bid and sell their generation at lowest possible price.

ii) TRANSCOS- These companies cater for transmission purposes from generation to consumer point.

iii) DISCOS-Discos refer to distribution companies to supply consumers with the demanded load.

iv) RESCOS-These are retail energy service companies which perform the function of comparing prices of different generation companies and pass on the information to the consumers.

v) ISO- Independent system operator performs very important role in the deregulated power scenario. He ensures the availability of respective load to respective consumer at feasible cost.

As deregulation of Electricity industry has brought culture of competition among multiple players in generation, transmission and distribution under varied constraints which was not there in restructured or vertically integrated sector, hence some important physical realities and limitations such as network losses and congestions can cause market inefficiencies. So to cope up with the recent trends in electricity structure, several distributed generation (DG) options are fast becoming economically viable. Distributed generation (DG) is a feasible alternative for new capacity expansion, which plays key role due to their economic viability and small size with immense benefits. DG includes the small and modular size conventional and non-conventional type generators or storage systems, at or near to the end-user to provide the required electric power and thermal energy. The rest of this paper is organized as follows. Section II describes in detail the concept of distributed generation and its advantages. Section III provides details about use of renewable energy resources in distributed generation and problems encountered. Section IV briefly reviews the probable solution to the problems encountered. Finally, Section V concludes this work.

II. Distributed Generation (DG)

Distributed generation (DG) technology which is also known as dispersed generation technology is electricity generating plant connected to a distribution grid rather than the transmission network. There are many types and sizes of DG facilities which include wind farms, solar photovoltaic (PV) systems, hydroelectric power, or one of the new smaller generation technologies. The DG concept emerged as a way to integrate different power plants, increasing the DG owner's reliability and security, providing additional power quality benefits of the power grid and improving the environment quality as a result of lower greenhouse gas emissions of air pollutants. DG technology can come from conventional technologies such as motors powered by natural gas or diesel fuel or from renewable energy technologies, such as solar PV cells and wind farms. Distributed Generation is a viable option in solving utility distribution systems capacity problems [1]-[3]. Given the many uncertainties and risks in the deregulated environment, DG is favorable because of its modularity, low investment costs and hence reduced capital risk [1], [2], [4]. The small sizes (plant area) make it easier to find sites and shorten construction times. It is also acknowledged that DG can improve security of the power supplies and present opportunities for diversifying the fuel mix in electricity generation, thereby providing an additional variable in overall power

system efficiency control. On the other hand, the installation of DG in the network has technical, environmental and commercial challenges that need to be managed properly if the benefits detailed above are to be achieved [5]-[7]. Technical challenges include the disruption of existing voltage control mechanisms and protection equipment, plant thermal constraints, short circuit levels, stability and network operation and control issues. Additional technical challenge is uncertainties associated with generation technologies which may become outdated resulting in reduced project life span. This could be due to unsustainably high maintenance or operational costs as a result of obsolescence. Environmental challenges depend on the generation technology chosen, for example, wind turbines may not be sited in certain areas even if the wind resource is favorable. Commercial challenges are the changing market conditions and regulations: energy and fuel prices, operating costs, maximum operating profit, incentive schemes and variation of load demand from the projected figures.

III. Renewable Sources in Distributed Generation

DG technology can come from conventional technologies such as motors powered by natural gas or diesel fuel or from renewable energy technologies, such as solar PV cells and wind farms. Over the past two decades, declines in the costs of small scale electricity generation, increases in the reliability needs of many customers, and the partial deregulation of electricity markets have made DG technology more attractive to businesses and households as a supplement to utility-supplied power [6]. However, the increasing number of DG units in electrical networks requires new techniques for the operation and management of the power networks in order to maintain or even to improve the power supply reliability and quality in the future. As a consequence, the control of DG unit should be improved to meet the requirements for the electrical network. Therefore, design of a control technique, which considers different situations of the electrical networks, becomes of high interest for interconnection of DG units to the power grid. DG technologies based on conventional energy resources viz. IC engines, gas turbines, and micro turbines and renewable energy resources viz. solar, wind and biomass etc [24–26]. The rating of DG can range from a few kilowatts up to 100 MW. While smaller units (a few kilo- watts to a few megawatts) are typically installed in distribution networks, larger units (tens of megawatts to 100 MW) are likely to be installed in sub transmission network [14]. Some DG technologies produce electrical energy almost as efficiently as large central power plants and at a cost competitive with centralized generation for certain applications. However, employment of DG in existing systems can cause several potential operating conflicts such as voltage flicker, disoperation of protection, and reverse power flow [19–20]. Therefore, such issues must be taken into consideration to assure an acceptable level of safety and reliability. DGs affect the flow of power and voltage conditions at customers and utility equipment. These impacts may manifest themselves either positively or negatively depending on the distribution system operating characteristics and the DG characteristics. Positive impacts generally include voltage support, improved power quality, loss reduction, transmission and distribution capacity release, improved utility system reliability. On account of achieving the above benefits, the DG must be reliable, dispatch-able, of the proper size and at the proper locations [13].

IV. Issues in implementing Distributed Generation (DG) in Deregulated Structure

a) Congestion management

In deregulated electric power systems, congestion in transmission systems is a major problem which leads to

electricity price spikes. Transmission congestion occurs when there is inadequate transmission capacity to fulfill the demands of all customers and more expensive generating units may have to be brought on-line, hereupon electricity market will not be able to operate at its competitive equilibrium and also imperil system's security. Therefore congestion management is one of the key issues for secure and reliable system operations especially under restructured electric power systems [17,19].

b) Power system reliability with DGs

The electric utility industry is moving toward a deregulated, competitive environment where system operator (SO) must have accurate information about system performance to ensure that customer expectations are met with an acceptable level of reliability. Over the past few decades, power system reliability evaluation has been mainly concentrated on generation and transmission. The basic reason for this is that generation and transmission systems are capital intensive, and their inadequacy can cause wide spread catastrophic consequences for both society and its environment [9,14,13]. To measure system performance, the electric utility industry has developed several performance measures of reliability. These reliability indices include measures of outage duration, frequency of outages, system availability, and response time. The use of DG capabilities by forming intentional islands during service restoration for improving system reliability has been discussed in [14]. The paper illustrated a procedure for service restoration using combination of network reconfiguration and intentional islands for DG units. An optimal siting and sizing method for placing DG in a distribution system was presented to improve the system reliability [15]. From the reliability point of view, microgrids can provide higher reliability and power quality at load points. The proximity of DG and load could decrease the duration and the frequency of outages as well as the level of energy not supplied with the employment of microgrid [16]. The situations were identified in [17], where the microgrid may reduce the interruption rate and duration of outages by improving the reliability of the distribution network. The main motivations behind the proposed works in the area of distributed generation integration are:

- 1) Deregulation in the power market, which encourages public investment to sustain the development in the power system.
- 2) Rapid increase in power demand in certain regions of the country.
- 3) Saturation of power flow limits in the existing networks and the continuous growth of the demand.
- 4) Environmental concern in building new transmission infrastructure.
- 5) Public awareness of the environmental impacts of electric power generation.
- 6) Significant advances in several generation technologies that are much more environmentally benign (wind power generation, micro turbines, fuel cells, and photovoltaic) than conventional coal, oil, and gas-fired plants.
- 7) Increasing public craving to promote “green” technologies based on renewable energy sources.
- 8) Awareness of the potential of DG to enhance the security of electric power supply, especially to critical loads, by creating mini- and micro-grids in the case of emergencies and/or terrorist acts, and/or embargoes of energy supplies.

c) Planning Issues

Several benefits accrue by integrating DG with utility networks. These benefits should be clearly evaluated, analyzed, and quantified in order to increase the potential and value of DG penetration. The benefits of DG have been evaluated and quantified in terms of capacity credit, energy value, and energy cost saving. In addition, quantification of voltage profile improvement, line-loss reduction, and environmental impact reduction have

attracted the attention of researchers. Many papers which discuss about the optimal planning and operation of the DGs have been presented in the literature [23,25]. However, none of the research works have considered the load-ability and voltage security criteria. DGs planning presented in the literature has not considered the allocation of DGs based on the requirements of utility and customer point of view. The studies can be extended to include the outage cases also for RESs based DGs allocation in the deregulated electricity market.

V. Conclusion

In this work, it has been attempted to review the existing works on integration of DGs, an area that has seen tremendous research activity in the last few years. Several possible ways of classifying the works depends on different parameters and operating conditions with DGs have been discussed, and based on this, a classification of hierarchy has been investigated. The traditional industry dominated by large monopolistic and vertically integrated utilities has now given way to a healthy competitive environment in which a number of generation and distribution companies can trade freely and have a nondiscriminatory access to the transmission network. Because of rapid growth of population along with proportionate industrial development, the healthy competitive environment deteriorates with a gap in generation and demand. This can be counteracted by integrating DGs at sub-transmission or distribution level, which adds value to the system with proper planning. Review of the various DG allocation techniques for power flow analysis has been presented in this work. Proper allocation of DGs will be beneficial to environment and economically beneficial for utility and consumers. The passive distribution or sub-transmission network becomes active, when DGs are integrated into the system and hence, leading to some technical and economic issues. This survey is a step to identify the current state of the art in the area and some of the interesting research challenges.

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PREDICTING STUDENTS' DROP OUT USING DATA MINING TECHNIQUES-A LITERATURE REVIEW

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Abstract

This research paper discusses different data mining techniques in educational data mining which has a greater impact in improving students' academic performance and reducing drop out. In the Indian context, predict students' retention is a major problem. By implementing data mining techniques, we can predict the learning habits of students. The growing number of students dropping out of institutes is major concerns for the top Educational institutions because it gives a big impact not only cost students but also waste of Public funds. Thus, it is essential to understand the students who are at risk of dropping out and what are the factors that contribute to high dropout rates? Prediction of students drop out is not an easy task, because It is not a one-dimensional problem, it is a multifactor problem. Student drop out depends on Academic level, socioeconomic status, family background, leisure activities, mental Health, health issues, educational qualifications of their parents, etc., can predict students Early dropouts, look for possibilities to retain students in their studies. Data mining plays a vital role in predicting early dropouts.

Keywords:- retention, data mining techniques, prediction, educational data mining

I. Introduction

The issue of student retention in higher institutions has gained a lot of attention and has become an important issue to college administrators to ensure the student succeeds or graduates and declines the desertion of the student from the institution. It is important for the university to understand the behavior of successful students. The number of students dropping out every year is increasing. Therefore, many researches aimed to examine Factors that affect student performance decline in various Educational levels such as primary, secondary and higher. The amount of information stored in educational databases Rapid increase due to progress in the field Information Technology. These databases contain a wealth of Data on students and are a valuable gold mine Information. The difficult task here is to identify and classify Valuable information hidden in these databases.

The most promising solution to this problem is the use of knowledge Discovery in databases or data mining in education is called educational data mining. A well-known and effective manner of coming across new information from large and complex data sets is data mining. Data mining demonstrates evidently looking for significant data stores to find out patterns and examples that move beyond trustworthy investigation techniques. Data Mining makes use of complicated numerical calculations for information sections and assesses the probability of destiny occasions. Data Mining is moreover known as Knowledge Discovery of Data (KDD). Data mining helps to extract the unique and meaningful data from the data warehouse. It is used to express discovery of knowledge and search for essential relationships between different variables/attributes in the data Deposit. It can be used in the different fields of the real world such as banking, education, medicine, telecommunications and fraud detection, etc. EDM has arisen due to the increasing accessibility of educational

data and hence the need to analyze this massive data. EDM is a multidisciplinary research field which is used to analyze educational data using data mining techniques

It is especially necessary in education when one wants to check the performance of a student in the near future with his previous record in education. It is a very time consuming and permanent process if we want to analyze student performance manually. Also, the result of the manual process is not up to the required level. There is a dilemma of dropping out of higher education institutes. In the education system in India and we are just trying to find out the reasons why they left HEIs. For that, the work has been done to find out the various attributes of the student that helps them drop out in education. Therefore, reducing dropouts in India is one of the challenges faced by the educational institution. They aim to enroll more students by providing qualified faculty, better infrastructure, and improved laboratories Work and sports facilities and the best study program. After enrollment, the main objective of each college is to guide each student to effectively complete his studies with appropriate knowledge and acquisition of good skills.

Currently, however, the deployment of Student Information Systems at the institutional level provides a adequate infrastructure for the organization and storage of student data, as well as data acquisition and deeper analytics This data can help model churn behavior and predict future churn, therefore giving an opportunity for counselors to mentor and guide students toward success. The demand for education in India has increased as more and more children now attend their schools. But there are many problems with educational system that causes many students to abandon their studies. We lack good infrastructure, quality teachers and poor delivery of course content in India which makes people drop out of school.

In this paper, a review of the research conducted on the prediction of the academic performance and drop out that a student may have was made. Section II describes different data mining ways which are substantially applied in the education system. Section III describes Systematic reviews of the literature on educational data mining by different experimenters and recent work done on educational powerhouse. Section IV describes different attributes selected by researchers for predicting educational dropout. In the last section, a conclusion on the review is given with future scope.

II. Data mining techniques

There are many techniques of data mining to find interesting patterns in the data set. Different types of algorithms and techniques like Classification, Regression, Association Rules mining, Genetic Algorithm, Clustering, Nearest Neighbors method, Decision Trees are used for information retrieval from educational databases. These techniques are also used to predict student performance, drop out, design new curricula, etc. In this section, a brief introduction to various data mining techniques is given.

Classification:-Classification is the way toward discovering a capacity that depicts and recognizes classes of information or ideas to have the option to predict the class of articles whose mark is obscure. Classification predicts absolute marks (discrete, chaotic). Grouping as per the sorts of data sets separated. The data mining framework can be grouped by the sorts of data sets separated.

Clustering:-Clustering is used to make groups of comparatively identical cases or observations. Things in a group are comparable to each other. They are also not related to things outside of the groups. Take the example of a university where many students are studying. We can group different students according to their attributes such as course, grade, activity, age, gender, hot seller, day-scholar, rural or urban student. With this, we can provide different types of facilities to different groups according to their specific requirements.

Regression:-Regression is a factual technique that is principal to numeric expectation albeit other strategies exist ll. They are four sorts of regression. 1. Standard numerous relapse considers all indicator variables at the normal time 2. Stepwise different relapse calculations will examine which indicators are best used to anticipate the decision of the neighborhood. 3. Hierarchical relapse is a consecutive process. 4. Sets relapse it investigations a bunch of factors as opposed to singular factors.

Prediction:-Prediction predicts a continuous-valued function or ordered value as opposed to a categorical label. For simplicity there is no ambiguity, will use the short end term of prediction to refer to numeric prediction.

Association rule mining:-Association between more than one attributes, or predicate (i.e. age, income, buys). Adopting the terminology used in multidimensional databases, where each attribute referred to as a dimension, the above rule referred to as a multidimensional association rule.

Outlier:- An information base may contain information protests that don't consent to the overall conduct or model of the information. These information objects are external. Most information mining techniques dispose of anomalies as commotion or special cases. An anomaly might be distinguished utilizing a factual test that expects a conveyance of likelihood model for the information or utilizing distance estimates where protests that are a significant separation from some other bunch are considered as exceptions.

III. Systematic reviews of the literature on EDM dropouts

During the last few years, a lot of work has been done on EDM, such as predicting student academic performance and progress, prediction of educational dropout, prediction of student placement, prediction of student outcome, etc. The result of these predictions is very useful for framing as well as the implementation of new rules and regulations, the adoption of new teaching methodology, the improvement of placement records, and the improvement of the curriculum in the educational institution.

Table 1 Table Listing Authors Name with Their Year of Publication, Publisher and Title of paper

Lovenoor Aulck, Nishant Velagapudi, Joshua Blumenstock and Jevin West, in their study, they present the

| Sr. No. | Author Name | Title of Paper | Publisher | Year of Publication |
|---------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------------------|
| 1. | Lovenoor Aulck, Nishant Velagapudi & others | Predicting Student Dropout in Higher Education | arXiv:1606.06364v3 | 2016 |
| 2. | Suganya S & Dr.V.Narayani | Analysis of students dropout forecasting using data mining | IJATES, volume no.5, issue no. 4 | 2017 |
| 3. | Boris Perez & others | Applying Data Mining Techniques to Predict Student Dropout: A Case Study | IEEE, 978-1-5386-6740-8/18 | 2018 |
| 4. | Johannes Berens, Kerstin Schneider & others | Predicting Student Dropouts Using Administrative Student Data from German Universities and Machine Learning Methods | Journal of Educational Data Mining, Volume 11, No 3, | 2019 |
| 5. | K Y Diaz Pedroza & others | Review of techniques, tools, algorithms and attributes for data mining used in student desertion | ICMSCT, Journal of Physics | 2019 |

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|-----|---------------------------------|---------------------------------------------------------------------------------------------------|----------------------------|------|
| 6. | Nafisa Tasnim & others | Identification of Drop Out Students Using Educational Data Mining | | 2019 |
| 7. | W F Wan Yaacob & others | Predicting Student Drop-Out in Higher Institution Using Data Mining Techniques | ICMSCT, Journal of Physics | 2020 |
| 8. | Fatima Alshareef & others | Educational Data Mining Applications and Techniques | IJACSA, Vol. 11, No. 4 | 2020 |
| 9. | M.Revathy & Dr.S. Kamalakkannan | Prediction of student's dropouts in Higher education using data mining techniques | Alochana Chakra Journal | 2020 |
| 10. | Alexandre G. Costa & others | Prediction analysis of student dropout in a Computer Science course using Educational Data Mining | IEEE, 978-1-5386-9111-3/19 | 2020 |

preliminary results of the prediction decreased students from a large, heterogeneous data set of student demographics and transcript records. They believed that these preliminary results point to a strong signal in text data for student dropout prediction, they display on it as relatively naive baselines to improve it in the future work.

Suganya S & Dr.V.Narayani, this study proposes to predict students' academic failure using data mining techniques algorithms. Algorithms are applied to a huge set of data and results are obtained, from which failures can be predicted. This information is more useful to teachers and the director of the organization, so that they can make appropriate arrangements and facilities to increase students' ability and reduce/prevent student failure in academic years.

Boris Perez, Camilo Castellanos & Dario Correia described the results of the educational data analyzing the case study focused on dropout detection from systems engineering (SE) Undergraduate students after 7 years of enrollment in Colombian University. They compared Decision Trees, Logistic Regression and Naive Bayes results in order to propose the best option. Their experimental results showed that the best AUC was achieved by decision tree model (0.94), so this accuracy could be confident enough to help in early dropping out early detection.

Vinayak Hegde & Prageeth P P In their study they introduce a methodology to predict student dropout using Naive-Bayes Classification algorithm in R language. And also examine the reason for student dropout in an early state and predict whether the student will fall or not.

Johannes Berens, Kerstin Schneider, Simon Görtz & others developed an early detection system (EDS) using administrative data of students from a state and private university to predict student dropout as a basis for a targeted intervention. To create an EDS that can be used in any German university, they use the AdaBoost Algorithm to combine regression analysis, neural networks, and decision trees, instead of relying only on a specific method.

K Y Diaz Pedroza, B Y Chindoy Chasoy, and A A Rosado Gómez, reviewed the techniques, tools, algorithms and attributes for data mining used in student desertion. They found that WEKA is the most widely used tool to implement the classifiers and they also found that the J48 algorithm was the most used algorithm in decision trees.

W F Wan Yaacob, N Mohd Sobri, S A Md Nasir, W F Wan Yaacob, N D Norshahidi and W Z Wan Husin, were described the uses of data mining techniques to predict student dropout of Computer Science undergraduate students after 3 years of enrolment in University Teknologi MARA Cawangan Kelantan, Malaysia. They compared Decision tree, logistic regression, random forest, K-nearest neighbor and neural network algorithm to propose the best model. According to them, the Logistic Regression model was found to be the best learner to predict the dropout students with identified potential subject causes.

Fatima Alshareef, Hosam Alhakami, Tahani Alsubait & Abdullah Baz reviewed the relevant studies in EDM, including the data sets and techniques used in those studies and identifies the most effective techniques. The most predominant applications include predicting student achievement; detect unwanted student behavior, group students, and student modeling. These applications aim to help decision makers in educational institutions to understand the situations of students, improve student performance, identify learning priorities for different groups of students and develop a learning process.

M.Revathy & Dr.S. Kamalakkannan investigates the causes and reasons for student dropout. they also reviewed some of the studies related to this work. It also suggests consequences, causes and some preventive measures to reduce student desertion. There is no single cause and reason for the student to interrupt your education.

Nafisa Tasnim, Mahit Kumar Paul and A. H. M. Sarowar Sattar proposed a threshold based approach to identify dropout students that outperforms the existing approaches to extract the important features; one only needs the attribute values and their corresponding information gain. From the extracted features the threshold value can be calculated. Once the threshold value is calculated, no classifier is needed for classifying a new pattern. The work in this paper is limited to applying the method for original datasets and for the datasets of after detecting outliers.

Alexandre G. Costa, Emanuel Queiroga & others presented a model that can predict student risk dropout rate using data from the first three semesters completed by students of Bachelor of Computer Science of Federal University of Pelotas. This work uses the CRISP-DM methodology and data from the Cobalt Management System.

Shivendra Kumar Dwivedi & Dr. Prabhat Pandey, used the classification data mining technique to extract the important trait stored in a database to analyze the reasons that influence student dropout in different colleges of higher education. They also work to identify those students who need special attention to reduce the dropout rate. This information is useful for developing and implementing a plan to reduce dropout and improve college enrollment in the university's various colleges.

January D. Febro, applied filter methods to data sets that are queried from university databases. To demonstrate the applicability of this method as a preprocessing step before data modeling, the predictive model was built using selected dominant features. Realizing these factors, the university can improve intervention programs to help students with retention and success.

Kelly J. de O., Angelo G. Menezes, Andre B. de and Carlos A. E. Montesco, Examine supervised learning in educational data mining to avoid students who drop out. This research study analyzes the writing of different supervised learning. Techniques (decision tree, neural network, support vector machine, and random forest are used to identify high-risk students in the Brazilian university.

Anjana Pradeep Smija Das Jubilant J Kizhekkethottam proposed a study on the prediction of the dropout

factor of students. They focused on what are the factors that affect students, their academic performance, leading them to predict their failures and dropouts. They use various educational data mining techniques to identify students who are performing in their academic studies. For the implementation, they used induction rules and decision trees to apply on the data.

From the above discussion, it is clear that different researchers have been working on educational data and find different results depending on their requirements. In most of the research papers, researchers used classification, clustering, and correlation algorithms to extract data for their prediction in educational settings. These techniques were widely used in the early period of EDM but are still widely used in various fields of application. To make predictions, student traits are used. The various traits used in predicting student performance are academic, social, demographic, personality and familial traits. But in most cases, the student's GPA, internal grades, external grades, parental education, profession and poor teaching methodology are the main factors that influence students' outcome.

IV. Various Attributes and Data Mining Techniques that are Frequently used for Predicting Educational Dropout

In this section, I examine those traits that compel students to drop out of education. These traits are also supportive of predicting student performance using EDM techniques. Concern and concern about the difficulty of disappointing students and the form of the main contributing factors to this problem have increased. There are a lot of factors that affect students' performance in their education. The best trait is selected based on the frequent occurrence in all papers considered for our research. In Selected Traits, we filtered out the top 10 traits to predict student dropout. Top selected traits are degree in HSG, SSG and other relevant education, gender, family grade student in HSG, SSG and other relevant education, gender (M/F), family structure, parental qualifications, parental occupation, required for domestic work, addiction (Alcohol, smoke, pills, solvents, drugs, etc.), essential facility in different educational institution for boys and girls, poor teaching methodology adopted, depiction of marriage in.

Table 2 Table Listing Attributes and Data Mining Techniques based on Review of Different Research Papers on Predicting Educational Dropout

| Subject/Topic | Feature Involved |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attributes that are substantially helpful for prognosticating educational powerhouse | Age, Gender, Cohort, Ethnicity, Occupation, location, GPA, Parent's interference, careful experimental evaluations, small class size, High School grade, Senior Secondary grade, student's family position, interest, poverty, teaching environment, Sexual lives, cost of the study, households work, family income, got married, household factor, poor infrastructure, lack of good faculty etc. |
| Various Data Mining Techniques used for Predicting educational dropout | Logistic regression analysis, CART, C4.5, J48, SL, JRip, RF, Naïve Bayesian Algorithm, Association rules mining, ANN based algorithm, Logistic Regression, NB, C5.0, SVM, LR and MP, Improved ID3 algorithm , ICRM2 |

Currently, Educational dropout is a major problem in the Indian education system. We consider that the prediction of educational dropout is very important. Because it further affects the literacy rate, the national development of any country. Most researchers found in EDM logistic regression analysis, CART, C4.5, J48, SL, JRip, RF, Naïve Bayesian algorithm, Association rule mining, ANN-based algorithm, logistic regression, NB, C5.0, SVM, LR and MP, improved ID3 algorithm and ICRM2 data mining algorithm are important.

In this section I found that age, gender, cohort, ethnicity, occupation, location, GPA, parental interference, careful experimental evaluations, small class size, school grade high school, high school grade, student's family position, interest, poverty, teaching environment, sex life, cost of study, housework, family income, marriage, factor home, poor infrastructure, lack of good teachers, etc. are the most important attributes to predict educational desertion. In the case of data mining algorithms used to predict educational dropout, classification and mining of association rules are mostly used. More than 50% of the research papers studied used these methods to predict dropout students. Logistic regression analysis is also an important prediction algorithm

V. Conclusion & Future Scope

In summary, it is important to say that forecasting dropout is a major, important and challenging task for every educational institution manager, policy maker and educator. To deal with these problems, the researcher tries to make use of DM techniques. After studying several important research papers, we realized that data mining techniques would prove useful in improving education. In my study, I found that data mining techniques are useful in online study program, engineering organization to predict their status, educational dropout prediction, student overall score, etc. Most educational data mining researchers use Naïve Bayesian Association Base Mining Algorithm, ANN-based Algorithm, Logistic Regression, CART, C4.5, J48, (BayesNet), SimpleLogistic, JRip, RandomForest, Logistic Regression Analysis, and ICRM2 to classify the dropout student from education. With the help of data mining techniques, we can find out all those traits that help a student drop out. Top selected traits are grades in HSG, SSG, other relevant education, gender, family structure, parental qualifications, parental occupation, required for domestic work, addiction (alcohol, smoke, pills, solvents, drugs, etc.), and basic facility in different educational institution for boys and girls, poor teaching methodology, married.

These selected features can be increased or changed in our future research. Because I have studied these traits according to the frequency of their occurrence in the selected papers under study. Also this information is useful for developing the plan and their implementation to minimize the dropout and improving the enrolment rate at various educational institutes.

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Educational Data mining for Prediction of Students' Performance Using Clustering Algorithm: a literature review

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ABSTRACT

In today's era universities from all over the world produce not only graduate students but also a huge amount of data from online and offline systems. Data from various students' activities are stored and can be used in better planning for students. So the question in this scenario is how higher education institutes can use this huge amount of data for future planning and benefits of their students. In this paper, we review various research papers and the work of their author on data mining algorithms, especially clustering algorithms. Without data mining techniques it is a very difficult task to build a system that can learn from this data, but it can be achieved by using data mining approaches like clustering, classification, prediction, association, etc. This paper focuses to consolidate the various clustering algorithms discuss in different research papers and how to apply those clustering algorithms to this huge data in the Educational Data Mining context.

Index Terms-Educational Data mining, Clustering

I. INTRODUCTION

According to the International Educational Data Mining Society, "Educational Data Mining is an emerging discipline, concerned with developing methods for exploring the unique and increasingly large-scale data that come from educational settings and using those methods to better understand students, and the settings which they learn in" [1].

Data mining is a process of analyzing, extracting, and discovering patterns, Correlations, finding anomalies in the huge volume of data to predict the outcomes. Data mining is the process of knowledge discovery in databases. DM process is to extract the usable data from a large set of raw data. It can be used in many areas such as database marketing, bank credit risk management, Education Data mining, spam Email filtering, fraud detection, Market predictions, etc. Data mining is not a new technology. The concept has been around for over a century, but its popularity is on top in the 1930s.

Data mining is utilized in numerous spaces of business and exploration, including deals and promoting, item improvement, medical services, education, and training. When utilized accurately on dataset, Data mining can give an immense benefit over contenders by permitting you to study clients, foster viable advertising techniques, increment income, and diminish costs. The actual data mining task contains various tasks like analysis of huge raw data to extract previously unknown, interesting patterns such as creating data record groups (cluster analysis), finding unusual records (anomaly detection), and finding dependencies. These patterns can then be treated as a summary of the input data and may be used in further analysis.

The objective and purpose of this research paper are to review, different research papers and different clustering algorithms as applied is discussed in these papers'. Numerous studies have been conducted in this context, but with a different aim.

This research paper is to present a comprehensive review of different clustering methodologies as applied in the

field of EDM. Section II is a background of related works about Educational Data Mining (EDM); Section III discusses the various clustering algorithms/techniques applied to the educational dataset. Section IV provides further discussion and finally, Section V shows the conclusion and future works.

II. EDUCATIONAL DATA MINING

[2] Amjad Abu Saa (2016) investigates numerous components to tracks down a subjective model which predicts the students' presentation dependent on the related individual and social elements.

[3] Tiska Pattiasina & Didi Rosiyadi (2020) took 253 students data of class XI students of SMA Negeri 3 Ambon with fourteen attributes like age, sex, the organization involved in school, extracurricular activities, pocket money, duration of his study, duration of using social media, duration of playing online games, information on his attendance, illness of the student, semester grades to find the various useful information.

[4] Chala Simon & Ybralem Bugusa (2018) examine various data mining methodologies that have been used to analyze and predict student performance and that Apriori algorithm and decision tree are the most used algorithms for predicting student performance and in identifying the relationship between different factors that can affect student performance.

[5] Chitra Jalota and Rashmi Agrawal (2019) used the kalboard 360 dataset on WEKA with five classification methods and different error criteria are used to determine the best classification.

III. CLUSTERING TECHNIQUES

[6] Henny Yashmi. R.S, Asfaq Ahamed. A, Arun Vadivu.S, Savitha. V, Dr. Kalaikumaran (2019), review the clustering algorithm and its applicability in EDM for the time period 1983-2016 and classify the student's records based on their achievement and predicted their result through data mining with the help of internal marks.

