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India Pin-464993, Ph-0755-6766100, 07480-295707
E-mail-aisectjournal@rediffmail.com, info@aisectuniversity.ac.in
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Computing & Allied Engineering Domain in India with Reference to Private Universities: A Case Study of Masters Programs

P. K. Paul[1]* P. S. Aithal[2] A. Bhuimali[3] R. Rajesh[4]

[1]Raiganj University (RGU) Raiganj (West Bengal) India

[2]Vice Chancellor, Srinivas University, Mangaluru (Karnataka) India

[3]Vice Chancellor, Raiganj University (RGU) Raiganj (West Bengal) India

[4]Principal, Rohini College of Engineering, Anjugramam (Tamilnadu) India

Abstract – Computer is one of the important and valuable devices today. Almost all the affairs these days are governed by the Computing and Information Technology. Engineering is a field and areas of knowledge that deals with the design, development, building, use of engines, machines, and structures for doing a specific task. Engineering previously called and treated as a field f hardcore activities and dealing but in recent past, the concept of the same has been changed and today many other emerging areas have been started in academics. Among these few important are Bio Technology, Nano Technology, Computer Technologies etc. Computing in today's context treated as a designing, developing, building and applications of hardware and software systems in different context. In India also Computing and allied domains especially Information Technology has been started in engineering track as well. Many universities have started Computing, Computer Sciences, Information Technology and allied sciences in their Science and Engineering track, both. Engineering program in the context of Computing is offered in Engineering Colleges, Universities and other National and Autonomous institutions and universities. This is a conceptual study and deals with the detailed study of computing field available in Private Universities throughout India.

Keywords: Computing, Computer Sciences, Information Technology, Allied Sciences, Applied Technologies, Education, New Age Programs, Universities, India.

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I. INTRODUCTION

Today's age is fully governed by the Information Technology and Computing Systems. It is a fact that equipments, institutions, services and common people these days are surrounded by the computing and digital systems. Computing and allied fields therefore become an important domain in the field of Applied Sciences and Technology. The common affairs are purely dealt with the Informatics practices. Information becomes a vital resource today and is essential for each and every affair, objective. Services are very much associated with the information and similar type of contents namely collection, selection, organization, processing, management, dissemination are governed by the tools, techniques, and technologies. And these affairs are purely deal by the Computing and Information Technologies (Altbach, 1993), (Gladwin, et. al., 1995), (Pau1, 2013a). In other words, Computing is a kind of goal-oriented activity which deals with computation and automation activities with the help of devices and systems— e.g. through computers. In other words, Computing deals with or responsible for the following—

(a) Processing, structuring, as well as managing information, data, and contents of various kinds.

(b) Engagement with the scientific research with computers and similar systems.

(c) Creating and electronic systems for intelligent systems/ environment.

(d) For the use of communications as well as entertainment and media communication.

As far as in terms of field is concerned computing is included and closely associated with the computer

engineering, software engineering, computer science, information systems, and information technology etc. India is gaining as a nation with developing tag towards developing nation. As mentioned in the Wikipedia that, "A developed country, industrialized country, or more economically developed country MEDC), is a sovereign state that has a highly developed economy and advanced technological infrastructure relative to other less industrialized nations. Most commonly, the criteria for evaluating the degree of economic development are gross domestic product GDP), gross national product GNP), the per capita income, level of industrialization, amount of widespread infrastructure and general standard of living". Hence the development of the GDP and nation many ways responsible in today's context with the use of Information Technology product, services and proper information infrastructure creation. The educated products play a vital role in the development of such information systems for the complete development. In India, Computing manpower is offered by the universities, colleges, and institutions of different kinds (Basak & Sathyanarayana, 2010), (Broko, 1969), (Pau1, 2013a). They offered a different kind of programs of various levels as well viz. Bachelors, Masters, Doctoral. Though certain programs with MPhil or DSc/DLitt degree are also important programs but offered limited and rare. In engineering context initially, programs were offered only at Bachelors level but gradually different level started to keep better sustainability in education.

II. OBJECTIVES

The paper is conceptual in nature and deals with following attributes and features (but not limited to)—

(a) To provide information to learn about the basics of Engineering and Engineering in the context of Computing and Information Technology.

(b) To learn about the universities, colleges and other educational systems (higher) in India and changing pattern.

(c) To dig out the Universities in India and private universities with reference to engineering programs.

(d) To learn about the available Computing and allied programs/ degrees available in India and abroad.

(e) To dig out the areas/ subjects of Computing and Information Technologies available in India and abroad with Masters in Engineering Sciences.

(f) To learn about the higher education systems in India and enter into the research of challenges and issues in this respect.

(g) To dig out the contemporary concepts of emerging engineering and professional education and research with Masters in Engineering Sciences.

(h) To learn about the concept of Major, Super Specialty in the context of Computing and engineering with Masters in Engineering Sciences.

(i) To learn about the emerging trends in collaboration format in higher education in India specially in the areas of engineering and computing with Masters in Engineering Sciences.

III. METHODOLOGY & PROCEDURE

For each and every kind of research work, a scientific method is needed. As far as this paper is concerned some of the important and vital methodologies are— use of the literature review, to learn about the background of Engineering research and degrees in India and abroad. The review also played a lead role to analyze and evaluate the changing nature of Computing and allied fields. Though to reach the concrete decision and hypothesis of the research Web Survey play a great role. Hence in this regard official portal of UGC (University Grants Commission), AICTE (All India Council for Technical Education) were studied in detail. As the study is concentrated on Private Universities thus the site of UGC was studied properly. The link given by the UGC of private universities websites were referred in detail between August-October, 2017 and the required information were collected, analyzed, and researched. All the findings later on incorporated in this paper used adequate scientific research methods. The main web link used is https://www.ugc.ac.in/privatuniversity.aspx. All the faculties related to Engineering/ Technology education of each of the private universities (279 in numbers distributed in 23 states of India) was studied to reach the destination and formulate hypothesis.

IV. COMPUTING AND ENGINEERING BASICS

Engineering is also called Engineering Sciences. Many universities worldwide practiced the term synonymously with Engineering. Though according to experts Engineering Science directly denotes a field of study whereas Engineering concept is far different, it may be a subject or may be a tool, mechanism etc. According to the ABET "The creative application of scientific principles to design or develop structures, machines, apparatus, or manufacturing processes, or works utilizing them singly or in combination; or to construct or operate the same with full cognizance of their design; or to forecast their behavior under specific operating conditions; all as respects an intended function, economics of operation and safety

to life and property". As far as emerging studies are concerned CS is important one. **Computer Science (CS)** is a core of Computing that deals with the following affairs—

(a) Computer Science is a study of mathematical affairs for computation and Computer Engineering is about hardware–software integration rather only software engineering and/ or electronic engineering related affairs or concentration.

(b) Computer Science is theoretical in nature and responsible for the areas of microprocessor, operating systems, artificial intelligence, pattern recognition etc.

(c) Writing software and firmware for the designing of chips, VLSI, sensors, mixed circuits boards etc. are the core of Computer Science and many ways Computer Science and Engineering.

(d) Computer Science is though somehow related to the Software designing, programming but Computer Engineering is purely concentrated with the supercomputing, robotics etc. (Brown, 1998), (Juell-Skielse & Enquist, 2012), (Paul, 2013b).

The combination of Computer Science and Computer Engineering created **Computer Science and Engineering** and available in the many universities of the world. Computer Science and Engineering is using digital systems in a huge manner to control as well as monitoring electrical systems. Among the systems, few important are motors, communications, and sensors etc. Information Technology is an applied science and less focused on mathematics. It is larger and in general than Computer Science or Computer Engineering. Information Technology term may be considered as both education/study area and tools/technology for any activities. The facets and attributes of Information Technologies include—

(a) Collection, Selection, Organization, Processing, Management and Dissemination of Information and other contents viz. Data and Knowledge with appropriate tools, mechanism, and technologies.

(b) Use of Software Technologies, Database Technologies, Networking Technologies, Communication Technologies, Multimedia Technologies are most vital for information systems retrieval and management.

(c) In Information Technology some of the areas such as Business, Management play a vital role. IT integrates management components so that it helps in organizational process, management and promotion. Project management is also included in many cases as far as IT is concerned.

Though country wise the areas, importance, and values of Information Technology is different. Information Technology with greater components of Business/ Management is also called as Information Technology Management. Though closely associated fields are available in this regard i.e. Information Systems. The domain of **Information Systems** is concerned with the designing, development, organization, processing, management of information systems and services. Information Systems is similar to the Information Technology and importantly Information Systems is deal with all the technologies which are related and associated with Information Technology. Additionally, it is also about management strategies, policy making, designing, development of IT services, Information Services of an organization. Hence here organizational focus is important and rigid. Although internationally another domain became popular called Information Science dedicated to the information affairs and activities with proper information management techniques, technologies similar to the Information Technologies. According to the experts and academician, it is an interdisciplinary science additionally apart from IT deals with management, laws, social sciences for better information and IT governance. Worldwide these subjects are popular and available in many universities (Gladwin, et. al., 1995), (Paul, 2013b), (Richards, 1992).

V. ENGINEERING AND COMPUTING EDUCATION IN INDIA

India is one of the important democracies in the world and also moving towards better economy in the world. The development of economy and sustainability is purely depends on education. And in the sector of education, research and training India is moving towards better position. Science and Technology especially mathematics is in better position in India. There are many developing countries (refer table 1) and India is also gaining rapidly towards a developed nation. To reach a developed nation apart from Science and Mathematics, India needs more attention in Engineering Sciences. Hence here in the context computing as well apart from Science platform engineering segment need to strengthen.

Table 1

Few Developing Countries at a glance

Few Developing Countries							
Argentina	Bangladesh	Brazil	Bulgaria	Colombia	China	Hungary	Malaysia
Mauritius	Mexico	Nigeria	Oman	Pakistan	Philippines	Poland	Qatar
Russia	South Africa	South Korea	Taiwan	Thailand	Ukraine	UAE	India

When internationally in computing and allied fields are available as Computer Science, Computer Engineering, Computer Science and Engineering, Information Technology, and some of the interdisciplinary fields (viz. Information Science, Information Management, Information Systems, Information Engineering and also few merged/ combined fields- Information Science and Technology, Computer and Information Science, Information Systems and Technology); in India, only areas mentioned above without parenthesis are available (Kling, 1983), (Farkas-Conn, 1990), (Paul, 2013c).

Computer Science is offered mainly as science programs with the degrees of Bachelor of Science, Masters of Science. Internationally it is abbreviated as BS and MS while in India it is BSc and MSc. Duration wise internationally BS and MS is 4 years and 1-year programs respectively while in India it is 3 years and 2 years. However, the subject additionally also offered in the large number of Engineering colleges (about 3000+) with Engineering track with following nomenclature—

(a) Bachelor of Engineering

(b) Bachelor of Technology

These programs are popularly called as BE and BTech respectively. Though fewer universities and INI (Institute of National Importance) categorized institutions also offered BTech/M.Tech programs. The concentration of the programs (CS and CSE) in India is same as practiced internationally i.e. core, mathematical and deals inside into the mechanism and high level of programming languages. However, CSE is also treated as more on hardware centric domain (Pau1, 2013a), (Richards, 1992).

Though internationally when academics were moved into Information Technology domain for the applied solution of informatics and computing in Industry and academia but Indian academics moved for a different nomenclature and concentration called Computer Application (software technology focused). The flagship program in this segment is called MCA (Master of Computer Application). It is designed for graduates of diverse disciplines. But the program should not be confused with IT (which is also opened for all type of Bachelors holders) programs available worldwide. Instead of concentration of Database Technologies, Networking Technologies, Communication Technologies, Multimedia Technologies, the Computer Application subject/ program is mainly concentrated on Software Technologies.

The case of Information Technology is also differs from the global context, internationally all the components mentioned in previous section play a lead role for information related affairs while in India the focus is same of Computer Application with little additional enhancement of other allied technologies. In USA, UK, and Australia, Information Technology program is enormously concentrated on Business and management components. These components are interdisciplinary and offered in concentration with technologies/computing/informatics. Like CS/CSE it is also offered in BSc & MSc, BTech & M.Tech, BE & ME platform with the duration of 3 & 2, 4 & 2, 4 & 2 years respectively.

Interesting to note that, few universities also offered Information Science in India. Though the curricula and focus of the programs differ from most of the universities practiced internationally. Indian Information Science is focused on software technologies (programming) and few on other technologies but worldwide the concentration lies in networking technologies, database technologies, multimedia technologies etc with strong liaison with information systems. Though, academician believes that Indian academics need to introduce Information Technology with Business, Management components. Even Information Science needs to merge with the few more components (apart from IT) such as Information Basics, Information Management, Social-Ethical Issues in Information, Computing and Information Technology. For better economy and sustainable development of the society and governance, India needs revamping curricula and introduction of such social technologies.

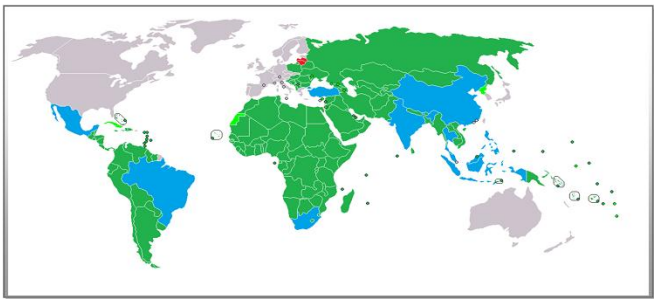

Fig. 1-Developing, Newly developed and newly economic countries (derived from Wikipedia)

India is in developing stage hence a collaborative effort is highly required. The Fig 1 showing the Developing Countries (colored as Green), whereas newly developed nations (colored as Red), Newly Industrialized countries (Blue).

VI. PRIVATE UNIVERSITIES EMPHASIZING MASTERS PROGRAM

Indian Higher Education Systems is governed by the Universities, Colleges, Autonomous, Institute of National Importance, Research Centres etc. Though, Universities are treated as a centre of apex learning. India has different types of universities Private Universities (established by the state legislative assembly but managed and financed by the private body), State Universities (Legislated, Managed, Governed, Funded by the concerned state), Central Universities (Legislated, Managed, Governed, Funded by the state government), Deemed Universities (an institute of excellence basically listed by the UGC as similar to the University). Though Apart from these Institutes of National Importance also an important body offers education, research, and training etc. In all these universities and engineering colleges (which is governed by the AICTE) run Engineering programs leading to BTech/BE & M.Tech/ME Degrees. As this study is mainly concentrated on Private Universities hence now we looked upon concentrated on engineering education at Masters level.

According to this study, it is noted that India (among its 29 states) holds 23 states established private universities. The state Rajasthan ranked first in terms of a number of universities (i.e. 46), while Gujarat and Uttar Pradesh ranked second (30) and third (29) respectively. It is worthy to note that among these private universities more universities offered BTech courses than M.Tech courses. As per the study it is noted that among 279 Universities in India total BTech/BE offering institutions are about 180 while M.Tech/ME is offered in 141 Institutions.

In Rajasthan 26 Universities offered M.Tech program while Uttar Pradesh ranked second with 23. It is interesting to note that, few states do not have options available for M.Tech viz. Jharkhand, Mizoram, Nagaland, Manipur. Details of such universities offering M.Tech program is listed in Table 2.