[7] Satinder Bal Gupta, Raj Kumar Yadav, Shivani (2020), In this analysis, the authors have discussed the most commonly used clustering techniques. In their comparative analysis, they found that wave clustering, CLARANS etc. are more effective techniques.

[8] Saja Taha Ahmed, Prof. Dr. Rafah shihab Al-hamdani, Dr. Muayad Sadik Croock (2018), In this paper, the author presents a comprehensive study of the latest e-learning decision-making and prediction methods and how the e-learning systems can use various classification and clustering algorithm for classifying the collected data.

[9] Gautam Biswas, Jerry B Weinberg, Douglas H. Fisher (1998), In this paper author describes an unsupervised discovery method with biases geared toward partitioning objects into clusters that improve interpretability. The algorithm, ITERATE, employs: (i) a data ordering scheme (ii) an iterative redistribution operator to produce maximally cohesive and distinct clusters.

| Title | Journal and Year | Algorithm/Method | Findings |
|------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| [10] Clustering In Data Mining: A Brief Review | International Journal Of Core Engineering & Management (IJCEM) 2014 | Well Separated Clusters, Centre Based clusters, Contiguous clusters, Density-based clusters, Shared Property or Conceptual Clusters | The author had explained all the techniques along with their implementation methods and also their merits and demerits. |
| [11] Educational | International Journal | Cluster analysis and | By using cluster analysis one model |

| | | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data mining using cluster analysis and decision tree technique: A case study | of Engineering Business Management 2020 | Decision Tree | with groups of students is prepared according to their behavior in the e-learning system and with a decision tree three models are made according to previously conducted cluster analysis. |
| [12] Educational Data mining for Prediction of Student Performance Using Clustering Algorithms | M. Durairaj et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (4) 2014 | K-Means Algorithm, Navie bayes, WEKA Tool | A graph is generated which denote the results of students' performance and status of students' analysis displayed through Receiver operator Characteristics or Receiver operator Curve. The data analysis is performed with the methods of recision, recall and f-measure. |
| [13] Educational Data Mining: Predicting student's performance using clustering | International Journal of Management, IT & Engineering Vol. 8 Issue 6, ISSN: 2249-0558, 2018 | K-Means clustering | The author took three clusters with a cluster size of 50. The author shows the result of two iterations of the data set, the overall performance of the cluster size 12 is 7.38, 4.98, and 9.41 with cluster sizes 12, 26, and 12. Also, a model was developed to predict the student's performance by using the k-means algorithm. |
| [14] Educational Data Mining (EDM) on the use of the Internet in the World of Indonesian Education | TEM Journal. Volume 9, Issue 3, Pages 11 341140, ISSN 22178 309, DOI: 10.18421/ TEM93-39 2020 | K-Medoids | This research result shows that in Indonesian education the application of the k-Medoids method can be applied to the use of the internet. Their results of the mapping conclude that Sumatra and Java are still dominated in the use of the internet. |
| [15] A Study on Classification and Clustering Data Mining Algorithms based on Students Academic Performance Prediction | International Journal of Control Theory and Applications 2017 | Expectation Maximization (EM), k-Means algorithm, C4.5 algorithm, k-Nearest Neighbor algorithm, Naïve Bayes algorithm | The result shows that the performance of the k-Means algorithm has an overall accuracy of 82%. Also, the performance of clustering algorithms is better in the prediction of student performance as compared to classification algorithms |
| [16] Clustering | Journal of | K-means, | In this study two clustering |

| | | | |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Educational Digital Library Usage Data: A Comparison of Latent Class Analysis and K-Means Algorithms | Educational Data Mining, Volume 5, No 2, 2013 | Latent Class Analysis | algorithms: LCA and K-means are compared using one-year Instructional Architect usage data. They compared the two clustering results from different angles: the Davies-Bouldin index, cluster evolution, accuracy as a teacher profiler. Also, they compared by using different data sets: self-reported teaching experience vs. teachers' online behaviors. |
| [17] Educational Data Mining Applications and Techniques | (IJACSA) International Journal of Advanced Computer Science and Applications 2020 | Neural Network, Naïve Bayes, Bayesian Network, Decision Tree, Rule Based, K –Nearest Neighbor(KNN), Multilayer Perception, REPTree, OneR, Iterative Dichotomiser 3 (ID3), Random Forest, PART, Logistic Regression | This paper identifies the most effective techniques for each of these EDM applications. The main feature of this review paper is to show the united evaluation criteria for the comparison of the different techniques of EDM. For the effectiveness of the surveyed techniques prediction accuracy is used as the main indicator. The author also shows that the effective technique in one application does not necessarily mean it will be effective on different applications. |
| [18] Extending the Student's Performance via K-Means and Blended Learning | (IJEACS) International Journal of Engineering and Applied Computer Science 2017 | K-Means algorithm | Author results show yields 9 clusters of students who are Exceptional, Excellent, Superior, Very Good, Above Average, Good, High Pass, Pass, and Fail. They share an idea to the K-means algorithm is used to obtain higher accuracy to predict the students' performance in 3 (maximum of 9) clusters. |
| [19] An Effective Cure Clustering Algorithm in Education Data Mining Techniques to | International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 10 (2018) | CURE Clustering algorithm | Author use the CURE Clustering algorithm for analyzing and predicting the reasons for the poor performance of the students in disciplines like psychology and sociology. |

| | | | |
|-------------------------------|--|--|--|
| Valuate Student's Performance | | | |
|-------------------------------|--|--|--|

Table 1 Review Papers

IV. DISCUSSION

So far we see that a lot of work has been done on subject-specific research but still, a lot more has to be done i.e. how do institutions benefit by using data mining methods to improve institutional effectiveness? An educational institution maintains and stores various types of student data like students' academic data as well as their personal data in online or offline mode. In various studies conducted by various authors, they have proved that students' performance can be predicted by using a data set that consisted of students' gender, parental education, financial background, etc. Researchers have applied different data mining methods regression analysis, classification algorithms, and other methods to predict the performance of the student based on attributes like attendance, performance in-class tests, assignments, etc.

V. CONCLUSION AND FUTURE WORK

Educational Data mining plays an important role in the education sector as it shows previously hidden information in a useful manner. This information may be used by students, teachers, and educational institutes for future planning, how to reduce the dropout rate at different stage, how to increase students' performance, and in other areas of education. In this review paper, we have detailed the various algorithm used by different authors and their uses in different disciplines of education. At one place we try to address different views and findings of various research authors and how they will be useful in future planning. We and other authors from all over world would continue to pursue research in clustering algorithms as applied to the educational context and will also be working towards generating a useful clustering algorithm and approach such that it could easily be applied to any educational institution.

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- [17] Fatima Alshareef, Hosam Alhakami, Tahani Alsubait3 , Abdullah Baz “Educational Data Mining Applications and Techniques” (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 11, No. 4, 2020
- [18] Zahida Parveen, Anushya Alphones, Samina Naz “Extending the Student’s Performance via K-Means and Blended Learning” (IJEACS) International Journal of Engineering and Applied Computer Science Volume: 02, Issue: 04, April 2017
- [19] Manjula. V. and A.N. Nandakumar “An Effective Cure Clustering Algorithm in Education Data Mining Techniques to Valuate Student’s Performance” International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 10 (2018)

ROLE OF PARTICLE SWARM OPTIMIZATION AND MULTIVERSE OPTIMIZATION IN SHARE PRICE OPTIMIZATION

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Abstract: The research is to optimise share prices so that investors can determine whether or not to invest in a certain firm. There has been a study of big cap, mid cap, and small cap funds that are available for investment in large, medium, and small sums. Large-cap stocks have shown to be more reliable, but their returns are limited. In the proposed research, the soft computing techniques PSO and MVO were used to predict the best solution. Data on share prices is first obtained from the NSE/BSE websites. The data is then optimised by pre-processing it. The data optimization procedure employs two processes. In one of the mechanisms, PSO was used for optimization. In the second optimization, the MVO integrated PSO was used. The optimization result has been compared in both cases. In addition, the shares were picked based on the best price.

Based on its current price, 52-week high, 52-week low, and average price, the proposed study employed optimization techniques to discover the best stock to purchase. The optimization assists in determining the best pricing among a set of data. The PSO, on the other hand, is often used to simulate the best possible outcome. Throughout the research, however, it was determined that MVO performed better than PSO. The share data set was obtained from the NSE/BSE website, pre-processed, and the best solution was determined using PSO and MVO. The screening was carried out with the goal of getting the most bang for your buck. In addition, the research compared performance in both scenarios.

Keywords: AI, PSO, MVO, SENSEX, NIFTY,

1. INTRODUCTION

This research focuses on share price optimization in order to assess whether or not to invest in a certain firm. There has been a study of big cap, mid cap, and small cap funds that are available for investment in large, medium, and small sums. Large-cap stocks have shown to be more reliable, but their returns are limited. Mid-cap stocks, on the other hand, are considered to be riskier than large-cap stocks, but the potential return is significant.

1.1 SHARE MARKET

It becomes a stock market where anybody who wants to purchase or sell stocks may do so. Shares of publicly listed companies may be bought and sold here. It offers a platform for efficient stock exchange. When a person wants to sell their shares in a company, he utilises this market to connect with someone looking to buy shares in similar businesses. It's important to note, however, that you may only trade stocks via a licenced intermediary known as a stock broker. To buy and sell stocks, people utilise electronic media. We'll look through stock brokers in more depth at a later time.

1.2 Sensex and Nifty

The Sensex index, often known as the S&P BSE Sensex index, is India's BSE benchmark index (previously

known as the Bombay Stock Exchange.) The Sensex index is a gauge for the Indian economy, consisting of 30 of the largest and most frequently traded securities on the BSE. The index's composition is updated twice a year, between June and December. The Sensex, which was founded in 1986, is India's oldest stock index. It is used by analysts and investors to follow the Indian economy, as well as the rise and collapse of certain industries.

The NIFTY 50 is a benchmark Indian stock market index that represents a weighted average of 50 of the country's largest companies listed on the National Stock Exchange. It is one of India's two main stock indices, with the BSE SENSEX being the other.

1.3 LARGE CAP / MID CAP / SMALL CAP

Large-capitalization industries are those with a total market capitalization of greater than 10 billion dollars. "Large cap" is an abbreviation for "large market capitalization." The market capitalisation of a firm is derived by multiplying the total number of outstanding shares by the current price of one share. This is nothing more than a calculation of a company's total market value. Big, medium, and small market capitalisation are now separated into three groups. Each has its own set of advantages and disadvantages.

We are investing money in the mid-cap stock market, and most of us are continuously wondering whether to invest in stock or not, due to the stock market's risk concerns. Mutual fund plans usually allow investors to invest without having to trade. It earns money in two different ways. As an investor, you've undoubtedly witnessed how market swings effect stock prices. On the other hand, investing your money may help you make a lot of money.

Individual stocks are categorised into equity mutual funds based on their asset size, or "market capitalization." The market capitalisation of a firm is derived by multiplying the total number of outstanding shares by the current price of one share. This is nothing more than a calculation of a company's total market value. Big, medium, and small market capitalisation are now separated into three groups. Each has its own set of advantages and disadvantages.

A small cap industry is one with a market capitalization of less than \$10 billion. The market capitalization of an industry determines the market value of an organization's outstanding shares. Small cap is defined differently by various brokerages, but it commonly refers to a company with a market capitalization of \$300 million to \$2 billion.

1.4 ROLE OF AI IN SHARE MARKETING

Artificial intelligence is supposed to provide intelligence to decision-making in order to choose the best share script at the correct moment based on their 52-week low/high and current value. AI has developed a number of optimization algorithms that may be used to anticipate the value of a stock.

1.5 OPTIMIZATION TECHNIQUES

PSO

It develops into an assessment procedure. It takes the shape of a method that is simple to learn and practise on a daily basis. It has previously been shown that such evaluation procedures find the best possible solution in a timely manner. This technique may be characterised as a method for resolving any problem in the field of information technology. It has been observed that in a PSO-based model, efforts to enhance the performance of the candidate solution are made one at a time. It discusses any population-related issue and suggests remedies.

In search-space, the designated particles move about. This method uses an arithmetical rule to calculate the particle's location and velocity. Its mobility is influenced significantly by its well-known domestic location. It travelled precisely in the direction of its well-known search-space locations. This webpage has been updated to include new places. Other particles can immediately recognise this location. As a consequence, the swarm is expected to migrate toward the best possibilities. PSO is a useful heuristic since it makes few, if any, assumptions about the problem at hand. Meta PSO and other I heuristics, on the other hand, do not guarantee that an optimal solution will ever be found. It has become one of the most important and useful met heuristics in the present situation, as it has shown success in a range of optimization problems. It's a stand-alone system. It determined the level of activity of these complicated systems. A cooperative and intelligent structure uses an extremely simplified model of social behaviour to cope with optimization concerns.

MVO

It's a brand-new innovation. It is an efficient way of maximising that is supported by the environment. This was created by Mirjalili et al. They kept two unique elements in mind while putting this into action. This technique was created by combining three cosmological ideologies. In addition to this, it is becoming well-known in a novel meta-heuristic optimization strategy. It effectively identifies issues that are connected to OPF. It is a strategy that draws on the living body as well as social science to provide ongoing motivation. Various cosmological ideologies are used in the implementation of this strategy. The notion of wormhole is also utilised in this manner, in addition to the white and black hole concepts. One of the most significant advantages of this approach is that it can quickly determine the rate of intersection. It selects a roulette wheel for this reason. Furthermore, this approach can handle both regular and discrete optimization problems.

2. LITERATURE REVIEW

In this post, we looked at a few similar system models:

X. Qiao et al. [1] proposed a strategy for optimum pricing and cost-effective benefits of good sharing in 2019 based on a B2C sharing platform evaluation. Pricing and the cost-effective benefits of great sharing are used to examine the approach in support of optimal. There are two distinct designs on this paper. The fundamental model compares regular market firms in order to assess the cost-effectiveness of common products. After that, an improved version of the model is studied, taking consumer irresponsible behaviour into consideration. Finally, numerical tests are carried out in order to get managerial impressions.

Validation of a Share Price Artificial Neural Network Model E. Turkedjiev et al. released UK Banking Sector Short-Term Trading in 2013. Its main purpose is to validate ANN applications in order to deliver more accurate share price forecasts in a shorter amount of time. In the financial business, this use of ANN has been verified. The effectiveness of models is assessed in a formal manner using four-week data. The results are intriguing, but further research is needed.

In 2010, M. Wu et al. [3] did an empirical study on the variables that impact the price of A and H stocks. Those affecting factors were experimentally evaluated on the basis of changing market value, resulting in a price difference between A and H Shares. The contributing features that cause the price of A and H shares to vary have been validated by recent occurrences. Finally, the findings of empirical research demonstrated that the price of both shares is influenced by a number of elements. The following dummy factors were also utilised in this study: The results show that the Hong Kong straight train and QDII, which were introduced as new factors

in 2007, may explain price differences between A and H stocks. Finally, for the first time, definite strategies for reducing the price discrepancy between A and H shares were offered.

In 2009, L. Guoyi et al. [4] looked at the relationship between the intermediary components that influence the price of Bank Share. The price of bank shares in the form of weighted shares influences the direction of the stock market. The research team selected total equity, after-tax profits per share, GDP, and the market index as relevant and appropriate metrics. The price of bank shares is affected by several factors. Simultaneously, an experimental model is being utilised to investigate and confirm these elements. It was done to examine whether there was any correlation between these criteria and bank share prices at the end of the reporting period. This relationship was identified to offer investors with a point of reference to aid in their decision-making.

In support of factor maximising in SVM, X. Fang et al. [5] employed the Wavelet Transform and Ant Colony method to anticipate the price of Share in 2009. In this work, the Wavelet transform and ACO-SVM were utilised to predict the price of a stock.

F. Wang et al. [6] proposed Optimal Pricing of User-Initiated Data-Plan Sharing in a Roaming Market in 2018.

N. Trivedi et al. presented a paper in 2016 that used a multi-verse optimizer approach to increase voltage stability and reduce voltage variation. Here, the problem of optimal power flow is tackled. For this, the Multi-Verse Optimizer, a modern meta-heuristic maximising technique, was used.

Mixed maximisation techniques were employed by M. Anbarasi et al. [8] to anticipate sickness. These strategies are based on tuning parameters. In this research, swarm-based optimization techniques are compared. A comparison was done between the tactics that were found to be the most effective and that were utilised on a regular basis. We evaluate the optimization approaches Particle Swarm Optimization (PSO) and Multi-Verse Optimization (MVO) before and after modifying parameters using three different datasets.

X. Wang and coworkers In 2020, they submitted a similar Multi-Verse Optimizer [9]. It was made available in response to requests for photos that were separated into many levels. Multi-version optimizers are an optimum approach for tackling numerous variant optimal tasks in the original universe, based on the concept of multi-verse. For the first time, a new analogue multi-verse optimizer (PMVO) was used in conjunction with transmission regulations. When this technique is employed for picture separation, the quality of the produced image has been shown to be better to that of other analogue approaches.

Table 1 Review of Literature

| S no. | Author Name | Year | Title | Objective of research |
|-------|-----------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 1 | X. Qiao, D. Shi & F. Xu | 2016 | The evaluation of B2C sharing platform ANN design setup in support of Share Price determines the ideal assessment policy pricing technique and commercial effect of product sharing. Short-Term Business in the UK Banking Sector | Propose the best pricing strategy |
| 2 | E. Turkedjiev, M. Angelova & K. Busawon | 2013 | The price of A and H shares differs according to influencing characteristics that were experimentally examined. | To utilise artificial neural networks to anticipate prices. |
| 3 | M. Wu & Q. Yu | 2010 | Analyze the link between the characteristics that determine the price of Bank Shares. Using Wavelet Transform and Ant Colony approach in support of factor maximisation in SVM, Bank forecasts the price of Bank Shares. | To investigate the elements that influence share. |
| 4 | L. Guoyi & L. Renzhong | 2009 | Excellent evaluation Within the transitory market, pricing of user-initiated data plans is shared. | Consider the factors that influence the price of bank shares. |
| 5 | X. Fang & T. Bai | 2009 | The use of a multi-verse optimizer approach improves voltage stability and reduces voltage variation. | In support of factor maximisation in SVM, forecasts the price of Share using Wavelet Transform and Ant Colony technique. |
| 6 | F. Wang, L. Duan & J. Niu | 2018 | On the basis of the tuning variable technique, illness identical predictions may be made. Multi-Verse Optimizer is designed to help with situations when | To get the best possible pricing in the roaming market |

| | | | | |
|---|---------------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| | | | images are divided into many tiers. | |
| 7 | N. Trivedi, P. Jangir, N. Jangir, S. A. Parmar, M. Bhoje & A. Kumar | 2016 | The evaluation of B2C sharing platform ANN design setup in support of Share Price determines the ideal assessment policy pricing technique and commercial effect of product sharing. Short-Term Business in the UK Banking Sector | To employ a multi verse optimizer to improve voltage stability |
| 8 | M. Anbarasi, K. S. Sendhil Kumar, R. Balamurugan & Thejasswini | 2020 | The price of A and H shares differs according to influencing characteristics that were experimentally examined. | Using hybrid optimization approaches, anticipate illness. |
| 9 | Wang, J. Pan & S. Chu | 2020 | Analyze the link between the characteristics that determine the price of Bank Shares. Using Wavelet Transform and Ant Colony approach in support of factor maximisation in SVM, Bank forecasts the price of Bank Shares. | In order to use MVO in picture segmentation, |

3. PROBLEM STATEMENT

There are, nevertheless, a number of studies in the subject of artificial intelligence. The problem with current research is that just a small amount of effort has been done to address real-world problems. The traditional approach did not include an optimization strategy for predicting the best share price. Furthermore, there is a need to give multi verse optimization mechanisms greater attention.

4. RESEARCH METHODOLOGY

A research technique is a way for doing research on a certain subject. Various research approaches exist. Quantitative research is a methodical inquiry of a certain issue, while qualitative research is a study of a specific research topic. These studies are descriptive and use logic. In their investigation, the researchers might combine qualitative and quantitative research methodologies. Experiment-based research is methodical, scientific, and

produces a result, while survey-based research provides us with a summary of a subject.

5. Result and discussion

In this research the simulation of PSO and MVO has been performed to filter the huge data set of share scripts. The comparison between PSO and MVO has been made considering time, optimum solution and objective value along with filtered data.

Result after simulation using PSO

The convergence curve plotted in case PSO is shown below

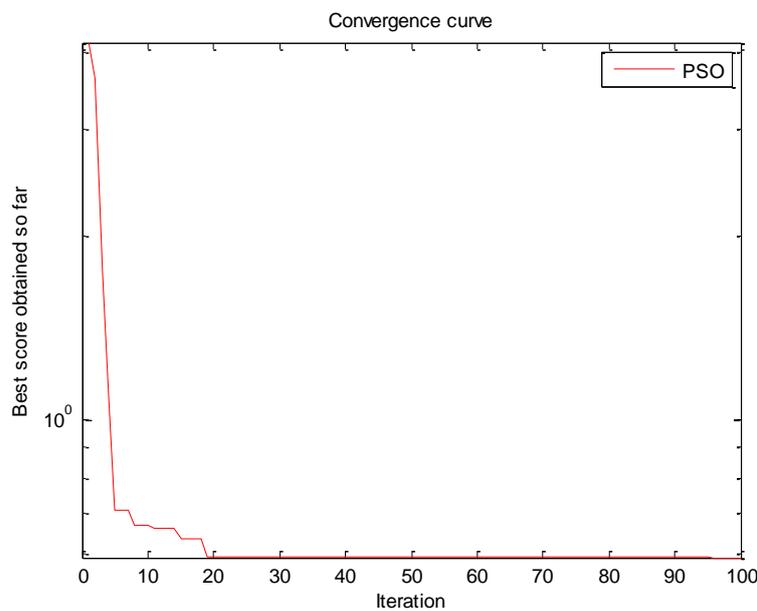


Fig 1 Convergence cure in case of PSO

The optimum solution and objective value is showing in following window

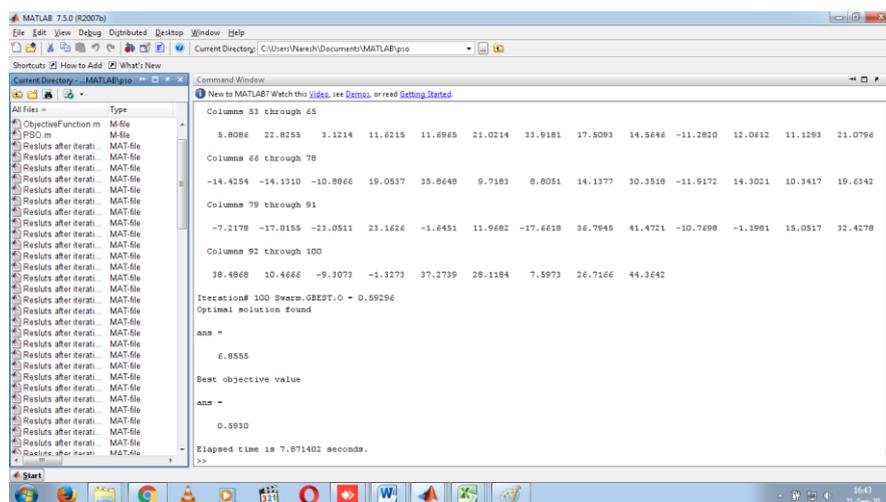


Fig 2 Optimization using PSO

As result have shown the optimum solution is 6.8555

Best objective value 0.5930

Elapsed time is 7.871402 seconds.

Get optimal solution using MVO

After getting optimal solution using MVO following results are produced.

The best solution obtained by MVO is : 6.8561

The best optimal value of the objective function found by MVO is : 0.59296

Elapsed time is 5.949338 seconds.

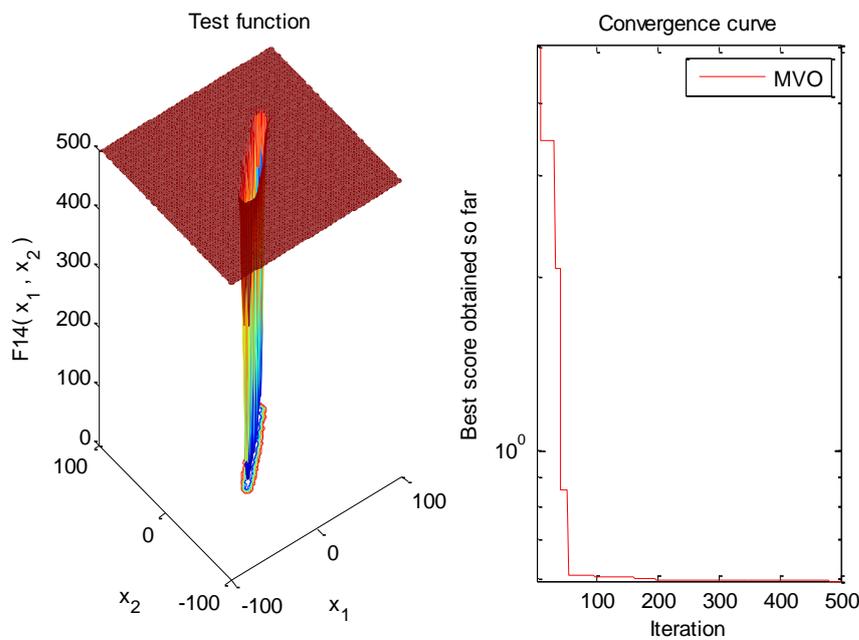


Fig 3 Convergence curve in case of MVO

Table 2 filtering data using PSO/MVO based optimized value following result is obtained.

| CODE | PRICE | 52WK HIGH | 52 WK LOW | MARKET CAP | AVG_PRICE | DELTA | PER |
|------|-----------|-----------|-----------|------------|-----------|-----------|--------|
| 5 | 2,039.00 | 2,499.65 | 1,865.45 | 353,001.40 | 2182.55 | 143.55 | 6.577% |
| 6 | 1,591.50 | 1,739.95 | 1,232.20 | 304,369.04 | 1486.075 | -105.43 | -7% |
| 7 | 465.4 | 552.4 | 367.75 | 301,220.46 | 460.075 | -5.32 | -1% |
| 14 | 1,882.65 | 1,915.90 | 1,291.45 | 180,583.37 | 1603.675 | -278.98 | -17% |
| 17 | 16,048.45 | 16,839.55 | 10,028.10 | 154,732.28 | 13433.825 | -2,614.63 | -19% |
| 18 | 536.8 | 624 | 497 | 145,669.54 | 560.5 | 23.70 | 4% |
| 19 | 2,124.40 | 2,559.00 | 1,225.95 | 137,613.26 | 1892.475 | -231.93 | -12% |
| 24 | 513.8 | 646.4 | 355.45 | 103,718.87 | 500.925 | -12.88 | -3% |
| 31 | 404.7 | 549.7 | 308.55 | 87,789.66 | 429.125 | 24.43 | 6% |
| 32 | 1,702.65 | 1,702.65 | 1,090.00 | 86,496.52 | 1396.325 | -306.33 | -22% |

| | | | | | | | |
|----|-----------|-----------|-----------|-----------|----------|---------|------|
| 33 | 489 | 525.3 | 357.1 | 86,409.42 | 441.2 | -47.80 | -11% |
| 35 | 21,960.70 | 25,341.20 | 17,222.00 | 79,235.85 | 21281.6 | -679.10 | -3% |
| 37 | 3,053.85 | 3,443.90 | 2,302.00 | 73,435.41 | 2872.95 | -180.90 | -6% |
| 38 | 708.75 | 845.7 | 607.9 | 69,902.03 | 726.8 | 18.05 | 2% |
| 41 | 2,919.15 | 3,844.00 | 1,460.05 | 62,107.19 | 2652.025 | -267.13 | -10% |
| 45 | 404.7 | 537.5 | 311.6 | 58,109.35 | 424.55 | 19.85 | 5% |
| 46 | 2,157.60 | 2,258.00 | 1,466.95 | 57,277.50 | 1862.475 | -295.13 | -16% |
| 50 | 2,999.60 | 3,363.00 | 2,352.00 | 49,842.30 | 2857.5 | -142.10 | -5% |

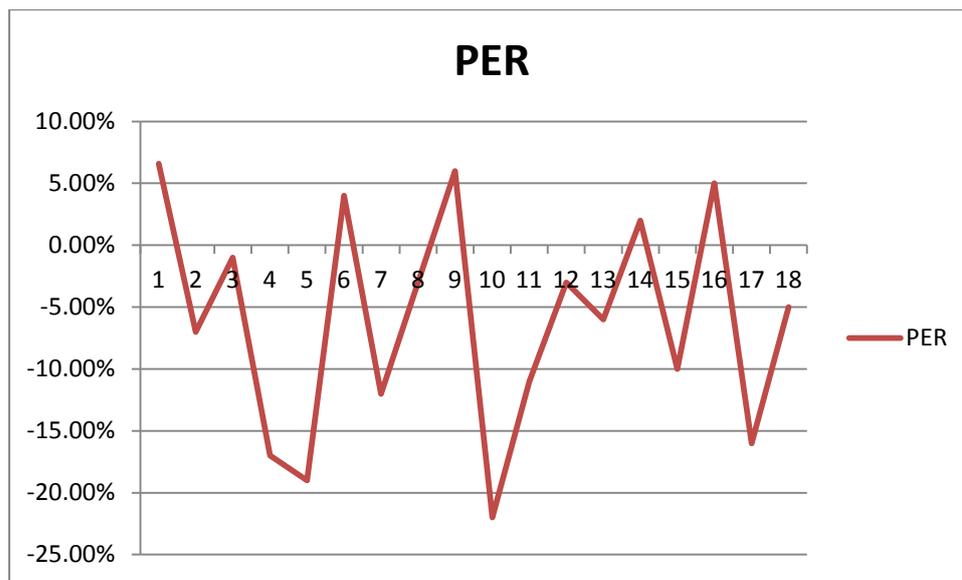


Fig 4 Result in percentage

The comparison of time, objective value, optimal solution and data after filtering is showing in following table.