Table 2

Private Universities offering M.Tech Degree (State wise)

Serial No.	States	No. of Universities	Universities with Engg. Unit (M.Tech)
1	Arunachal Pradesh	7	3
2	Assam	5	3
3	Bihar	2	1
4	Chhattisgarh	9	5
5	Gujarat	30	10
6	Haryana	20	10
7	Himachal Pradesh	17	13
8	Jharkhand	7	Absent
9	Karnataka	14	7
10	Meghalaya	8	1
11	Mizoram	1	Absent
12	Madhya Pradesh	24	12
13	Maharashtra	9	2
14	Manipur	1	Absent
15	Nagaland	3	Absent
16	Odisha	4	1
17	Punjab	15	11
18	Rajasthan	46	26
19	Sikkim	5	1
20	Tripura	1	1
21	Uttar Pradesh	29	23
22	Uttrakhand	13	6
23	West Bengal	9	5
Grand Total		**279**	**141**

In such institutions, most common degrees and subjects are Computer Science (also called as Computer Science and Engineering) and Information Technology. Some of the Universities also offered Information and Communication Technology (ICT) program concentrated on communication and networking technologies in computing. Interestingly few universities also offered all three domains Computer Science, Information Technology, Information and Communication Technology programs. In West Bengal among 9 private universities, 5 offers M.Tech Program. Though, M.Tech-CSE is offered only in 4 universities. A total 21 universities among 279 offered two track of M.Tech (i.e. Computer Science and Engineering, Information Technology), Madhya Pradesh stands 1 in terms of number of universities offering both CS/CSE and IT. In South India and Eastern India (including West Bengal), not a single universities are offering both the track of computing sciences.

Table 3

Private Universities offering M.Tech Degrees both CSE/ IT track

Serial No.	States	No. of Universities	Universities with M.Tech-CSE & M.Tech-IT
1	Arunachal Pradesh	7	2

2	Assam	5	Absent
3	Bihar	2	Absent
4	Chhattisgarh	9	1
5	Gujarat	30	3
6	Haryana	20	Absent
7	Himachal Pradesh	17	Absent
8	Jharkhand	7	Absent
9	Karnataka	14	Absent
10	Meghalaya	8	Absent
11	Mizoram	1	Absent
12	Madhya Pradesh	24	6
13	Maharashtra	9	1
14	Manipur	1	Absent
15	Nagaland	3	Absent
16	Odisha	4	Absent
17	Punjab	15	1
18	Rajasthan	46	5
19	Sikkim	5	1
20	Tripura	1	Absent
21	Uttar Pradesh	29	1
22	Uttrakhand	13	Absent
23	West Bengal	9	Absent
Grand Total		**279**	**21**

Surprisingly, though Karnataka is developed in Information Technology sector but among its 14 private universities not a single offered M.Tech in the areas of CSE and Information Technology sector. Similarly, Haryana and Himachal Pradesh both stands well in terms of number of private universities (20 & 17 respectively) but not a single university offer M.Tech in both the fields. A detailed picture is depicted in Table 3 whereas Fig 2 showing top states in terms of offering both CSE and IT in M.Tech level.

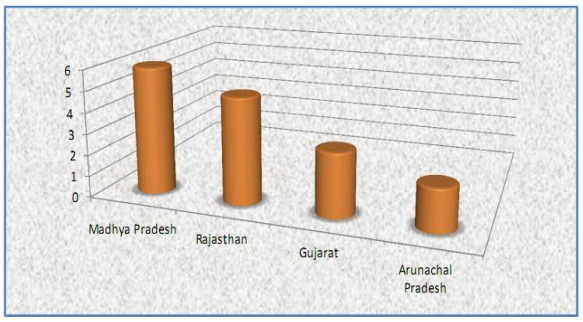

Fig. 2 -Developing, Newly developed and newly economic countries (derived from Wikipedia)

The Information Technology field is gaining and research in academic innovations as well. The trend is going on for offering skill based and emerging technologies. Among the emerging technologies, few important are include—

(a) Cloud Computing

(b) Big Data Analytics

(c) Data Sciences

(d) Cyber Security etc.

However, in this study, all the individual components of Information Technology (viz. Database Technology, Software Technology, Multimedia Technology, and Networking Technology) considered and apart from the emerging areas which are listed above. Though Multimedia and Database Technologies found absent among the universities and some of the universities offered innovative programs in the concentration of Software Technology and Networking Technology. Table 4 is depicted detailed report of such innovative concentrated programs analyzed from 279 universities in M.Tech level.

Table 4

Private Universities offering M.Tech-CSE program with concentration

S. No.	States	No. of Univer-sities	Universities with M.Tech-CSE	Univer-sities with M.Tech-CSE with Concen-tration Programs
1	Arunachal Pradesh	7	3	Absent
2	Assam	5	2	4
3	Bihar	2	1	Absent
4	Chhattisgarh	9	4	2
5	Gujarat	30	5	2
6	Haryana	20	9	6
7	Himachal Pradesh	17	11	5
8	Jharkhand	7	Absent	Absent
9	Karnataka	14	5	9
10	Meghalaya	8	1	Absent
11	Mizoram	1	Absent	Absent
12	Madhya Pradesh	24	11	Absent
13	Maharashtra	9	1	3
14	Manipur	1	Absent	Absent
15	Nagaland	3	Absent	Absent
16	Odisha	4	1	1
17	Punjab	15	9	3
18	Rajasthan	46	23	3
19	Sikkim	5	1	Absent
20	Tripura	1	Absent	Absent
21	Uttar Pradesh	29	20	7
22	Uttrakhand	13	5	Absent

23	West Bengal	9	4	Absent
Grand Total		**279**	**116**	**45**

Such programs offered with CSE Concentration like M.Tech-CSE (Networking), M.Tech-CSE (Software Engineering). For example, the Assam Royal Global University, Assam is offering following programs—

(a) M.Tech-CSE (Intelligent Computing)

(b) M.Tech-CSE (Networking & Web Engineering)

(c) M.Tech-CSE (Data Analytics & Engineering)

(d) M.Tech-CSE (Software & Web Engineering)

VII. SKILL, COLLABORATION, AND EMPLOYMENT: CHANGING & EMERGING PROGRAMS AT M.TECH LEVEL

Skill has become important and most valuable aspects of today's age. It is required in all the areas and sectors of business, healthcare, governance, public administration, education and so on. As far as Information Technology is concerned it is noted that many new areas are emerging viz. Cloud Computing, Virtualization, Human Computer Interaction, Data Analytics, Big Data Management, Usability Engineering, Network and Cyber Security, Database Systems, Web Technologies etc. It is worthy to note that Computer Science deals with internal and core affairs of Computing and mathematical areas for designing and development of computers and similar systems, and most of the above mentioned skilled areas are from Information Technology. But most of the universities are offering such areas of specialization/ concentration as a part of Computer Science/ CSE. The reason behind this may be the popularity of CSE programs and availability of the domains in different institutions and universities. As per this study among 279 universities 41 are emerging and skill based (Table 5).

Table 5

Skill and emerging technology based institutions based on M.Tech

Serial No.	States	No. of Universities	Skill based Emerging Institutions
1	Arunachal Pradesh	7	Absent
2	Assam	5	1
3	Bihar	2	Absent
4	Chhattisgarh	9	2
5	Gujarat	30	4
6	Haryana	20	2
7	Himachal Pradesh	17	5
8	Jharkhand	7	Absent
9	Karnataka	14	4
10	Meghalaya	8	Absent
11	Mizoram	1	Absent
12	Madhya Pradesh	24	4
13	Maharashtra	9	2
14	Manipur	1	Absent
15	Nagaland	3	Absent
16	Odisha	4	1
17	Punjab	15	2
18	Rajasthan	46	8
19	Sikkim	5	Absent
20	Tripura	1	Absent
21	Uttar Pradesh	29	5
22	Uttrakhand	13	Absent
23	West Bengal	9	1
Grand Total		279	**41**

However, as far as this study is concerned it is noted that total 41 institutes among the private universities fall under this category. Rajasthan, Himachal Pradesh, Uttar Pradesh has a large number of private universities with skill based institutions based on M.Tech program (refer Table: 6).

Table 6

Skill and emerging technology based institutions based on M.Tech

Skill Based Specializations		
States	**No. of Universities**	**No. of Skill based Institutions**
Rajasthan	46	8
Himachal Pradesh	17	5
Uttar Pradesh	29	5

It is important to note that the Assam Royal Global University, Assam, Ansal University, Haryana, PES University, Karnataka among the few universities offering a large number of M.Tech programs in skill and emerging areas of study. However, few universities also offered only one or two M.Tech programs and they have started skill based degrees instead of general M.Tech-IT/CSE such as MIT Art Design & Technology University, Maharashtra, Dayanand Sagar University, Karnataka. Details on

universities and programs in emerging Information Technology areas listed in Table 7.

Some of the universities in this regard are NIIT University, Rajasthan, Guru Kashi University, Punjab, Amity University, UP.

Table 7

Universities offering good number of M.Tech super specialty programs

M.Tech (In Skill Based) minimum 3 programs		
Serial No.	**Universities**	**Programs**
1	The Assam Royal Global University, Assam	M.Tech-CSE (Intelligent Computing/ Networking & Web Engineering/ Data Analytics & Engineering/ Software & Web Engineering)
2	Ansal University, Haryana	M.Tech-CSE (Software Engineering/ Data Analytics/ Network & Information Security/ Tele-commutation & Mobile Technology)
3	PES University, Karnataka	M.Tech-CSE (Cloud Computing/ Web Technology/ Software Engineering/ Big Data/ IoT/ Cyber Security)
4	Sharda University, Uttar Pradesh	M.Tech-CSE (Networking/ Software Engineering/Mobile Computing/ Cyber Security & Information Assurance)
5	Eternal University, Himachal Pradesh	M.Tech-CSE (Software Engineering/Information Security/ Computer Applications)
6	Dayanand Sagar University, Karnataka	M.Tech- CSE (Big Data/ IoT/ Cloud Computing)
7	JSS Science & Technology University, Mysuru	M.Tech-Data Science/ Software Engineering / Network & Internet Engineering
8	MIT Art Design & Technology University, Maharashtra	Intelligent Systems & Analytics/ IoT)
9	Guru Kashi University	M.Tech-Remote Sensing/ Software Engineering/ Cloud Computing

Some of the universities also offered M.Tech specialization and emerging areas not as a major or concentration it is directly as M.Tech, for example M.Tech- Data Engineering & Cloud Computing, M.Tech-Data Science, M.Tech-Cyber Security etc.

Table 8

Universities offering emerging full-fledged M.Tech Degrees in IT/CSE areas

Sl. No.	Emerging M.Tech	
	Universities	**Full-fledged**
1	Marwadi University	M.Tech (Cyber Security) Pure MSc Eligible with PGDCA
2	Bahra University, Himachal Pradesh	M.Tech-Cyber Security
3	Reva University, Karnataka	M.Tech- Data Engineering & Cloud Computing Computer Network Engineering
4	Dr. A.P.J. Abdul Kalam University, Madhya Pradesh	M.Tech- Cyber Security
5	Oriental University, Madhya Pradesh	M.Tech-Computer Network
6	People's University, Madhya Pradesh	M.Tech-Cyber Security
7	Sandip University, Maharashtra	M.Tech-Cloud Technology & Information Security
8	Centurion University of Technology and Management, Odisha	M.Tech-(Internet Security)-Le Innovate M.Tech-Data Science (Silicon Lab)
9	Guru Kashi University, Punjab	M.Tech-Remote Sensing/ Software Engineering/ Cloud Computing (MSc eligible)
10	Career Point University, Rajasthan	M.Tech- Mobile Computing
11	Maharishi Arvind University, Rajasthan	M.Tech-Computer Design/ Digital Design
12	Manipal University,	M.Tech-Advance Computing &

	Rajasthan	Data Science-with CDAC / Information & Network Security-with CDAC
13	NIIT University, Rajasthan	M.Tech-Education Technology/Cyber Security (with PwC) M.Tech-GIS/ Education Technology
14	Amity University, UP	M.Tech-Geo Informatics M.Tech-Computer Network & Information Security
15	Seacom Skills University, West Bengal	M.Tech-Web & Game Designing/ CAD

The above M.Tech programs become good alternatives to the aspirants not only holding BTech degrees but also the equivalent qualifications like Computing degree holders in Science stream with the degrees such as MSc-CS/IT/CA, and MCA. Hence if one has interest in obtaining Engineering at Post Graduate level (ME/M.Tech) they can get not only conventional ME/M.Tech but also super specialty and emerging subjects. Table 8 depicted

Universities offering emerging full-fledged M.Tech Degrees in IT/CSE areas. Like full-fledged M.Tech in emerging information technological/computing areas, many private universities are also offering M.Tech only in emerging areas instead of any other general M.Tech-CSE/IT/ICT. Among such institutes, few are NIIT University, Rajasthan, Sharda University, UP, Sandip University, Maharashtra etc. A detailed analyzed programs and institutions are listed in Table 9.

Table 9

Private Universities offering only skill based Engineering (Masters) programs

Serial No.	Universities	Programs
1	The Assam Royal Global University, Assam	M.Tech-CSE (Intelligent Computing/ Networking & Web Engineering/ Data Analytics & Engineering/ Software & Web Engineering)
2	The Northcap University, Haryana	M.Tech-CSE (Cyber Security/ Data Science)
3	PES University, Karnataka	M.Tech-CSE (Cloud Computing/ Web Technology/ Software Engineering/ Big Data/ IoT/ Cyber Security)
4	Sandip University, Maharashtra	M.Tech-Cloud Technology & Information Security
5	Chandigarh University, Punjab	ME (Hons) CSE (Cloud Computing/ Big Data/ Information Security)-IBM
6	J.E.C.R.C. University, Rajasthan	M.Tech- CSE (Software Engineering/ Computer Network & Security)
7	NIIT University, Rajasthan	M.Tech-Education Technology M.Tech-Cyber Security (with PwC) M.Tech-GIS
8	Sharda University, UP	M.Tech-CSE (Networking/ Software Engineering/Mobile Computing/ Cyber Security & Information Assurance)
9	ITM University, CG	M.Tech-CSE (Cyber Security)
10	Babu Banarasi Das University, UP	M.Tech-CSE (Computer Networks/ Software Engineering)
11	Seacom Skills University, WB	M.Tech-Web & Game Designing M.Tech-CAD

Among the institutes/universities which are offering a large number of only skill based M.Tech degrees, important are The Assam Royal Global University, Assam, PES University, Karnataka, Sharda University, UP etc. In these areas both skill and technology and also domain based information sciences/ technological major or concentrations are exits (Paul, 2013c).

VIII. FINDINGS

(a) India is growing rapidly with many universities during last decade which have been established by both the central and the state governments. In terms of the private

universities also significant changes are noticeable. About 300 (279) universities are established spreading 23 states in diverse fields.

(b) Engineering education has become an important part of these private universities. As far as private universities are concerned M.Tech degrees are available in 140 universities.

(c) Skill based degrees are emerging rapidly. In this segment programs on Technology based and Domain based; both are available. In popular courses in Technology segment are Cloud Computing, Big Data, Cyber Security etc. whereas in Domain based segment the popular courses are Education Informatics (available as Education Technology), Geo Informatics (available as Remote Sensing as well).

(d) Industry-academia collaboration noticed during this study. Many universities have followed the academic style that is practiced worldwide. Among the universities which are offered M.Tech in emerging areas notable are NIIT University, SOA University for introducing collaboration for training, internship, and placement etc.

IX. SUGGESTIONS & DIRECTIONS

(a) The universities which have not yet started M.Tech degrees among the private universities may start the program with emerging innovative specializations.

(b) Proper industrial tie-ups are required for better exchange of training, internship (even placement if possible) including curricula development etc.

(c) Finishing schools may be started on campus so that they not only learn emerging skills but also which are currently practicing in Industry.

(d) Corporate visit and stay is always better for healthy output creation. The universities in this regard may choose industry as the first option for collaboration then HR companies (companies responsible for skill product creation).

(e) In private universities fees normally higher than public institutes and thus it is better to create an environment for the privileged.

(f) Universities need to introduce some of the more emerging areas as specializations viz. Human Computer Interaction, User Experience Design, Healthcare Informatics etc.

(g) Instead of full-fledged degrees, the specialized/ major based degrees may be offered to keep them ready for all types of industries and government sectors.

X. CONCLUSION

Universities are playing a good role in terms of the development of skilled manpower in recent past. Many universities have established industry-academia cell in recent past including those are offering general BTech-M.Tech as well. Initially, a majority of such interested universities have started specializations in the areas of sub fields of Information Technology (viz. Networking Technology, Database Technologies etc.). But gradually universities were moved these listed super specialty programs. Interestingly many of these M.Tech programs started in collaboration with leading industries. Among the key collaborative institutes, few important are include IBM, PwC, Le Innovate, Silicon Lab, CDAC, iNurture etc. Cloud Computing is one of the important specialization noticed as per this study and among others few important are Big Data, Cyber Security, IoT. However due to related nature and more prospects combine programs and specializations may also be offered such as Cloud Computing & Big Data, Cloud & IoT, Cloud & Cyber Security etc. It is better to start these programs in other state universities and central universities as well. It is important to note that planning, collaboration is must for the success of any such emerging programs. Organizing seminar, workshop, and other knowledge event are essential to keep more updated to the students and faculties both for this type of emerging innovative programs. From government context proper governing and control etc. are essential for the success of engineering programs of private universities.

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Corresponding Author

P. K. Paul*

Raiganj University (RGU) Raiganj (West Bengal) India

E-Mail – pkpaul.infotech@gmail.com

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Organizational Conflict and Role of Workers Participation in Management

Sanjay Patel*

Barkatullah University, Bhopal (M.P.) India

Abstract – This research paper made a sincere attempt to present the impact of workers participation in management on the organizational conflicts in telecom sector special reference to Bharat Sanchar Nigam limited. Organizational conflicts have essential part of industrial democracy in present modern competitive telecom sector. It is trying to arriving to maintain reasonable balance between the business benefit, social gain and community incentive. In order to have peace in workplace and clashing free interest between the employee and employer, wpm is important in current scenario. The meaning of role of workers participation in management and its impacts in this research is underline. According to this emphasize, subject matter its situation and needs under consideration in study, are in true spirit and its result provide solid foundation result in the industry in the form of conflict managed environment, which is helpful to boost up the commercial environment and over all Indian economy.

Key word: Organizational Conflict, Industrial Relation, Organizational Performance, Social Gain, Industrial Democracy

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I. INTRODUCTION

A sound economic environment helps to have sound industrial relation. It is due to role of workers participation in management, industrial relation system is one in which relationships between workers and management (and their trade union representative and management representative respectively) on the hand and government have to play role to harmonize relation of workers and management, further remove all factors that are responsible for conflictual environment, conducive to economic betterment and efficiency. This concept, role of workers participation in management motivate employees and create employees loyalty toward the organization which ultimately removes conflicts and develop mutual faith and trust between employee and employer.

II. OBJECTIVES AND METHODS

(a) Objectives

(i) To study role of Workers participation in management.

(ii) To analysis organizational conflicts of BSNL Bhopal.

(iii) To evaluate the workers participation in management in BSNL Bhopal.

(b) Research Methodology

This study is based on data primary and secondary in nature. Both primary and secondary data has been used for the purpose of information analysis. For primary data the researcher has made extensive use of survey method in this study. He visited BSNL Bhopal on several occasions. Secondary data is taken from reports and websites of organization.

III. CONCEPT OF ORGANIZATIONAL CONFLICT

Organizational conflict means protest in systematic manner against prevailing industrial conditions raised by a group or a class of workers. The scientific movement analyzed the activities of workers whereas administrative management authors focused attention on the activities of manager or management side. Significance of the man or worker behind machine and tool and technique, the importance of unit or individual as well as group relationship (WPM) was not valued in proper prospective. The commercial, social aspect of workers job was totally of ignored. This is the basic reason behind conflicts between both the parties' mentioned above i.e. workers and managers.

As per the available literature the common fact is- "In its most general sense the term 'human relation' refers to all the instructions that can occur among people whether they are conflicts or co-operative

behaviors, the study of human relation in business and industry is the study of how worker can work effectively in groups in order to satisfy both (a) organizational goals and (b) individual or personal needs."

In other words the term is usually taken to mean "Getting along with others." The industrial conflicts constitute organized protests against existing industrial condition and clashing interest between two groups. Also the conflicts may be defined as deference of opinions between management and workers and the terms of employment. It is a disagreement employer and employee.

(c) Impacts and Consequences of Conflicts

Organizational conflict causes incalculable damages to the economy of the nation. The impacts of industrial disputes are therefore dangerous. Workers face many problems, basically in the form of loss of income as wages and employment. The image, goodwill and brand value of organization suffers badly by conflict and market value gets seriously injured.

Following are the impacts –

(i) Impact on the management

(ii) Impact on the workers

(iii) Impact of general public

(iv) Impact on national economy

(d) Forms and Causes of organizational conflict

There are various from of organizational conflicts such as strikes, lockout, gherao, picketing and Boycott etc. Causes of organizational conflict are Wages and allowances, Lay- offs and retrenchment, indiscipline and violence, union Rivalry organizational Biased Policy

(e) Organizational Performance

Organizational performance means establishment performance as to compare to set goals and objectives within limitation of the organization. There are three primary results or outcomes i.e. financial performance, market performance, and shareholder value performance another. It in a way also provides scale as to how well an organization is doing to reach organizational vision, mission and goal.

IV. WORKERS PARTICIPATION IN MANAGEMENT AT BSNL- ANALYSIS

As per democratic concept workers participation in management in action based on facts and element of equity, equality, and voluntarism. It gives to the workers and their representatives' right to participate in management.

Worker participation in management and its role in BSNL Bhopal was analyzed by sample survey to obtain facts and opinion of workers and management through Questionnaire. Questions and analysis are tabulated below:-

Question 1-Do you know the objective of workers participation in management?

Table No. 1

Objective of workers participation in management of BSNL Bhopal

Objectivity of workers	O_1	O_2	O_3	N
Numbers of workers	10	40	200	250
Number of workers in %	4	16	80	100

Variables

O_1 = Indifferent

O_2 = the present system of worker participation in management and its objectivity not known to workers

O_3 = the present system of worker participation in management and its objectivity known to workers

N = Total number of respondents

Conclusion- 80% of total employees know the objectivity of participative mechanism in BSNL Bhopal.16% of workers are of category they do not known to the objectivity of workers participation in management. 4% of respondents of found Indifferent it means they do not respond positively to the concept of workers participation in management in organization.

Question 2: Do you attend the meeting conducted by organization in participation forms and participation schemes regularly?

Table 2

Regularity of workers participation in management of BSNL Bhopal

Regularity of workers	R_1	R_2	R_3	N
Numbers of workers	20	10	220	250
Number of workers in %	8	4	88	100

Variables

R_1 = the present system of worker participation in management and its regularity of not attending the forms and schemes meetings by workers

R_2 = Indifferent

R_3 = the present system of workers participation in management and its regularity of attending the forms and schemes meetings by workers

N = Total number of respondent or universe.

Conclusion - 88% workers participate in management of Bharat Sanchar Nigam Limited, Bhopal.8% of total employees are not known or do not attend meeting. 4% of workers are of category they do not know or do not attend 4% of workers are found Indifferent it means they do not respond positively to the concept of workers participation in management in organization, on the point of this interrogative fact.

Question 3-Does management resolve worker's problem through relevant forum like trade unions?

Table 3

Resolving action on workers problem by participative forum like trade union in participative management of BSNL Bhopal

Resolving action of workers	Ra_1	Ra_2	Ra_3	N
Numbers of workers	20	10	220	250
Number of workers in %	8	4	88	100

Variables

Ra_1 . the present system of worker participation in management is not resolving workers problems by participative forum like trade union in BSNL Bhopal.

Ra_2 . Indifferent

Ra_3 = The present system of workers participation in management is resolving workers problem by participative forum like trade union.

N - Total number of respondent or universe.

Conclusion-88% workers participate in management of Bharat Sanchar Nigam Limited, Bhopal.8% of total employees feel that the problems are not resolved by forum like trade unions and the forms and schemes by workers, of participative mechanism in said organization.4% of workers are of category that they do not believe in workers problem or resolving action on workers problem. It means that 4% of workers are found Indifferent it means they do not respond positively to the concept of workers participation in management in organization, on the point of this interrogative fact.

Question no 4- Do you consider that for every employee participate in decision making?

Table 4

Decision making and its degree

Decision making process and workers participation	D_1	D_2	D_3	D_4	N
Numbers of workers	120	100	20	10	250
Number of workers in %	48	40	8	4	100

Variables

D_1= strongly agree with the view it is necessary for every employee should participating in decision making in management.

D_2 = Agree with the view it is necessary for every employee should participating in decision making in management

D_3 = Disagree with the view it is necessary for every employee should participating in decision making in management

D_4= Indifferent

N = Total number of respondent or universe.

Conclusion- 48% of total employees Strongly Agree with the view it is necessary for every employee to participate in decision making in management of BSNL Bhopal. 40% of respondent or employees of BSNL, Agree with the view that it is necessary for every employee to participate in decision making in management. 8% of respondents of research disagree with the view that it is necessary for every employee to participate in decision making in management. Only 4% of workers strongly disagree with the view that it is necessary for every employee to participate in decision making in management.

Question no. 5- Is there positive impact of workers participation in industrial peace and cordial relation?

Table 5

Industrial peace and cordial relation

Industrial peace and cordial relation	I_1	I_2	I_3	I_4	N
Numbers of workers	180	0	60	10	250
Number of workers in %	72	0	24	4	100

Variables

I_1= Positive impact on, industrial peace and cordial relation

I_2 = Negative response of workers or industrial peace and cordial relation.

I_3 =. May be effective for industrial peace and cordial relation

I_4= Indifferent

N = Total number of respondent or universe.

Conclusion-72% workers feel that there is Positive impact on, industrial peace and cordial relation, with the concept of workers participation in management of BSNL Bhopal. 0% of respondent or employees of BSNL have negative response. 24 % feel that it may be effective for industrial peace and cordial relation by the concept of workers participation in management and 4% of workers are indifferent.

Question 6- Is workers participation in management, concept useful in improving relation between managers and workers?

Table 6

Relation between manager and workers

Relation between manager and workers	Rb_1	Rb_2	Rb_3	Rb_4	N
Numbers of workers	180	50	10	10	250
Number of workers in %	72	20	4	4	100

Variables

Rb_1= strongly agree, with the view of, it is necessary and useful for improving relation between manager and workers by the concept of workers participation in management.

Rb_2 = Agree with the view of, it is necessary and useful for improving relation between manager and workers by the concept of workers participation in management.

Rb_3 = Disagree with the view of, it is necessary and useful for improving relation between manager and by workers the concept of workers participation in management.

Rb_4= Indifferent

N = Total number of respondent or universe.

Conclusion - 72% strongly agree, with the view of, it is necessary and useful for improving relation between manager and workers by the concept of workers participation in management of BSNL Bhopal. 20% of respondent or employees of BSNL Agree with the view it is necessary and useful for improving relation between manager and workers by the concept of workers participation in management. 4 % of respondents of research are found Disagree with the view it is necessary. and useful for improving relation between manager and workers by the concept of workers participation in management And only 4% of workers are strongly disagree with the view it is necessary and useful for improving relation between manager and workers by the concept of workers participation in management.

Question 7- Is your employer cooperative with you in workers participation in management scheme?

Table7

Cooperative attitude of employer to word participative scheme

cooperative attitude of employer to word participative scheme	C_1	C_2	C_3	C_4	N
Numbers of workers	60	180	0	10	250
Number of workers in %	24	72	0	4	100

Variables

C_1= strongly agree, with the view of cooperative attitude of employer to word participative scheme by the concept of workers participation in management.

C_2 = Agree with the view of cooperative attitude of employer to word participative scheme by the concept of workers participation in management.

C_3 = Disagree with the view of cooperative attitude of employer to word participative scheme by the concept of workers participation in management.

C_4= Indifferent

N = Total number of respondent or universe.

Conclusion - 24% strongly agree, with the view of cooperative attitude of employer towards participative scheme by the concept of workers participation in management of BSNL Bhopal. 72% of respondent or employees of BSNL Agree with the view of cooperative attitude of employer towards participative scheme by the concept of workers participation in management. 0 % of respondents of research were found who Disagree with the view of cooperative attitude of employer towards participative scheme by the concept of workers participation in management and only 4% of workers strongly disagree with the view of cooperative attitude of employer towards

participative scheme by the concept of workers participation in management.

V. CONCLUSION

Participative management program which was introduce in BSNL Bhopal as a part of national economic planning of India was examined. During the analysis it has been observed that in the opinion of both the management and the workers as party, the existing level of participation of employees, in management level of BSNL Bhopal mainly relates to the matters like welfare, culture, sport and health etc. The most important pre-conditions to manage organizational conflicts are good level of work culture and climate that has to be created to maintain the mutual faith and co-operation between workers and management. These preconditions do not meet adequately in BSNL Bhopal.

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Corresponding Author

Sanjay Patel*

Barkatullah University, Bhopal (M.P.) India

E-Mail – lawyer1sp@gmail.com

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Processing and Value Addition of Pulses

Prasoon Verma*

Senior Scientist (AS&PE), Indian Institute of Pulses Research, Kanpur (U.P.) India

Abstract – Cereals and food legumes are the basic ingredients of Indian diets, especially, for the people with low-income groups. For these groups, food self-sufficiency still remains an unachieved objective. Although India is now self-sufficient in the production of cereals but it has yet to depend on import in case of pulses to meet the domestic requirements. This is not always or only because of the inefficiency of the local production systems but due to post harvests losses also. The extent of post-harvest losses in case of pulses is estimated to be in the range of 25-30%. This is because pulses are required to pass through a number of unit operations before they are converted to dal. Some losses take place at every stage of processing which must be reduced. Nutritional security in India can be achieved by reducing post-production losses. In fact, production improvement must match with improvement in post-harvest operations and prevention of post-harvest losses. This paper, therefore, takes a look at different unit operations involved in processing of pulses and ways to improve the process to reduce the losses. Experiences or solutions resulting from the use of traditional methods, suitable technologies and mechanized systems are also discussed in detail. It also suggests measures to utilize the by-products for the manufacture of value added products, thereby enhancing income to the farmers. It also suggests future research thrusts in this area.

Key words: Pulse processing, unit operations, Value added products, Mini Dal Mills.