Table 3 Comparison Chart of time

| Technique | Time | DATA After filtering |
|-----------|------|----------------------|
| PSO | 8 | 44 |
| MVO | 6 | 44 |

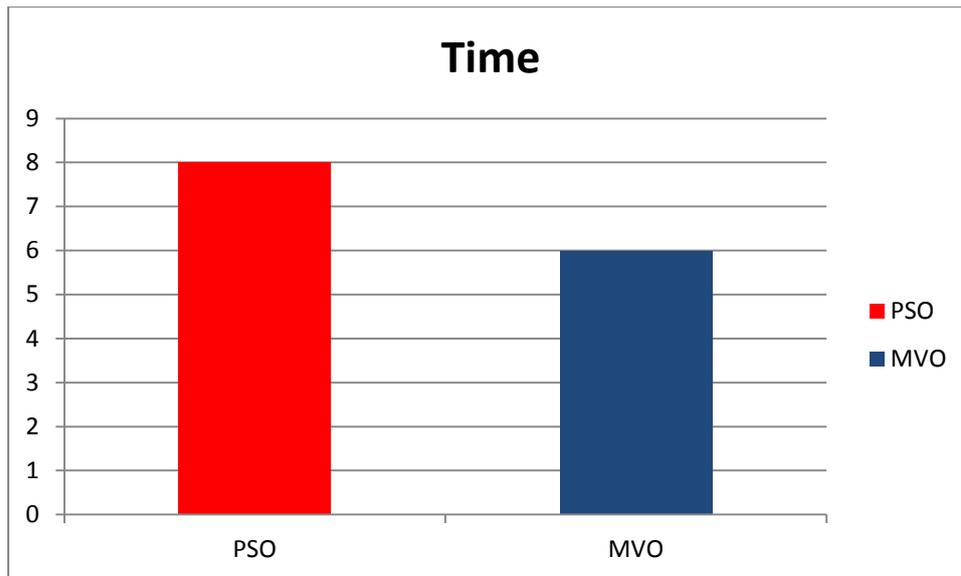


Fig 5 comparison of time

Table 4 comparison of objective values

| Technique | Objective value |
|-----------|-----------------|
| PSO | 0.59 |
| MVO | 0.6 |

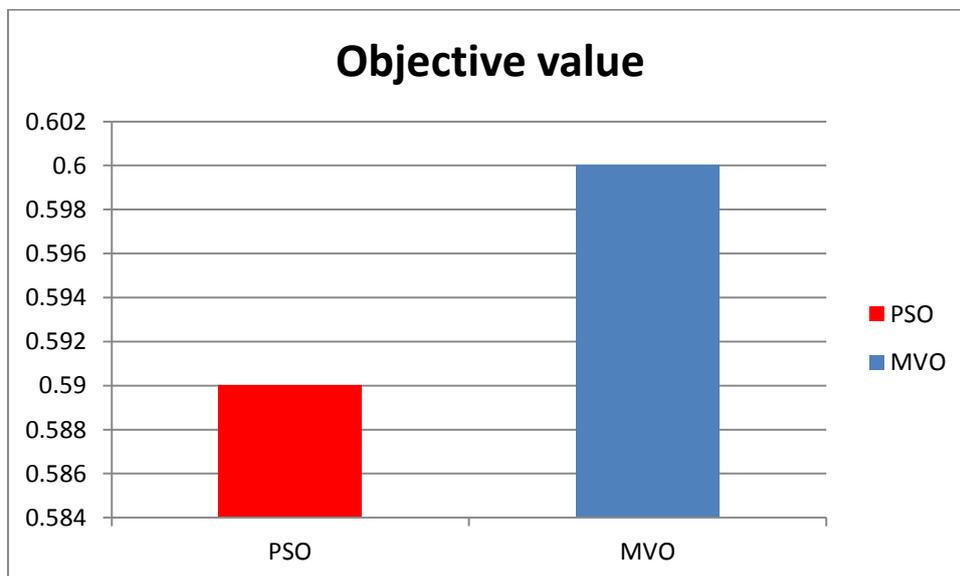


Fig 6 comparison of objective value

Table 5 comparison of optimal solution

| Technique | Optimal solution |
|-----------|------------------|
| PSO | 6.85 |

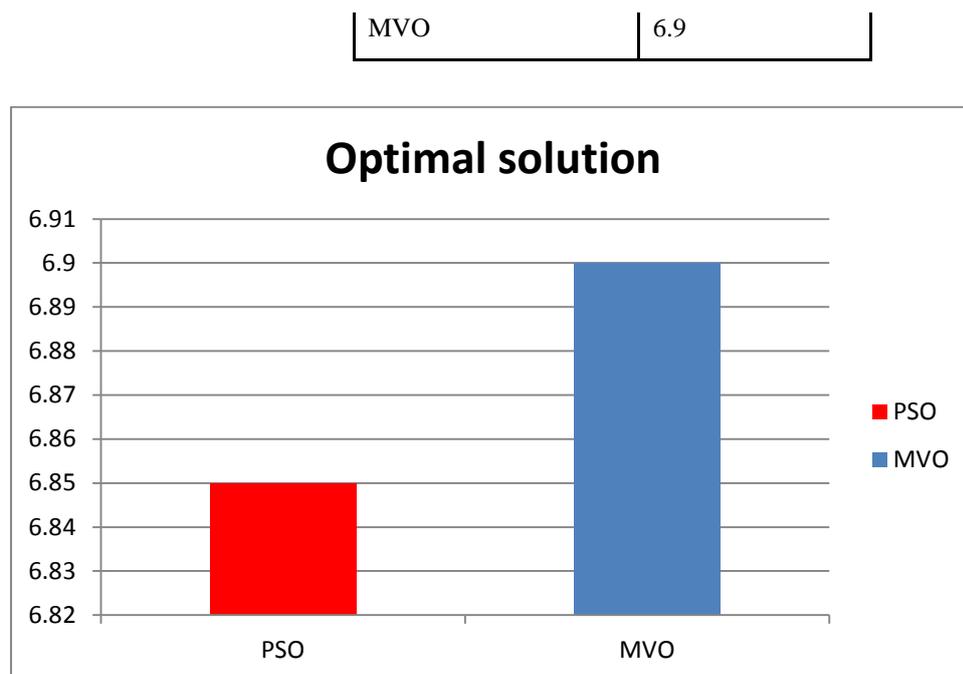


Fig 7 Comparison of optimal solution

6. CONCLUSION

The proposed research used optimization methods to find the best stock to buy in based on its current price, 52-week high, 52-week low, and average price. The optimization aids in the prediction of the optimal price among a collection of data. The PSO, on the other hand, is typically used to simulate the optimum output. However, it was discovered throughout this study that MVO had a faster performance than PSO. The share data set was obtained from the NSE/BSE website, pre-processed, and then PSO and MVO were used to determine the optimal solution. The screening was done with the best value in mind. Furthermore, the study compared performance in both circumstances.

7. FUTURE SCOPE

This study was important in predicting the price of a stock based on a variety of parameters. Such studies are valuable to fund houses and investors who spend a lot of money to track the condition of a stock they want to buy. The study has developed a scalable and adaptable method for predicting the optimal value and filtering out the appropriate script. In the future, a technique like this might be useful in crypto currency trading, where the value of the currency swings and investors need to know which currency to buy in the current situation.

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A new fangled parallel search technique for optimization

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Abstract

Parallel search technique is gaining popularity as it is much better suited for modeling, simulating and understanding complex, real world phenomena. In this paper parallel search technique has been applied to solve some benchmark equations in such a way that no point is searched more than once and also optimized value is obtained. A simple operation has been used for searching the points in the domain of 10^n search space. This proposed technique can efficiently traverse each search point only once and no search point is left. In the entire search space the search points are selected using a method called RLC.

Keywords: Parallel search, benchmark, Rotate Left and Complement (RLC) operator, search space, search points, optimization

1. Introduction

Optimization is the process of finding the greatest or least value of a function for some constraint, which must be true regardless of the solution. In other words, optimization finds the most suitable value for a function within a given domain. In mathematical terms, an optimization problem is the problem of finding the best solution from among the set of all possible solutions. The objective is to find the solution to a predefined objective function via an iterative process, towards an optimal value. In optimization problems, a mathematical representation of the objective function is clearly defined along with its constraints [1].

In this paper we introduce a new, efficient, distributed as well as parallel computing strategy for exponential (10^n) search space with the above objectives. The results show that the proposed technique is really efficient in terms of time and suitable for highly distributed and parallel environment and is found to provide better results. But describing the proposed technique, some we have discussed some important points.

The organization of this article is as follows, Section 2 depicts problem with existing methods is demonstrated. Section 3 describes the proposed technique. Some Benchmark functions are used for optimization using proposed technique in section 4. Section 5 contains the conclusion.

2. Problems with existing methods

Although in literature, there are many available algorithms that can be used to solve an optimization problem; none of them are equally suited for all [2]. Sometimes they are good to be used for certain kind of problems and fails for the other [3].

Genetic algorithm (GA) is an expedient tool for function optimization based on the principles of natural genetics. However, there are some problems with genetic algorithms. GA uses many tunable parameters. Although some guidelines exist to select some of these parameter values, there is no exact way of selection of these parameters. In the process, for the same problem it is quite possible to get two very dissimilar results for the same number of

iterations/generations in genetic algorithms. GA is popular as it is proved to provide optimal solutions as the number of iterations goes to infinity [4]. However, the number of iterations cannot be infinite which forces the user to stop the process after some finite iteration. This, in turn, forces the user to fine tune the parameter values. GA starts with a population of random solutions. Iteration produces a new population of chromosomes with selection, crossover and mutation operations [8]. At the end, we get a population of solutions.

3. Proposed Technique:

In this paper we have proposed a technique to optimize some benchmark functions for exponential (10^n) search space. So the optimal value obtained is always a decimal integer. The proposed algorithm is fast, and suitable for highly distributed and parallel environment.

The algorithm starts with an initial population of distinct solutions. As the algorithm proceeds, we always get a distinct population of solutions at each generation. The process is repeated until the whole search space is covered. No point appeared more than once which saves the execution time.

In the proposed searching technique, the entire search space is split in to several subsets. The number of subset is a function of the length of the search space. For example if the length of the string to be searched is three, then the size of the search space is $10^3=1000$. This search space is divided in to 170 subsets. Among them, 165 subsets contain 6 elements each and rest 5 subsets contain 2 elements each. The technique of dividing the search space in to subsets has been explained later. So the searching of the element can be performed from 170 different search points and the process of searching the element from those 170 search points can be performed in parallel.

The initial search points start from n number of 0's. That is, if the size of the search space is 10^3 , then the starting search point (which has been termed as Generator later) is 000. Then the other initial search points are obtained using some algorithm.

The notations used are as below:

S_i = String of length n

D = Total search Space = 10^n

G = Total number of Normal Generators

E = Total number of Exceptional Generators

α_k = Maximum value of normal generator for k digit decimal string

A decimal coded string of length n is used as a representation of each search point. Each string S in the search space D is of the form $S = (d_1, d_2 \dots d_n)$, where $d_i \in \{0, 1, 2 \dots 9\}$, $\forall i$. The total number of strings in decimal representation is 10^n . We propose to find the optimal string(s) among these strings. A finite and distinct sample of initial solutions, each of length n , is drawn from D (10^n) to form the initial population P . To incorporate variation within the solutions, a Rotate Left and Complement operator (RLC) [5] [9] has been used. The RLC operator is described below:

Suppose we have a solution s_i of length is 5 ($n = 5$) at instance t . Let it be $s_i = 02341$. Using the RLC operator, it is possible to generate $2 \times n = 2 \times 5 = 10$ different solutions (including s_i) from a single solution s_i .

The string 02341 produces 23419 using RLC operator. The underlined portion of the string is shifted 1 position

to the left and 9's complement of the left most digit of the old string is placed at the unit position of the new string. Thus the generated strings are 23419, 34197, 41976, 19765, 97658, 76580, 65802, 58023, 80234 over $(2*n-1)$ iterations. The process of generating strings is stopped when the initial string comes back. Thus from a search string of length n , we can obtain $(2*n-1)$ new distinct search strings using the RLC operator. The string 02341 is called a **Normal Generator**, as it can generate $(2*n-1)$ number of distinct strings. If RLC operator is applied on a string generated from the normal generator, then the same strings are generated which have already been generated from the normal generator. For any particular value of n , there are a fixed number of normal generators. A string is said to be an **Exceptional Generator** if it does not produce $(2*n - 1)$ different strings by successive application of RLC operator. Table 1 depicts an example of normal and exceptional generators for $n=1, 2, 3$.

Table 1
Normal and Exceptional Generators

| String Length | Values of Normal Generator | Values of Exceptional Generator |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| 1 | 0,1,2,3,4 | Nil |
| 2 | 0,1,2,3,4,5,6,7,8,11,12,13,14,15,16,17,22,23,24,25,26,33,34,35,44 | Nil |
| 3 | 0, 1, 2, 3, 4,5,6,7,8,10,11,12,13,14,15,16,17,18,20,21,22,23,24,25,26,27,28,30,31,32,33,34,35,36,37,38,40,41,42,43,44,45,46,47,48,50,51,52,53,54,55,56,57,58,60,61,62,63,64,65,66,67,68,70,71,72,73,74,75,76,77,78,80,81,82,83,84,85,86,87,88,111,112,113,114,115,116,117,121,122,123,124,125,126,127,131,132,133,134,135,136,137,141,142,143,144,145,146,147,151,152,153,154,155,156,157,161,162,163,164,165,166,167,171,172,173,174,175,176,177,222,223,224,225,226,232,233,234,235,236,242,243,244,245,246,252,253,254,255,256,262,263,264,265,266,333,334,335,343,344,345,353,354,355,444 | 090, 181, 272, 363, 454 |

There are 1000 points in the search space for string length 3. Here we find that only 170 (165 normal and 5 exceptional) generators are enough to traverse the whole $10^3 = 1000$ search points in parallel. Note that no point is common between any two sets of points generated by any two of the above 170 generators.

Table 2, depicts the string length (n) and corresponding number of normal generators and exceptional generators.

Table-2

Number of Normal and Exceptional Generators

| String Length | No. of Normal Generator | No. of Exceptional Generator |
|---------------|-------------------------|------------------------------|
| 1 | 5 | 0 |
| 2 | 25 | 0 |

| | | |
|---|------|---|
| 3 | 165 | 5 |
| 4 | 1250 | 0 |
| 5 | 9999 | 5 |

From the table we find that as the string length is increased, the number of generators is also increasing almost exponentially.

Table 3 provides the number of normal generators needed for searching the space. It is self-explanatory. Total search space = number of normal generators \times number of iteration for normal generator + number of exceptional normal generators \times no. of points to be searched by exceptional generators. For example, for a string of length 5, we need 10004 generators (9999 normal and 5 exceptional) to traverse $10^5 = 100000$ points in parallel.

Table 3

Number of generators for string length n

| String Length (n) | Size of Search Space $\text{Base}^n = x*a + y*b$ | No. of Normal Generator (x) | No. of Iteration for Normal Generator (a) | No. of Exceptional Generator (y) | No. of Iteration for Exceptional Generator (b) |
|-------------------|-----------------------------------------------------|-----------------------------|-------------------------------------------|----------------------------------|------------------------------------------------|
| 1 | $10^1 = 5*2 + 0$ | 5 | 2 | 0 | 0 |
| 2 | $10^2 = 25*4 + 0$ | 25 | 4 | 0 | 0 |
| 3 | $10^3 = (165*6) + (5*2)$ | 165 | 6 | 5 | 2 |
| 4 | $10^4 = (1250*8) + (0*0)$ | 1250 | 8 | 0 | 0 |
| 5 | $10^5 = (9999*10) + (5*2)$ | 9999 | 10 | 5 | 2 |

The maximum value of Normal Generator for string of length n can be represented as a function of string length (n) and the maximum value of Normal Generator for string of length $n-1$.

Let the maximum value of normal generator is α_n where n is the length of the string. The minimum string length is 1 and it has been extended up to 10. The maximum value normal generator is calculated according to the following formula:

- $\alpha_n = 10 * \alpha_{n-1} + 4$ When $n > 2$ and n is an Odd number
- $\alpha_n = 10 * (\alpha_{n-1} + 1) + 4$ When $n > 2$ and n is an Even number

For example:

- $\alpha_0 = 0$
- $\alpha_1 = 10 * \alpha_0 + 4 = 10 * 0 + 4 = 4$
- $\alpha_2 = 10 * \alpha_1 + 4 = 10 * 4 + 4 = 44$
- $\alpha_3 = 10 * \alpha_2 + 4 = 10 * 44 + 4 = 444$
- $\alpha_4 = 10 * (\alpha_3 + 1) + 4 = 10 * (444 + 1) + 4 = 4454$ $n > 3$ and n is an even number
- $\alpha_5 = 10 * \alpha_4 + 4 = 10 * 4454 + 4 = 44544$

Table 4 enlists the string length and the corresponding maximum value of normal generator.

Table 4
Maximum value of Normal Generator

| String Length | Maximum value of Normal Generator |
|---------------|-----------------------------------|
| 1 | 4 |
| 2 | 44 |
| 3 | 444 |
| 4 | 4454 |
| 5 | 44544 |

It has already been mentioned that a string is said to be an *Exceptional Generator* if it does not produce $(2^n - 1)$ different strings by successive application of RLC operator.

4. Optimizing Benchmark Functions

The above stated technique has been used to optimize a set of benchmark functions [6][7].

The initial value to optimize an equation is taken as 0 and number of 0's depends on the number of variables of the function. For example, we consider the Ackley Function 2.

$$-200e^{-0.02\sqrt{x_1^2+x_2^2}}$$

The function contains two variables; x_1 and x_2 . So size of the search space is $10^2=100$. Hence the initial value of x_1 and x_2 is considered as 0, 0. The other values of x_1 and x_2 for optimization of the function are obtained from (0, 0) using the RLC operator. As there is 25 normal generators of string length 2, so searching of optimum solution can be accomplished in parallel starting from those normal generators. As previously stated, if string length is 2^n , ($n > 0$), there is no exceptional generator. Hence, if the function contains 3, 5, 6, 7 or 9 variables, then searching for the optimum solution also takes place from the exceptional generators.

The following table states the values of each Benchmark functions with their search domain, global optimum values and optimum values obtained by the proposed algorithm. Here in this table the first column depicts the name of the Benchmark functions. The next column contains the function itself; the third one specifies the range. The next column with the data format $f(x, y) = z$ represents that the function f has the optimum value by Genetic Algorithm at the points (x, y) and its optimum value at that point is z . The last column is stating the optimum value obtained by the proposed algorithm and that point in which it is located.

Table 6:
Benchmark functions used for optimization

| Function Name | Function | Domain | Optimum value by Genetic Algorithm | Optimum values obtained by the proposed algorithm |
|---------------|----------|--------|------------------------------------|---------------------------------------------------|
| | | | | |

| | | | | |
|---------------------------|-------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|----------------------------------------------|
| Ackley Function 2 | $-200e^{-0.02\sqrt{x_1^2+x_2^2}}$ | $-32 \leq x_i \leq 32.$ | $x^* = (0, 0),$ $f(x^*) = -200$ | $x^* = (0, 0),$ $f(x^*) = -200$ |
| Adjiman Function | $f(x) = \cos(x_1) \sin(x_2) - \frac{x_1}{x_2^2 + 1}$ | $-1 \leq x_1 \leq 2,$ $-1 \leq x_2 \leq 1.$ | $x^* = (2, 0.10578),$ $f(x^*) = -2.02181$ | $x^* = (2, 0.11111),$ $f(x^*) = -2.02175$ |
| Bartels Conn Function | $f(x) = x_1^2 + x_2^2 + x_1x_2 + \sin x_1 + \cos x_2 $ | $-500 \leq x_i \leq 500$ | $x^* = (0, 0),$ $f(x^*) = 1$ | $x^* = (0, 0),$ $f(x^*) = 1$ |
| Bohachevsky 1 Function | $f(x) = x_1^2 + 2x_2^2 - 0.3 \cos(3\pi x_1) - 0.4 \cos(4\pi x_2) + 0.7$ | $-100 \leq x_i \leq 100$ | $x^* = (0, 0),$ $f(x^*) = 0$ | $x^* = (0, 0),$ $f(x^*) = 0$ |
| Bohachevsky 3 Function | $f(x) = x_1^2 + 2x_2^2 - 0.3 \cos(3\pi x_1 + 4\pi x_2) + 0.3$ | $-100 \leq x_i \leq 100$ | $x^* = (0, 0),$ $f(x^*) = 0$ | $x^* = (0, 0),$ $f(x^*) = 0$ |
| Bukin 2 Function | $f(x) = 100(x_2 - 0.01x_1^2 + 1) + 0.01(x_1 + 10)^2$ | $-15 \leq x_1 \leq -5$ $-3 \leq x_2 \leq -3$ | $x^* = (-10, 0),$ $f(x^*) = 0$ | $x^* = (-15, -3),$ $f(x^*) = -424.75$ |

Conclusion:

In this paper, our endeavor is to provide an alternative GA like parallel algorithm where only two tunable parameters are used. They are the string length (n) and number of generators. In comparison to many other meta-heuristics, much less number of tunable parameters has been used by introducing the Rotate Left and Complement (RLC) operator. It has been used to generate distinct points and also to avoid repetition of search points. We have investigated the exhaustive parallel algorithm for decimal coded string only. We have observed that $2 \times n$ distinct strings are generated for an n length string. However it is also possible to implement the algorithm for any other real coded version. Here some benchmark functions have been optimized using the discrete search points generated by the proposed algorithm. From the given results, it is observed that the proposed algorithm can produce comparable and competitive results.

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The Many Facets of a Woman: Love, Friendship and Identity in Chitra Benerjee's "Sister of My Heart"

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Abstract

In this paper the main focus is on the emotional attachment between two cousin sisters Anjali and Sudha and how they stayed together here in India and afterwards in America. In this novel 'Sister of My Heart' portrayed the life of these two girls how they were attached emotionally and how they shared a strong bond in every situation. This story is narrated by these two girls themselves. Here we are going to study the how women can proceed a smooth life without men. Gauri ma, Nalini and pishi are the women who played an important role and through these ladies Chitra Banarjee successfully portrayed that how a woman can be a good friend of women and an enemy of another woman. Chitra Banarjee took interest in ladies after leaving India and then she started writing about Indian women and their important role in society.

Keyword: Attachment, Anjali, Emotional, Sudha, Women,.

Introduction:

Chitra Banarjee Divakruti always portrayed the immigrant women in her novels. Chitra Banarjee Divakruti is an Indian American writer. She herself was settled in America and undergone through the difficulties in America. here she wrote about the women, their relationship, their struggle and their strong bond. In this paper we will explore the trial and tribulations of all these women characters. San Francisco Chronicle stated, "The power of stories and strength of women who tell them are lovingly rendered in... a tale rich and bountiful as the scent and sounds of Calcutta." Chitra Banarjee Divakruti explored the life of the women and the attachment of these two girls very beautifully. Anjali (Anju) and Basudha (Sudha) are two sisters not real sister but cousin and they both were born on the same day they went to same school and get married on the same day and they were pregnant at same time and finally reunited in America. They were more than friends and more than cousin. They were sisters of heart as they explained this in this novel. Once Sudha asked,

"Anju, why do you love me?" (Sister of My Heart 46)

Then Anju replied

"I love you because you're my sister, you know that." (Sister of My Heart 46)

When Sudha asked Anju, what will you do if I am not your sister then Anju said,

"I'd love you," I say, "no matter who you were. I'd love you because you love me. I'd love you because no one else knows us as we know each other." (Sister of My Heart 47)

Widowhood

Here Chitra Banerjee succeed in the portrayal of the life of a widow. When Sudha explained about her pishi ma who lost her husband at the threshold of young age. She was only eighteen when she lost her husband. Now she is living a very simple life and widows are supposed to engage themselves in all the religious activities. This showed the miserable conditions of woman as widow. The conditions of widows were very terrible in those time. They had to remove all their jewelry and hair as well. They were broken emotionally and suffer physically as they live very simple life with simple food and white cloths. We can see this in the lines when Sudha introduce us to her pishi ma. She explained

"There is pishi, our widow aunt who threw herself heart-first into her younger brother's household when she lost her husband at the age of eighteen. Dressed in austere white, her graying hair cut close to her scalp in the

orthodox style so that the bristly ends tickle my palm when I run my hands over them.” (Sister of My Heart4)

In other lines Sudha told that,

“Kirtans are one of the few pleasures pishi considers suitable for widows and thus allows herself.”

On the other hand, we can see Sudha’s mother Nalini chararjee who is very beautiful and too much conscious about her looks, she used to apply turmeric paste on her face and many times she invited her friends for tea. Now we talk about Gauri who is Anju’s mother who is not very beautiful but shown as a very strong lady. She promised her husband before his death that she will give a good life to their child and she ran a bookstore so that she can give her daughter a respected life. She had lines of hardship on her forehead and on her face.

Sister’s bond

We can see that these two girls in this novel ‘**Sister of My Heart**’ shared a special and strong bond. The most important concept in the writing of Chitra Banerjee Divakaruni is sisterhood, that mysterious female bonding which goes far deeper than conventional familial ties and which insistently surfaces in women’s relationships despite all patriarchal conditioning. Sister of My Heart explores the particular nature of sisterhood relationship in a traditional Bengali household. They were more than real sister as Anju said about Sudha,

“I could never hate Sudha. Because she is my better half. The sister of my heart.” (Sister of My Heart 11).

She said I will love you now and forever because we know each other very well and nobody can know us like this. One day a friend of Nalini said them,

“don’t you girls ever do anything without each other? I swear, you are like those twins what do they call them, born stuck together.” (Sister of My Heart 14).

They loved each other and we can see this many times in the novel. They shared everything, they felt happy for each other and sad as well. When Nalini punished Sudha not to go collage then Anju protest this and when it was about the Anju’s happiness Sudha sacrificed her love Ashok. When Sudha came to know that family’s reputation matters a lot to Sunil’s father as he said,

“Our talk with the bhaduris had progressed quite a bit. But as I told my wife, even the best match, I’ll break it. Even at the last moment. It’s a matter of family izzat after all.” (Sister of My Heart 124)

She knew very well that Anju loved Sunil too much and if she elopes with Ashok Sunil’s father will break the marriage.

When this was about Sudha’s life then Anju took a strong step for her and did part time job to collect money for Sudha’s ticket so that she can give her a better life. When she came to know that Sudha’s in laws forced her for abortion she spent so many sleepless nights. She always thought about the wellness of Sudha. when Anju was in America, she was very careful about Sudha. She updated herself with everything in Sudha’s life. They both always protected each other in all situations and ultimately reunited.

Love affairs

Both Anju and Sudha experienced love in their life. Sudha met Ashok when they secretly gone for cinema. Sunil was sat next to her in white shirt and Sudha felt in love with him at first sight as Sudha saw him first and thought,

“In the pearl of the theatre, the man’s- but he was not more than a boy himself- eyes glimmer, dark and bright in turns. His smile is at once open and apologetic. His hair tumbles over his forehead charmingly, I think.” (Sister

of My Heart 58)

And

“The cleft on his chin can break a girl’s heart.”(Sister of My Heart 58)

Sudha was deeply in love with Ashok and she left him for the sake of Anju’s life. Ashok also loved her respectively he was ready to marry her after she was divorced and pregnant with Ramesh’s daughter. He offered her for marriage but again she left him for her daughter and then left India for America.

Anju was also in love with Sunil when she saw her on the bookstore. Before her first meeting with Sunil, she did not believe in love and when Sunil visited the bookstore and he purposed her for marriage and then she said,

“It’s going to happen to me any day now, probably as soon as Mr. America gets here.” (Sister of My Heart 119)

And when Sunil told her that he is the one she was waiting for Anju was amazed and she was very happy to know about Sunil that he himself is Mr. America. As she came to know she dreamt of reading her favorite books with him. She was so happy after her meeting with Sunil and said,

“As soon as I get home I’m going to apologize to Sudha because she was completely, absolutely right. Love happens and so do miracles.” Sister of My Heart

Mother’s love

Here in this novel by Chitra Banarjee we can see the unconditional love of mother for their children. Gauri’s love for Anju, she promised her husband to bring her daughter very well and she really did so by giving Anju a good life. She never let Anju feel down in her life she just did her best efforts to make Anju’s life better. She supported her at every step of life and she ran a bookstore herself for family earning. She told Anju,

“The last promise made to your father was that if anything happened to him, I’d bring you up the way he wanted. The way a daughter of the Chatarjee should be. you know that.” (Sister of My Heart 53)

She did not agree for surgery just because it was too expensive and she need money for the dowery of her daughter. Nalini also tried to become a good mother and collect things as good as she can for Sudha. Here we can see the love of mother for unborn child when Sudha left her in laws home for the sake of her unborn daughter Dayita. She knew that it will be difficult for her to bring up her daughter alone but still she left the home and took the bold step. She didn’t care for her future but her unborn daughter. Anju was also very excited for her baby and she was in depression when faced the miscarriage and asked Sunil,

“What did he look like?” (Sister of My Heart 281)

She cried,

“My baby, I killed him.”²⁸² Sister of My Heart

She just closed her eyelids tight and said,

“I’m not going to open them ever again.” (Sister of My Heart, 282)

These lines show the pure and unconditional love of a mother for her children even for unborn one.

Sudha sacrificed her love second time for her daughter when she said to Ashok,

“Dayita is my daughter. She needs me. How will I face her later when she asks me why I abandoned her for the sake of my own pleasure?” (Sister of My Heart 271)

Daughter’s care

Chitra Banarjee successfully shows each and every aspect of women’s life we can also see the care of daughter in this novel. When Nalini was annoyed at Sudha because she secretly went to cinema and she decided that she will not go for college education and will get married. Anju protested but Sudha said,

“Every person has a heart, but we are not lucky enough to get a glimpse of it. And every heart, even the hardest, has a fragile spot. If you hit it there, it shatters. I’m all my mother has. I just don’t want her to feel that I too have turned against her.”⁷³ Sister of My Heart

So, Anju also cared for her mother a lot. When her mother suffered a heart stroke then she offered her mother, “I want to run the bookstore.” (Sister of My Heart 73)

She agreed to get married after her mother’s heart stroke. She felt very sad when she saw her mother with the burden of responsibilities and the hardness of life. She always offered her mother for help.

Feeling of guilt

We can see Sudha here who was the victim of the feeling of the guilt. She forced her pishi to tell her the truth behind his father’s death. Then pishi told her that her father deceives Anju’s family and his father. Then we came to know that Gopal (Sudha’s father was not our cousin and he lied to us that he (Gopal) belongs to our ancestors and then in the search of ruby he took Bijoy (Anju’s father) on the way to death. When this deception came in Sudha’s knowledge she was in the feeling of guilt. We can see her hate for Gopal in these lines

“My father, the handsome rascal, the masquerader with the dangerous, diamond laugh, blown in a bad luck wind. Who took the lives of this household into the hands and his thoughtless wanting broke them like rotted dry wood” (Sister of My Heart 38).

She was feeling guilty for Anju when she said to herself

“Ah, my sweet Anju with a world of love in your eyes, what would you say if you knew.” (Sister of My Heart 39).

Sudha blamed herself for all the misfortune in the chaterjee family and for the death of Anju’s father. After knowing the truth, she was in a mental trauma and she was not in condition to face anybody in chaterjee family. She was devastated when she knew that she and Anju are not really cousin as they think. Sudha confine herself in room for some days after this. And this was her guilt which did not allow her to elope with Ashok. She thought if I run away with Ashok this will affect Anju’s marriage and she preferred to get marry with Ramesh and opt a loveless marriage.

“Oh, Anju, if only you hadn’t fallen so much in love. What will happen to you if I run away with Ashok?” (Sister of My Heart 124)

later she realized that the marriage was the huge mistake of her life and this loveless marriage ended with divorce.

Phase of struggle

When Gopal and Bijoy did not hear and went in the search of ruby they left behind the two pregnant women Gauri and Nalini. They did not come back as they met an accident and lost their lives. Then these women face the hardship of the life then they decided to earn for family. Gauri ran a bookstore for the earnings, she suffered a lot both of them she and Nalini lost their husband before the birth of their daughters. This was not as easy for a woman to live without a man, for a daughter to live without father but they not only live but earn and give a good life to their daughters. On the other side we can see the struggle of Sudha first to get married with a man she did not love then adjust herself in his family. After this she had to go through the pain of a childless lady and when she conceived, she was forced to abort the baby just because it was a girl. She was broken in tears when she called Anju and told her,

“They want to kill my baby” (Sister of My Heart²³⁷)

And

“My mother-in-wants me to have an abortion” (Sister of My Heart²³⁷)

She spoke

“When the test showed that it was a girl. My mother-in-law said the eldest child of the Sanyal’s family has to be male.”

These above lines show the struggle of the ladies in this novel.

Conclusion

Chitra Banarjee Divakaruni successfully portrayed the emotional struggle of the women at every stage of life. She presented the life of women without men here and how these women took strong steps towards the wellness of the family. They earned money for family and provided their daughters a good life. She presented the point of view of people towards girl child. Women in this novel faced everything in their life like widowhood, love affair, separation, divorce, broken heart and mental trauma etc. Chitra Banarjee here showed the life in abroad and how the life is different in America. There are much more steps need to take for the women.

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Changing Paradigms of Education during Covid-19 Pandemic: An Analysis

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Abstract

Covid-19 has brought many risks to our society i.e. health problems, disruption in education, job losses thereby triggered shutdown of the economy and has affected peoples' lives. Not only men, women, children, immigrants, all have suffered a great loss. The current paper highlights the severity of people in education affected by Covid-19 pandemic. The paper explores how Indian Education System has redefined itself and provided continuous streaming through online teaching to the students during the pandemic. The unexpected transformation of teaching activity from the traditional face-to-face model to the online modality was taken as challenge by the teachers. To the surprise of all, not only the teachers but also the students adapted this transformation. The Govt. of India implemented online courses and MOOC courses for students and teachers so that they do not have to miss out on their courses. Resources such as the DIKSHA portal containing video lectures, e-worksheets, e-textbooks and assessments, e-Pathshala and the National Repository of Open Educational Resources (NROER) portal were made available for students.

Keywords: Covid-19, Pandemic, Education, Govt. of India, Online modality

Introduction

The COVID-19 pandemic has led to a dramatic loss of human life worldwide and presents an unprecedented challenge to humanity. Frequent lockdowns, border closures, travel restrictions and confinement measures have been preventing majority from accessing markets, including for buying inputs and selling their produce. The pandemic has blindfolded the world in a moment engulfing millions of lives without warning. The world was frozen and became numb to the thrashing of this pandemic.

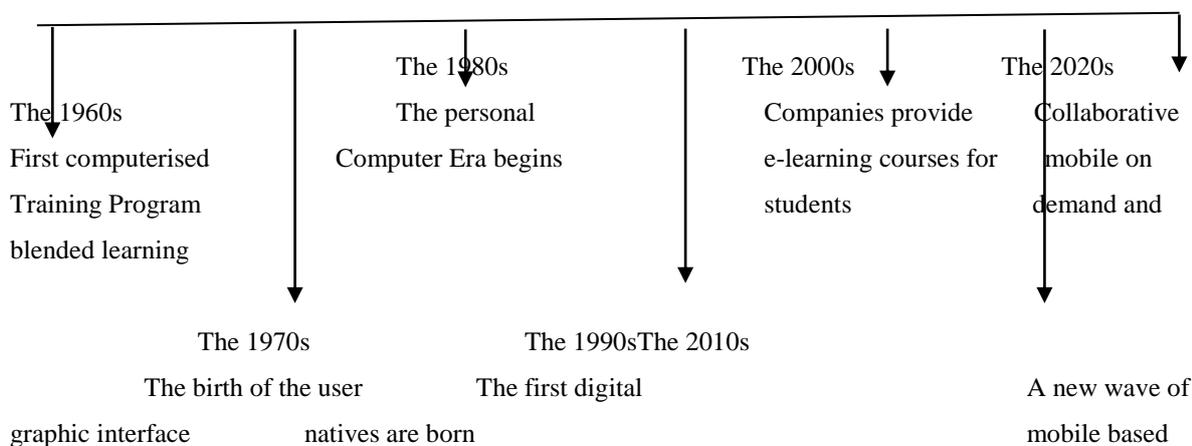
Education Sector is also badly affected by it. It has hampered the education of millions of students across the globe. More than 35 crore students stopped going to school and all educational activities came on a standstill. The educational institutes were left with no other choice then to switch on other platforms with technologies, online apps, and digital sources to provide continuous online teaching clearing the threat of the pandemic.

COVID-19 pandemic has affected every aspect of life around the globe, from individual relationships to institutional operations to international collaborations. In this dark world of uncertainty, fear of survival on the loss of dear and near ones becomes more challenging and painful. Deaths, Injuries, violence and disorder are some of the most threatening results of this un-foretold pandemic. Survivors are deprived of basic needs such as food, clothing, shelter and health. The shrouded humanism is unfolded in spreading its optimistic ray of hope during such time of dire need. The paper intends to capture the chaotic situation caused by pandemic reducing humans from the very state of being humans.

Role of Educators

Online teaching was the only option left before educators to provide uninterrupted classes to the students staying at home. More effective online instructions encouraging learners to participate, collaborative learning and pedagogical changes were some of the steps taken by institutions to bring digital literacy into forefront. This digital advancement could also be seen in the figure given below-

The History of Learning at a Glance



Positive impact on education system:

Although the occurrence of COVID-19 caused hindrance in providing education to the students, yet the learning never stopped. There was absolute transformation in the Indian education system. The Govt. of India implemented online resources like MOOC courses, DIKSHA portal, SWAYAM database and also several courses were aired through DTH platforms.(Dish TV, TataSKY etc.) National Repository of Open Educational Resources (NROER) portal were also made available for the students.

Key points on positive impact on education system:

- 1) **Usage of E-content-** No availability of books forced students to depend on e-content. Teachers prepared notes in the form of e-content to cater the needs of the students.
- 2) **Two way online teaching-learning-** It gave the opportunity where two way online teaching and learning could be exercised fruitfully.
- 3) **Increase in usage of Online platforms-** The pandemic triggered the use of virtual platforms, webinars and e-conferences and people get used to it.
- 4) **A Rise in Digital literacy-** Digital Literacy got boost up due to more and more use of digital technology.
- 5) **Sharing platforms became Trendy-**Study materials were shared using social media like WhatsApp, Telegram, Facebook etc.
- 6) **Wide-reaching Acquaintance-** The learners and educators got an opening to interact with people on daily basis. Learners have become acquainted with international community to deal with imparting and sharing knowledge.
- 7) **Improvement in Time Management Skills-** Students are nowadays able to manage their time more efficiently in online education during pandemics.
- 8) **A requisite of Open and Distance Learning-** During the pandemic situation, most of the students favored Open and Distance Learning mode as it provide better learning opportunities from various resources as per their requisite.

Negative impact on education system:

- 1) **More focus on the end result:** The 'quality' of the student's education is measured in proportion with the percentage, marks or grades in exam. The insight why a student is studying was done through getting good marks and laid emphasis on rote learning. This makes the students learn and cram the subject matter and write in exams without understanding that which creates a problem of unemployment and better future prospects
- 2) **Degradation in the quality:** Many students remained devoid of education during the lockdown which adversely affected the quality of education in India. Even very few institutions find a place in global rankings.
- 3) **Profit and loss business:** Many educational institutions have become money minting institutions. Their sole purpose is to make education as profit making business which is ethically wrong and hampers nation's growth.
- 4) **Effect of Price:** if the focus would be more on earnings and profits surely the quality of education won't be taken care of. Unfortunately most of the efforts are made by the academic institutions to make money from the students on different pretexts like capitation fees, development fees etc.
- 5) **Money-oriented Attitude:** A student visualizing and growing up in money making environment will indirectly affect his/her psychology and such an attitude is harmful for student in long run as the students will value money over hard work and knowledge.
- 6) **Impact on Teachers:** The salaries of teachers were reduced to half whereas the online teaching doubled their work. It has affected their life both mentally and financially.
- 7) **Impact on Students:** Students have to suffer doubly as they were asked to pay for transportation and other fees without availing it.
- 8) **Impact on the country:** Due to lack of proper career opportunities, excellent professionals look for more secure job openings in foreign countries. This migration of intellectual human resource to other countries is a loss to our nation..

More than 185 countries and government organizations had closed the offices and schools due to unavoidable circumstances caused by the pandemic and to cope with the situation teachers were being trained for using ICT. ICT was considered the only viable option in the teaching methodology and became a requisite for continuing education with the teaching-learning process in crisis times.

World Education Monitoring Report states that only 40% of adults in upper-middle-income countries are able to send an email with an attachment. Furthermore, research displays insufficiencies in digital proficiency and inadequate teacher training, although teaching fraternity displayed an optimistic approach toward ICT. Alternatively, there is also another essential point on shifting professional work to online mode of education. The other aspect was how much prepared were the institution to shift towards online mode of teaching. According to the 2018 PISA report, the survey reflected that between 30% and 80% had the required technological skills and show capacity to quickly adapt and transform it. However, the developed countries showed distinguished results with proportions between 70 and 80%.

Internet and advanced technologies in present times have made the life easy and induced the way of education, functioning, and virtual meeting discarding boundaries and distances and information has become accessible in all corners of the world. This certainly has become prerequisite for the development of new individual, societal, and qualified professional.

Conclusion

A developing country like India still needs to prepare infrastructure to make digital education accessible to all parts of the country. The students who are not well versed with technology had to acquire the requisite skills. The priority should be to equip the student of the country with advanced technologies for better education. We need to develop and strengthen IT infrastructure so that we are ready to face COVID-19 like pandemic in future and we can make education accessible and affordable for young learners. We need more detailed statistical study to discover the impact of COVID-19 on education system of India. The study on the impression of the COVID-19 pandemic on teaching and learning across the world provides conclusion that although various findings have been carried out, in the case of developing countries, apt pedagogies and platform for different class levels of higher secondary, middle and primary education need to be reconnoitered additionally.

Facilities of Internet are necessary for digital education. Though Internet bandwidth is relatively low with lesser access points, and data packages are costly comparatively with the salary of the people in many developing countries, thus making user-friendliness and affordability insufficient. Policy-level intervention is mandatory to progress this condition. Further examination and analysis on effectual pedagogy for online teaching and learning is an area for research. Essential for emergent tools for trustworthy evaluations and well-timed reaction is found to be another area of study and analysis. The policy document inclusion is also very important. Education system across the world including India needs to capitalize on the professional development of teachers, especially on ICT and effective pedagogy, considering the present scenario. Making online teaching resourceful, inventive and cooperative through accessible tools is the other area of research and development. This would assist and prepare the education system for such uncertainties in the future.

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Reflection of Indian Society and Social Microcosm in the Selected Works of Mulk Raj Anand

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Abstract:

India is the country which has foundations that are deeply rooted in great scriptures like Bhagavad Gita and Ramcharitamanas, Upanishads, epics as Ramayana, Mahabharata. Mulk Raj Anand is universally acknowledged as novelists of philosophical consciousness, and has intrigued critics of India and abroad. The present research has explored socio-cultural factors and the reflection of Indian Society and Social Microcosm of Mulk Raj Anand. The novels that have been selected have a high scope for in depth sociolinguistic study and the characters used in cultural language. The effort has been done to show the realities that were socially present in past India *i.e.* pre-independence India and post India.

Key words: Coolie, Mulk Raj Anand, Reflection, Sociolinguistic, Untouchable

Introduction

Sociolinguistics is defined as “the study of language in relation to society”. Sociolinguistic approach is a tool to study how various aspects of society its cultural norms, the way of language. R. A. Hudson, (1996) also describes the difference between Sociolinguistics and sociology of language as follows: “Sociolinguistics is ‘the study of language in relation to society,’ whereas the sociology of language is ‘the study of society in relation to language.” This approach was developed in the last quarter of the 20th century. At that time relation of society with respect to language was discarded due to theoretical advances (Trudgill, 1995). Sociolinguistic approach is also used for fictional discourage. The present study explores how Sociolinguistics is approached in novels of Mulk Raj Anand especially novels as Coolie (1936) and Untouchable (1935).

Objectives

To study various aspects of sociolinguistics and how it is applicable in Mulk Raj Anand’s novel specifically Coolie (1936) and novel Untouchable (1935)

Methodology and Techniques Used

The main focus is on the aspects of sociolinguistics. Sociolinguistic approach is used to analyze the selected novels. In this present study two novels of Mulk Raj Anand are taken to emphasize the understanding the aspects of sociolinguistics, style, structure, socio-cultural nuances and language. Different modes like kinship terms, blessings, markers of co-operative principle and politeness principle, modes of address, foregrounding, title tags, abusive expressions, addresser-addressee relationship, sociolinguistic turn taking, self-humbling, code-mixing, code-switching, diminutive expressions, visual mode of communication and greetings are studied against the backdrop of Indian-socio culture aspects.

A Survey of selected Novels of Mulk Raj Anand’s

It is perfect that a survey is done in a brief way of two novels that have been selected for this present study. This survey tells that Anand was a novelist-sociolinguist and also a novelist-sociologist.

Untouchable (1935):

This was the first novel of Mulk Raj Anand. This is a story of the protagonist named Bakha who was suffering untouchability. This novel deals with the discrimination theme based on the caste system in Indian Society. The novel depicts how a untouchable suffers injustics from his master. His sufferings were aggravated when a

Brahmin priest molested his sister named Sohini. The novel gives suggestion that how to eradicate untouchability a) Gandhism, b) Christianity, and c) Modernization,. This novel ends by showing that Bakha;s thinking of the things he heard but he could not understood anything.

Coolie (1936):

This novel that has been selected is a story of a boy who is an orphan and whose name is Munoo. This story melts our heart. Munoo begins his life from the Himachal Pradesh's Kangra Hills. He was forced to leave the village and was said that go to Simla and Bombay. He travels from one place to another so that he could earn his livelihood. Different roles were played by him just as a coolie, factory worker, domestic servant and a rickshaw puller. He was shown as a adolescent who was desperate and was facing many problems in a society that was class ridden. Generally, coolies are always discriminated. Mumoo's struggle to establish his self-identity was left as a dream. At last Munoo was died because of tuberculosis. He used to work a lot and was also suffering from malnutrition, physical and psychological exploration. Munoo was beaten by Babu Nathoo Ram. He was also abused by his wife Bibiji and cursed whenever he goes. He was now habituaal to these circumstances. The language used by two poles of communication reveals the difference of tortured and the torturer.

Selection of Novel and its Author

Some parameters are taken here to select novel. Mulk Raj Anand is a writer who is socially committed and has done linguistic experimentations in his novels. Here two novels are selected. These novels offer a high scope to study sociolinguistic behavior of the characters. Mulk Raj Anand's novel depicts how an unfortunate and depressed person becomes victim of discrimination of class and caste. He explores downtrodden people's suffering and humiliation by his sociolinguistic experiment.

Philosophical nature of Mulk Raj Anand

Mulk Raj Anand was a writer whose literary genius was commendable. Anand was a follow of Gandhi and is also a passionate advocate. He also joined a Marxist workers study circle with Trade Unionist Alan Hutt, met PalmeDutt, T. S. Eliot, John Strachey and Herbert Read. These great philosophers shaped the philosophy of Anand as a creative writer.

Social nature of Mulk Raj Anand

Anand was a social writer. His society which was depicted in his novels was full of conflicting situations which were arosen due to exploiatation of the Coolies, the untouchables, maltreatment and exploitation of the laborers and women. In his writings the struggle of the uneducated and the educated, the master and the servant, the rich and the poor is depicted.

Character of Mulk Raj Anand

Anand depicts his characters in a natural way that it becomes representatives of the Indian Society. These characters are taken from inevitable struggle situation. Characters described by Anand are vivid. In novel, Coolie a fifteen year old child labourer named Munoo suffers from tormenting situations to earn his livelihood. In another novel Untouchable, a protagonist named Bakha depends on the action done by others that belong to the higher strata of society.

Conclusion

The main purpose of this paper is to analyze and study the novels selected by applying sociolinguistics principles. Language conveys idea and concept of any society. Not only the words, syntax of the language

people use also reflects the society where they live. This approach study the masterpieces of English literature generally and Indian English fiction particularly. Language is a reflection of culture that prevails in a society and the world's perception.

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सामाजिक विज्ञापनो में महिला ब्रांड एम्बेसडर की भूमिका

ज्योति

ओम स्टर्लिंग ग्लोबल यूनिवर्सिटी, हिसार

सार

आजका युग एक आधुनिक युग है इससे आधुनिकता प्रदान करने में विज्ञापन ने अहम भूमिका अदा की है क्योंकि विज्ञापन द्वारा ही हमें किसी वस्तु विद्याया सेवा की जानकारी प्राप्त होती है जो हमारे जीवन स्तर को उठाने में सहायता करती है। आधुनिकता के इस दौर में आज चारों तरफ प्रतिस्पर्धा का वातावरण देखने को मिलता है। हर उत्पादक अपने उत्पाद को दूसरे से बेहतर दिखाना चाहता है व अधिक लाभ कमाना चाहता है जिसके लिए अपने उत्पाद के बारे में उपभोक्ताओं को बताने या सूचनाएं देने के लिए नए माध्यमों का सहारा लेता है। जिनमें से एक यशवी है जिसके माध्यम से उत्पादक अपने ब्राण्ड की गुणवत्ता के विषय में उपभोक्ताओं को सूचना देना प्रयास करता है।

सूचक शब्द

विज्ञापन, ब्रांड एम्बेसडर, सामाजिक विज्ञापन, वस्तु, समाज,

विज्ञापन का परिचय

विज्ञापन द्वारा ही हमें किसी वस्तु

विद्याया सेवा की जानकारी प्राप्त होती है जो हमारे जीवन स्तर को उठाने में सहायता करती है अतः

आजके युग को विज्ञापन का युग कहा जा सकता है। जब मनष्य का जन्म होता है तो वह इस समाज का हिस्सा बन

जाता है वह समाज के साथ जुड़ जाता है जैसे ही वह समाज के साथ जुड़ता है उसके साथ बहुत सी आर्थिक, सामाजिक

, राजनैतिक और धार्मिक जरूरतें भी जुड़ जाती हैं। इन जरूरतों को पूरा करने में विज्ञापन उसकी सहायता करता है।
विज्ञापन द्वारा ही इनकी जानकारी प्राप्त होती है

विज्ञापन का अर्थ

विज्ञापन दो शब्दों से बना है " वि और ज्ञापन "

विका अर्थ है विशेष और ज्ञापन का अर्थ है सूचना या जानकारी प्रदान करना। इस प्रकार विज्ञापन का अर्थ है किसी वस्तु या सेवा के प्रति विशेष सूचना या जानकारी प्रदान करना।

विज्ञापन के कार्य

विज्ञापन के निम्नलिखित कार्य हैं

1. नई वस्तु एवं सेवाओं की जानकारी देना।
2. किसी वस्तु की उपयोगिता को श्रेष्ठता बताते हुए उसकी और लोगों का ध्यान आकर्षित करना।
3. उपभोक्ताओं में वस्तु के प्रति मचित विश्वास उत्पन्न करना।
4. विशेष छूट आदिकी जानकारी देते हुए उपभोक्ता मांग में वृद्धि

ब्रांड एंबेसडर

एक ब्रांड एंबेसडर वह व्यक्ति होता है जिसे किसी संगठन या कंपनी द्वारा ब्रांड का सकारात्मक प्रतिनिधित्व करने के लिए नियोजित किया जाता है, और ऐसे करने से, ब्रांड जागरूकता और बिक्री बढ़ाने में मदद मिलती है। ब्रांड एंबेसडर का प्रमुख तत्व प्रचारण नीतियों का उपयोग करने की उनकी क्षमता है जो ग्राहक-उत्पाद-सेवा संबंध को मजबूत करेगा और अधिक खरीदने और उपभोग करने के लिए बड़े दर्शकों को प्रभावित करेगा।

विज्ञापन में ब्रांड एंबेसडर और उसके कार्य

किसी भी ब्राण्ड का ब्राण्ड एम्बेसडर वो होता है जो किसी भी ब्राण्ड के उत्पाद किसी भी सेवा या सामाजिक विषयों के प्रति जनता व समाज को सकारात्मक सूचना प्रदान करे बशर्ते उस उत्पाद, सेवा या विषय के बारे में उसे सही से जानकारी हो और ब्रांड एम्बेसडर वो व्यक्ति होता है जिसे समाज के एक बहुत बड़े वर्ग द्वारा जाना जाता हो जिससे उस उत्पाद सेवा या विषय के प्रति लोगों उसकी तरफ आकर्षक हो। कोई भी व्यक्ति जो वस्तुओं की बिक्री व जनता को समाज के प्रति जागरूक करने की प्रक्रिया में अहम भूमिका

सामाजिक विज्ञापन में महिला ब्रांड एम्बेसडर

समाजवादी पेंशन योजना

ब्रांड एंबेसडर- विद्या बालन

मशहूर फिल्म अभिनेत्री विद्या बालन अब समाजवादी पेंशन योजना का प्रचार करती नजर आएंगी। प्रदेश सरकार ने उन्हें इस महत्वाकांक्षी योजना की ब्रांड एंबेसडर बनाया है।

मुख्य मंत्री ने कहा कि विद्या बालन के इस योजना से जुड़ने से हमें दोहरा लाभ होगा। योजना का प्रचार होगा और लाभार्थियों की संख्या बढ़ेगी। विद्या बालन के जुड़ने से प्रचार की कमी दूर हो जाएगी। गांवों में महिलाएं हमें भले ही न जानती हों, विद्या बालन को जरूर जानती हैं।

मिशन इंद्रधनुष योजना

ब्रांड एंबेसडर- शूटर मनुभाकर

हरियाणा के मुख्य सचिव डीएस देसी की अध्यक्षता में खसरा एवं रूबैला अभियान के लिए गठित की गई राज्य स्तरीय स्टेयरिंग कमेटी की बैठक में शूटर मनुभाकर को इस अभियान की ब्रांड एंबेसडर बनाने का ऐलान किया। हरियाणा के झज्जर जिले के गोरिया गांव की रहने वाली मनु ने दो साल पहले ही निशानेबाजी शुरू की है। उन्होंने ऑस्ट्रेलिया में चल रहे कॉमनवेल्थ खेलों में गोल्ड मेडल जीता है। गुरुग्राम में इस टीकाकरण के तहत सात लाख बच्चों को दवापिलाई जाएगी।

एमएए - "माँ का पूर्ण स्नेह"

ब्रांड एंबेसडर- माधुरी दिक्षित

स्वास्थ्य और परिवार कल्याण मंत्रालय का एकराष्ट्रव्यापी कार्यक्रम है, जिसका उद्देश्य स्तनपान को बढ़ावा देना है।

अतुल्य भारत

ब्रांड एंबेसडर- प्रियंका चोपड़ा

एक अभियान है जिसका उद्देश्य है भारतीय पर्यटन को वैश्विक मंच पर बढ़ावा देना है।

अभी तक किये गए कार्य की संक्षिप्त समीक्षा

कुमारी और शिवानी (2012) ने अपने लेख "भारतीय पत्रिका विज्ञापनों में महिला चित्रण" में कहा है कि फिक्की-केपीएमजी 2012 की रिपोर्ट के अनुसार, विपणन के लिए एगए विज्ञापन व्यय में काफी वृद्धि हुई है। भारत का कुल विज्ञापन व्यय INR 300 बिलियन है, जो समग्र मीडिया और मनोरंजन उद्योग के राजस्व का 41% योगदान देता है। लेखक तीन पत्रिकाओं अर्थात् जनरल सेचुने गए 120 विज्ञापनों पर सामग्री विश्लेषण करने के बाद इंटरनेट मैगज़ीन - इंडिया टुडे, वीमेन्स मैगज़ीन - फेमिना एंड मेन्स मैगज़ीन - ऑटोकारनेनिष्कर्षनिकाला कि पत्रिका विज्ञापन में महिला भूमिका को गृहिणी

(19.2%), सेक्सऑब्जेक्ट (45%) औरसेलिब्रिटी (21.7%)
केरूपमेंपहचानागया।वैश्विकप्रवृत्तिकीतुलनामेंभारतीयविज्ञापनउन्हेंरूढ़ियोंकेरूपमेंचित्रितकरतेहैं।

किरणप्रसादमेंहरिप्रिया (2005) "टेलीविजनपरविज्ञापनमेंमहिलाएं" "महिलाएंऔरमीडिया-
चुनौतीपूर्णनारीवादीप्रवचन"

मेंकहागयाहैकिउदारीकरणऔरनिजीकरणनेनिश्चितरूपसेभारतमेंआजकेउपभोक्ताबाजारकोप्रभावित
कियाहै।हमाराशहरीभारतधीरे-

धीरेपश्चिमीसमाजकीओरबढ़रहाहै।वैश्विकगांवऔरसूचनाक्रांतिकीअवधारणानेबाजारोंकोएकसंदेशके
साथदुनियाकोलक्षितकरनेकेलिएप्रेरितकियाहै।लेखकनेकहाकिइसप्रक्रियामेंपश्चिमीसंस्कृतिहमारीरगों
मेंसमाईजारहीहै।विज्ञापनदातामहिलाओंकेनिष्पक्षऔरसच्चेचित्रणकोप्रस्तुतकरनेमेंसफलनहींहुएहैं।नि
श्चितरूपसेभारतीयमहिलाओंकेलिएपुनर्जन्मकीप्रक्रियाचलरहीहै।लेकिनभारतीयमहिलाकेइसकायाक
ल्पकोविज्ञापनदाताओंद्वाराठीकसेनहींपकड़ाजारहाहै।विज्ञापनसामग्रीमेंबदलावकेलिएआवाजउठानेकी
जरूरतहै।

डिसाल्वाटोर (2010) नेअपनेशोधपत्र "महिलाओंकाचित्रण" मेंविज्ञापन"

नेप्रिंटऔरटेलीविजनमीडियामेंमहिलाओंकोचित्रितकरनेवालेविज्ञापनोंकेविकासकासामग्रीविश्लेषणकि
याहै।अखबारविज्ञापनोंमेंमहिलाओंकेइतिहासपरप्रकाशडालताहै।लेखकमहिलाओंपरमीडियाकेकठोरप्र
भावोंपरभीचर्चाकरताहै।लेखकनेनिष्कर्षनिकालाकिमहिलाओंकोविनम्रयौनभूमिकाओंमेंप्रस्तुतकियाजा
ताहै।उनकाउपयोगसफाईउत्पादोंयास्त्रीउत्पादकाविज्ञापनकरनेकेलिएकियाजाताहै।उन्हेंघरमेंमांकेरूप
मेंरहनेऔरपुरुषोंकीयौनइच्छाओंकोपूराकरनेवालीपत्नीकेरूपमेंरूढ़िवादीभूमिकाओंमेंदिखायागयाहै।

श्रीखंडे (2003) नेअपनीथीसिस, "टेलीविजनविज्ञापनोंमेंमहिलाओंकीस्टीरियोटाइपिंग"

मेंटेलीविजनविज्ञापनोंमेंमहिलाओंकेचित्रणकीजांचकीऔरटेलीविजनविज्ञापनोंमेंमहिलाओंसेजुड़ीरूढ़ि
योंकोप्रस्तुतकिया।इसअध्ययनकेलिएसामग्रीविश्लेषणकोजांचकीएकविधिकेरूपमेंचुनागयाथा।इसउ
द्देश्यकेलिएतीनचुनेहुएनेटवर्क, एबीसी,
सीबीएसऔरएनबीसीसेदोसौछब्बीसविज्ञापनरिकॉर्डकिएगएथे।नमूनेमेंकोईस्थानीयविज्ञापनयासार्वज
निकसेवाघोषणाएंशामिलनहींथीं।और,

सुबहऔरशामकीसमयावधिमेंनेटवर्ककेबीचकोईतुलनानहींकीगई।प्रत्येकविज्ञापनकोमुख्यरूपसेकेंद्रीय
आकृतिकेलिएकोडितकियागयाथा, चाहेकेंद्रीयआकृतिपुरुषहोयामहिला।

**Son kusare, 2013, Impact of television advertising on Buying behaviour of women
consumers ' (with special reference to FMCG Product) chandigarh city, International
Journal of business and management invention, Volume- 2, Issue - 3, PP 31-38**