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I. INTRODUCTION

Indian diets are good combination of all essential amino-acids. Proteins present in cereal and pulses are complimentary to each other. Dal-Roti, Dal-Chawal, Idali-Sambhar etc., indicates traditional understanding about nutritional security. Pulses are consumed after dehusking and splitting called pulse milling, in form of dal. With urbanization of agro-processing industries, this age-old practice got upscaled into large capacity commercial mills. Pre-milling treatments are given to loosen the attachment of seed coat from cotyledons prior to milling. Water soaking, oil mixing and heating of grains are prevailing pre-milling treatments. Dehusking and splitting is usually performed with the help of abrasive rollers in successive passes. This causes scouring losses and yields lower dal recovery. The chain of pulse processing wholesalers, processors and retailers make higher profit than the producer, who has to sell raw grain at cheaper rates and purchase finished product at higher prices. Concept of village or farm level pulse processing will not only add income and employment opportunity to rural entrepreneurs but also strengthen the rural economy. Various research organizations have developed low capacity (75-125 kg/h) dal mills to cater the need. Mini dal mills developed by IIPR, Kanpur, CIAE, Bhopal, PKV, Akola and CFTRI, Mysore, are commonly adopted in different pockets of the country. Value added products from pulses and pulse milling by-products can further enhance the rural income.

II. PULSE MILLING

Pulse milling is the third largest food industry in India after wheat and rice. Like any other crop, pulses are consumed after minimal processing. Pulses are mostly consumed in form of deshusked splits or dal. About 80% of total pulse production in India is either consumed in form of dal or powder. Remaining 20% is utilized as whole grain or kept for seed purposes. Depending upon pulse type, variety, milling process and machineries used, there is 5% variation in milling recoveries (Mangaraj et al. 2005). Pulses are milled in about 14000 dal mills scattered throughout the country, which yield 65-70% dal recovery against potential recovery of 88-89% (Anonymous, 2015).

Dehusking of pulses is an age old practice started from domestic level in the beginning to present large capacity modern mills. The major steps involve in dehusking, either at cottage or commercial levels are same. The process includes (i) Pre-milling treatment – to loosen the seed coat, (ii) Dehusking or husk removal – to add culinary properties and (iii) Splitting – to convert dehusked whole (gota) into dal. Dehusking and splitting processes take place simultaneously in the milling units. Dehsuking is an essential process for pigeonpea, whereas other

pulses can be consumed as whole, splits with husk and dehusked splits. In most of the secondary and tertiary processed products, powder form of dehusked grains is used. Removal of husk not only reduces fiber but also improves appearance, texture, cooking quality, palatability and digestibility. Dehusked splits offer better resistance to insect activities in comparison to whole grains without any chemical application, if external infestation is prevented (Lal et al. 2008).

Presence of gummy substances between seed coat and cotyledons makes husk removal difficult during milling. According to the quality and quantity of gums present, pulses are categorized in easy-to-mill (lentil, chickpea, field pea etc.) or difficult-to-mill (pigeon pea, blackgram, greengram etc.) kind of pulses.

III. UNIT OPERATIONS IN COMMERCIAL PULSE MILLING PROCESS

Essentially milling process involves cleaning, grading, pitting, treatment, milling and polishing operations. Each unit operation requires specific machinery to perform the individual task. Usually pre-milling treatments and processes were developed for the toughest-to-mill pulse grains, i.e., pigeon pea. The major steps of pulse milling are described as under:

(a) **Cleaning and Grading:** Pre-cleaning and grading of raw material is an essential step in milling. It involves removing dust, dirt and foreign material, off-sized, immature and damaged grains and grading. At the first step, raw material is passed through cleaner-cum-grader. The quality of raw material used for milling determines the quality of end product, i.e., dal. Cleaners are used to remove impurities, foreign matter, damaged and shriveled grains. Depending upon size, shape and gravity raw material is graded to get uniform quality of raw grains. Commonly reel machines are used at commercial mills for size grading. Destoner is used to remove stones and pebbles. Lighter impurities are removed with the help of aspirators, fans or pneumatic separators.

(b) **Pitting:** This is a common practice in commercial *dal* mills using emery-coated roller. The emery coating is used for abrasive action. Whole pulses are passed through abrasive roller machine for scratching of the seeds. Cracked seed coat facilitates entry of oil/water applied to the grain during pre-milling treatment. Ideally cracks should not be visible from naked eyes, but during pitting process some dehusking and splitting takes place.

(c) **Pre-milling Treatments:** Depending upon scale of milling, wet or dry pre-milling treatment can be adopted. Wet milling is adopted at domestic or cottage scale milling whereas dry pre-treatment is commonly practiced for commercial milling.

(d) **Cottage Scale Pulse Milling (Wet Milling) :** At cottage scale, whole grain is soaked overnight or stipulated time period followed by sun drying and tempering for 2-3 days to attain 10-12% moisture level before dehusking and splitting in hand operated wooden or stone chakkies. Husk is removed by manual winnowing operation. Several other pre-treatments, viz., red earth application, iron pan roasting with or without sand, oil smearing, boiling etc., are being practiced in different part of the country. At cottage scale pulse milling is time consuming, weather dependent and labour intensive process. Despite pre-treatment, it is hard to achieve 100% dehusking in traditional chakkies, which decreases appearance of dal and diminishes market value. But a section of affluent market is developing preference for cottage scale unpolished dals.

(e) **Large Scale Milling (Dry Milling):** At commercial scale pulse milling efforts were made to overcome constraints of traditional cottage scale mills. Problems of drudgery, time consuming, weather dependency and improper dehusking were addressed in commercial pulse mills. To minimize soaking and drying time, oil and water application, referred as dry treatment, is quite popular in northern zone. Linseed oil is applied at the rate of 0.7% on pitted grains. Alternate day time heating under the sun and heating and cooling during nights for 3-4 days, loosens the seed coat. Thus, treated grains are milled in emery roller mills for dehsuking. But this process also depends upon weather and solar radiations for sun drying.

(f) **Large Scale Milling (Dry Milling):** At commercial scale pulse milling efforts were made to overcome constraints of traditional cottage scale mills. Problems of drudgery, time consuming, weather dependency and improper dehusking were addressed in commercial pulse mills. To minimize soaking and drying time, oil and water application, referred as dry treatment, is quite popular in northern zone. Linseed oil is applied at the rate of 0.7% on pitted grains. Alternate day time heating under the sun and heating and cooling during nights for 3-4 days, loosens the seed coat. Thus, treated grains are milled in emery roller mills for dehsuking. But this process also depends upon weather and solar radiations for sun drying.

(g) **Thermal Treatment:** Pulse milling pre-treatments at cottage or large scale are labourious, time consuming and weather

dependent process. A weather independent thermal process was developed by CFTRI, Mysore. The process also completely eliminates use of oil. In the process grains are subjected to high temperature (166^0C) using heated air followed by tempering in insulated bins for 6 hours to maintain the grain temperature. The process is repeated twice for proper conditioning. This is weather independent process but not being adopted due to more investment on machinery and high operational expenses.

At GBPUA&T, Pantnagar, sodium bi-carbonate, vinegar and enzyme treatments were evaluated. But none of the treatments could reach up to commercial acceptance.

(h) **Tempering:** After water soaking or oil application grains are heaped and covered with gunny bags for 12 to 18 hrs for uniform conditioning of entire grain mass. This **process** allows penetration of oil/water beneath the seed coat and helps in loosening of gummy substances.

(i) **Drying:** Sun drying of treated and tempered grains is quite common in commercial mills of Indian subcontinent. For round the year operation and reduce weather dependency electricity based mechanical dryers are being used on limited scale. Alternate sun drying in thin layer during day time (heating) and heaping in nights (cooling) for 2-3 days results into loosening of seed coat. Sun drying process is time consuming and labour intensive operation. Drying in mechanical dryers takes 2-3 hours, thus, saves both time and energy.

(j) **Dehusking and splitting:** In commercial mills after complete pre-treatment, grains are subjected to abrasive surfaces for removal of husk. The operation of dehusking and splitting is performed in emery roller mills. The emery coating, also referred as carborundum, is made of silicon carbide (carbon + crystalline alumina). The grit size of carborundum affects the dehusking efficiency. Different grit sizes are used for different kind of pulses. Most of the mills use emery rolls for dehusking and splitting. Some millers use disk sheller for splitting of dehusked grains (gota), whereas dehusking is performed in emery rollers only. Milled fractions viz. unhusked whole, dehusked whole, unhusked dal, dehusked dal and broken are separated to achieve quality product. By-product from milling industry (mixture of husk and powder) commonly goes for cattle feeding.

(k) **Polishing:** Polishing is required to give uniform appearance to milled product and increase consumer appeal. Certain fraction of milled product includes dal with husk cover. Polishers help in removal of husk from such dal. Different kinds of polishes, such as nylon polish, oil/water polish, leather and makhmal polish are applied to different kind of dals. Oil and edible colour polish is commonly adopted in commercial mills. With increasing awareness of adulteration and use of non-edible compounds, consumers are developing preference for unpolished dal.

IV. MINI DAL MILLS

Like most of the food processing industries, high capacity pulse processing plants are mostly located in cities. Whole grains are procured by middlemen at cheaper rates and value added product, dal, is sold back to villages at higher prices. Sometimes cost of finished product is double the price of raw material. In forward and backward linkages, procurement agencies, wholesaler and retailer network takes the maximum advantage. The actual grower and rural population are at loss as they have to shell out more money for processed dal and profit margin moves to urban areas. It was realized that pulse processing can be adopted among rural entrepreneurs to strengthen rural economy. Concept of small capacity mini dal mills was visualized by several research organizations. Mini dal mills developed by CFTRI, Mysore; CIAE, Bhopal, PKV, Akola and IIPR, Kanpur are popular in different pockets of the country. Mini dal mills in rural areas will reduce the expenditure made on to and fro transportation and make cheaper dal available to rural population. At small scale, it is easy to control milling losses, thus, such units give higher dal recovery. Establishment of processing units in rural catchments has potential to promote rural entrepreneurship, generate employment opportunities, enhance rural income and ultimately, prevent migration to the cities.

V. VALUE ADDED PRODUCTS OF PULSES

In India pulses are consumed in various ways and forms viz., utilized as whole, dehusked splits, milled, mixed with cereals, roasted, puffed, salted and sweetened etc. Immature pulse grains are utilized as green, roasted, boiled, fried, crushed and cooked forms. After maturity the same pulse can be consumed as dried grain, soaked, sprouted, boiled, steamed, fried, cooked as dal. Dal or sambar is prepared from dehusked cotyledons on daily basis at every household of southern India. Dehusked splits are also converted into flour to make various delicacies throughout the country. Soaking, cooking, roasting, puffing, extrusion, germination, fermentation

etc., are essential processes involved in preparation of different recipes from pulses. During pulse milling, due to abrasive dehusking in commercial mills, only 70% dal is recovered against the potential dal recovery of 85%. The by-product obtained from pulse milling utilized as cattle feed. This low protein and high fiber by-products can find edible use for human consumption. At IIPR, Kanpur efforts were made to utilize this nutritious fiber and protein rich byproduct for human use. By sieving of milling by-product about 30% of cotyledon powder is separated which can be used as powder of pulses for making various pulse based recipes or instant dal. Phenol and fiber rich husk component of sieved fractions can be find therapeutic usages.

For making biscuits 10, 20 and 30% milling by-product was incorporated in dough. The fiber and protein rich biscuits can be exploit commercial potential of milling by-product. These biscuits from pulse by-product are quite comparable with commercially available wheat fiber based biscuits. Organoleptic evaluation of the product among subjects of different age group revealed acceptability for such products. Mature age people had clear appreciation for biscuits with high fiber, whereas young people showed the preference for lower milling byproduct.

VI. FUTURE RESEARCH THRUST AREAS

(a) Improved varieties: Varieties need to be developed keeping the requirements of millers. Low gum and husk content varieties can easily be dehusked with minimal losses.

(b) Efficient pre-treatments: There is need to develop newer methods and processes for loosening the seed coat prior to milling.

(c) Freedom from weather dependence: Pulse milling is a weather dependent process. There is need to develop process and machineries which can dehusk the grains irrespective of weather conditions.

(d) Improved dehusking unit : To achieve maximum dehusking with minimum breakage and powdering improvement in machine parameters viz., emery grit size, roller-sieve clearance, diameter-length ratio etc. need to be improved.

(e) Utilization of milling byproducts: Pulse milling by-products usually go as cattle feed. However, this low protein and high fiber milling by-product has potential to be used as edible value-added products.

VII. CONCLUSION

Pulse milling is third largest food processing industry after flour and rice milling. Dehusking and splitting is an essential process as pulses are mostly consumed in from of dal. Urbanization of processing industries adversely affected the rural economy. Low price raw material is purchased by industries and high value end product is sold back. In this chain intermediaries are involved which make profit at every stage of post-harvest chain. Agro-processing technologies suitable for rural areas have potential to enhance rural income and employment opportunities. Mini dal mills and value-added products at cottage scale will not only make cheaper products available to rural population but also strengthen the rural economy.

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Corresponding Author

Prasoon Verma*

Senior Scientist (AS&PE), Indian Institute of Pulses Research, Kanpur (U.P.) India

E-Mail – prasoonverma@rediffmail.com

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Studies on Algal Biodiversity of Tapti River in Burhanpur District of Madhya Pradesh, India

Dr. Iftekhar A. Siddiqui*

S.G.J. Quaderia College, Burhanpur (M.P.) India

Abstract – The present investigation was undertaken with a view to study algal biodiversity of Tapti River in Burhanpur District of Madhya Pradesh, India. The research Work was performed during June 2015 to May 2017, Altogether 26 genera were indentified and recorded from different 10 sites of Tapti River during the two year period of investigation of these 13 genera belonged to chlorophyceae 06 genera belonged to Becillariophyceae, 04 genera belonged to Cyanophyceae, 02 genera belonged to charophyceae and ol genera belonged to Euglenophyceae. The members of chlorophyceae were dominant followed by becillariophyceae, charophyceae and euglenophyceae. Diversity of algae in terms quantity and quality were observed at all selected sites of Tapti River. Unicellular, colonial and filamentous algal forms were reported throughout the period of investigation. The algal gehera whose species recorded at all sites of study area were sjzivogyra, zygnemo cosmarium, Nit3 sehia, Euglena, Chlorococcus, oscillatoria and Phormidium (see table :1 & table:2 & Plate 1,2,3A, 3B)

Key Words: Algal Biodiversity, Burhanpur, Tapti River, Madhya Pradesh, India.

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I. INTRODUCTION

Algal are the most widespread and abundant photosynthetic life in aquatic as well as terrestrial ecosystem. Algae gain its importance in the modern time not only as alternative potential source of protein for the hungry man but also as the primary source of food for aquatic animals. Palmer (1969), Trivedy and goel (1980) have reported different algal forms as an indicator of water pollution. The accumulation of algae at or near source f the water is called as **"Algal Blooms" or "mats"** riew of literature reveals that the algal biodiversity in East Nimar is still in infacy. Therefore to fulfill this lacuna, it has been decided to work on algal biodiversity of Tapti River in Burhanpur District of Madhya Pradesh, India.