टीवीविज्ञापनलक्षितश्रोताओंकोसंदेशसंप्रेक्षणकाएकबहुतप्रभावशालीसाधनहैक्योंकिइसमेंदृश्यऔरश्रव्य
संचारकासंयोजितकरनेकीक्षमताहैऔरइसप्रकारहैविज्ञापनद्वारा लोगोंकोकिसीउत्पादकेबारेमेंजानकारी
देनेकाएकमहत्वपूर्णमाध्यमहै।ऐसेबहुतसेउत्पादहैजोमहिलाओंगताभोगताकरतीहैंऐसेबहुतसेउत्पादहै
जोमहिलाउपभोक्ताप्रयोगकरतीहैंऔरवेएफएमसीजीउत्पादकोकाफीजानकारीकेबादखरीदतीहैं।इसशोध
पत्रमेंकाउद्देश्यविभिन्नकारकोंपरअध्ययनकरनाहैजोखरीदनेकेव्यवहारकोप्रभावितकरतेहैं।विज्ञापनके

साथउनकीसंतुष्टि

FMCG

उत्पादोंमेंरणनीति,

उनकामानसिकखर्चआदिचंद्रपुरसिटीमेंपीसउत्तरदाताओंसेप्राथमिकडाटाएकत्रकियागया।एकप्रश्नावली
में

10

प्रश्नलिखेजोमहिलाउपभोक्ताओंसेपूछेगएसेकेंडरीडाटापुस्तककोवेबसाइटलेखोंमेंएकत्रकियागया।।

निष्कर्ष

सामाजिकविज्ञापनमेंमहिलाब्रांडएम्बेसडरकीभूमिकाबहुतहीप्रभावशालीरहीहैक्योंकिबहुतसारेऐसेमुददे
हैंजिनपरपुरुषखुलकरनहींबोलपातेहैलेकिनमहिलाएबहुतअच्छेसेविचारोकोअभिव्यक्तकरसकतीहैऔर
सामाजिकविज्ञापनद्वारादिगएसंदेशकोसमाजकीसामनेअच्छेसेप्रस्तुतकरसकतीहै

अनुसंधानक्रियाविधि

प्रस्तावितअध्ययनकेलिएडेटामाध्यमिकस्रोतोंसेएकत्रितकियागयाहैविभिन्नपुस्तको ,साइटों
,अखबारआदिसेडेटाएकत्रितकियागयाहै

संदर्भग्रंथसूचि

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"जयपुर की ब्लू पॉटरी के वर्तमानस्वरूप का अध्ययन"

सुमितकुमार

ओम स्टर्लिंग ग्लोबल यूनिवर्सिटी

सार

विश्व भर में अनेक प्रकार की मिट्टी पाई जाती है और उनसे बनने वाले पात्र पॉटरी की श्रेणी में आते हैं। जैसे काली मिट्टी, लाल मिट्टी, पीली मिट्टी, चाईना क्ले आदि लेकिन जयपुर की पॉटरी इन सभी से अलग है इसको सिलिका स्टोन (क्वाट्स पाउडर) द्वारा बनाया जाता है। पहले कि जो ब्ल्यू पॉटरी कि जाती थी वह बहुत ही साधारण होती थी उस पॉटरी पर बस फूल पत्तियाँ बुटे व राजा महाराजाओं रानियों के चित्र भी बनाये जाते थे । यह प्रमप्रागत चलता आ रहा था मगर आधुनिक युग में ब्ल्यू पॉटरी जो है वह रचनात्मक हो गई है ब्ल्यू पॉटरी में प्रमपरागत व रचनात्मक दोनों को ही बनया जाता है । आधुनिक युग में ब्ल्यू पॉटरी पर बहुत सारे प्रयोग किये जा रहे हैं । पहले जो ब्ल्यू पॉटरी थी उसमें एक नीले रंग का ही प्रयोग किया जाता था मगर यह आधुनिक युग कि बहुत बड़ी खोज है कि अब ब्ल्यू पॉटरी में लाल, नीले, पीले, हरे आदि रंगो का उपयोग होने लगा है । कि उसकी सुन्दरता को और बढ़ा देता रचनात्मकता कंवल रंगों में ही नहीं आई बल्कि ब्ल्यू पॉटरी में हर वस्तु को रचनात्मक तरीके से बनाया जाता है । बर्तनों को हर दिनकुछ रचनात्मक करने का प्रयर्तन किया जाता है। ब्ल्यू पॉटरी में रंगों और बर्तनों में ही नही बल्कि डिजाईनिंग में भी परिवर्तन आया है । परम्परागत के साथ-साथ आधुनिक शैली को भी जोड़ा है । डिजाईनिंग को लेकर बहुत सारे प्रयोग किये गए हैं

सूचकशब्द

ब्ल्यू पॉटरी, मिट्टी, रचनात्मक, आधुनिक, जयपुर



ब्ल्यू पॉटरी का इतिहास एवं परिचय

प्राचीन कालसे लेकर वर्तमान तक पॉटरी बन रही है उन्हीं मे से एक है ब्ल्यू पॉटरी। गुलाबी नगरी जयपुर एक ओरजहाँ अपने वैभवशाली स्थापत्य के लिए विश्वभर में प्रसिद्ध है वहीब्ल्यू पॉटरीके लिए भीविश्वभर में प्रसिद्ध है । ईरान से यह कला अफगानिस्तान होती हुई मुल्तान, लाहौर सेहिन्दूस्तान के दिल्ली और आगरा शहरों में आई । हिन्दुस्तान के अखिरी मुगल बादशाह बहादुर शाह जफर के समय दिल्ली में एक ईरानी संगीनेजाज काम करता था इसी संगीने जाज से दिल्ली के भोला कुम्हार ने इस कला को सीखा और उसे अपने परिवार की विरासत बनाया । जयपुर के तत्कालीन महाराजा सवाई राम सिंह बड़े ही

कला प्रेमी थे । उन्हें कईप्रकार के शौक थे । जिनमें से एक शौक उन्हें पंतंग लड़ाने का भी था वह पंतंग बाजी के प्रतिस्पर्धाकरवाया करते थे और जो इस प्रतिस्पर्धा में जीतते उन्हें महाराजा सवाई राम सिंह इनाम देते थे दो कुम्हार भाई चुडामणि और कालूराम जयपुर आए और पंतंग बाजी की प्रतियोगिता में उन्होंने महाराजा सवाई राम सिंह की पंतंग की ढोर काट डाली । जिससे देखकर राजा बहुत प्रसन्न हुए और महाराजा सवाई रामसिंह ने उन्हें दिल्ली भोला कुम्हार के पास ब्ल्यू पॉटरी अथवा चीनी मिट्टी का काम सिखने के लिए भेज दिया । जब ये दोनों काम सिखकर जयपुर लौटे तो वहां स्कूल ऑफ आर्ट में सन् 1868 में पॉटरी विभाग के अध्यक्ष बना दिये। लगभग 100 वर्ष तक यह विभाग उसी खानदान के अधिकार में रहा।सन् 1952 में आर्ट स्कूल से सभी प्रकार के हस्तनिर्मित कला हटा दिए गए तो पॉटरी भी बन्द हो गई । सन् 1963 में अखिल भारतीय हस्तकला मण्डल की अध्यक्षता श्रीमति "कमला देवी" ने "कृपाल सिंह शेखावत" को भारतीय चित्रकला के माध्यम के लिए एक स्कूल खोलने के लिए कहा। उसी दौरान उसमे एक विषय ब्ल्यू पॉटरी को भी जोड़ दिया गया । आज जयपुर व जयपुर के आस-पास के गाँव तक के लोग इस कला से जुड़े हुए हैं और अपना जीवनयापन कर रहे हैं । इस कला ने हजारों लोगों को रोजगार तो दिया साथ में जयपुर का नाम इस ब्ल्यू पॉटरी से जुड़ कर दूनिया में नाम किया है. इन सबका श्रेय "कृपाल सिंह शेखावत" की ही जाता है ।



ब्ल्यू पॉटरी की विधियाँ एवं तकनी

विश्व भर में अनेक प्रकार की मिट्टी पाई जाती है और उनसे बनने वाले पात्र पॉटरी की श्रेणी में आते हैं। जैसे काली मिट्टी, लाल मिट्टी, पीली मिट्टी, चाईना क्ले आदि लेकिन जयपुर की पॉटरी इन सभी से अलग है इसको सिलिका स्टोन (क्वाट्स पाउडर) द्वारा बनाया जाता है।

ब्ल्यू पॉटरी :

ब्ल्यू पॉटरी एक बहुत ही अलग तरह की पॉटरी है इसका बनाने का तरीका और इसका पकाने का तरीका सभी पॉटरीयो से अलग है इसकी सुन्दरता इसका नीला रंग इसको और पॉटरीयो से अलग करता है यह एक ऐसा माध्यम है जो मनुष्यों कीलगन और महत्व पर निर्भर करता है क्योंकि यह पॉटरी इसलिए ही सभी पॉटरीबो से अलग है इस पॉटरी में सभी काम मनुष्य द्वारा ही किये जाते हैं ब्ल्यू पॉटरी को बनाने में एक लम्बे समय की दूरी तय करनी पड़ती है। यह मेहनत के साथ-साथ समय भी लम्बा लेती है इसके एक बर्तन को

बनाने के लिए कम से कम हमें 20 से 25 दिन तक लगते हैं यह समय वातावरण पर भी निर्भर करता है। सर्दियों में अगर सूर्य ना निकले तो यह कुछ इससे ज्यादा समय भी ले सकती है। क्योंकि इसको सूर्य की किरणों से ही सुखाया जाता है ।

ब्ल्यू पॉटरी बनाने के लिए सामग्री :

1. क्वाट्स पाउडर
2. ग्लास पाउडर (काँच का पाउडर)
3. कतिरा गोंद (राम)
4. मुल्तानी मिट्टी
5. सांजी (पापड़ बनाने वाला नमक)
6. मैदा
7. सिंदूर (रेड ऑक्साईड)
8. सुहागा (चोर्न ओक्साईड)
9. पलास्टर ऑफ पेरिस (पी.ओ.पी.)
10. मैटेलिक ऑक्साईड रंग जैसे (कोबाल्ट ऑक्साईड, कोपर, ओक्साईड, कैल्शियम ऑक्साईड, आयरन ऑक्साईड आदि

ब्ल्यू पॉटरी की विधियाँ.

1. साँचा बनाना ।
2. अस्तर बनाना ।
3. अस्तर करना ।
4. साफ करना (फनिसिंग) ।
5. शीशे का आवरण करना (ग्लेज) ।
6. डिजाईनिंग करना ।
7. रंग करना ।



8. शीशे का आवरण बनाना (ग्लेज को बनाना) ।
9. भट्टी में बर्तन लगाना व उनको पक्काना ।

साहित्य की समीक्षा

- दीप्ति शुक्ला सार : नीली मिट्टी के बर्तन बनाने की कला को सबसे पहले मंगोल कारीगरों द्वारा विकसित और प्रबंधित किया गया था , जिन्होंने चीनी ग्लेज़िंग तकनीक को फ़ारसी सजावटी कलाओं के साथ जोड़ा था । ब्लू पॉटरी उद्योग 17 वीं शताब्दी से जयपुर में काम कर रहा है , और विदेशों में नीली मिट्टी के बर्तनों की लगातार मांग होती रही है लेकिन अच्छे प्रबंधन और शासन के अभाव में इसे कुशलतापूर्वक और प्रभावी ढंग से पूरा नहीं किया जाता है । सुंदर रंग संयोजनों का उपयोग करके जटिल डिजाइनों के साथ 24 इंच का फूलदान तैयार करने के लिए एक कारीगर के चार से पांच दिनों के समय और कौशल की आवश्यकता होती है । इसलिए , वर्तमान पेपर हस्तशिल्प उद्योग में इस कला की मौजूदा स्थिति और भविष्य की पीढ़ियों के लिए इस कला को जीवित रखने के लिए किए जा सकने वाले प्रबंधन उपायों पर केंद्रित है ।
- डॉअंजलिपांडे:यह लेख ताम्रपाषाणकालीन मृदभांड , जैसे बेलनाकार बर्तनों और सुराही के साथ टेराकोटा कुम्हार , इंगित करते हैं कि पश्चिम एशिया और ईरान का प्रभाव के बारे में है । चमकता हुआ मिट्टी के बर्तनों की कला में स्वदेशी रूप , डिजाइन और जीवंत

नीला रंग होता है। टेर्को - फ़ारसी प्रभाव वाले नीले मिट्टी के बर्तनों के लिए जयपुर व्यापक रूप से पहचाना जाता है। नीली मिट्टी के बर्तनों की वस्तुएं लैंपशेड, क्रॉकरी, ज्वेलरी बॉक्स, सर्विंग ट्रे, फूलों के फूलदान और कटोरे आदि हैं।

- डॉ. आंचलभारद्वाज: यह लेख जयपुर (राजस्थान) में ब्लू पॉटरी उद्योग के बारे में है। ब्लू पॉटरी को आमतौर पर जयपुर के एक असाधारण शिल्प के रूप में स्वीकार किया जाता है। लोग नीले मिट्टी के बर्तनों की डिजाइन की विशिष्टता के कारण उनकी प्रशंसा करते हैं। यह किसी भी घर के इंटीरियर को भव्य रूप प्रदान करता है, हालांकि ब्लू पॉटरी बनाने की प्रक्रिया काफी लंबी है। वर्तमान में ब्लू पॉटरी उद्योग जयपुर में कई लोगों को रोजगार प्रदान करता है। जयपुर की ब्लू पॉटरी पूरी तरह से हाथ से पेंट की गई है, सिरेमिक क्षेत्र की गर्म और शुष्क जलवायु के लिए उपयुक्त है

निष्कर्ष

1. जयपुर की ब्लू पॉटरी की विधियाँ

जयपुर के ब्लू पॉटरी को बनाने में कौन-कौन सी विधियों का प्रयोग किया जाता है एक वस्तु पर शुरुआत से लेकर अंत तक कैसे तैयार किया जाता है उसकी हर प्रक्रिया का अध्ययन करना आवश्यक है क्योंकि विधियों के द्वारा ही हमें पता चलता है कि ब्लू पॉटरी दूसरी पॉटरी से अलग है विधियों के अध्ययन से ही कला का वास्तविक रूप सामने आता है

2. ब्लू पॉटरी में हुए रचनात्मक प्रयोग रचनात्मक ब्लू पॉटरी



ब्ल्यू पॉटरी मुगलो के समय से चलती आ रही है । इस पॉटरी में प्रमप्रागत रीति-रिवाजो को लेकर हि काम होता आ रहा था मगर बदलते दौर को देखते हुए इस ब्ल्यू पॉटरी में भी बदलाव आया । आज कि जो ब्ल्यू पॉटरी है वह रचनात्मक ब्ल्यू पॉटरी से अपनी पहचान बना चुंकि है । क्योंकि पहले कि जो ब्ल्यू पॉटरी कि जाती थी वह बहुत ही साधारण होती थी उस पॉटरी पर यह प्रमप्रागत चलता आ रहा था मगर आधुनिक युग में ब्ल्यू पॉटरी जो है वह रचनात्मक (Creative) हो गई है आधुनिक युग में ब्ल्यू पॉटरी पर बहुत सारे प्रयोग किये जा रहे है । पहले जो ब्ल्यू पॉटरी थी उसमें एक नीले रंग का ही प्रयोग किया जाता था मगर यह आधुनिक युग कि बहुत बड़ी खोज है कि अब ब्ल्यू पॉटरी में लाल, नीले, पीले, हरे आदि रंगो का उपयोग होने लगा है । रचनात्मकता कंवल रंगों में ही नहीं आई बल्कि ब्ल्यू पॉटरी में हर वस्तु को रचनात्मक तरीके से बनाया जाता है । डिजाईनिंग को लेकर बहुत सारे प्रयोग किये जा रहे है।

3. ब्लू पॉटरी का दैनिक जीवन में उपयोग

दैनिक जीवन में ब्ल्यू पोटरी की महत्वपूर्ण भूमिका रहती है । ब्ल्यू पॉटरी जो है वो हमारी दैनिक जीवन से जुडी हुई है । हम अपने दैनिक जीवन में पॉटरी का इस्तेमाल अनेक कार्यों के लिये करते है ।

अनुसंधानविधि

प्रस्तावित अध्ययन के लिए डाटा प्राथमिक और माध्यमिक दोनों स्त्रोतों से एकत्रित किया

गया है प्राथमिक डाटा को ब्लू पॉटरी के प्रमुख कलाकारों के गहन साक्षात्कार द्वारा एकत्रित किया गया है। माध्यमिक डाटा विभिन्न पुस्तकों, साइटों, अखबार आदि से डेटा एकत्रित किया गया है।

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TELEHEALTH AND TECHNOLOGY TOWARDS TRANSFORMATIONAL HEALTH SYSTEM IN ABU DHABI, UNITED ARAB EMIRATES

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ABSTRACT

UAE has announced first case of novel corona virus on 29th January 2020² and later in March 2020 COVID 19 disease was declared as a pandemic by the World Health Organization (WHO). Pandemic has caused healthcare systems around the globe to rapidly, and in some cases, radically rethink the delivery of medical care. The global expansion of telehealth services is one way we have seen this transformation occurred and resulted in significant opportunities in the field, as well as unprecedented regulatory changes. With multiple challenges to maintain social distancing, taking care for venerable patients against avoidable exposures, providing medical guidelines to isolated and quarantine patient's, routine checkups, prescription filling, refilling etc. necessitate adoption of enhanced technological advances to transform healthcare into an efficient and convenient model of care.

KEYWORDS: ♦Telehealth♦Telemedicine♦COVID -19 ♦Patients ♦Providers♦Medicines♦Technology♦UAE

INTRODUCTION:

Telehealth refers to the delivery of healthcare services where patients and providers are separated by distance, using information and communications technology for the exchange of information for the diagnosis or treatment of diseases and injuries³.

Some distinguish telemedicine from telehealth with the former restricted to service delivery by physicians only, and the latter signifying services provided by health professionals in general, including nurses, pharmacists, and others. However, for the purpose of this review paper, telemedicine and telehealth are synonymous and used interchangeably.

Telehealth is not a new concept – healthcare providers, academics and technology developers have been advocating for its use for decades. There are many benefits to the widespread adoption of telehealth, including improved access to healthcare services, risk mitigation, convenience and flexibility, and in many cases, a reduction in overhead costs. However, the use of telehealth is not without its challenges. For example, it is not suited to all forms of healthcare, its implementation and adoption can be time consuming and costly, and additional care must be taken in relation to the transfer of patient health information.⁴

OBJECTIVE

This study reviewed progress in the use and adoption of technology in healthcare services delivery systems in Emirates of Abu Dhabi during COVID period, January 2020 till January 2022 aiming to provide a comprehensive summary of transformations via use of technology to develop healthcare system that can be adopted by other policy makers, health professionals, regulators for future preparedness.

METHOD

Systemic reviews were conducted on media reports, international guides, articles, circulars, announcements,

² WAM, Emirates News Agency

³ World Health Organisation's definition of Telehealth

⁴ DLA Piper, Telehealth around the World – A global Guide

standards from various search engine tools like Google and Regulatory Web Portals. The review followed the scientific process of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines of identification, selection, assessment, synthesis, and interpretation of findings.

REVIEW OUTCOME

In 2020, The WHO Global Strategy on Digital Health was adopted by the World Health Assembly, presents a roadmap to link the latest developments in innovation and digital health, and put these tools to action in order to improve health outcomes. The purpose for a Global Strategy on Digital Health is to promote healthy lives and wellbeing for everyone, everywhere, at all ages. To deliver its potential, national or regional Digital Health initiatives must be guided by a robust strategy that integrates financial, organizational, human and technological resources.⁵

Healthcare Technology Readiness in UAE

Medical services in UAE have improved dramatically during past 10 years, where number of facilities (includes hospitals, centers, clinics, pharmacies, drug stores and others) have increased from 1352 to 3021; clinicians (includes physicians, dentists, nurses/midwives, allied health professionals, pharmacists, alternative medicine) from 21,115 to 50,553 during the period of 2011 – 2020 and Bed capacity from 2867 to 9215 during the period of 2012 – 2020 (<https://www.doh.gov.ae/resources/opendata>).

As per **Future Health Index Report, 2016**; United Arab Emirates (UAE) ranks highest on FHI and leads the other countries on the index by a significant margin due to positive views on the current state of integration throughout the health system and patient and healthcare professional readiness to adopt technology – 43% of UAE patients feel the health system is very or completely integrated, the highest rate among countries polled.

The UAE's Future Health Index (FHI) score of 65.3, the highest among the 13 countries surveyed, is driven by its strength in access, integration and the adoption of connected care technologies as per data.

Status of Telehealth in Emirates of Abu Dhabi

1. Current Status

As a brief background, at a federal level, the annex to Cabinet Decision No. 40/2019 On the Implementing Regulation of Federal Decree-Law No. 4/2016 on medical liability ("Information and Communication Technology Health Law"), entitled "Controls and Conditions of Providing Remote Health Services" ("Federal Telehealth Regulations") expressly covers a range of telehealth.

The regulation of telemedicine is fragmented across the Emirates of Abu Dhabi by the Department of Health ('DOH').

The DOH issued its initial telemedicine regulatory framework in 2014; since then, the industry has awaited updates to the same and a more comprehensive acceptance of new telehealth providers in the emirate. In September 2020, the DOH issued an updated DOH Standard on Tele-Medicine ('DOH Telemedicine Standard'), bringing Abu Dhabi's telemedicine standards in line with recent federal legislation, and current care delivery models. The standard sets out the minimum requirements for the provision of telemedicine services by DOH licensed providers, covering:

- Tele-diagnosis
- Tele-counselling
- Tele-medical interventions
- Tele-consultation

⁵WHO, Digital Health Webpage- Global Strategy

- Tele-prescription
- Tele-monitoring

2. COVID – 19 related transformations

The DOH Telemedicine Standard is in addition to and supplements the circulars⁶ issued over the period of March 2020 – January 2022 in relation to DOH’s COVID-19 response.

- 2.1. One such development was the mandate that telemedicine is required to be a benefit in all insurance products, until further notice⁷.
- 2.2. Launch of the DOH Remote Care Platform in March 2020 for virtual care visits for certain approved specializations and services by providing delivery of non-emergency, non-urgent care remotely by all licensed providers and covering all health schemes.
- 2.3. Besides the special requirements for controlled medicines an extended duration of three months was permitted for patients, who are prescribed controlled medicine through unified electronic platform to avoid re-visits temporarily in the month of March 2020.
- 2.4. Teleprescription and delivering of medications to home where reasonable are permitted (and encouraged) through the platform and activation of Tele-Medicine Services and Medicine Home Deliveries were extended multiple times until 31st March 2022.

3. Other Smart Solutions to fight COVID- 19⁸

- 3.1. **The Al Hosn App:** UAE’s official app for contact tracing and health status related to COVID-19 supported by below data:
 - i. COVID-19 test results and a record of all previous COVID-19 results with their dates
 - ii. a notification if you have been in contact with a confirmed case of COVID-19
 - iii. vaccination information, including the type of vaccine you have taken, and the date of dose given.
 - iv. Facilitates sharing test reports and vaccination certificates.
 - v. Colour coding system helps authorities to identify the health status of individuals and permit them to go to public spaces and workplaces.
 - vi. Parents and guardians can add their family members and access the test results of their dependents.

4. Abu Dhabi’s Healthcare Technology Solutions in response to COVID -19

During this pandemic period, Emirates of Abu Dhabi has initiated several digitalization steps adopting various technologies. Some of the examples are as below:

⁶Department of Health, Abu Dhabi; Circular No. 10; 23/03/2020; No.(58) dated 18/6/2020, No.(72) dated 20/7/2020, No.(85) dated 25/8/2020, No.(98) dated 23/9/2020, No.(149) dated 30/12/2020 and No.(152) dated 10/10/2021, No. (1) dated 03/01/2022

⁷Al Tamami and co. web page, law update; November 2020

⁸The UAE Government Portal, Information and Services, Handling the COVID-19 Outbreak

| Year | Healthcare Technology Solutions | Description |
|------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2020 | Health Workforce Management System | Digital platform for Volunteers |
| | TraceCovid | Innovative smartphone application which allows users to keep track of COVID-19 cases and curb its spread between members of the society. |
| | ESTIJABA ⁹ enhancement with Medical Operations Command Centre | Direct electronic communications channel, to respond to patients' emergency requests promptly locally. |
| | Centralization of Database through Malaffi ¹⁰ | Real-time COVID-19 test results from all COVID-19 testing sites |
| | Home Isolation Program Smart Service | WhatsApp service platform |
| | Diffractive Phase Interferometry (DPI) Test | A blood test for detection of COVID – 19 infections |
| 2021 | Remote healthcare platforms for UAE international patients | Activation of system to provide necessary care |
| | Announcing use of Drone Technology | For Medical Supply Transfer and Delivery |
| | Virtual Autopsy for Mortuary Investigations | To support the healthcare sector in confirming the cause of death while ensuring the health and safety of individuals who have been in contact with the deceased. |
| | Epidemiological Modelling Tool | For continuing monitoring and adjust measures as necessary. |
| | Digital birth certificates | For newborns |

Source: Department of Health, Abu Dhabi, Media Webpage

RESULTS:

This review paper demonstrates journey of technology including telehealth services in Emirates of Abu Dhabi during COVID-19 and transitional changes henceforth. The results showed that progress made in the utilization of telemedicine and other technologies were substantially recognized and implemented towards digital healthcare ecosystem.

CONCLUSION:

This review provides a comprehensive journey and transitions of exiting telehealth status across the region and various developments or changes that have been adopted during the COVID-19 and ongoing. This is likely to be

⁹ It is a unique AI-based system that was launched in 2019 by DoH's Centre of Emergency Preparedness and Response.

¹⁰ Abu Dhabi first Health Information Exchange Platform for a centralised database of unified patient records, improving healthcare quality and patient outcomes.

sustained beyond the COVID-19 era with strengthening and widening of healthcare services with conceptual use of technology and enhancing patient experience. A further study or review is recommended to evaluate effectiveness of these transformations at user level to take further feedbacks on enhancing the patient experience.

CONFLICT OF INTEREST:

The author declares no conflicts of interest.

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माधव कौशिक का साहित्य व तकनीकी प्रयोग

बजरंग लाल

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शोधपत्र सार -

माधव कौशिक के हिन्दीसाहित्य के अन्तः फलक परविचार करने पर यह तथ्य उभरकर आता है कि किसी भाषा की शक्ति प्रौद्योगिकी को अपनी सामाजिक स्मृति, लोकोन्मुखपक्षधरता, सांस्कृतिक व जातीय अस्मिता के संरक्षण में एक 'तकनीकी' की भाँति प्रयोग करनेमें है न कि प्रौद्योगिकी को अपनी सामुदायिक स्मृति करने में है, न कि इसके के द्वारा अपनी मूल ऐतिहासिक परम्परा, लोकतांत्रिकसंवेदना व भावात्मक वैशिष्ट्य के अस्तित्व में। यह सही है कि प्रौद्योगिकी ने मानवीय संवेदनाओं का अस्तित्व स्थापित किया है तथापि प्रौद्योगिकी मनुष्य के मस्तिष्क की ही उपज है। यह मनुष्य के विवेक पर निर्भर है कि वह किस तरह उसे अपनी सौन्दर्यानुभूति, कलात्मक-अनुभवों, सामाजिक, राजनैतिक व आर्थिक विकास के सम्बन्ध में एक 'तकनीकी उपक्रम' के रूप में प्रयोग करे। भूमण्डलीकरण व नव-उदारवादी सांस्कृतिक पड़ाव में सूचना-प्रौद्योगिकी ने भाषाकी अस्मिता को भी कई तरह से प्रभावित किया है। अंतर्जाल तकनीकी ने सोशलमीडिया की उपलब्धता करा कर एक नए तरह के भाषा-विमर्श को जन्म दिया है। रचनात्मक स्तर पर भी सामाजिक-सहभागिता के विस्तृत पटल को उपलब्ध कराकर एक तरफ सकारात्मक प्रभाव छोड़े हैं, तो वहीं दूसरी तरफ मनुष्य की कल्पनाशक्ति का हास, भाषा सम्बन्धी खतरे व अन्य नकारात्मक प्रभावों से भी नकारा नहीं जा सकता।

keyword: तकनीकी(प्रौद्योगिकी), अंतर्जाल(इन्टरनेट), कम्प्यूटर (संगणक)

प्रस्तावना-

अगर हम तकनीकी विकास के द्वारा हिन्दी भाषा- साहित्य के मूल चरित्र के विकास की बात करें तो स्पष्ट है कि अंतर्जाल , वेब-पोर्टल व व्हाट्स-अप आदि के साहित्य में प्रयोग ने साहित्य की सामाजिक स्वीकार्यता को बढ़ाया है। आज सोशल मीडिया पर गद्यकोश, कविताकोश, हिन्दी समय डॉट कॉम जैसी अनेक वेबसाइट्स साहित्य के संरक्षणका दायित्व बहुत अच्छे से निभा रही हैं। फेसबुक, ट्विटर, ब्लॉग आदिव्यक्तिगत-अनुभूति को सुप्रसिद्ध करने के सशक्त माध्यम के रूप में उभरकर आए हैं। इन्होंने पाठक, श्रोता व रचनाकार का प्रत्यक्ष सम्बन्ध स्थापित कर विचार-विमर्श की नयी सम्भावनाओं को प्रकट किया है। सम्पादक व प्रकाशक की भूमिका अब रचनाकार स्वयं ही निभाकर साहित्य के रूढिमूलक-व्यक्तित्व से अलग एक नवीन तरह का साहित्यिक संसार रच रहा है, जो कि सम्पूर्ण रूप में तकनीक आधारित या आभासी है। कविता, कहानी, विमर्श आदि के लिए सोशल मीडिया में पूरा स्थान उपलब्ध है। माधव कौशिक के कथा संसार में विस्तृत रूप से फैले विभिन्न क्षेत्रों जैसे-गजल संग्रह:आईनों के शहर में, किरण सुबह की, सपने खुली निगाहों के, हाथ सलामत रहने दो, आसमान सपनों का, सूरज के उगने तक, अंगारों पर नंगे पाँव, खूबसूरत है आज भी दुनिया, सारे सपने बागी हैं, जला दो चिराग आंधी में, सपना सही सलामत दे, नई सदी का सन्नाटा, उड़ने को आकाश मिले, पानी पर तहरीर नई, नयी सुबह की नई कहानी, नयी उम्मीद की दुनिया, खण्ड काव्य -सुनो राधिका(पुरस्कृत), लौट आओ पार्थ (पुरस्कृत), नवगीत - मौसम खुले विकल्पों का, शिखर संभावना के, जोखिम भरा समय है, कथा-संग्रह:-ठीक उसी वक्त (पुरस्कृत), रोशनी वाली खिड़की, माधव कौशिक की प्रतिनिधि कहानियाँ कविता-संग्रह:-सबसे मुश्किल मोड़ पर, एक अदद सपने की खातिर, कैण्डल मार्च, बाल-साहित्य:-खिलौने मिट्टी के , आओ अंबर छू लें, अनुवाद:-‘क्षितिज के उस पार’ (जस्टिस सुरेन्द्र सिंह की अंग्रेजी-पुस्तक का अनुवाद), आवाज के आकार (डॉक्टर रमेश की पंजाबी-पुस्तक का अनुवाद इत्यादि में समृद्ध सांस्कृतिक काव्यात्मक परिपाटी के साथ-साथ आधुनिक तकनीकी के व्यापक स्वरूप में देखा जाना जनमानस के लिए एक उपलब्धि होगी | इसका मुख्य कारण वर्तमान

महामारी व आर्थिक व्यस्तता के युग में मनुष्य का तकनीकी का आश्रय लेना है और यह उपयुक्त भी है क्योंकि इसने राष्ट्र व समाज की बंदिशों को तोड़कर पूरे विश्व को एक कर दिया है। साहित्य-अवदान ढूँढने के लिए केवल मात्र रचनाकार का नाम ही गूगल करना पड़ता है।

ट्विटर , फेसबुक ,ब्लॉग ,व्हाट्स-अप व मेल्स के माध्यम से हर प्रकार का साहित्य संसार के किसी भी कोने में भेजा जा सकता है। असंख्य कवि, लेखक, लेखिकाएँ आदि निरन्तर एक साथ सक्षम रूप से अपनी सक्रिय उपस्थितिही दर्ज नहीं कराते हैं, अपितुइनपर टिप्पणी में कई सकारात्मक सम्भावनाएँ भी उभर कर आती हैं। 'व्हाट्स अप' आदि पर रचनात्मक व विमर्शीयलेखन हिन्दी की सर्वग्राह्यता के पटल को विस्तार देता है। गूगल मीट , जूम , माइक्रोसॉफ्ट टीम आदि पर माधव कौशिक जी के साहित्य को जनमानस तक आसानी से पहुँचाया जा रहा है।

हिन्दी शब्दतन्त्र, शब्दमाला,डिक्शनरी, ई-महाशब्दकोश आदि के अतिरिक्त पारिभाषिकशब्दावली सम्बन्धी; वैज्ञानिक तथा तकनीकी शब्दावली सम्बन्धी,तकनीकी शब्दावली आयोग द्वारा जारी शब्दकोश, कथा समान्तर कोश, ऑनलाईन बैंकिंग शब्दावली, हिन्दी यूनिकोड पाठ संग्रह, अरविन्द सहज समान्तर कोश, आदि शब्दकोश उपलब्ध हैं । इस तमाम तकनीकी प्रयोगधर्मिता ने एकव्यापक सन्दर्भ में हिन्दी भाषा की लोकप्रियता, रचनात्मक सम्भावनाशीलता वप्रयोजनमूलकता को बढ़ाते हुए एक बहुत बड़े समूह को हिन्दी साहित्य के प्रति आकर्षित किया है। जहाँ तक यह सवाल साहित्य की भाषा के प्रयोग का है, आचरण का है, प्रौद्योगिकी के प्रयोग ने इसके दायरे को बढ़ाने के साथ-साथ सांस्कृतिक व सामुदायिक-संरक्षण का भी प्रत्यन किया है। हिन्दी अब जन व्यवहार कीकम्प्यूटर कार्य शैली के माध्यम के रूप में विकसित हो रही है। यदिहिन्दी साहित्य का प्रश्न है,तो यह विशेष सवाल उठता है कि हिन्दी की तकनीकप्रयोगमूलक सुविधा व सोशल मीडिया की सुलभता के माध्यम से जो साहित्यिकपरिप्रेक्ष्य में उभरकरआता है, उसकी मूल संरचना ने हिन्दी की परम्परा, जातीय प्रवृत्तिव उसकी सामर्थ्य कोपूर्ण रूप से प्रभावित किया है।सोशल मीडिया के माध्यम से आज किसी भीरचनाकार को व्यक्तिगत अस्तित्व के साथ स्थान

उपलब्ध है। वह प्रकाशक, रचनाकार व सम्पादकतीनों की भूमिकाओं में है।

एक दूसरा सवाल यह भी उभर कर आता है □ □ सोशल मीडिया, जो प्रौद्योगिकी का एक हिस्सा है, ने समाज व संस्कृति बोध को कितना अधिक प्रभावित किया है ? सोशल मीडियाने एक अपना विशेष शब्द-कोश विकसित किया है जिसके प्रभाव को नाम चॉमस्की ने काफी पहले स्वीकार कर लिया था। । यह ठीक है कि विश्व में निरंतर भाषाओं का संरक्षण भाषा की प्रयोजनमूलकता ही तय करेगी। एक ऐसे भाषायी संकट के समय सोशल मीडिया जिस अनुवादपरक, बाजारीकृत, अमानकीकृत, असाहित्यिक, भाषा-स्वरूपों को सामुदायिक चेतनाओं पर चिपका रहा है, वह विचारणीय है। सोशल मीडिया पर गैर-साहित्यिक वर्ग प्रायः भाषा के इसी रूप को व्यवहार में लाता है। संवेदनाओं की सरलतम अभिव्यक्तिके लिए जहाँ प्रतीक चिहनों को काम में लिया गया है, वहीं हिन्दी का व्यवहृत रूप विकसित अवश्य हुआ है, किन्तु वह एक सांस्कृतिक जातीय-संवेदना की विकासपरक परम्पराके आवश्यक 'माध्यम' के रूपमें है । यह आश्चर्यजनक है कि जहाँ हिन्दी भाषा में अंग्रेजी आदि विदेशी भाषिक -शब्दोंके प्रयोग को ऐतिहासिक परिवर्तन के तहत देखा जा रहा है, वहीं संस्कृत आदि प्राचीन भाषा-स्वरूपों के प्रयोग को उस सहजता से नहीं लिया गया है ।

वास्तव में ऐसा इसलिए होता है कि हमने तकनीक को साध्य समझ लिया है, जबकि वह सिर्फ साधन है। 'तकनीकी कुशलता' में हमारी मानकों व उपलब्धियों को हमें अन्तचेतना में सामुदायिक अनुभवों से जोड़करके देखना चाहिए। प्रौद्योगिकी तो साधन है, साध्य तो मानवीय अस्मिता है; और विकास है। किसी एक विज्ञान-परक पद्धति को विकसित करके और उसी को प्रोत्साहित करके, लोक प्रसिद्ध बनाना तो काफी नहीं है। इन तरीकों से तो दुनिया की दूसरी दर्जनों भाषाओं का भी भला हो जाता। लेकिन कारोबार का सवाल है। माधव कौशिक जी ने अपने साहित्य में विस्तृत सामाजिक दृष्टिकोणों को उजागर करके साहित्य के स्वरूप को आधुनिक युग की चिरपरिचित विभाजक रेखा के पास लाकर स्थापित कर दिया है । इस स्थापना के पीछे तकनीकी का प्रयोग उनके साहित्य को व्यापक पटल प्रदान करेगा । ऐसा सुनिश्चित एवं सफलताकारक प्रभाव के रूप दर्शित है । माधव कौशिक का साहित्य राष्ट्रीय एवं अंतर्राष्ट्रीय स्तर

प्रकाशित हो चुका है | इन द्वारा रचित खंड काव्य 'सुनों राधिका' अनेक भाषाओं में अनुवादित हो चुका है | अनुवाद की यह प्रक्रिया तकनीकी प्रयोग से अछूती नहीं है | माधव जी ने स्वयं भी जस्टिस सुरेंद्र सिंह की अंग्रेजी भाषा की पुस्तक 'क्षितिज के उस पार' तथा डॉ. रमेश की पंजाबी भाषा में रचित पुस्तक 'आवाज के आकार' को हिंदी भाषा में अनुवादित किया है | यहाँ यह स्पष्ट करना भी जरूरी है कि इस तकनीकी युग में अनुवाद का पर्याय क्या है | किसी भाषामें कही या लिखी गई बात का किसी दूसरी भाषा में सार्थकरूपांतरण अनुवाद कहलाता है। कम्प्यूटर साफ्टवेयर के प्रयोग से एक प्राकृतिक भाषा के टेक्स्ट या कही गयी बात को दूसरी प्राकृतिक भाषा के पाठ या वाक्य में अनुवाद करने को यांत्रिक अनुवाद या मशीनी अनुवाद कहते हैं। कम्प्यूटर के साफ्टवेयर की क्षमताओं में अत्यधिक विकास के कारण आजकल अनेक भाषाओं का दूसरी भाषाओं में मशीनी अनुवाद भी सम्भव हो गया है। यद्यपि इन अनुवादों की गुणवत्ता अभी संतोषप्रद नहीं कही जा सकती, तथापि अपने इस स्वरूप में भी यह मशीनी-अनुवाद अनेक अर्थों में और कई दृष्टियों से बहुत उपयोगी सिद्ध हो रहा है। इस प्रकार स्वतः सिद्ध है कि अनुवाद हमारे परिवेश का एक अभिन्न अंग हो चुका है। सत्य तो यह है कि सूचनाओं को जनमानस तक पहुँचाने के लिए अनुवाद सशक्त माध्यम है और इस माध्यम प्रयोग करने में माधव कौशिक जी स्वयं भी सफल रहे हैं तथा अनेक रचनाकारों द्वारा इनकी रचनाओं को अनुवादित करके समाज तक पहुँचाने में सफलता हासिल की गई है |

शोध -पत्र निष्कर्ष :

साहित्य एवं साहित्यकार जिस प्रकार एक दूसरे पर आश्रित हैं, उसी तरह सामाजिक बदलाव भी साहित्य को अनिवार्यतः प्रभावित करते हैं | तकनीकी बदलाव के चलते साहित्यिक परम्पराएँ भी बदली हैं | केवल और केवल पुस्तकीय साहित्य पर आश्रित रचनाकार वर्तमान दौर में पिछड़ते नजर आ रहे हैं | आधुनिक तकनीकी के पायेदान पर कदम रखने वाले साहित्यकार अनायास ही वैश्विक स्तर पर स्थान पा रहे हैं | माधव कौशिक का साहित्य भी विस्तृत रूप में अंतरजाल पर उपलब्ध है | राष्ट्रीय एवं अंतर्राष्ट्रीय समालोचनाएँ उनकी ख्याति को और अधिक बलवती कर रही

हैं |

सन्दर्भ सूची -

1. सर्च इंजिन-गूगल। अंतर्जाल से प्राप्त सूचनाएँ।
2. सुनो राधिका खंड काव्य - माधव कौशिक
3. माधव कौशिक की काव्य संवेदना (प्रो. मंजुला राणा)
4. माधव कौशिक का अनुवादित साहित्य

Harnessing Technological Advancements in Hospitality Industry – An Overview on Cloud Kitchen

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Abstract**Background**

Hospitality industry is one of the few dynamic industries which needs to keep pace with the changing times and also with the taste and preferences of the guests. The industry is very closely dependent on the relationship between the guests and the hosts. In order to provide service to the highest level, the industry has to rely on many factors – one of which happens to be “Technology”. Phrases like technology, digitalization has engulfed the life of the human beings and the hospitality industry too has to embrace the technological advancements happening around the globe. “Cloud Kitchen” is one of the modern advent of the technological advancements happening in the hospitality arena.

Purpose

Digitilisation is transforming the hospitality industry slowly and silently. The industry is a very sophisticated and delicate one where one needs to provide excellent service. Future relationships can be build or broken based on the previous experiences. Thus there is a need where there is ample scope of utilizing the technology in order to minimize error and provide maximum benefit within a short span of time. The essential objective of the paper is to understand the concept of cloud kitchen and the various technologies it uses.

Methodology

Research design consists of secondary data (information from books, magazines, journals, websites) scanning which will help to form a better understanding of the research objectives. The paper would be descriptive in nature.

Findings

From the literature explicated in the paper a clear attempt will be made to reiterate the point that the concept of cloud kitchen is very pertinent in the present situation and the industry are adopting various technological changes in order to reach out to millions of guests around the country.

Originality

Being a dynamic industry - the stake holders have to devise new ways in order to target its guests. The paper upholds a modest attempt of the author to identify the essentials of this changing environment.

Implications

The coverage of the paper makes an attempt to reveal the potentiality of ICT as a potent weapon tool which can be used to benefit the hospitality industry and more specifically the cloud kitchen sector in the days to come.

Keywords: Hospitality, ICT, Digitilisation, Guests, Technology

Harnessing Technological Advancements in Hospitality Industry – An Overview on Cloud Kitchen**Introduction**

The rapid advancements in science and technology has revolutionised the life of human beings to a great

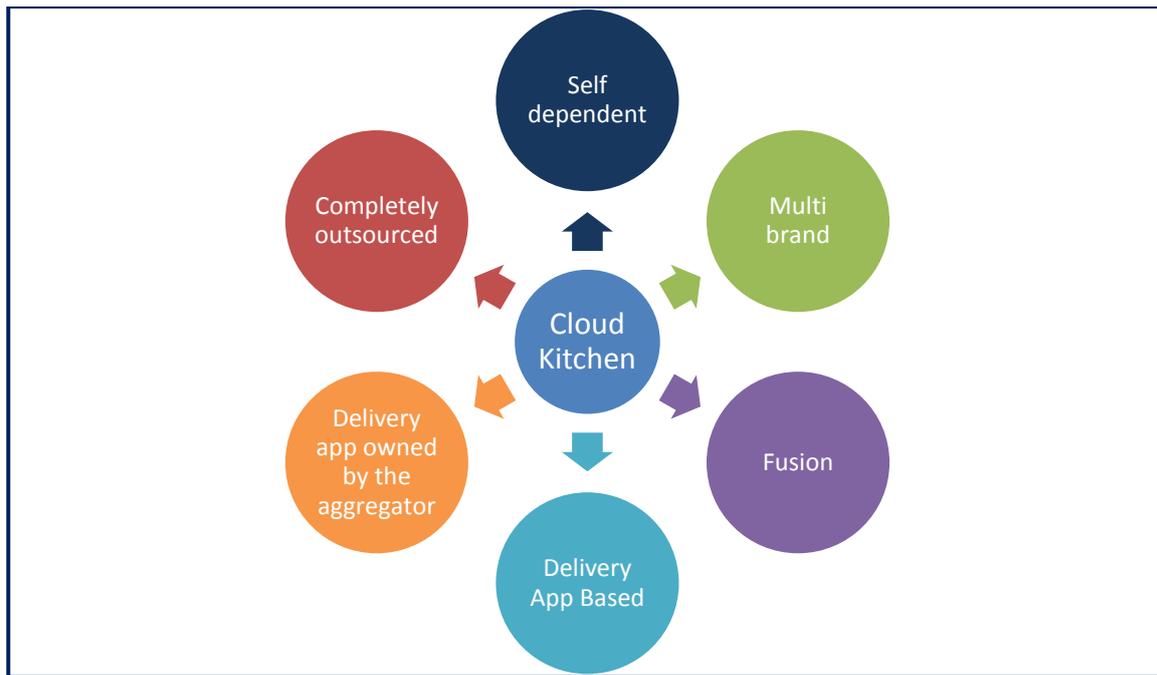
extent and have made its presence felt in each and every sectors. Hospitality industry is one such where the wings of technological growth can be witnessed in different domains. Though, hospitality industry is human centric, smoke less industry, but the rapid usage of technology is quite prevalent and is the need of the hour. Since the tastes and preferences of the guests are always changing and are on the lookout for innovative things, the industry must be ready to offer the same in order to sustain in the business. During the last few years the concept of “Cloud Kitchen” has caught the attention of the hospitality industry and it has embraced and adopted it so as to offer something new, innovative to its customers. Food or Cuisine tops the list in the hospitality industry and the words which can be associated to it are gourmand and gourmet. The search for authentic culinary experiences has led guests to travel far and wide in order to satisfy their soul.

Cloud Kitchen is a type of kitchen concept where a commercial kitchen is used for the preparation of food. The fundamental concept behind cloud kitchen is that the prepared food is used for delivery and take away purposes only with no dine in facilities. The customers have the option of ordering food through app and the restaurants on the cloud kitchen delivers the food to the customer’s doorstep. This concept is a perfect example where a business can be run successfully without the aid of any proper location, infrastructure and environment. According to a rough estimate, for a dine in restaurant the owners have to shell out around 40% of the sale as fixed and variable costs per month.

Cloud kitchens are the food production spaces used commercially where one or two or more restaurants can take up the space as rent to deliver the food to its customers. Not only that, a single restaurant can run dozens of brands all under one roof. The menus which are there are selected in such a manner that it can be produced with ease and at the same time delivery can be done by maintaining the proper quality & hygiene. These places offer parking places for the drivers, waiting areas and pick up areas so that the system can move in quick transition.

Models of Cloud Kitchen

Cloud Kitchen operates on six different models which can be depicted as follows:

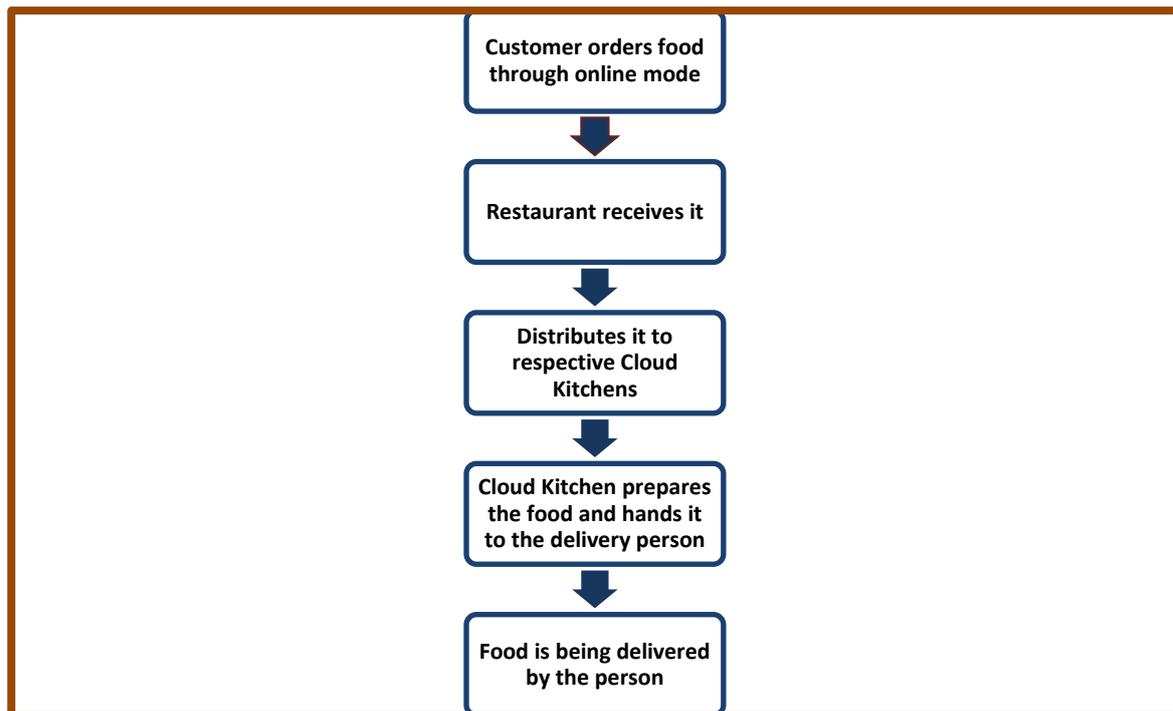


Models of Cloud Kitchen

- 1) Self dependent cloud kitchen –These constitute a single kitchen and a single brand. The kitchen receives its orders through online mode and are specialised in a particular type of cuisine while it can deliver through its own resource or through its aggregators.
- 2) Multi brand cloud kitchen – As the name suggests it also has a single kitchen but multiple brands. The receiving and delivery of orders are exactly the same like that of self dependent cloud kitchen.
- 3) Fusion cloud kitchen – This type of cloud kitchen consists of a single brand with a single kitchen but with multiple outlets. They also receive the orders through online mode but have an option of offering multiple cuisines to its guests. They take care of the delivery part by themselves and with the help of aggregators.
- 4) Delivery app based – These are mainly owned by aggregators with multiple cuisine options and rented co-working cuisines. The orders are received from the online system and the foods are delivered through the aggregators.
- 5) Delivery app owned by the aggregator – These type of models are dependent on the app which are owned by the aggregators and they receive the orders directly from the owner's app. Here the customers are allowed to have the walk in facilities.
- 6) Completely outsourced – The features of this type are: cooking as well as delivery are completely in the hands of outsiders (outsourced), the orders are being taken from different quarters, the raw materials and the equipments are being bought by the cloud kitchen and its is the responsibility of them to prepare the food in their own kitchen and then it sends them to individual kitchens from where it is being picked up and finally delivered.

Operational Procedures in a Cloud kitchen

The operational procedures of a cloud kitchen are very interesting and the following flow chart describes the process:



Delivery Process

Technological Usage in Cloud Kitchens

Technology is the backbone of cloud kitchen and since the customers can be congregated through the digital platform, the usage and investment on this area are of utmost importance and the companies associated are always in search of new technology. The entire process starting from ordering the food right up to its delivery are very much technology dependent and they require an integrated system which can solve their problems.

The most commonly used technologies in cloud kitchen are as follows:

- 1) **Point of Sale System** – The cloud kitchen receives orders from various channels and the respective orders must be managed properly so that smooth functioning can be organised and manual errors can be eliminated. The customer data which is being collected helps one to market the cloud kitchen in a presentable manner. Through the point of sale software, not only the inventory can be managed but sales and customer relationship can also be managed.
- 2) **Online Ordering of Food** - Online ordering of the food is the order of the day and the cloud kitchen which organizes the online distribution to its customers will always have an upper hand amongst its competitors. Along with it, there should be adequate promotional activities or else everything will go in vain. Online ordering can be done in the following three ways –through own's web site, mobile applications and also having a joint partnership with the food delivery companies.
- 3) **Kitchen Display System** – The entire gamut of cloud kitchen is a complex set of activity which requires co-ordination and co-operation from all quarters. Food is to be delivered within a short period of time which requires precision and accurateness. Rather than shouting and passing the order to the next person, the kitchen display system will help to inform the Chefs about the kind of orders received and the various nitty

integrity associated with the orders. As everything is through online mode each and every staff is able to view and prepare every order accordingly. At the same time, the operations of the kitchens are being streamlined without any manual intervention.

- 4) **Integrating with Third Parties** – The use of right technology bring together cloud kitchen with the right food aggregators on the same platform at the same time who can help to increase the sales volume. Multiple food joints also find it convenient to operate their kitchen through a single point which will reduce their infrastructure and manpower cost to a minimal.

To Sum up

The face of hospitality industry is changing – changing with the times. From normal to new normal, hospitality industry are being forced to embrace technological innovations and mould itself in order to present in an attractive, modern, smart outlook. The outbreak of Covid 19 has accelerated the process to a quite extent and the industry is now offering various kinds of sustainable services which its predecessors have not heard before. Cloud Kitchen is one of them and the food and beverage industry has embraced innovations so that it can reach out to the majority of the population. A customer requires only a smart phone through which not only food can be ordered online but a whole lot of things can be opened in front of him. The concept of Cloud Kitchen has a brighter outlook than ever before and it is going to stay provided it changes itself with the change in technology and is ready to present the “Wow” factor.

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STUDY OF ANTIOXIDANT ACTIVITY OF SOME MEDICINAL PLANTS: A REVIEW

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ABSTRACT:

Free radicals if present in the biological system has the capability to adversely affect lipids, proteins and DNA and can cause a number of human diseases and ageing as well. Antioxidants have the potential to manipulate free radical and hence prevent or control a number of diseases. Antioxidant prevents cell damage caused due to presence of free radical by neutralizing that free radical. Natural products such as Indian species and medicinal products are considered to have strong antioxidant activity. This review presents information about some of the herbal medicinal plants which possess appreciable antioxidant activity.

Keywords: Free radical, antioxidant, natural products, herbal medicinal plants, ageing

INTRODUCTION:

Since the last decades, a great emphasis has been given on the study of free radicals and antioxidant. A free radical may be defined as any molecular species which has the capability of independent existence; it has an unpaired electron and hence is unstable. There are many free radicals which are highly reactive and which can either donate an electron to or extract an electron from other molecules to gain stability and behaves like an oxidant or a reductant. Radicals having high reactivity have a very short life while some radicals may survive for longer duration¹. These free radicals may be either reactive oxygen species or reactive nitrogen species and are generated by our body. The free radical production can adversely affect DNA, protein and lipid and can causes' tissue damage. Free radical production may be because of environmental sources (smoking, pollutants, UV light, radiations etc.) or endogenous sources (auto oxidation reactions, enzyme reactions, respiratory burst etc.)².

A number of diseases are linked to oxidative stress caused by free radicals such as tissue injury, cell death, ageing, cardiovascular diseases, ischemic heart diseases, cancer, Atherosclerosis, central nervous system injury, neural disorders, inflammation, obesity, gastritis, arthritis etc.³. Scavenging of these free radicals is found to be an effective action that suppresses the level of oxidative stress. We are not helpless against free radicals. The body has a mechanism that quenches these free radicals as water does against fire. Studies revealed that naturally obtained antioxidants have the capacity to counteract these unstable molecules⁴.

Antioxidants are compounds that can prevent or slow down damage to cells caused by free radicals or unstable molecules produced within the body as a result of any intrinsic or extrinsic factor. Antioxidants are also known as free radical scavengers. These help to neutralize free radicals by giving up some of their own electrons and making them stable molecules⁵.

It has been reported that naturally obtained antioxidants from plants protects from severe effects of free radicals and shows broad range of pharmacological consequences such as antimutagenic, antimicrobial, antiallergic, anticarcinogenic, antioxidant free radical scavenging actions and antidiabetic⁶.

Plant antioxidants play a very important role in fighting against many diseases prevention and treatment. Some of the major phytochemicals responsible for antioxidant activity are polyphenols, carotenoids, phytosterols, limonoids, terpenoids etc. Regular intake of fruits and vegetables is suggested to decrease the risk of chronic ailments as they contain a recommendable amount of flavonoids and other antioxidant compliments.

A wide variety of plants are available which contains a large amount of antioxidants. Herbs are traditionally defined as any part of a plant that is used in the diet for their aromatic properties with very less nutritional value⁷⁻⁹. However, herbs have been identified as sources of various phytochemicals, which act as powerful antioxidant. Thus, herbs may have a role in antioxidant defense activity^{10,11}.

LIST OF SOME MEDICINAL PLANTS HAVING ANTIOXIDANT PROPERTY

| Name of plant | Botanical name | Family | Phytochemical constituent present | Reference no. |
|----------------------------------|-------------------------|--------------------------|------------------------------------------------------------------------------------------------------|---------------|
| Acai palm | Euterpe oleracea | Arecaceae | Polyphenols, Cyanidin 3-glucoside, cyanidin 3-rutinoside, quercetin, orientin, and proanthocyanidins | 12 |
| Alfalfa | Medicago sativa | Fabaceae | Flavonoids | 13 |
| Allspice | Pimenta dioica | Myrtaceae | eugenol, methyl eugenol and caryophyllene | 14 |
| Aloe vera | Aloe barbadensis miller | Asphodelaceae (Lilaceae) | Bioactive phenol | 15 |
| Indian ginseng, Ashwagandha | Withania somnifera) | Solanaceae | Phenolics, flavonoids | 16 |
| Basil | Ocimum basilicum | Lamiaceae | rosmarinic acid, b-carotene and tocopherol | 17 |
| Bugleweed | Ajuga | Lamiaceae | Flavonoids, Iridoids, Phytosterols | 18 |
| Ginger | Zingiber officinale | Zingiberaceae | 6-shogaol, 6-gingerol, and oleoresin | 19 |
| Hibiscus | Hibiscus rosa sinensis | Malvaceae | flavonoids, flavonoid glycosides, hibiscetin, cyanidine, cyanidin glucosides, tannins | 20 |
| Horseradish tree, drumstick tree | Moringa oleifera | Moringaceae | Flavonoids, quercetin and chlorogenic acid | 21 |
| Indian bael | Aegle marmelos | Rutaceae | flavonoids, phenol, carbohydrates, alkaloids, steroids, tannins, and cardiac glycosides | 22 |
| Liquorice | Glycyrrhiza glabra | Legumes | Flavonoids, isoflavones, such as glabridin, hispaglabridin A, and 30-hydroxy- 4- O- methylglabridin | 23 |
| Malabar silk, cotton tree | Bombax ceiba | Bombacaceae | flavanoid, terpenoid saponins, phenolic compounds, carbohydrates, tannins and glycosides | 24 |
| Neem | Azadirachta | Mahogany | azadirachtin, nimbolinin, nimbin, | 25 |

| | | | | |
|-------------------------|---------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|----|
| | indica | (Meliaceae) | nimbidin, nimbidol, salannin, and quercetin | |
| Oregano | Origanum vulgare | Lamiaceae | gentisic, chlorogenic, p-coumaric and rosmarinic acids, hyperoside, isoquercitrin, quercitrin, quercetin and luteolin | 26 |
| Patalgarudi | Cocculus hirsutus | Menispermaceae | Flavanoids, Anthocyanin, Phenolic compounds | 27 |
| Peppermint | Mentha piperita | Lamiaceae | Linalool, epoxyocimene | 28 |
| Rosemary | Salvia rosmarinus | Lamiaceae | Carnosic acid, carnosol, rosmanol and epirosmanol | 29 |
| Sage | Salvia officinalis | Lamiaceae | carnosol, rosmarinic acid, and carnosic acid, caffeic acid, rosmanol, rosmadial, genkwanin, and cirsimaritin | 30 |
| Shatavari | Asparagus racemosus | Asparagaceae | Flavonoids, polyphenols, Vitamin C | 31 |
| Sitaphal, custard apple | Annona squamosa | Annonaceae | glycosides, phytosterols, carbohydrates, oils, saponins, tannins, alkaloids, phenols, flavonoids, peptides, and various acetogenin compounds | 32 |

CONCLUSION:

Many novel approaches are going on in the field of free radicals and antioxidants and also remarkable findings have been come to light in the last few years. Many of the traditional Indian spices and many medicinal plants are rich sources of antioxidants which has the potential to convert unstable free radicals into stable one. Increase in intake of herbal antioxidants may help in maintaining adequate antioxidant value in biological system. It is highly recommendable to introduce herbal medicine systems in health care system.