II. METERAIL AND METHODS

Fortnightly collection of water sample was done from all the 10 Sites (Before samshan ghat [S_1] to Tapti river [S_{10}])of Tapti river in Burhanpur, M.p India. (See table:1) Physiochemical parameters where analyzed wing standard methods of APHA (1998) and Khanna and Bhutiani (2008). The algal sample collection carried out with the help of truneate eone shape plankton net the plankton net is made of bolting Silk No. 25 Standard grade. This has an aperture size of o.64 mm. The Sample Was eoncentrated by Sedimentation method, removing this Supernatant by decanting and the desired final volume was obtained. For counting, 1 ml of Concentrated sample was taken and placed Sedgwick Rafter Counting cell following the Standard methods of APHA (1998).Trivedi And Goel (1986), hutChinson (1967), and Khanna and Bhutiani (2008), The Concentrated was preserved in 4% Formatin for study (Wetch,1952). (See Table:1 & Table:2), Given Formula is used to calculate percentage.

$$\text{Percent} = \frac{\text{No. of genera}}{\text{Total No. of genera}} \times 100$$

Table: 1

Sample Collected from 10 different Sites/location

S. No.	Source	Sample Location	Sites
01	Tapti river	Before Samshn ghat	S_1
02	Tapti river	Shamshan ghat	S_2
03	Tapti river	Nagzhiri ghat	S_3
04	Tapti river	Rajghat	S_4
05	Tapti river	Jainabad Bridge	S_5
06	Tapti river	Satiyara ghat-1	S_6
07	Tapti river	Satiyara ghat-2	S_7
08	Tapti river	Big Pool Bridge	S_8
09	Tapti river	Small Pool Bridge	8_9
10	Tapti river	After Small Bridge	8_{10}

Table:2

Algal genera common in water habitat of Tapti River in Burhanpur. District of Madhya Pradesh, India

S. No	Name of Algae / genera	Class	Total No. of genera	Percentage %
01	Chlorella, Cosmarium, oedogonium, Pediastum, scendesmus, Spirogyra, Ulothrix, Hydrodictyon, Chladophora, chlorococcus, Desmidium, zygnema, and volvox	Chlorophyceae	13	50.0
02	Navicula, Nitzschia, Fragilaria, Pinnularia, Cymbella. And Cyclotella.	Becillariophyceae	06	23.7
03	Oscillatoria, Spirulina, Nostoc, Phormidium	Cyanophyceae	04	15.3
04	Chara, Nitella	Charophyceae	02	7.6
05	Euglena	Euglenophyceae	01	3.8
Total	26	05	26	100.4

III. RESULTS AND DISCUSSIONS

The information on algal biodiversity is essential in monitoring and management of a aquatic ecosystems.

The result & Discussions are summarized as below:-

(a) In present study overall 26 genera were recorded from five groups of algae i.e chlorophyceae, Bacillariophyceae, eynophyceae, charophyceae and eliglinophyceae.

(b) Chlorophyceae group Was dominant as it was represent by (13) genera, Becillariophycceae (06) genera, eyanophyceae (4) genera, charophyceae (2) genera and euglenophyceae (01) genera. (See table: 2 & Plate 1,2,3,)

(c) The composition of chlorophyceae was greater in genera composition as compared to the other group of algae.

(d) Class wise parcentage contribution study of algal genera reveals that higest contribution was of chlorophyceae (50.0%) followed by Becillariophyceae (23.7%) eyanophyceae (15.3%), chlorophyceae (7.6%) and Euglenophyceae (3.8%).(See Fig:1 & Fig:2)

(e) During present inventigation it is observed that algal bloom formation starts in ther month of September reaching a peak in the month of November to January . The blooms exists up to may.

(f) Algal genera of 10 selected sites of Tapri river is very rich and it is found in diverse form. (See Table:1& Plate:1,2,3)

IV. CONCLUSION

(a) Algae Biodiversity Composition: In present investigation algal genera such as Cosmarium, spirogyra, scendesmus, zygnema, Ulothrix, Pediastum, Phormidium, Oscillatoria, Spirulina, Fragilaria Pinnularia, and Euglena were dominant.

(b) Seasonal Variation: Winter and summer seasons are found favourable for the growth of algae.

(c) Pollution index: For Pollution index study, Pollution tolerant genera of algae were recorded from all Sites of Study area. The Pollution tolerant genera which were recorded at all sites are Euglena, Oscillatoria, Scendesmus, Phormidium, spirogyra, and cosmarium.

(d) Algal genera of satnding and running water habitats: Maximum algal forms were found at standing water sites as compared to running water sites.

(e) Algal Blooms: Algal blooms are cladophora, zygnema, Oscillataria, phormidium and hydrodictyon

(f) Epiphytic Algal: Algae epiphytic on aquatic angiosperms like cyperus sp. , Ipomoea sp. And Typha sp. Were collected and observed. i.e. Ulothrix, Oedogonium pinnularia.

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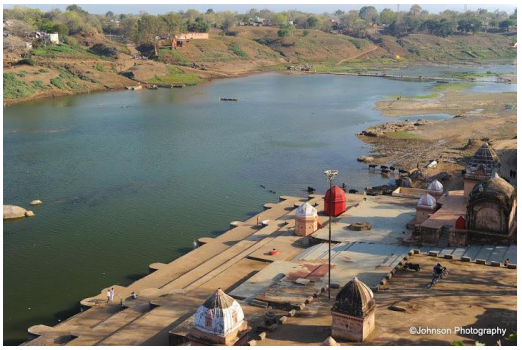


Fig.1 - Tapti River Showing Selected Sites (Before Shamshan Ghat S1 to After Small Bridge S10)

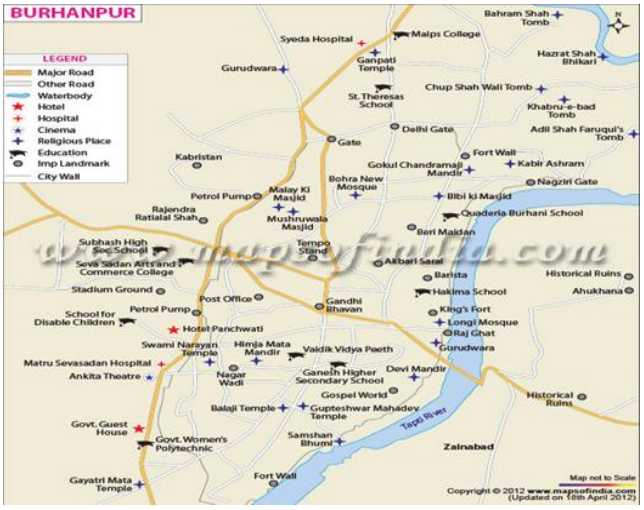


Fig. 2 - Map of District Burhanpur Showing Sampling Sites (S1 to S10) In Tapti River

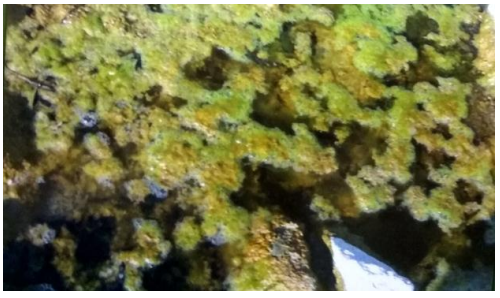


Fig. 3 - Algal Blooms

Fig. 4 - Floating Algae

Fig. 5 - Epiphytic Algae

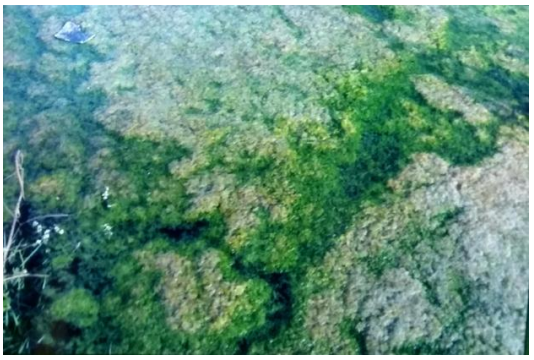
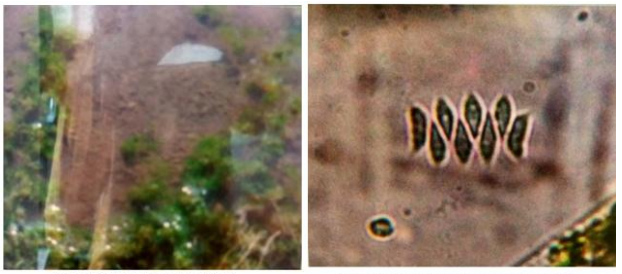
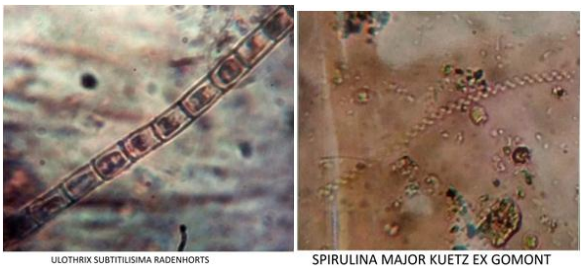


Fig. 6 - Algal Pollution





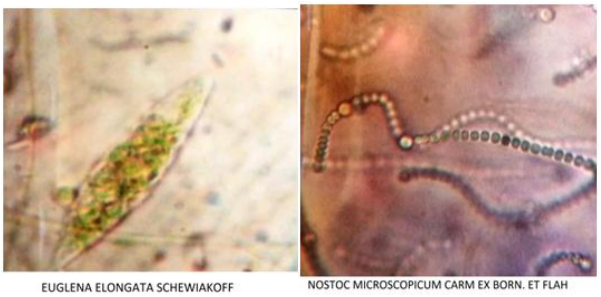
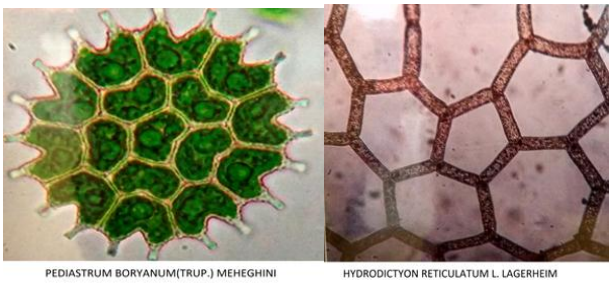


Fig. 7 - Plate: 01



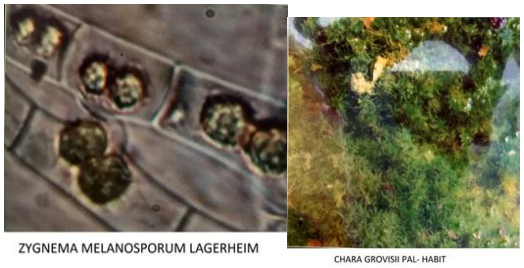
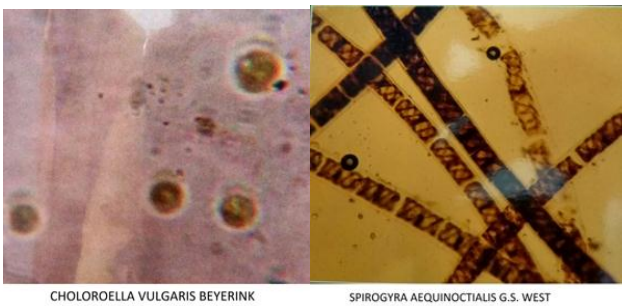


Fig. 8 - Plate: 2

Fig. 9 - Plate: 3A



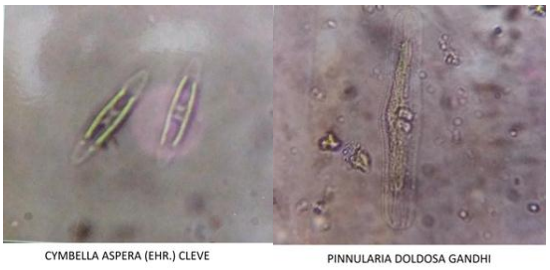


Fig. 10 - Plate: 3B

Corresponding Author

Dr. Iftekhar A. Siddiqui*

S.G.J. Quaderia College, Burhanpur (M.P.) India

E-Mail – iftekhar.siddiqui@yahoo.com

Fuzzy Logic Based Speed Control of Three Phase Induction Motor

Divya Rai[1]* Dr. S. R. Nigam[2]

[1]Elec Dept., SRGI, Jhansi (UP) India

[2]Elect Dept., RNTU, Bhopal (MP) India

Abstract – In the industrialized countries, three phase induction motors have wide applications due to robustness, low maintenance, low cost, reliability and simple construction. The speed control of motor is required to obtain maximum torque and improved performance. This paper deals with the theory and simulation of a rule based fuzzy logic controller applied to induction motor model in closed loop to control its speed efficiently in a simple way. The control systems using artificial intelligence technique are the smart and intelligent control systems. Induction motor has non-linear features, so conventional control methods cannot ensure good performance, hence knowledge based fuzzy logic controllers are used which works efficiently and does not require accurate mathematical model. Fuzzy logic is the convenient way to incorporate the knowledge of human experts in to the systems. The fuzzy logic controller depends on a set of simple linguistic if-then rules. The scalar control strategy based on simplified volts/Hertz control scheme with stator frequency regulation is implemented where the slip value is the variable to be regulated to provide the required frequency signal for speed control. This paper presents Mamdani type FLC applied to induction motor control and its simulation results. Various toolboxes in Matlab are used for testing the simulated design to analyze the performance.

Keywords- Induction Motor, MATLAB, Simulink, Fuzzy, Scalar Control.

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I. INTRODUCTION

Three-phase induction motors are the most commonly used machines in the industries. These are simple in construction, with high power to weight ratio. Their maintenance is easy. Some other advantages are their ruggedness, lower rotor inertia, absence of commutator and brushes, besides the lower price and smaller size. In the past conventional methods were used only to control the speed of induction motor. Those controllers like PI controller show simplicity in design and stability in performance. They still require the mathematical model of induction motor (Senthilkumar and Vijayan, 2012).

To overcome these problems, intelligent and smart control systems, based on fuzzy logic, are being widely used for induction motor control. These control systems may be based on both artificial intelligence and conventional control theories.

When intelligent controller with fuzzy logic is used, excellent performance can be achieved even in the presence of parameter variations and non-linearities. In addition, the fuzzy logic has following advantages: (i) The linguistic variables result in control process being same as human thinking. (ii) It relates output to input, without understanding all the variables (iii) A fixed set of rules based on expert's knowledge. (iv) Complete knowledge of the system is not required before starting work. (v) It has increased robustness (vi) Only a few rules can handle greater complexity.

For the motor speed control, two required input variables for FLC are: the speed error of the motor (e) and its derivative, which represents the change of speed error (ce). The controller output is the change in frequency of the voltage supply fed to motor. The output of FLC is given to the 3 phase inverter to produce waveform with variable voltage and frequency. It controls the speed of the induction motor.

Based on the reference point and feedback, FLC produces the control signal to be used by the inverter for control of the speed of the induction motor. The control signal, representing frequency is than given to Volt/Hz block which maintains a constant ratio between voltage and frequency. This keeps the torque constant while the speed varies. The closed loop control system of FLC and three-phase voltage source inverter has been simulated by using Mat lab software. Simulation results show better result of the proposed FLC over the conventional one with PI

controller. The FLC has proved highly advantageous in the industries as it has the capability to control the complex nonlinear systems better.

Induction Motor Model

For the Induction Motor dynamic modeling is done through SIMULINK/ MATLAB software by using mathematical equations. Synchronous frame of reference is used with following variables:

w_0 = (base frequency)

w_m = (Rotor Frame) frequency

w_k = (dq Frame) frequency

w_s = (Synchronous Frame) frequency;

(rad/sec)

λ_s = stator flux

λr = rotor flux

R_s, R_r =stator and rotor resistance

v_s , v_r = stator and rotor voltage

i_s , i_r = stator and rotor current

L_s , L_r = stator and rotor inductance

L_m = magnetizing inductance

L_{sl} = stator leakage inductance

L_{rl} = rotor leakage inductance

T_e = em torque

T_L = load torque

B_m = viscous friction coefficient;

(pu)

d,q = direct, quadrature axis

p = number of poles

H = inertia constant(s)

Operators: $\otimes$ = cross product, • = dot product

1. Electrical system equations :

$$v_s = R_s\, i_s + \frac{1}{w_0}\frac{d\lambda_s}{dt} + w_k\, M_{\frac{\pi}{2}}\, \lambda_s \qquad (i)$$

$$v_r = R_r\, i_r + \frac{1}{w_0}\frac{d\lambda_r}{dt} + (w_k - w_m)\, M_{\frac{\pi}{2}}\, \lambda_r \qquad (ii)$$

where

$$\lambda = \begin{bmatrix} \lambda_d \\ \lambda_q \end{bmatrix}$$

$$i = \begin{bmatrix} i_d \\ i_q \end{bmatrix}$$

$$M_{(\frac{\pi}{2})} = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

2. Flux linkage current relations –

Ford axis :

$\lambda_{sd} = L_s\, i_{sd} + L_m\, i_{rd}$ (iii)

$\lambda_{rd} = L_m\, i_{sd} + L_r\, i_{rd}$ (iv)

For q axis:

$\lambda_{sq} = L_s\, i_{sq} + L_m\, i_{rq}$ (v)

$\lambda_{rq} = L_s\, i_{sq} + L_m\, i_{rq}$ (vi)

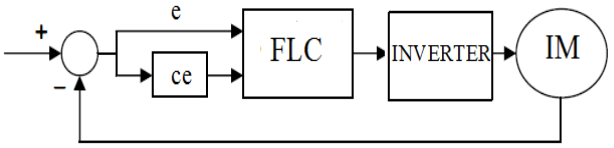
3- Mechanical system equations-

$$T_s = 2H\frac{dw_{mech}}{dx} + B_m w_{mech} + T_L \qquad (vii)$$

$$T_e = \lambda_s \otimes i_s = M_{\frac{\pi}{2}}\, \lambda_s \bullet i_s \qquad (viii)$$

$$w_{mech} = \frac{2}{P} w_m \qquad (ix)$$ (Asija, 2010).

II. Proposed Control System



Fuzzy Speed Control Method of IM

III. FUZZY LOGIC CONTROLLER

FLC is an efficient technique to create human-like thinking within a control system. It can be designed for utilizing human deductive thinking, i.e., to take decisions from what they know. It has been mainly applied for controlling the process through fuzzy linguistic descriptions (Chitra and Prabhakar, 2006).

FLC has been utilized to design controllers for plants with complex dynamics with highly nonlinear models. In a motor control system, the function of FLC

converts linguistic control rules into control strategy on the basis of information using knowledge of experts. This approach is very useful for induction motor speed drives as there is no need for exact mathematical model of the induction motor (Bose, 2002). It has a fixed set of control rules, usually derived from human knowledge. The membership functions (MF) of the input and output linguistic variables is already defined. For the successful design, proper selection of input and output scaling factors (gains) or tuning of the other controller parameters are critical, which in many cases done through trial and error for improved control performance (Bose, 2002, Miloud.)

The structure of FLC is shown in fig.2. The structure shows four functions, each one achieved by block (Badr, et. al.)

(a) **Fuzzification Block-** The fuzzy control converts crisp error and the change of error into fuzzy variables; then mapped into linguistic labels. Membership functions are defined in the normalized range (-1, 1), and associated with each label: NL (Negative Large), NS (Negative Small), ZE (Zero), PS (Positive Small) and PL (Positive Large). Five MFs are chosen for e(pu) and ce(pu) signals and five for output. All the MFs are symmetrical for the positive and negative values of the variables. Thus, maximum 5x5 = 25 rules could be formed as tabulated at Table 1. The surface view and membership functions for the inputs (error and change of error) and output of fuzzy control for scalar control are shown in fig 3.

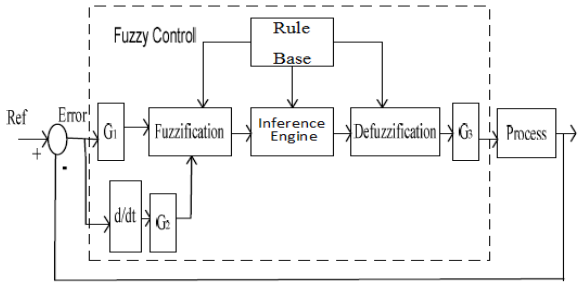


Fig.2. Structure of Fuzzycontrol

(b) **Rule Base-** (a set of If-Then rules), This contains the definition of the fuzzy subsets, their membership functions, their universe of discourse and the whole of the rules based on experts knowledge for achieving good control.

(c) **Fuzzy Inference Mechanism-** ("inference engine") This is heart of a fuzzy control, possess the capability of taking the human decisions and utilizes the expert's decision in interpreting and applying knowledge for better control of the plant.

(d) **Defuzzification Block-** which converts the conclusions of the fuzzy inference into actual inputs for the control process. In this work; Center Of Area (COA) is used as a defuzzification method, which can be presented as:

$$X^{crisp} = \sum^{n}_{i=1} x_i \mu_A(x_i) / \sum^{n}_{i=1} \mu_A(x_i)$$

Where

n: Number of the discrete elements

x_i: The value of the discrete element

$\mu_A(x_i)$: The corresponding MF value at the point x_i.

Gains G1, G2, and G3 are scaling factors to adapt the variables to the normalized scale. However, the inference strategy is the mamdani FIS, so the if-then rules for fuzzy control will be twenty five rules (Badr, et. al.)

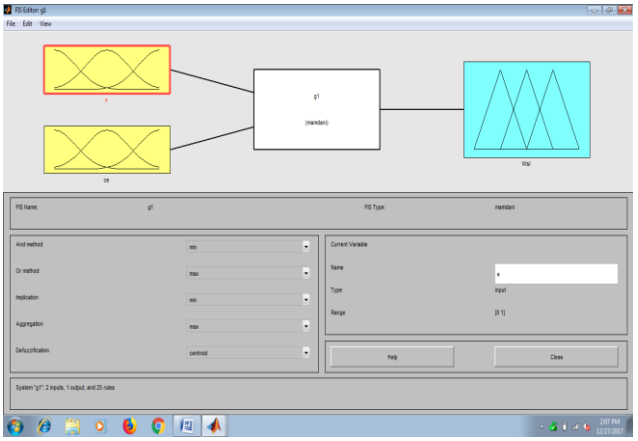


Fig. 3 (a) FIS editor

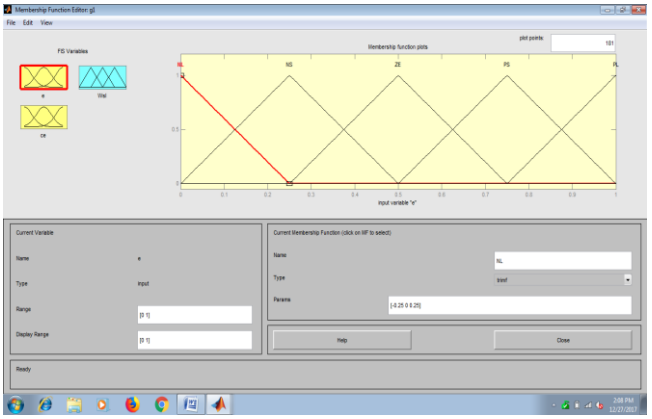


Fig. 3 (b) Inputs membership function

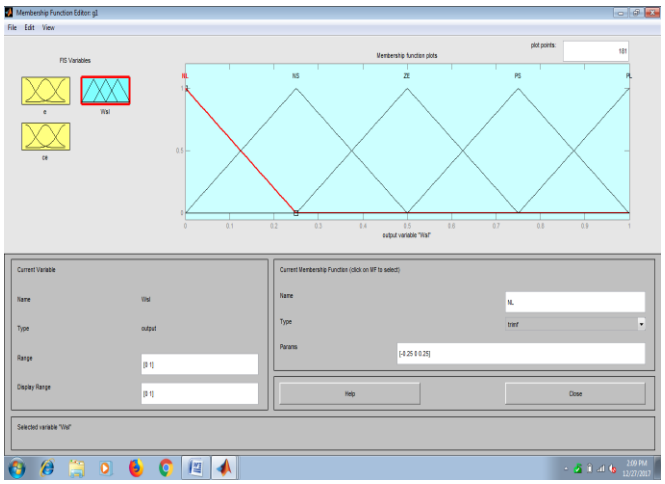


Fig. 3 (c) Output membership function

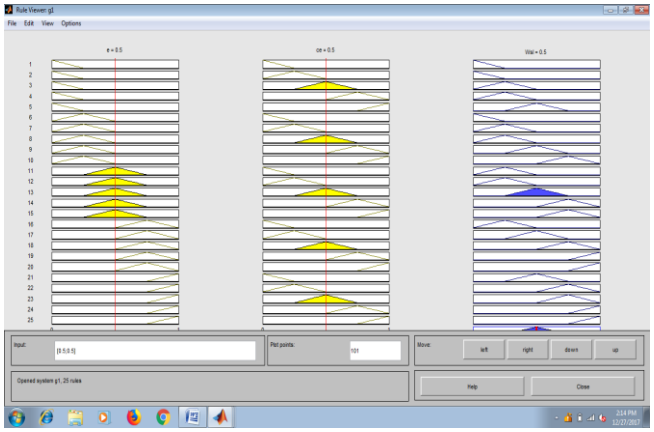


Fig. 3 (d) Rule view

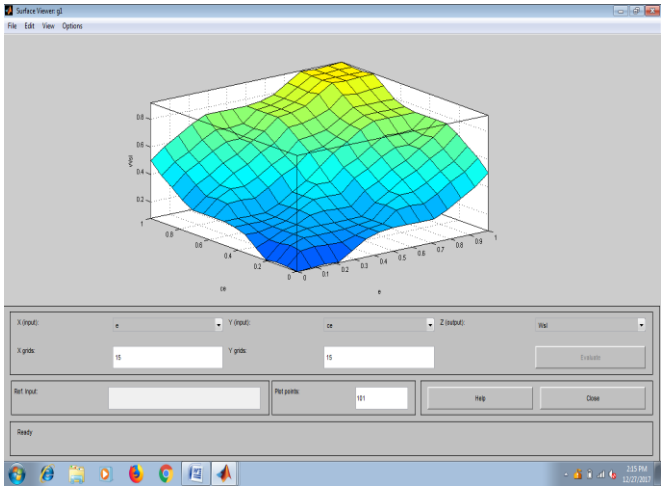


Fig. 3 (e) Surface view

Table 1

Rules for Fuzzy Controller

e \ ce	NL	NS	ZE	PS	PL
NL	NL	NL	NS	NS	ZE
NS	NL	NS	NS	ZE	PS
ZE	NS	NS	ZE	PS	PS
PS	NS	ZE	PS	PL	PL
PL	ZE	PS	PS	PL	PL

Table 2

Induction Motor Parameter

PARAMETERS	VALUE
Stator resistance (p.u)	0.01
Rotor resistance (p.u)	0.02
Stator leakage inductance (p.u)	0.1
Rotor leakage inductance (p.u)	0.1
Magnetizing inductance (p.u)	4.5
Base frequency (rad/sec)	2*pi*50
Poles	2
Inertia constant (s)	0.3
Viscous friction coefficient	1 e^{-5}

The parameters of fuzzy speed controller are:

Kp=0.3; Ki=1

The parameters of PI speed controller are:

Kp=3; Ki=5; saturation limit (p.u)=0.5

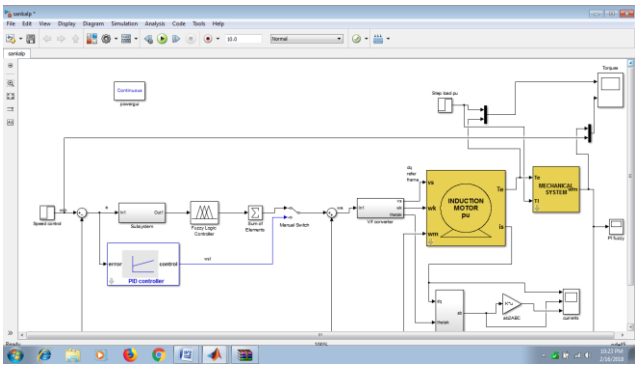


Fig.4.Scalar Control of Induction Motor in Simulink in Matlab (Ramon, et. al.)

IV. SIMULATION RESULTS

Simulation is performed to validate a theoretical development. Simulation model was made in Simulink/Matlab. A simullink model is carried out to realize induction motor equation using parameters in Table 2. Fig 4 shows the implementation of fuzzy controller for scalar control. Fig 5 shows the torque/speed response of the induction motor using fuzzy logic controller.

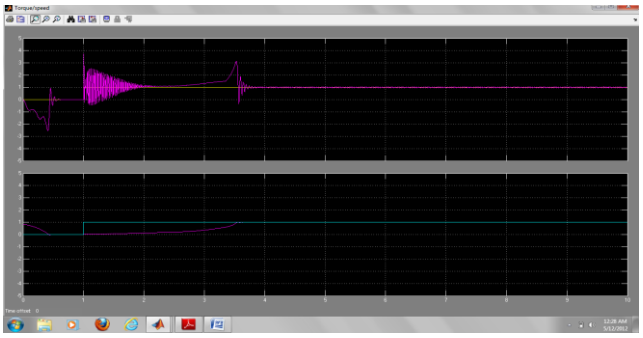


Fig 5

V. CONCLUSION

Fuzzy Logic Controller with the Mamdani FIS is quite convenient to implement. It does not require any cumbersome procedures. The proposed controller shows noticeable fast control response with induction motor. The proposed new FLC gives maximum torque over the entire speed range. Simple linguistic rules here control the speed. This fuzzy speed controller shows fast response, smooth performance and high dynamic response along with dynamic and transient conditions.