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Development of Heat resistant Aromatic polymers**B Sabitha¹, B Chandramouli², B SanjeevaRao³, D Shireesh⁴, and Renu Sharma⁵**¹ Department of Chemistry, Om Sterling Global University, Hisar, India.²Department of Chemistry, Government Degree College Narsampet, Warangal, Telangana State, 506132³Department of Physics, Government Degree College Rangasaipet, Warangal, Telangana State.⁴Department of Physics, Kakatiya University, Warangal, Telangana State.⁵Professor and Dean, School of Applied Sciences, Om Sterling Global University, Hisar, India.**Abstract**

Spectroscopic and thermal properties of some heat resistant polymer resins of DHPPE- FM (1- [2, 4 Di Hydroxy Phenyl]- 2 – Phenyl Ethane - Formaldehyde) and DHPPE-FM-PMAP (1- [2, 4 Di Hydroxy Phenyl]- 2 – Phenyl Ethane - Formaldehyde - Para MethoxyAcetophenone) copolymer are presented in this studies. Infrared studies of DHPPE-FM show absorption bands at 3298, 2978, 2910, 1628, 1479, 1460, 1374, 1275, 888, 816 and 609 cm⁻¹ positions ; while DHPPE-FM-PMAC showed bands centered around 3334, 2950 2900, 1624, 1490, 1439, 1372, 1264 and 850 cm⁻¹ positions. These absorption bands conform the presence of various chemical groups present in both the molecular systems.

NMR spectrum of DHPPE-FM showed sharp peaks situated at 4.0, 4.2, 6.3, 7.2 and 7.5, positions; while DHPPE-FM-PMAP showed peaks around 2.8, 3.1, 4.1, 6.2, 7.17.3, 7.4, 7.8 and 12.4 positions. Regarding thermal degradation aspects of the two systems, though initial thermal degradation was delayed in in DHPPE-FM-PMAP by 60°C, when compared to DHPPE-FM, thermal degradation of 50 % of initial mass was much larger in DHPPE-FM-PMAP than DHPPE-FM. Thermal degradation profiles of both the systems are evaluated by plotting Arrhenius plot.

INTRODUCTION

Heat resistant polymers are employed in high temperature, high altitude applications. The heat resistant polymers include polytetrafluoroethylene, polycarbonate, poly ethylene terephthalate, polyimide etc. It is generally believed that polymers containing aromatic groups have good thermal stability than the aliphatic polymers. Though various types of polymers available, there is a need to develop new systems with high thermal profiles. In this context, Fyfe (1) investigated on thermal degradation mechanism of cured phenolic resins using NMR spectroscopy. Kondaiah et al (2) have reported on synthesis, characterization and biological activity behavior of some novel resacetophenone Schiff base (RAPPHTH) ligand and their metal complexes..Nayak et al (3) have reported on resins based on 2,4-dihydroxyacetophenone and characterized them by IR spectroscopy. Solution properties, fungicidal properties of the resins are investigated. Sasikala (4) has developed high heat resistant aromatic polymers like 3-amino – 4-hydroxy benzoic acid AHBA, 4-amino benzoic acid (ABA) with superior thermal stability of 740°C from inedible biomass (kraft pulp) and feed stock without inorganic fillers.

Kuroda et al have (5,6) studied degradation of aromatic polymers like poly carbonate, polyacrylate, poly ester amide (PEI) poly sulfone(PSF) poly ether sulfone (PESF). These polymers were degraded in vacuum at 380 C and molecular weights, molecular weight distributions are measured by gel permeation chromatography (GPC). The polymers preferably undergo crosslinking rather than degradation. The degree of crosslinking is in the order of

$$PEI > PAR > PC > PSF = PESF$$

The carbonate linkages, isopropylene moieties increase rate of chain scission. They have also reported on degradation of polyimide (PI2080) to thermal and thermos oxidative degradation and the studied the changes using GPC, IR techniques. Crosslinking of polymer is observed by the recombination of free radicals produced by cleavage of $C_6H_4 - CH_2C_6H_4$ linkage. Crosslinking is reported to be effected by mobility of molecular chains, when glass transition temperature reaches degradation temperature. Thermo oxidative degradation proceed in a different manner where crosslinking continue after T_g Relation between crosslinking density and T_g and degradation behavior is also observed.

SandroDattalo et al (7) have studied thermal degradation of poly ether sulfone random copolymer using mass spectroscopy, GC, and thermos gravimetric analysis (TGA). Thermal degradation is reported to occur at 370-650°C with a char residue of 32-35%. The thermal degradation data suggest that decarboxylation of pendant acid moieties during initial stages of degradation. Scission of iso butyl groups is reported in the temperature range of 420-480 C involving main chain scission of diphenyl sulfone and diphenyl ether groups. Ko Cobb Jr has (8) probed thermal degradation kinetics of aromatic ether polymers, Jeong(9) have investigated on thermally stable novel ester based polymers using XRD, DSC and birefringence techniques. The polymer is reported have good water barrier properties than PET poly ether 2-6-naphtalate PEN and polyimide films. ShoFurutate(10) reported on superior thermal stability and fast crystallization behavior of novel biodegradable alpha- methylated bacterial poly ester.

In the present studies, the authors made an attempt to study two new molecular systems namely DHPPE-FM and DHPPE-FM-PMAP by spectroscopic (IR and NMR) and thermal methods (TGA and DTA).

EXPERIMENTAL

Resins of DHPPE-FM and DHPPE-FM-PMAP are synthesized and gifted. Infrared spectra of homopolymer and copolymer are recorded on PERKIN ELMER spectrometer. NMR spectra of the samples have been recorded on JEOL spectrometer. TGA and DTA thermos gram are recorded on METTLER with a constant heating rate of 10°C/minute in nitrogen atmosphere,

RESULTS AND DISCUSSION

Homopolymer and copolymer are analyzed by spectroscopic [Infrared (IR) and nuclear magnetic resonance (NMR)] techniques. Thermal analysis has been carried out by the TGA (thermogravimetric analysis) and differential thermal analysis (DTA) methods.

INFRARED STUDIES:

Infra red spectra of DHPPE-FM and DHPPE-FM-PMAP are as shown in Fig1 and Fig2 respectively. Band positions of both the polymers are summarized in Table1. DHPPE-FM has shown characteristic absorptions centered around 3298 (OH stretching vibration of DHPPE) [I] 2978 (CH stretch of aromatic ring [II], 2910 (CH Vibration of methylene group) [III], 1628 (carbonyl str of ester carbonyl) [IV], 1479 (unsaturated C=C vibration of aromatic group)[V] 1460 (CH₂ bending vibration) [VI], 1374 (in plane OH bending vibration of DHPPE) [VII] 1275 (C-OH Stretch of DHPPE)[VIII], 888 (stretching vibration of penta and tetra substituted phenyl ring [IX] , 816 out of plane vibrations of phenyl/benzene groups [X], 609 (out of plane vibrations of phenyl/benzene groups [XI]For comparison purpose both the spectra are shown in Fig2. As both the polymers have structural similarities, the absorption bands overlapped and shifted, as indicated in the table1

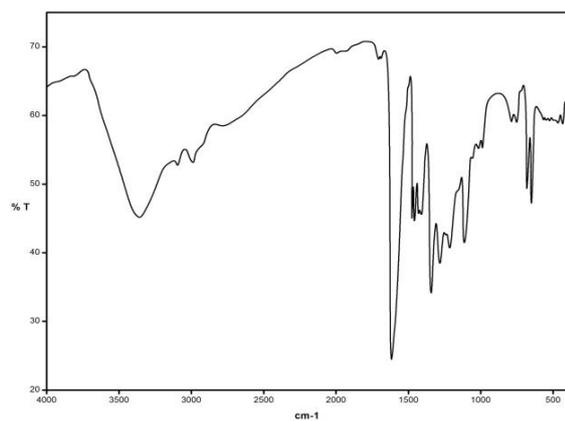


Fig 1: Infrared spectra of DHPPE-FM

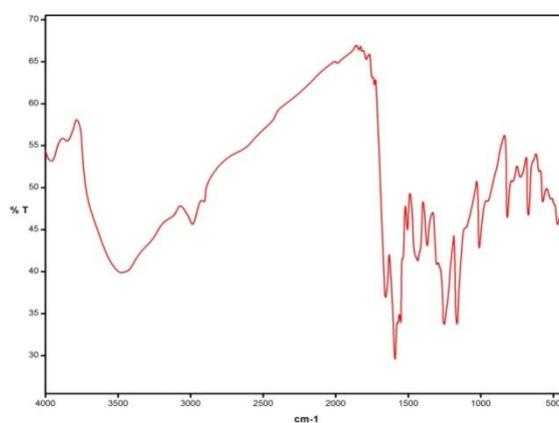


Fig 2: IR spectra of DHPPE-FM-PMAP

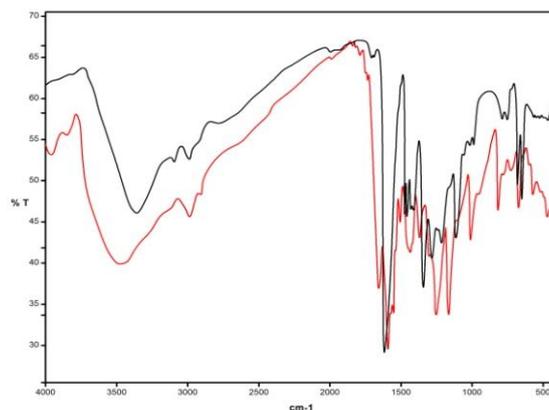


Fig 3: Comparison of IR spectra of DHPPE – FM & DHPPE –FM – PMAP

Table 1: Comparison in infrared absorption bands

| S No | DHPPE -FM | DHPPE – FM- PMAP | Assignment | shift |
|------|-----------|---------------------|---------------------------------|-------|
| I | 3298 | 3334 | O-H of DHPPE | + 36 |
| II | 2978 | 2950 | CH/OH stretch of aromatic group | -28 |
| III | 2910 | 2900 | H str of methylene group | -10 |

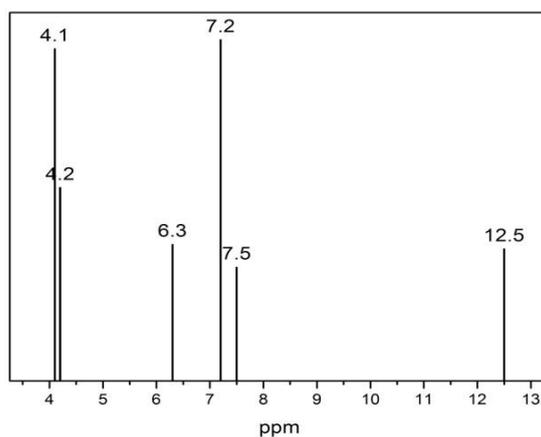
| | | | | |
|------|------|------|------------------------------------------------|-----|
| IV | 1628 | 1624 | ester carbonyl group | -4 |
| V | 1479 | 1490 | Unsaturated (C=C) of aromatic group | +11 |
| VI | 1460 | 1439 | CH ₂ bending Vib of methylene group | -21 |
| VII | 1374 | 1372 | Inplane OH bend vib of DHPPE | -2 |
| VIII | 1275 | 1264 | C-OH Strevib of DHPPE | -11 |
| IX | 888 | 850 | Strvib of Subst tetra and penta phenyl ring | -30 |
| X | 816 | 812 | out of plane vib of benz/ Phenyl | -4 |
| XI | 609 | 608 | Out of plane vib of benz/phenylgp | -1 |

NMR ANALYSIS:

NMR spectra of DHPPE-FM and DHPPE-FM-PMAP are as shown in Fig 4 and Fig 5. The spectra are in consequent to the chemical structure of both the molecular systems. A comparison chemical shifts and peak interpretations are as given in Table2. It is observed that the peaks observed for DHPPE-FM at 4.2,6.3, 7.2 7.5, 12.5 δ ppm have shifted to lower sides in case of DHPPE-FM-PMAP in addition to the new peaks of 2.8, 3.1, 4.0 7.3 and 7.8 δ ppm. DHPPE-FM has shown an additional peak at 4.1 δ ppm. Shifting of peaks and appearance of new bands is due to presence new chemical environments of PMAP groups.

Table 2: COMPARISON OF NMR DATA

| S. No | DHPPE –FM | | DHPPE-FM-PMAP | |
|-------|--------------|-----------------------------------------|---------------|------------------------------------------|
| | δ ppm | Assignment | δ ppm | Assignment |
| 1 | --- | --- | 2.8 (3H)S | –COCH ₃ GP PMAP |
| 2 | --- | --- | 3.1 (3H) S | –OCH ₃ grp of PMAP |
| 3 | --- | --- | 4.0 (1H) S | BRIDGED - CH ₂ gp protons |
| 4 | 4.1 (2H) S | bridged –CH ₂ group protons | --- | --- |
| 5 | 4.2 (2H) S | –CH ₂ group protons of DHPPE | 4.1 (2H) S | CH ₂ PROTONS OF DHPPE --1 |
| 6 | 6.3 (1H) S | para-OH group protons of DHPPE | 6.2 (1H) S | PARA OH group protons of DHPPE-- 1 |
| 7 | 7.2 (5H) S | phenyl protons of DHPPE | 7.1 (5H) S | phenyl grups of DHPPE -1 |
| 8 | --- | --- | 7.3 (1H)S | meta hydrogen of terminal DHPPE |
| 9 | 7.5 (1H) S | ortho hydrogen of DHPPE | 7.4 (1H) S | Ortho hydrogen of DHPPE |
| 10 | --- | ---- | 7.8 (2H)DS | orthohydrogens of PMAP OF comonomer |
| 11 | 12.5 (1H) | ortho OH groups of hydrogen bond DHPPE | 12.4 S | ortho OH groups of hydrogen bond DHPPE-1 |

**Fig 4: NMR spectra of DHPPE-FM**

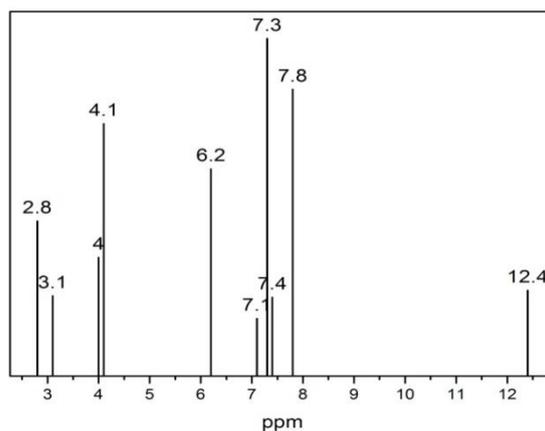


Fig 5: NMR SPECTRUM OF DHPPE-FM-PMAP

THERMAL STUDIES:

TGAthermos grams of DHPPE-FM and DHPPE-FM-PMAPare as shown in Fig 6 respectively; whileDTA thermos gram of DHPPE-FM and DHPPE-FM-PMAP are as shown in Fig7 respectively. The TGA curves indicate that both the polymers undergo thermal degradation in two stages. For DHPPE-FM first stage begins at 270°C and second stage start at 800°C; while for DHPPE-FM-PMAP first stage of degradation start at 250°C and second stage is at 600°C.

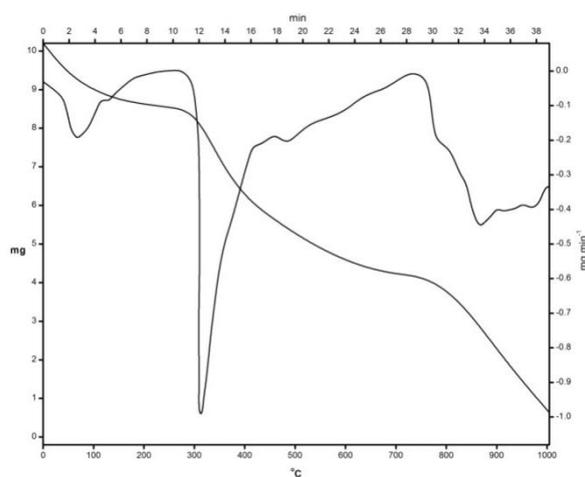


Fig 6: TGA and DTA of DHPPE – FM

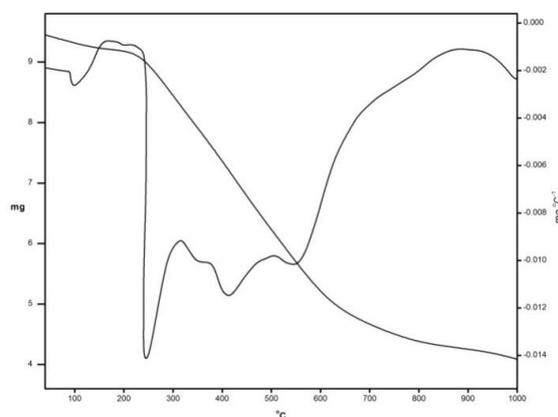


Fig 7: TGA and DTA OF DHPPE-FM – PMAP

Analysis of Thermograms:

To find activation energy of thermal degradation the method proposed by Rajendiran and Jayanthi(11) has been used. Plots of inverse of temperature and logarithm of weight ratio at desired temperatures are taken and plots are drawn as shown Fig 8a and Fig 8b. From the slope of such graphs activation energy associated with thermal degradation of polymers is calculated. DTA analysis is used to estimate glass transition temperature of polymers.

Table 3: Comparison in Thermal degradation profiles of DHPPE-FM & DHPPE-FM-PMAP

| S.No | Weight loss | DHPPE-FM Temperature°C | DHPPE-FM-PMAP Temperature°C |
|------|-------------|------------------------|-----------------------------|
| 1 | starting | 120 | 120 |
| 2 | Initial | 260 | 320 |
| 3 | 5 | 250 | 100 |
| 4 | 5-10 | 300(7.96) | 250 |
| 5 | 20 | 350 | 350 (25) |
| 6 | 40 | 450(36.81) | 450 |
| 7 | 50 | 550 (51) | 550 (49.5) |
| 8 | 60 | 600 (57) | 800 |
| 9 | 70 | ---- | 900(76) |
| 10 | 80 | ---- | 950 |
| 11 | 90 | ---- | 1000 |

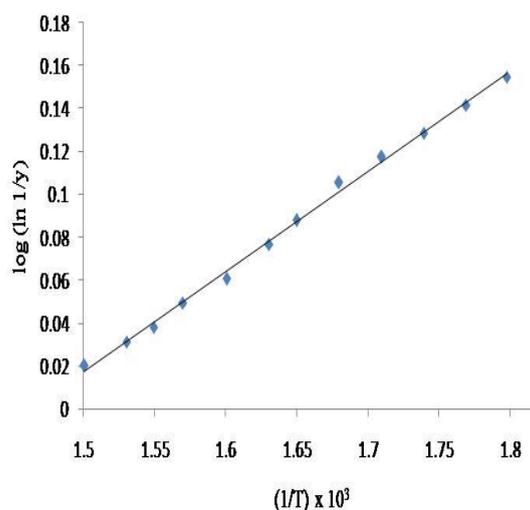


Fig 8a: Plot of 1/ T vs log (ln 1/y) DHPPE-FM

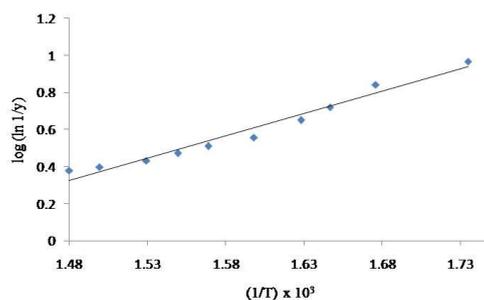


Fig 8b:Plot of 1/T vs log(ln 1/y) DHPPE-FM-PMAP

COMPARISON OF THERMAL PROPERTIES

Using the above data, thermal properties of DHPPE-FM and DHPPE-FM-PMAP can be summarized in Table 3.

Table 4: Thermal properties of DHPPE-FM & DHPPE-FM-PMAP

| S.No | Thermal property | DHPPE-FM | DHPPE-FM-PMAP |
|------|------------------------------|----------|---------------|
| 1 | Glass transition Temperature | 336 | 332 |
| 2 | Activation Energy | -87.15 | -34 |
| 3 | Oxygen Index | 0.18 | 0.17 |

CONCLUSION

High heat resistant polymers of DHPPE-FM and DHPPE-FM-PMAP are characterized by infrared and NMR spectroscopic techniques. The band positions in IR spectra and peak positions of NMR spectra are in conjunction with the chemical structure of polymers. Thermal studies suggest that DHPPE-FM is thermally more stable than DHPPE-FM-PMAP.

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Pleiotropy of Curcumin

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Abstract

Curcumin is an established anti-oxidant and anti-inflammatory natural herbal product. It is basically a polyphenol, is extracted from the rhizome of plant *Curcuma longa*. It has been traditionally used in Asian countries in different products, including colorants, curries, tea, and cosmetics. It aids management of oxidative and inflammatory conditions, metabolic syndrome, arthritis, anxiety and hyperlipidemia. A range of studies have reported the antimicrobial activity of curcumin, including antibacterial, antiviral, and antifungal activities. Oxidative stress and inflammation often goes together with bacterial infections. Therefore, curcumin, with easy availability, high efficacy, and low cytotoxicity, serves as an ideal candidate to use in combination therapies against bacterial pathogens of humans. In addition, it also has high potential to be developed into an antibiotic against *S. aureus* and other bacterial strains in the future. However, the challenges mentioned in the preceding sections should be taken into consideration to open the door for the development of more biologically active curcumin derivatives.

Keywords; Turmeric, curcumin, anti-Inflammatory, anti-oxidant, antibacterial

Introduction

Turmeric is a rhizomatous herbaceous perennial plant (*Curcuma longa*) of the ginger family. Curcumin is the chief polyphenolic constituent that is responsible for the yellow colour of turmeric (Tønnesen *et al.*, 1985). Curcumin (1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione), also called diferuloylmethane, is the main natural polyphenol found in the rhizome of *Curcuma longa* (turmeric) and in others *Curcuma* spp. Curcumin is being recognized and used worldwide in many different forms for multiple potential health benefits (Sharma *et al.*, 2005). For example, in India, turmeric containing curcumin has been used in curries; in Japan, it is served in tea; in Thailand, it is used in cosmetics; in China, it is used as a colorant; in Korea, it is served in drinks; in Malaysia, it is used as an antiseptic; in Pakistan, it is used as an anti-inflammatory agent; and in the United States, it is used in mustard sauce, cheese, butter, and chips, as a preservative and a coloring agent, in addition to capsules and powder forms. *Curcuma longa* is mainly cultivated in tropical and subtropical regions (Hewlings *et al.*, 2017). India is one of the chief producers of turmeric. It has been conventionally utilized to savor food, dye cloths and for treating numerous human ailments (Hsu *et al.*, 2007). Curcumin is extracted from turmeric by solvent extraction (preferably with ethanol) through various methods (e.g., Soxhlet, ultrasonic, microwave, and supercritical carbon dioxide) followed by purification via column chromatography. Recent publications have also reported that curcumin is very effective against surplus of drug-resistant bacterial strains (Lestari *et al.*, 2014). *S. aureus* infection is a major problem in many developing countries, especially in hospitals where the MRSA (Methicillin-resistant *Staphylococcus aureus*) spreading is difficult to control (Zhou *et al.*, 2011). Over the years, the multidrug-resistant *S. aureus* infection has increased the global morbidity and mortality. Due to the difficulty in treating the infection, it has consequently imposed an elevating burden on healthcare resources. Cumulative findings in recent years

have shown that curcumin is active against both MSSA (methicillin-susceptible *Staphylococcus aureus*) and MRSA. *Curcuma longa* has been traditionally used as antimicrobial agent (Aggarwal *et al.*, 2007). Previous findings have reported the broad-spectrum antimicrobial action for curcumin. These include antibacterial, antiviral, antifungal, and antimalarial activity. It was even studied as an antimicrobial agent suitable for textile materials. Results have shown that curcumin when in combination with aloe vera and chitosan could be a potential suppressor for microbial growth in various factor cotton, wool, and rabbit hair assessed by the exhaustion method (Fadus *et al.*, 2017). Curcumin finished wool had semi-durable antimicrobial activity, less durable to light exposure than home laundering with 45% and 30% inhibition rates against *Staphylococcus aureus* and *Escherichia coli*, respectively, after 30 cycles of home laundering. Curcumin along with other pharmacological bactericidal and bacteriostatic agents is used for the development of antimicrobial skin gels and emulsions. These gels exhibit enhanced skin protection and wound healing properties. Hydrogel silver nanoparticles (antimicrobial agent for wound dressing), when used with curcumin is used to boost the function of hydrogel silver nanocomposites. Curcumin-loaded myristic acid microemulsion (having 0.86 $\mu\text{g/mL}$ of curcumin) is found suitable for skin application. It exhibited 50% of inhibition rate of *S. epidermidis* (Liu *et al.*, 2012)...

Curcumin possesses variety of biological activities due to which it has gained significant attention of researchers all over the world is available in several pharmaceutical forms like capsules, tablets, energy drinks, ointments, soaps as well as cosmetics (Hatcher *et al.*, 2008). Curcuminoids have been approved as "Generally Recognized as Safe" (GRAS) by the US FDA (Fadus *et al.*, 2017). It shows good tolerability. It has been proved clinically safe even at concentration between 4000 and 8000 mg/day. Three curcuminoids: curcumin, bisdemethoxycurcumin, and demethoxycurcumin are proved to be safe even at 12 g/day of 95% concentration (Goel *et al.*, 2008).

Mechanisms of Action

Antioxidant

Curcumin exhibits a property of improving systemic markers of oxidative stress (Jurenka *et al.*, 2009). There is experimental support that it leads to increase serum activities of antioxidants action such as superoxide dismutase (SOD) activity. Curcumin can scavenge diverse reactive forms of free radicals, such as nascent oxygen and nitrogen species (Rao *et al.*, 2013). It could also change the action of GSH, catalase, and SOD enzymes active in the consumption of free radicals. In addition, curcumin is a lipophilic (non polar) compound, which makes it an highly efficient scavenger of peroxy radicals, therefore, it is considered as a good antioxidant (Menon *et al.*, 2007).

Anti-Inflammatory

Curcumin blocks NF- κ B molecules that travel into the nuclei of the cells and activate genes associated with inflammation. NF- κ B is believed to play a significant role in several chronic diseases (Rao *et al.*, 2013). Several studies have shown that curcumin serve as a potent pain reliever and decreases the onset of symptoms of inflammatory diseases compared to the harmful steroidal and nonsteroidal pain medication. A recent study indicated that oral administration of curcumin was effective in attenuating the leukocyte inflammatory response against zymosan-induced inflammatory disease model (Kholi *et al.*, 2005). It is evident that curcumin could be a

potent alternative therapy for inflammatory diseases. it inhibits the biosynthesis of inflammatory prostaglandins and arachidonic acid (Fadus *et al.*, 2017).

Anti-Arthritic

Previous findings gave scientific evidences exhibiting reduction in pain and inflammation-related symptoms after treatment with turmeric extracts (typically 1000 mg/day of curcumin for 8–12 weeks) Therefore, curcumin could be recommended in symptomatic treatment of arthritis, especially osteoarthritis (Jackson *et al.*, 2006).

Antibacterial

Curcumin also have antifungal, antibacterial, antiviral, antiparasitic and antiprotozoal action. It is also known for its antibiofilm action throughout the inhibition of bacterial quorum sensing (QS) mechanisms and elimination of previously produced biofilms (Tyagi *et al.*, 2015; Alyousef *et al.*, 2021) Curcumin molecule was experimentally found to have photodynamic activities by the cytotoxic reactive oxygen species (ROS) synthesis against both planktonic and biofilm forms of bacteria. The literature data have also shown its beneficial effects against Gram-negative uropathogens (*Escherichia coli*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, and *Serratia marcescens* (Adamczak *et al.*, 2020), Curcumin also have preventive action in the creation of struvite stones connected with the infections of urinary tract . In addition of above, synergistic effect against microbes and fungus showed by curcumin in combination with antibiotics and antifungal against various pathogens, enterotoxigenic *Escherichia coli* (ETEC), and *Candida albicans*. It is widely used for the treatment of *H. pylori*-related gastritis, peptic ulcers, and gastric adenocarcinoma (Gunes *et al.*, 2016). Curcumin show antibacterial activity against both Gram-positive (*S. aureus* and *E. faecalis*) and Gram-negative (*E. coli* and *P. aeruginosa*) bacteria. It is an amphipathic molecule, due to which it penetrates into plasma membrane (Izui *et al.*, 2016)

Conclusion

Curcumin is considered as a pleotropic molecule because it possesses multiple beneficial effects on human body and preventive measurements against several diseases. It has been used extensively in ayurvedic medicines as it is non-toxic to the greater extent (Anand *et al.*, 2007). Curcumin is now well-established therapeutic agent against cancer, neurodegenerative diseases, microbial infections, arthritis and other inflammatory disorders. It has hepatoprotective, immune-enhancer, cardiovascular and gastrointestinal effects. Nanoformulations of curcumin are gaining more importance because of its greater bioavailability.

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**ROLE OF MASS MEDIA IN AGRICULTURE DEVELOPMENT:
A CASE STUDY OF NABARANGPUR DISTRICT IN ODISHA**

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ABSTRACT

The role of the Mass media or Mass communication has immense potential in terms of development of the society. The tectonic shift of the Mass media into the digital platform, made a remarkable change to the society. The Nabarangpur is a southern most tribal populated area. The district is predominantly depended on the Agriculture sector. The community development wouldn't be possible without economy and informative empowerment. The role of the media is pivotal to connect with the mainstream world. More information leads them more opportunity, more people will connect them. The recent study is seed light how agriculture development is possible through an effective communication tools that is Mass media. The Mass media can be including communication medium like Newspaper, Radio, Television, computer, internet. Mass media are often used in areas like education, agriculture, or libraries. Therefore, the present investigation was undertaken to study about how mass media helps in community development through agriculture. The agriculture sector and the inhabitant are complementary to each other. The use of traditional equipment never competes with rapid growing population of our sate as well as the district. To tackles those hindrances the government should implements good public policies. And the policy make should recognize the opinions of the ground level. They can be easily and effectively done through the Mass media like, Television, paper, community media etc. can media do something have any role in the in the community development. In the present Indian context, media does play an important role in the exertion of power and distribution of values. Media affects the overall quality of public life and also shapes people's engagement in the specific policy decisions in the Indian democracy.