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Corresponding Author

Divya Rai*

Elec Dept., SRGI, Jhansi (UP) India

E-Mail – divya_rai2007@rediffmail.com

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परम्परा से विधान की ओर प्रवाहमान गोरक्षा का विधिशास्त्र

Haricharan Singh Yadav[1]*, Dr. Dharmendra Kumar Singh[2]

[1] Research-Scholar, Law Department, M.J.P. Ruhalkhand University, Bareilly (UP) India

[2] Associate Professors, Law Department, Bareilly College, Bareilly (UP) India

सारांश - गोहत्या प्रतिशेध हेतु आवश्यक विधिक उपायों के विरूद्ध आज भारत में अनेक स्वर मुखर हैं। वस्तुतः संवैधानिक निर्देशो को अग्रसारित करने वाले मौजूदा प्रयासों का तात्कालिक लक्ष्य जहां विधायन के माध्यम से लोकनीति को, जिसमें हिंसा का अतिसीमित स्थान है, अग्रसर करना है वहीं इसका एक विशद सांस्कृतिक पक्ष भी है। अपनी सुस्थिर गति में प्रतिगामी सामाजिक विचलन के लक्षणों का समाज विविध उपायों के माध्यम से प्रतिकार करता है। यह संघर्ष एक ऐतिहासिक तथ्य है और इसकी सम्पूर्ण यात्रा में रेखांकित हुआ है। प्रस्तुत अध्ययन ऐसे सूत्रों के उद्घाटन का एक प्रयास है जो अतीत से अपनी यात्रा आरम्भ कर वर्तमान में विधायनों और न्यायिक विवेचनाओं में सूत्रबद्ध भी हुए हैं। इसका उद्देश्य इस संभावना की खोज करना है कि क्या हम भारत की विगत यात्रा का पुनरावलोकन कर मौजूदा दृष्टिगोचर उथल पुथल के थम जाने की आशा कर सकते हैं और यदि हां, तो उपाय क्या हो सकते है?

महत्वपूर्ण शब्दः- गोरक्षा, विधिशास्त्र, अनुच्छेद** 48, **धर्म की स्वतंत्रता, भारत का संविधान

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प्रस्तावना

सामान्य अर्थों में विधिशास्त्र विधि के ज्ञान से संबंधित है तो कहीं इसका प्रयोग न्यायालयों द्वारा दिए गए निर्णय क्रम के लिए भी किया गया है। परवर्ती समय में इसके अर्थ को कुछ विशिष्टता मिल गयी और इसका तात्पर्य उन सामान्य सिद्धांतों के वर्णन से माना गया जिन पर विधि के वास्तविक नियम आधारित हैं। प्रारंभ मेंे ही इस मान्यता की ओर ध्यान दे देना आवश्यक लगता है कि विधिशास्त्र या विधि के सिद्धांत का एक छोर दर्शन और दूसरा छोर राजनीतिक सिद्धांत से जुड़ा है।

गोवध का निषेध वर्तमान में भारतीय विधिक जगत के बड़े प्रश्नों में से एक अहम् प्रश्न बना हुआ है।1 पूर्ववर्ती काल की तुलना में यह प्रश्न अपनी सहजता खोकर अब एक जटिल समस्या का रूप ग्रहण कर चुका है। सन्दर्भ और प्रकृति में विलग मुद्दों के कुसंयोजन से मौजूदा दौर में जटिलता और भी बढ़ी है। ऐसा देखने में आता है कि पूर्ववर्ती समय में यह आयोजित घालमेल न था या न के बराबर ही था। प्राचीनकालीन भारतीय विधिक विचार इस संकल्पना पर आधारित था कि सामूहिक जीवन के अस्तित्व को नियंत्रित करने के लिए कुछ मूलभूत सिद्धांत हैं जिनका अस्तित्व राजनीतिक दिशाओं से स्वतंत्र रूप में स्थापित है, जो राजा और प्रजा सभी पर समान रूप से लागू होते हैं। इसे 'ऋत' के रूप में स्वीकार किया गया है। ऐसा नहीं है कि भारत ने बस विधि के इसी स्थायी और अपरिवर्तनशील रूप को ही स्वीकार किया। यहां इसकी जगह 'धर्म'- धर्म और व्यवहार दो रूपों में उपलब्ध - का प्रयोग भी मान्य किया गया। व्यवहार के रूप में विधि सामाजिक, आध्यात्मिक विचारों और सामाजिक जीवन के अनुसार समायोजनक्षम भी मानी गयी।

भारत एक लम्बी, समृद्ध व वैविध्यपूर्ण ऐतिहासिक परम्परा का देश है। यह सहज ही प्रमाणित है कि प्रागैतिहासिक काल से लेकर आधुनिक काल तक के मानव जीवन के सभी रूप इस विशद् भौगोलिक परिक्षेत्र के अन्दर उपलब्ध रहे हैं। जीवन व्यवहार की इसकी विशिष्टता साक्ष्यों के आधार पर प्रमाणित तथ्य है और इसे दुनिया में उभरी तमाम संस्कृतियों एवं समाजों से पृथक् करने के लिए पर्याप्त है। विशेषज्ञों के लिए विस्मयकारी मान्यताएं भी यहाँ जीवन के सहज तथ्य रहे हैं और विश्वास को बहुधा तर्क से

ऊपर रखना मान्य व्यवहार। विद्वान अचकचाते हुए पूछ बैठते हैं कि इस पृथ्वी पर का कोई जानवर व चीज गहन श्रद्धा की वस्तु कैसे हो जाएगी? ऐसा होना कई बार विचित्र लगता है लेकिन यही एक विशिष्ट भारत गढ़ता है। कहना जरूरी नहीं कि विश्वास हरदम अतार्किक ही नहीं हुआ करते। अब कौन जानता था कि एक दिन पश्चिम की 'अति आधुनिक' दुनिया भी पीपल और पोखर को पूजने का या कम से कम आदर देने का वह व्यवहार अपनी संतति को सिखाने के लिए विपुल धनराशि खर्च करने को आतुर होगी जोकि सभ्यता के प्रारंभिक चरण से ही भारत में जीवन का सामान्य जन-व्यवहार रहा है। सिंधु-सभ्यता से प्राप्त प्रमाणों में भी वृक्षों, जलाशयों व प्रकृति के अन्य तत्वों, जिनमें जानवर भी शामिल है, की पूजा के विपुल साक्ष्य उपलब्ध हैं। आज तो यह प्रत्यक्ष है जिसे किसी प्रमाण की जरुरत ही नहीं।

यह देखा जा सकता है कि ऐसा विचार कि जल, जंगल, जमीन व जानवर के भीतर भी परमात्म शक्ति का अंश है; या कि उनकी पूजा का व्यवहार किसी स्वतः स्फूर्त प्रक्रिया से उत्पन्न न होकर एक सचेत व प्रयासपूर्ण आरोपण का फल है। इसे वेदों में भारत ने गाया है, गुरूकुलों में सिखाया है और निरंतर संस्कृति के विविध अधिष्ठानों के माध्यम से जन-जन तक पहुंचाया भी गया है। जीवन व्यवहार यानि कि संस्कृति की यात्रा का एक सामान्य पुनरावलोकन भी इसके निमित्त पर्याप्त होगा। पूर्ववैदिक काल में गोमांस-भक्षण व प्रयोग के पक्ष में बलात् पेश दलीलें कम से कम इतना तो साबित कर ही देती हैं कि उत्तरवैदिक समाज अपने सचेतन प्रयास से इस प्रवृत्ति से दूर हटा है और इसे पाप-कर्म, त्याज्य- कर्म की कोटि में शामिल किया गया। यह सब अपने आप हो गया, मानना कठिन है। राजसत्ता से निरपेक्ष रहकर समाज जीवन में मान्य व्यवहार की सतत उपस्थिति के पीछे वर्षो की तैयारी और अनेक संघर्षो की महती भूमिका रही। मुसलमान व ईसाई सरीखे विपरीत मतावलंबियों के राज में सनातन विचारों की रक्षा हेतु चलते हुए सामाजिक-राजनैतिक संघर्ष भी इस स्थापना को पुष्ट करते हैं।

हम अभी यह नहीं कह सकते है कि गोरक्षा के आग्रह का सम्मान भारत के भीतर राजसत्ताओं की एक सहज वृत्ति रही है, परन्तु यह कहना संम्भव है कि उन्होंने एक लोक विश्रुत मान्यता एवं जन-आग्रह का सम्मान अवश्य किया। विधिशास्त्र के क्षेत्र में आज कई आधुनिक विधिशास्त्री भी अंतर्चेतना की अभिव्यक्ति के रूप में विधि की परिभाषा को स्वीकार करते हैं। ऐसा उस समय स्वतः स्फूर्त रहा होगा या हो सकता है कि संभावित सामाजिक संघर्षो के परिहार की सोच की इसमें मुख्य भूमिका रही हो। अग्रिम विवेचन ही इस पक्ष पर रोशनी डालने में समर्थ होगा।

पूर्ववैदिक एवं वैदिककालीन भारतीय व्यवहार तथा शिक्षा

यद्यपि, सिंधु सभ्यता की लिपिबद्ध सामग्री दुरुह होने के कारण कोई राज उद्घाटित नहीं करती, फिर भी अन्वेषणकर्ताओं को इस बात के अनेक पुरातात्विक साक्ष्य मिले हैं कि उस काल में मनुष्य प्रकृति के तत्वों की महत्ता से बखूबी परिचित था और उनमें से ही ऐसे कई तत्वों की पूजा करता था। इन पूजनीय तत्वों में वृष भी शामिल है2, जिससे गोवंशीय पशुओं की महत्ता के सम्बन्ध में सिन्धु घाटी के निवासियों का विचार प्रगट होता है। सिंधुघाटी सभ्यता के पुरातात्विक स्थलों से प्राप्त मुद्राओं पर पशुओं का अंकन हुआ है। विद्वानों का अनुमान है कि इन्हें पवित्र व पूजा की वस्तु माना जाता होगा। जानवर उस समय संस्कृति के भाग थे और वैवाहिक समारोहों में अनिवार्य रूप से शामिल भी किए जाते थे।3 मोहेंदो-जारो की खुदाई में प्राप्त मुद्रा पर सांड़ की सींग, पूंछ और खुर वाले मनुष्य की आकृति का अंकन प्राप्त होता है। इसे पशुओं की पूजा का प्रतीक साक्ष्य माना गया है।

वैदिक काल के जीवन को वर्तमान में जानने का साधन लिखित सामग्री है। ऋचाओं एवं सूक्तों के रूप में उपलब्ध विविध पाठों ;टेक्स्ट्सद्ध की भावनाएं एक दूसरे के विरुद्ध दर्शाई गई हैं और बहुधा गोमांस भक्षण को सहेतुक प्राचीनकालीन ठहराने का परवर्ती प्रयास लगती हैं। संक्षिप्ततः, हम पाते हैं कि अनेक पाठ गोमांस खाने की दैवीय तथा सामान्य जन की प्रवृत्ति को पुष्ट करने के लिए प्रयुक्त किए गए हैं। विदेशी विद्वानों के साथ-साथ कुछ भारतीय विद्वान वेद के सूत्रों के आधार पर यह सिद्ध करने की कोशिश करते रहे हैं कि उस काल में मांस, यहां तक कि गोमांस भी खाया जाता था। गोमांस खाना न केवल परंपरा थी वरन् जीवन के अनेक व्यवहारों में यह एक अनिवार्य पदार्थ था। इन्द्र, जो सर्वश्रेष्ठ देव माने जाते हैं, स्वतः इस बात की पुष्टि करते हुए प्रदर्शित किए गए हैं।4 इन्द्र के समान ही अग्नि के संबंध में भी ऐसा दर्शाया गया है।5 यह प्रयास कुछ नया सा भी नहीं जान पड़ता। 1884 में प्रकाशित अपनी रचना के माध्यम से एक विद्वान इस स्थापना के पक्ष में खड़े दिखते हैं।6 दैवीय भोज्य पदार्थ

होने के साथ ही साथ गोमांस धार्मिक अनुष्ठानों में प्रयुक्त सामग्री के रूप में भी उल्लिखित हुआ है।7 संस्कृति के अंग के रूप में यह दाह-संस्कार के समय अनिवार्य रूप से उपयोग में लाया जाता था।8 निष्कर्षतः यह साबित किया जा रहा है कि प्राचीन वैदिक संस्कृति के अंतर्गत गोहत्या व गोमांस का भक्षण तथा उपयोग सामान्य आहार व संस्कार का अंग था।

प्रमाण इन प्रस्थापनाओं (सम्भावनाओं) को पर्याप्त परिमाण में कम करने को भी उपलब्ध हैं। सर्वप्रथम हम इस उल्लेख की ओर ध्यान दें कि वैदिक संस्कृति यद्यपि कि बहुलवादी है परंतु शाकाहार की ओर विशिष्टतया उन्मुख9 यज्ञ-संस्कृति है; कि ऋग्वेद में यज्ञ में हिंसा मात्र के निषेध की बात की गयी है10। इसी के साथ हमें इस बात की ओर भी ध्यान ले जाना है कि संहिताबद्ध ऋचाओं में गाय को 'अघन्या' व 'अदिति' की संज्ञाओं से अभिहित किया गया है11। अब इस बात को समझ पाना कठिन हो जाता है कि आखिर क्यों एक ही वैदिक संहिता के एक भाग में पशुवध की वर्जना है तो दूसरे भाग में ऐसा नहीं है। ऐसी स्थिति इस बात की ओर संकेत करती है कि वेदों में किसी भी भांति की पशुहत्या की बात का निष्कर्ष निकालना उचित न होगा। हमारा यह मत अन्य प्रमाणों के प्रकाश में और भी पुष्ट हो जाता है। यजुर्वेदादि ऋग्वेदेतर संहिताएं आत्मामात्र की एकता व जीवहत्या यानि सृष्टि-हत्या के जिस संदेश का प्रतिपादन करती हैं वह गोहत्या व गोमांस-भक्षण संबंधी निष्कर्ष के विरोध में ही है12। यहाँ ध्यातव्य है कि परवर्ती काल में विद्वानों द्वारा वेदों के मूलपाठ पर रचित विविध टीका ग्रंथों में भी गो-मांस खाने को गर्हित कर्मों में शामिल किया गया है; अर्थात समाज की चेतना इस बात की अनुमति नहीं देती। यह कैसे संभव है कि टीकाकार मूल पाठ की भावना को ही खंडित करते हुए स्वयं के विचारों का प्रतिपादन करें? दूसरे, उपरोक्त टीकाओं के परवर्ती हिन्दू धर्मशास्त्र, जिनमें विधिक सूत्रों का विवेचन किया गया है, कतिपय ही गोहत्या का पक्ष पोषण करते हैं; वस्तुतः इनमें भी इस प्रवृत्ति को पाप-कर्म (हत्या) ही निर्धारित किया गया है13। इन विचारों व जारी बहसों के आलोक में इतना तो अवश्य ही कहा जा सकता है कि वर्तमान समय में ग्रहण किए जा रहे इस भाव का पुनरीक्षण आवश्यक हो गया है कि वैदिक साहित्य गोवध का समर्थन करता है।