Key Words: Mass media, Community Devt., Communication, Agriculture,

INTRODUCTION

The Nabarangpur is besieged by spellbound nature, the hilly mountains river are the mute testimony of the glorious past. The district is one of the most tribal populated districts of southern part of Odisha. The Nabarangpur district is located at 81° 52' to 82° 53' E Longitude and 19° 9' to 20° 5' N Latitude and stretches over an area of approximately 5294 Sq. Kms. Its boundary stretches in the north to Nuapada and Kalahandi Districts, west to Bastar District in Chhattisgarh, east to Kalahandi and Rayagada Districts and south to Koraput District. The river Indravati forms the border between Nabarangpur and Koraput districts. In the north, the Panabeda area, recently renamed as Chandahandi is only 500 ft (150 m) above sea level and experiences similar climate and social life to that of the adjacent Kalahandi District. The rest of Nabarangpur district is mainly flat with a few pockets of low hills. The highest peak is Podagda, which has historical significance as well. The district gets monsoon rains in the month of July, August and September. There is no effect of north-east monsoon here. In summer the district remains dry but pleasant.

Role of Mass media in community development of society

The Mass media played the vital role in the making of a vibrant healthy society. The district Nabarangpur is a tribal populated society where many of the people are far away from the basic necessity. How

policy of the government can be implemented through the help of the mass media. Does it successfully implement, or it need revamp.

Today India is passing through the phase of communication revolution, which has brought about a significant growth of media in mass communication. It has become an important part of development initiatives in health, nutrition, agriculture, family planning, education, community economy and world empowerment. The present study aims to study the agriculture development with the emergence of the new communication technology. The study is being undertaken to know how agriculture development is possible through an effective communication tools that is Mass media. The Mass media can be includes communication medium like Newspaper, Radio, Television, computer, internet. Mass media are often used in areas like education, agriculture, or libraries. Therefore, the present investigation was undertaken to study about how the use of mass media helps in agricultural development in rural areas. For the present study for knowing the use of ICT among the farmers, Nabarangpur district of Odisha is being chosen. As a sample the Kosagumuda Block of the district was chosen to know the use of technology among the farmers. The sample of the study is 170 comprising of locals farmers of Raighar, seeds company's agents and ICT experts, selected with a simple random sampling methods, randomly with an age group from 20 years to 55 years. The data were collected through a structured with simultaneous observation of responses from the sample. Data were analysed with different statistical measures through percentage and frequency of the data.

Statement of Research Problem:

In this information age where communication has been taken as a vital instrument for rural economic, social and political development. Even in most rural communities where media are complexity or partially available, information is shared among the people who cannot read or write and get them to maintain a stable system of living.

This study intends to find out the impact of mass media in communities in the context of development. The problem also include to what extent is the attitude and behavioral changes or rural drivellers when exposed to the mass media.

Aims and objectives of the Study:

The overall aims and objectives of this study are to analysis of the role of mass media in community development on sustainable agriculture development through mass media of Nabarangpur, odisha.

- How Mass Media effectively implemented in the development of a community through agriculture.
- How modern-day agriculture influenced by the information technology.
- To find out role of media in agriculture development and Role of public policy in (Agriculture) through the media.
- To examine the extent which mass media has contribute to the development of rural community.
- To examine the problems faced by mass media practitioners in this community and what are suggested solution to these problems.
- To find out the media engagement in agriculture sector of Nabarangpur.
- To assess the people's awareness towards media application in agriculture development.

Hypothesis:

- Tribal and Indigenous people live in remote inaccessible hilly areas.

- Their Agricultural and livelihoods rely on forest and agriculture.
- They are facing a lot of problems due to lack of basic infrastructure and other facilities.

RESEARCH METHODOLOGY:

Universe of the Study:

Kosagumuda is a Block (CD) in the Nabarangapur District of Odisha. According to Census 2011 information the sub-district code of Kosagumuda block is 03195. Total area of Kosagumuda is 413 km. Kosagumuda has a population of 93,166 peoples. There are 20,238 houses in the sub-district. There are about 72 villages in Kosagumuda block.

| POPULATION OF KOSAGUMUDA BLOCK | | | |
|---------------------------------------|-------------|---------------|--------------|
| Population type | Male | Female | Total |
| Rural | 45,968 | 47,198 | 93,166 |

Methodology:

The research has been completed with collecting both primary as well as secondary data. Secondary Data Collection: The secondary data has been collected through different source of materials, portals, websites.

1. Data will be collected by field visit work
2. Published and unpublished work will be taken into consideration.
3. Specify the regional variation in architectural as well iconographical context.
4. Analysis of agricultural data.
5. National and state government agriculture portal
6. Policy and act of State and Central Government.
7. Different Schemes and Projects on promotion through mass media of Odisha Government.

Sampling

Conducting study of the entire universe is not feasible on the part of the individual scholar due to time and resources constraints. Therefore, various sampling techniques were applied to determine the sample of the study. Multistage sampling method was followed in selection of sample households in the block. There is 2 Village in Kosagumuda block. Out of 72 village which 2 Villages Parajaguda and Ponduguda is selected on the basis of its dominance of SC and ST population. In the second stage sampling, the unit of sampling in the villages from the two G.P's was selected by using purposive sampling method. The villages are the G.P headquarters villages which were selected based on its closeness to the urban area because most of the rural villages are not given proper share for infrastructural development.

Behind of this, the study will also use the multiple sampling models to obtain the growth rate of Agriculture over the time period. Data relating to development and provision of rural agricultural devt.will be taken from 2015-16 to 2018-19. Rather than using traditional methods of large-scale sampling design that can be amenable to statistical analysis. The strength of this research lies in the detailed inter-sectoral analysis as part of this research. The researcher has tried to highlight emerging issues in rural infrastructural problems at the state and field level, as well as policy and operation constraints.

Tools and techniques of Data Collection

Data for the present study were collected from both primary and secondary sources. The secondary data relating to the objectives and present status of the scheme, the budget allocated for the said period, the process of identifying beneficiaries, bank linkage, procurement of material persons involved and process of income generation for the project were collected from the records of the concerned officials at district and state levels and non-government organizations if involved. Apart from primary data, information is also collected from secondary sources regarding the implementation and utilization of various development programmes in the block and selected villages. Data from secondary sources comprise both published and unpublished. The published sources comprise reports, survey documents, and statistics from district and block level institutions including district statistical Office, Agriculture Deptt., Horticulture Deptt., Watershed, DRDA Office, ITDA Office, etc. Unpublished data are also collected from the records of various offices of the block. It is also includes informal discussions held with the various officials like Gram Panchayat officers, CDPO, Anganwadi workers, teachers and with officials of NGOs etc.

The primary data were collected through anthropological field work including observation, interview schedule, formal and informal discussions including focus group discussion (FGD) and case study method. An interview schedule was prepared for the collection of primary data from the selected beneficiaries. The interview schedule includes questions relating to socio-economic profile of the beneficiary, awareness of the schemes, process of applying and getting the assistance under Agr/Horticulture and Watershed Deptt., problems faced and opinion on getting sanction of the scheme, goals and objectives of the scheme, persons involved, size of accommodation, infrastructure facilities their pertinence, to the present status extent of asset development and income generation, expected and actual inputs and outputs of the program.

The data through direct observation are as a rule, preferable to data collected through interview schedules, inspection as a special on the spot investigation, either scheduled or unscheduled provided lot of information to identify facts in actual implementation of the Programme. The management of data includes scouting of filled – in schedules and the preparation of tabulation plan. The data and other qualitative information were processed using computer on the basis of tabulation plan prepared for the purpose taking into account the objectives of the evaluation, the quality and spread of data gathered and conclusion to be derived.

Data Analysis

Collected data was analyzed using the statistical package for social sciences. Descriptive statistics including percentage, average etc. were used to summarize different variables. Data was interpreted with the help of a computer software i.e. statistical package for social sciences.

Limitation of the study:

The present study is confined to the Nabarangpur district of Kosagumuda block. However, the study does not include the rural tribal people of other blocks of the district. The study is again restricted to only three villages of selected gram panchayats in the Kosagumuda block of Nabarangpur District. Only the farmer is taken as respondent for the study even though the researcher has also discussed informally with the other members regarding the study. There are still many issues which remained unexplored and on which further study can be conducted. Nevertheless, the researcher has taken the best effort and utmost care to make the study full-fledged and an unbiased one.

THE SUCCESS STORY OF FARMERS IN NABARANGPUR W/S PROGRAMME**CASE STUDY/ SUCCESS STORY-01****Contribution and Committee Compassion: A Case of Sunadhar Mirgan**

Sunadhar Mirgan, a resident of Parajaguda village located in Kosagumuda Block of Nabarangpur district earns his livelihood primarily from one acre of land, the only asset under his possession. He has four sons and one daughter, all got separated after their marriage. He was under high depression and totally clueless about what to do after the heavy flood of 2011 which completely destroyed his paddy field. Not a single crop plant could be saved. At this time the VDC (village development committee) constituted as a result of the project interventions came to his rescue. After being informed about the committee and the benefits people getting from this institution, Mirgan approached the committee. He became an active member of the committee and took 30 Kgs of paddy seed. In return he agreed to rework on his field along with his wife to remove sand deposited by contributing their labour. Now the land is ready for next kharif paddy cultivation.

CASE STUDY/ SUCCESS STORY-02**Organic farming practices brought smiles in the face of Rajendra:****A marginal farmer**

Rajendra Bhatra is a progressive farmer and a resident of Dakaribhatta village. His livelihood is primarily dependent on agriculture. On two acres of land, paddy cultivation is undertaken on one acre while on the rest vegetable cultivation is done by him. He was a regular user of fertilisers and pesticides and spent around Rs. 8000 – 10,000 every year to grow vegetables. The situation took a shift after he participated in the training on Organic Farming organized by UDYAMA at SAMBHAV, Nayagarh as a part of this project. The training focus on exposing the farmers to organic farming and enhancing their skills on preparation of organic manures and pesticides. Rajendra attended the training programme and learnt the skill on preparing low-cost organic manure, compost, nursery raising, vermiculture, seed treatment, seed preservation, pest management and SRI technique. The interesting part has been that he applied the knowledge this year and avoided use of chemical fertilizers on his vegetable fields. He prepared organic manure and used in vegetable cultivation. He also promoted organic farming and preparation of vermicompost in the village and played an instrumental role in inspiring other farmers in the village for adopting organic farming. Rajendra is very happy having making a profit of Rs. 25,000 this year with the adoption of organic practices.

CASE STUDY/ SUCCESS STORY-03

Goura Bhatra is a small farmer of Ponduguda Village of Parajaguda MWS under Batch II of IWMP VI Kosagumuda Block of Nabarangpur District. He has 2.5 acres of land out of this he has cultivated vegetables like Cabbage, Tomato, Onion, Radish and Coriander in 1 Acres of land of his own by using Motor from Well. He was doing his vegetable cultivation in an area of .5 Acre by using Tenda and KB Pump. After the intervention of Parajaguda Watershed Committee he applied for help from watershed and in this year 2017-18 from PSME Component he has got a support of Rs. 24000/- by PFMS. By getting this support from the Watershed Committee he has purchased one Motor, Veg. Seeds, Sprayers and Medicines and increases his area to 0.5 acre to 1 acre and it helps him and his family a lot. In this year he has spent near about Rs.7000 from his own and till now he has been sold Cabbage Rs.10000/- and his expectation for another Rs 3000/-from selling Cabbage, From tomato and Onion he has an expectation of Rs. 14000/-. His gross income from selling Cabbage, Tomato and Onion would be Rs 27000.00 the net income from Vegetable Cultivation would be 20000.00.



Goura Bhatara Watershed Committee of Parajaguda MWS has shown a new way to earn income for increase his livelihood.

CASE STUDY/ SUCCESS STORY-04

Trilochan Choudhary is a small farmer of Pharsaguda Village of Pharsaguda MWS under Batch II of IWMP VI Kosagumuda Block of Nabarangpur District. He has 4.5 acres of land. He had a keen interest of Vegetable farming but due to irrigation problem he couldn't do it. In the year 2015-16 he applied for one Farm pond to his Watershed committee. In this year 2015-16 his farm pond was done by the committee by expending an amount of Rs.100000.00 (Estimated cost). Then he started to do vegetable cultivation with the water of farm pond. In the year 2016-17 he had done Tomato, Onion and Radish in his land and for this he has invested an amount of Rs.12000.00 and he sold Rs. 16000.00 from tomato, Rs. 3000.00 from Radish and Rs.10000.00 from Onion. This year he has got a net profit of Rs. 17000.00 from vegetable cultivation only and from Pisciculture he got Rs.5000.00.



In the year 2017-18 he has got training from IWMP VI Watershed regarding pisciculture. And with proper procedure first he had done liming work then after 7 days he left Fish Yearlings in his pond and take proper care as he learned from the training and exposure. Also he got a support from PSME Rs.15000.00 for Pisciculture Work. This year he got profit of Rs.20000.00 from Fishery work and from vegetable cultivation Rs.20000.00.



According to Trilochan Choudhary, IWMP Watershed shown a new way to earn income for increase his livelihood. Now he has also purchased one Water pump of his own and hope for more work and more profit.

CASE STUDY/ SUCCESS STORY-05

Prahallad Majhi of Parajaguda village is a marginal farmer having 3 acres of both medium and low land in a single patch. He is the only primary bread earner of his 6 member family and very often his wife supports him by doing wage labour. Apart from agriculture he has no other source of income then work as a labourer. It is seen that, once in a two year due to the unfavorable weather/rain he gets less than expected yield in comparison to his investment. Therefore he maintains his family stress full life. Such condition forced him to go for daily wage labour which is also not regular in this locality. Every year he borrows money from outside/relatives and run from the pillar to the post to repay it through various means such as pledging some of



his assets like land, house etc.

Prahallad Majhi, requested the watershed committee for construction of a farm pond in his land. Before the construction of farm pond he was cultivating paddy over an area of 3.00 Acre with an

investment of Rs. 15000/-@ Rs.5000/- per acre. and his gross income was around Rs.57600/-. After construction of the farm pond he was encouraged to practice Integrated farming system. During the year2015-16, Even though there was shortfall of rain during this year 2015-16, he used motor pump and irrigated his land and was able to take up Vegetable crops like Brinjal, Tomato, Peas, Bitterguard, Potato & Maize etc. throughout the year apart from paddy cultivation and earned i.e. Rs.60,000/- apart from paddy harvest. During the year 2016-17 he received, Rs5600.00 from vegetables apart from Paddy harvest during kharif season. Further, he has prepared the field to take up rabi crop over 2.0 Acres of land and expect to get Rs.50,000/- & more within a period of 4 months. Besides, this he has also taken up Pisciculture during this year that will add to his income which will strengthen and sustain his income.

He is now able to take 2 crop per year and get himself & his family members engaged for more than 8 month per year. He has become an inspiration for the other leading farmers in the village. After the success of Integrated farming system, the same has been replicated in the nearby villages.The farmers of the Parjaguda village are confident, enthusiastic & self reliant towards adoption of Integrated farming system. The farmers of the Parjaguda village has requested for replica of the same works to be executed in other nala's of the watershed.

A CASE STUDY MALE AND FEMALE SHG GROUPS

A Mali community (farming in caste), consisting of 30 members owning 12 Acres of land reside in Parajaguda MWS. After the visit of District Collector to Parjaguda watershed, the Mali farmers requested for 3 nos of deep bore wells. Paddy cultivation was predominant in this watershed. After erection of bore wells 2 nos. of SHGs were formed among the mali community, Raja Chaunria SHG consists of 10 female members and Bhima Krushak SHG.

| Name of the SHG | Bhima Krushaka (Male) | Raja Chaunria (Female) |
|---------------------------|--------------------------------|-------------------------------|
| No. of beneficiary | 16 nos. | 10 nos. |
| Item | Vegetable cultivation | Vegetable cultivation |
| Amount Supported | Rs 25000.00 | Rs.20000.00 |
| MWS Name | Parajaguda (Kosagumuda) | |
| Component | Livelihood | |
| Scheme | IWMP-VI | |

Which is consist of 16 male members, under the water shared programs they were allocated 20000/- to Raja Chaunria SHG and Rs 25000/-to Bhima Krushak SHG. Also supported Rs22000/- to 4 members of their family from PSME component. The total amount is 67000/- support them from the watershed.

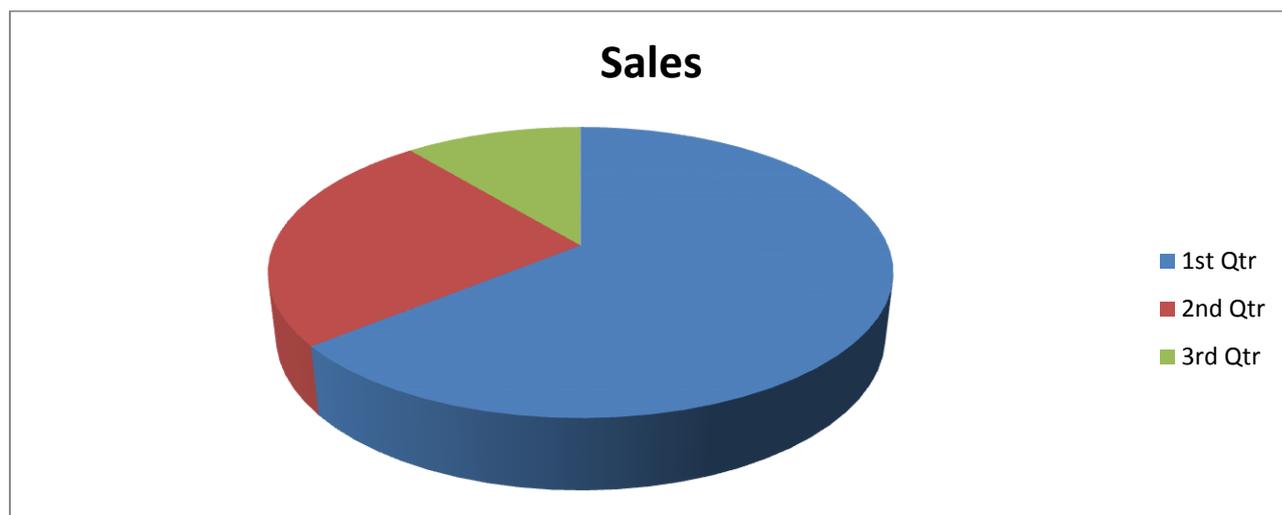
BHIMA KRUSHAK (MALE) SHG



They have also supported 8 Kgs of onion seeds,5 Kgs brinjal seeds, 10Kgs radish seeds, 3 Kg coriander seeds from the W/s committee Parajaguda. These two SHGs contributed Rs 40000.00 for vegetable cultivation. It is a great achievement for the small farmers of Parajaguda Watershed. According to the Raja Chaunria and Bhimakrushak SHG the IWMP-VI watershed has shown the new way to raise the income source.



(RAJA CHAUNRIA (FEMALE) SHG)



Capital investment:

Support amount through RF to SHGs : Rs.45000.00
 Support amount through PSME to 4 members : Rs.22000.00
 Vegetable mini kits support through PSME to 30 members : Rs.20000.00
 (Onion, brinjal, radish & coriander)
 Beneficiary Contribution: Labour, fencing, fertilisers, etc. : Rs.40000.00
 Total : Rs.132000.00

| INCOME | | |
|-------------------|----------|--------------|
| Onion cultivation | 300 qtl. | Rs.500000.00 |
| Brinjal | 50 qtl. | Rs.100000.00 |
| Radish | 50 qtl. | Rs.100000.00 |

| | | |
|--------------|---------|---------------------|
| Corriander | 2qtl. | Rs.50000.00 |
| Potato | 15 qtl. | Rs. 13000.00 |
| Tomato | 3 qtl. | Rs. 30000.00 |
| TOTAL | | Rs.703000.00 |

Net Profit: Income – Expenditure(Rs.703000.00 – Rs.132000.00)= Rs.571000.00

After achieving such a great success in vegetable cultivation, the mali community has planned to take up more area under lease this year for rabi cultivation. A new ray of hope has aroused and they have returned the RF to the watershed committee. The two SHGs have been linked to the bank and they have opted for bank loan during this rabi season.



COLLECTOR MRS. RASHMITA PANDA INTERACT WITH SHG MEMBERS AT PARAJAGUDA MWS , IWMP-VI , BATCH-II OF KOSAGUMUDA BLOCK



COLLECTER MRS. RASHMITA PANDA VISITS MANGO PLANTS OF DEV. NURSERY AT PARAJAGUDA MWS , IWMP-VI , BATCH-II OF KOSAGUMUDA BLOCK**CONCLUSION**

Traditionally the use of the media has been about communicating research messages when there are success stories in particular, which various government channels have been constantly doing. But it has the potential to be more of an agent of change. It is in quite a unique position, potentially being the voice of policymakers, the voice of farmers, the voice of researchers. The essential role of the media should be to create opportunities for farmers to express themselves directly on the air: this is the only way that they will have a say and therefore participate in the decision process. The media can also provide a platform through which the farmers can engage with policymakers, so that their perspectives can be taken on board. Also, media needs to be engaged more as a partner since beginning till end for every developmental scheme rather than just being involved for coverage.

The media has a potentially broader role as an effective player in success of agriculture revolution and agriculture development. There is need for media to walk hand-in-hand with farmers and help in dissemination of information. Media is in quite a unique position, potentially being the voice of policymakers, the voice of farmers, the voice of researchers. So, they potentially can be quite a powerful catalyst for change. Farmers are curious to get knowledge and use that knowledge here media has the role of providing knowledge timely to the farmers. The essential role of the media is to create opportunities for farmers to express themselves directly on the air: this is the only way that they will have a say and therefore participate in the decision process. Media is an inseparable part of agriculture revolution.

Information on agriculture, both crop and livestock was communicated among farmers from ancient times. However, with the development in agricultural research, need arises to transfer new information and technologies to the users i.e. farmers. To fulfill this need, mass media like newspapers, magazines radio, TV film and internet play a vital role. What we know about the new information on technologies, public figures and public affairs is largely dependent upon what the mass media told us about it.

The success of agricultural development programs in developing countries largely depends on the nature and extent of use of mass media in mobilization of people for development. Press, Radio, Television, Internet, Mobile etc., have been acclaimed to be the most effective media for diffusing the scientific knowledge to the masses. In a country like India, where literacy level is low, the choice of communication media is of vital importance. In this regard the television and radio are significant, as they transfer modern agricultural technology to literate and illiterate farmers alike even in interior areas, within short time.

The role of the media is found immense, availability of the internet in the every part of the country made to the near to the informative world. Though, the Nabarangpur district is mostly tribal populated area still it has lot of potentiality in the agriculture sector. The tools of the mass communication are needed to this area. Through the informative and innovative way the agriculture of this land can be enhanced. Now the media communication to the agriculture community is less than 40 percent. The use of the community media is very less in this area. The mainstream Medias are not focusing into this area. It need more attention to build up faster agro based environment through the mass media.

The above case studies are shown that it has huge potential in this area. But it could have been better if

the government effectively implement the policy through help of Mass media. The government should set up more community based local language media which might lead to spread awareness. And new technology and can implemented at easy manner.

The Success of the mass media and community Devt.programme is depends on for the most part, on the emancipation of the rural women. But, the emancipation of the rural women is possible only through the active cooperation and support of many trained female workers. But present they exist in very small number.

The failure of the Community Devt.programme is attributed to the lack of harmony among various departments of the government. Furthermore, there is lack of coordination between the bureaucrats, Media and the rurality.

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ASPECT OF DHARMA IN KARMAYOGA

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Karmayoga is a path of liberation given in Bhagavad Gita. Karmayoga means a path of liberation through selfless actions. Selfless actions are those which are free from desire of fruit (success or failure). But the main aspect of karmayoga is that what types of karma one should do and which types of karma one should not do in life that he can follow the path of karmayoga. In Hinduism there is the concept of 'Dharma' which is very important part of karmayoga. 'Dharma' explain that which karma are suitable for karmayoga that leads to satisfaction, peace at mind and harmony of society. So karma according to 'dharma' are only those karma that opens the path of liberation through action (karmayoga).

Keywords : Dharma, Karma, Karmayoga.

INTRODUCTION:**Dharma:**

According to Hindu, Buddhist and Yogic concept 'dharma' is referring to a law or principle which govern the universe. If a person is not following the laws of dharma in his life he will suffer from many problems in his life and can not attain the ultimate goal of his life i.e. moksha (liberation). There are four main philosophical principles in hinduism (four purushartha) that are 1. Dharma, 2.Artha, 3.Kama and 4.Moksha. These are the four proper goals or aims of human life. "Object of human pursuit"ⁱ Here Dharma means righteousness and moral values. Artha means prosperity and economic values. Karma means pleasure, love and psychological values and moksha is considered the ultimate goal or aim of human life. Moksha means liberation, spiritual values and self-actualization. "Purushartha is also referred to as Caturvarga"ⁱⁱ.

'Dharma' is the first aim of life and all the three goals depends on it. Because without 'Dharma' we can not attain rest of three goal or aims of life. So Dharma is most important concept and Indian literature emphasize that dharma is foremost. "If dharma is ignored, artha and kama profit and pleasure respectively lead to social chaos."ⁱⁱⁱ

According to Hindu, Buddhist and yogic concept, referring to a law or principle which governs the universe is called 'dharma'. Commonly 'Dharma' is as a law of righteousness and satya (truth), giving order to the customs behaviours and ethics which make life possible. 'Dharma is based on 'Rta'. 'Rta, the order that makes life and universe possible'^{iv} In vedic religion 'Rta' means the order, rule and truth. "Rta is the principle of natural order which regulates and coordinates the operation of universe and everything which it"^v Rta is responsible for all the moral, sacrificial and natural orders. Conceptually, Rta is closely allied to the injunctions and ordinances thought to uphold it. Collectively referred to as Dharma, and the individual actions in relation to those ordinances referred as 'karma'. "Rta and 'dharma' are parallel concept, the former being a cosmic principle, the later being a moral sphere"^{vi}.

Dharma is the order which play an very important role in protection and support the cosmos. Dharma is equivalent to natural law, social order, the sense of duty and right ordering of human heart. Commonly right ordering of human heart is called conscience. Here the role of conscience is very important in selection of action or karma. Commonly conscience is a part of mind that tells the right and wrong. Conscience is a cognitive process that elicits emotion and rational associates us based on an individuals moral philosophy and value system.

“Your conscience is what makes you feel guilty when you do something bad and good when you do something kind”.^{vii} Commonly a man have an conscience that play a very important role in selection of action (karma) on the base of morality and values. According to ‘dharma’ the actions should be based on the conscience (inner voice) and that actions do not disturb our mental peace and social harmony. Dharma commonly translated as ‘righteousness’, ‘merit’ or ‘religious and moral duties’ governing individual conduct.”^{viii} Dharma includes morality, law, customs, duty, right justice, virtue, morality, ethics, good work . Dharma is that behaviour which is considered necessary for order of things in the universe and all life in nature, society, family as well as at the individual level. This behaviour should be base on morality. The opposite word of ‘Dharma’ is ‘Adharma’. “Adharma means that which is against the nature, immoral, unethical, wrong or unlawful.”^{ix}

“Dharma is ‘right living’ defined by the practice of universal ethics and personal morals’.”^x

Karmayoga

The concept of karmayoga is discussed in detail in Bhagavad Gita. Karmayoga means ‘discipline of action’ and it focuses on the adherence to duty (dharma) which remaining detached from rewards. It means that one should do his karma or actions (according to dharma) without the attachment to the fruits means doing duties in unselfish manner. Bhagavad Gita (chapter 3 shloka 7) defines it as “Those karma yogi who control their knowledge senses with the mind, O! Arjuna and engage the working senses in working without attachment, are certainly superior.” Those one do his duties without the attachment to karma phala (fruits) keeping control over senses and mind than these types of karma does not bound them. “When one work in the world, with the body but keeps the mind attached to God, know it to be karma yog. When one engages in spirituality with the body, but keep the mind attached to the world, know it to be hypocrisy’. (Bhakti Shatak verse 34).

According to situations and conditions there may be different karma for different peoples. So one should do their duties in awareness regarding his conditions and situations. “By performing their prescribed duties, king Janak and other attained perfection. You should also perform your duties to a set an example for the good of the world’ (Bhagavad Gita, Chapter 3, Verse 20).

Action should be done in awareness because ignorant people perform their duties which the attachment to the fruit or results, this will cause bondage in materialistic world. But wise people perform his duties without attachment to result that leads to liberation. Karma or action depends on individual nature and one should prefer their duties in accordance with his nature. This is given in Bhagavad Gita chapter 3, Verse 33.

“Even wise people act according to their nature, for all living beings are propelled by their natural tendencies” in Bhagavad Gita. The ‘swa’ means ‘self’ and ‘dharma’ means responsibilities, duties, thoughts, actions that are appropriate to personal nature. Karmayoga is very essential for the purification of mind but it should be done skillfully (Bhagavad Gita chapt. 2, verse 50). “One who performs their duties endowed with wisdom without the attachment can get rid of both good and bad reactions in his life itself. This is karmayoga is path for spiritual liberation when one should perform his karma according to his nature, without attachment to outcome (niskama karma), in accord to dharma and in unselfish way these type of karma are useful in purification of mind and leads to liberation. “To a karma yogi, right action is a form of prayer”^{xi}

Swami Vivekananda described karma yoga as a mental discipline that allows person to carry out his/her duties as a service to entire world, as a path of enlightenment.^{xii}

According to Swami Vivekananda our actions should be such a type that are good for the world and

not produce any negative effect on world. These type of actions produces harmony and peace on personal and social level.

CONCLUSION

Dharma is an very important part of karmayoga; because in karma yoga there are actions or karma which are the tools for practical application of karmayoga, But it is very important to understand which type of karma one should perform in karmayoga. The criteria for karma or actions in karmayoga is 'Dharma'. Actions or karma should be in accord 'dharma'. Dharma is the universal law and actions should be done according to this law. Everything in this universe performing their activities according to this universal law.

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