वेदोत्तर नवीन धर्म व जनविश्वास बनते दर्शन

भारतीय इतिहास की यात्रा ने बाद के कालखण्ड में दो महान आन्दोलनों का साक्षात्कार किया जहाँ अहिंसा को परम् आचार के रुप में अपनाया गया। बौद्ध मत एवं जैन मत का प्रसार अभिजन वर्ग की अपेक्षा आमजन के मध्य बड़ी तेजी से हुआ। जैन धर्म की शिक्षा के ग्रंथ अचरंग-सूत्र के अनुसार किसी भी सांसयुक्त, अस्तित्ववान, जीवित, संवेदनसमर्थ जीवधारी की हत्या नहीं होनी चाहिए; न तो उसके साथ हिंसा होनी चाहिए14। यहां तक कि टहलते समय किसी चींटी को मार देना भी पाप समझा जाता था। इस प्रकार के विचार को हम पूर्वकथित वैदिक साहित्य के उद्धरणों में भी पाते हैं। यह एकता किस भांति आकस्मिक ठहरायी जा सकती है? विचारों की एकता के इस तथ्य पर गौर करने पर एक सम्यक निष्कर्ष यह निकलता है कि इस भूभाग का इतिहास एक सतत यात्रा है तथा भारतीय जीवन प्रवाह वैचारिक अधिष्ठान के अपने मौलिक तल पर भी अटूट रहा है। अहिंसा के प्रति पूर्वकथित आग्रह उपरोक्त पुनरोद्भूत भाव के प्रभाव में क्रमशः जनविश्वास में परिणित हो गया तथा जीवों के प्रति की गई हिंसा का विचार निंदनीय घोषित कर दिया गया। हिंसा का आचरण मनुष्य को पाप का भागी बना देता है, यह विचार काफी गहरे जा पैठा। यहाँ ध्यान रखना होगा कि तत्कालीन समाज में जनविश्वास व धार्मिक मान्यताएं आचरण के प्रमुख नियामक के रुप में स्थापित थे। आधुनिक काल जैसे विधायी नियमन के सूत्रों (विधायन) व तंत्र का तो सर्वथा अभाव ही था। राज्य प्रेरित नियामकों का प्रभाव तो पश्चात्वर्ती कालखण्ड में ही स्थापित हो सका। गायें चन्द्रगुप्त द्वितीय के शासन काल में भी श्रद्धा की व पवित्र वस्तु थीं जिन्हें दान भी दिया जाता था15। इस प्रकार, ईसा की पहली शताब्दी के मध्य में गुप्त राजाओं द्वारा गाय की हत्या करने पर मृत्यु-दण्ड का प्रावधान किया गया16। इसके बाद कुछ अंशकालिक अपवादों को छोड़कर दसवीं सदी तक धर्म परायण हिन्दू राजाओं का भारत वर्ष पर शासन चलता रहा। धार्मिक विश्वास व मान्यताएं जहाँ प्रमुख शासन सूत्र रहे, जिनका निष्पादन मंत्री द्वारा, जो प्रायः ब्राह्मण वर्ग से आता था, होता रहा। श्रुति सम्मत आचरण प्रमुख लक्ष्य रखा गया। ऐसे समय गो-हत्या की घटनाओं की उपस्थिति का विचार कोरी कल्पना के सिवा और कुछ भी नहीं ठहरता।

मध्यकालीन भारत

इतिहास एक सतत यात्रा है तथा भारतीय जीवन प्रवाह अटूट रहा है। वह दौर कभी नहीं आया जब यह देश बिखरकर समाप्त हो गया हो और उसे पुनः उठ खड़े होने के लिए जरूरी जीवन-सूत्रों की पुनर्खोज करनी पड़ी हो। राजनैतिक व्यवस्थाएं यद्यपि कि बनती बिगड़ती रहीं या फिर रूप में परिवर्तित हुईं फिर भी समाज का मूल चरित्र व चिंतन अपनी जड़ों से प्रभावित व अनुप्राणित होता रहा। सुल्तानों और मुगलों की सत्ता भारत के लिए एक परकीय विचारों से अनुप्राणित राजव्यवस्था थी। ऐसे समय में भक्तिकाल, जिसे कौव्वाली के बरअक्स कीर्तन की 'चैतन्य' धारा कहा गया, का महत्व सनातन विचारों की रक्षा के एक वैचारिक संधर्ष के रुप में स्वीकार किया जाता है।17 इसने प्रथमतः, काल-प्रवाह से संस्कृति के मूल तत्वों को बचाए रखने में अहम योगदान किया, दूसरे एक सहज व सघन आस्था का वातावरण बनाने का भी सार्थक प्रयास किया। इस प्रकार आस्था संचालित समाज में गो-हत्या बड़े दूर की कौड़ी हो गई। मुगल काल के अनेक शासकों के समय गो-वध पर राजाज्ञा के माध्यम से रोक लगी, इस बात के प्रमाण उपलब्ध हैं। बाबर की भावना बहादुरशाह तक सम्मान पाती रही, हां इतना अवश्य कि औरंगजेब की नीति गोवध के मुद्दे पर कुछ अलग रही। बाबर अपनी वसीयत में यह कहता है-

पुत्र इस देश हिन्दुस्तान में विभिन्न मत-पंथ हैं। अल्लाह का हमें यह राज्य देने के लिए शुक्रिया। हमें अपने दिलों से सभी भेद मिटा देने चाहिए और प्रत्येक समुदाय के साथ परंपरा के अनुरूप न्याय करना चाहिए। यहां के लोगों को प्रशासन के मामलों में समाविष्ट करने के लिए और उनका दिल जीतने के लिए गोहत्या को वर्जित करो18।

यद्यपि कि तात्कालिक शासकों की निजी मजहबी मान्यताओं में इसके लिए कोई आग्रह नहीं रहा है। पशुओं का मांस खाने के उनके व्यावहारिक आग्रह का तत्व भी कोई छुपा हुआ तथ्य नहीं है फिर भी गो-वध पर रोक लगी। इस प्रकार संभावित संघर्षो से समायोजन की मंशा का तथ्य स्पष्ट होता है। एक-दूसरा तथ्य भी रेखांकित किए जाने योग्य है। मुगल काल की स्थापना से लेकर उसके अंत तक मुगल सत्ता के विरूद्ध राजनैतिक संघर्ष का एक प्रयास लगभग लगातार उपस्थित ही रहा। राजपूत, मराठे और सिख राजा इसके उल्लेखनीय संघटकों में शूमार किए जा सकते हैं। संस्कृति के प्राचीन और सनातन मूल्यों की रक्षा और उन्हें पुष्ट करने का आग्रह मौलिक रूप से इन संघर्षरत तत्वों का विशिष्ट वैचारिक आधार रहा है। यह भी ध्यान देने योग्य है कि आग्रहजन्य यह संघर्ष आमने-सामने के टकराव का रूप धर कर भी सामने आया। राजनैतिक दृष्टिकोण से यदि इन्हें एकदा निष्प्रभावी मान भी लिया जाए तो भी वैचारिक समन्वय के प्रक्रम में इनकी भूमिका को सहजतया नकारा नहीं जा सकता।

आधुनिक भारत एवं ब्रिटिश साम्राज्य

भारत के लिए अंग्रेजी आक्रमण एवं ब्रिटिश-राज सर्वाधिक विकट व विनाशकारी सिद्ध हुआ है। राजनीतिशास्त्र के एक प्रमुख विद्वान इसे यूं रेखांकित करते हैं-

भारत में विदेशी आकमण होते रहे हैं, उनके शासन के साथ-साथ उनकी लूटमार यहां चलती रही है। किंतु 1757 से आरंभ होने वाली अंग्रेजों की हुकूमत का अंदाज दूसरे विदेशियों की हुकूमतों से काफी हद तक अलग था। अंग्रेजों से पहले आने वाले विदेशी या तो लूटमार करके चले गए, (जैसे महमूद गजनवी, नादिरशाह, चंगेज खां) या फिर स्वयं इस देश द्वारा जीत लिए गए और यहीं के होकर रह गए... भारत में अपने राजनैतिक शासन के दौरान अंग्रेजों ने अपनी उन्नत पूंजीवादी आर्थिक व्यवस्था द्वारा भारत का इस्तेमाल अपने आर्थिक स्वार्थों की पूर्ति के लिए किया। भारत से बटोरी गई दौलत ने जहां एक ओर ब्रिटेन के पूंजीवादी औद्योगिक विकास में योगदान दिया, वहीं भारत को एक ऋणग्रस्त पिछड़ा हुआ देश बना दिया। भारत अंग्रेजों के लिए स्वर्ग और अधिकांश भारतीयों के लिए नरक बन गया।19

इसके द्वारा संचालित आक्रमण ने न केवल जीवन के स्थूल तत्वों को आक्रांत किया वरन् अब तक सुदृढ़ बने रहे वैचारिक धरातल को भी रौंदा। इसे शिक्षा के माध्यम से रूप देने की योजना रखी गई। वुड के 'शिक्षा संबंधी घोषणापत्र' का उद्देश्य ही था भारत में 'पाश्चात्य संस्कृति का प्रसार और सार्वजनिक प्रशासन के लिए उचित तौर पर प्रशिक्षित सेवक प्राप्त करना'। पाश्चात्य शिक्षा के आरोपण की उनकी योजना को आकार देने के संबंध में अग्रलिखित वक्तव्य हमारी बात को अग्रसारित करता है-

"1823 में कलकत्ता में 'जनरल कमेटी आॅफ पब्लिक इन्स्ट्रक्शन' का गठन किया गया जिसे एक लाख रूपये के व्यय के विषय में निर्णय लेने का अधिकार था। परंतु शीघ्र ही यह समिति ओरियंटलिस्ट और एंगलिसिस्ट दो समूहों में बंट गई। पहला समूह प्रिंसेप के नेतृत्व में भारत में

प्राचीन शिक्षा प्रणाली को कायम रखने के पक्ष में था जबकि दूसरा समूह संस्कृत, अरबी, फारसी के अध्ययन पर कोई राशि खर्च करने के पक्ष में नहीं था। इसके सदस्य उदार शिक्षा के लिए आवश्यक साहित्यिक और वैज्ञानिक जानकारी अंग्रेजी माध्यम से देने पर ही फंड की राशि को व्यय करने के पक्षधर थे। अंत में, यही द्वितीय समूह, जिसके नेता श्री मैकाले थे, विजयी रहा और संस्कृत तथा अरबी शिक्षा पर अंग्रेजी तथा पाश्चात्य शिक्षा को प्राथमिकता दी गई"।20

भारत को नष्ट कर डालने का उनका प्रयास बहुत हद तक सफल रहा। अपनी ही मान्यताओं व विश्वासों पर शंका करने वाले तमाम लोग इसमें उपजे। विद्वान इस बात पर सर्वथा सहमत हैं कि-

अंग्रेजी शिक्षा भारतीय जीवन की वास्तविकताओं से अलग-थलग रही। इसके माध्यम से भारतीय जीवन, उसकी राजनीतिक दासता और आर्थिक व सांस्कृतिक पिछड़ेपन का सच्चा चित्र पेश नहीं किया गया। भारत के इतिहास का विकृत रूप पेश किया गया और ब्रिटिश विजेताओं को गौरवपूर्ण सभ्यता का वाहक बताया गया। इससे भारतीयों के राष्ट्रीय गर्व और आत्मसम्मान की भावनाओं को ठेस पहुंची।21

अंधतार्किकता मान्यताओं और विश्वासों पर लगातार आक्षेप करने लगी। इतना ही नहीं, समाज हित व लोकहित को पीछे रख वैयक्तिक आग्रहों की पूर्ति को तत्पर एक नया वर्ग भी सामने आया।

भारतीय विचार पाश्चात्य धाराओं में बहने लगे। पेन और ह्यूम के सिद्धांत लोकप्रिय होने लगे और संस्थाबद्ध धर्म के प्रति विद्रोह प्रारंभ हुआ। अंग्रेजी शिक्षा में शिक्षित भारतीय विभिन्न धार्मिक आयोजनों को अज्ञानता और अंधविश्वास की उपज मानकर उपहास उड़ाने लगे।22

न केवल सामाजिक संरचना नष्ट हुई वरन् राजव्यवस्था में भी विषम तत्वों का समावेश हो गया। भारत प्रशासनिक रूप से क्रमशः अंग्रेजी राज के अधीन आया। लेकिन आक्रमण की अभूतपूर्व एवं तीखी प्रकृति ने ही शायद भारतीय जन-मन को पूरी तरह से झकझोर कर भी रख दिया। परिणामतः एक तीखा व सबल प्रतिरोध उठ खड़ा हुआ। प्रथम स्वतंत्रता संग्राम के रूप में भारत का अंग्रेजी सत्ता के विरुद्ध संगठित प्रतिकार कहीं न कहीं प्राचीन मान्यताओं व जीवन मूल्यों की रक्षा हेतु संगठित था। कारतूसों पर चढ़ी गाय एवं सूअर की चर्बी से उपजा प्रबल आकोश इसका सर्वप्रमुख कारण रहा था। ईस्ट इंडिया कंपनी की सेवा में नियुक्त सैनिकों के लिए लाई गई ली इन्फील्ड राइफलों में प्रयुक्त बारूद के खोखों (कार्टिज) के सिरों को दांत से काटकर खोलना होता था। सेना के हिंदू व मुसलमान समुदाय से आने वाले सैनिकों का विश्वास था कि इन खोखों के सिरों पर लगी ग्रीस में गाय व सूअर की चर्बी मिलायी गयी है23। ऐसे में उन्हें यकीन होने लगा कि विदेशी सरकार उनके धार्मिक मान्यताओं को खंडित करना चाहती है। इसे 'विद्रोह' के प्रमुख कारणों में गिना जाता है।

स्वतंत्रता के लिए भारतीयों का संगठित आन्दोलन आगे बढ़ रहा था। इसके लिए आवश्यक जनचेतना की जागृति का प्रयास नेताओं द्वारा किया गया। चेतना जागरण के इस अभियान को कइयों ने प्राचीन सनातन सांस्कृतिक अधिष्ठान का आधार भी दिया। 1857 की घटना के पहले और उसके बाद के कालखण्ड में भी यह प्रवृति पायी जाती है। इस प्रकार से प्राचीन सांस्कृतिक चेतना के विकास के साथ-साथ आधुनिक राजनैतिक चेतना भी बलवती होती गई।24 वेदों की ओर लौटो और वंदेमातरम् के स्वर इसकी परिणिति के रुप में सामने आए और एक बारगी सम्पूर्ण भारत पर छा गए। इनकी गूँज काल-प्रवाह में लुप्त न हुई। ऐसे में गो-रक्षा या गो-हत्या पर वैधानिक रोक लगाने का प्रश्न कैसे पीछे रहता? दक्कन में बालगंगाधर राव तिलक द्वारा रोपित गणपति उत्सव एवं उनके द्वारा स्थापित गोहत्या विरोधी सभा कालक्रम में सम्पूर्ण देश में फैल गए जिसके बड़े ही दूरगामी परिणाम हुए25। कांग्रेस के बहुलतापूर्ण गठजोड़ से संगठित आंदोलन के दौरान भी सांस्कृतिक आग्रह अनेक अवसरों पर आगे आए। कई बार यह आग्रह अंग्रेजी सरकार के समक्ष संगठित राजनैतिक आग्रह के रुप में भी प्रस्तुत किया गया। पंडित मदन मोहन मालवीय जी के नेतृत्व में किया गया प्रयास इसका प्रतीक है। उसमें गो-रक्षा का प्रश्न एक अहम् प्रश्न था।

भारत की ऐतिहासिक यात्रा के इस मुकाम पर सर्वथा पहली बार कुछ ऐसे सूत्र मिलते हैं जो हमें सचेत भी करते हैं। तात्कालिक सांस्कृतिक चेतना की जागृति में से सांप्रदायिक पृथकता के तत्वों को छांटकर उनका प्रयोग अंग्रेजी सरकार द्वारा भारतीयों, विशेषकर हिन्दुओं व मुसलमानों की एकता को तोड़ देने में सफलतापूर्वक किया गया26। शायद यह

प्रत्येक शासक वर्ग की स्वयं की सत्ता की रक्षा के लिए अन्तर्निहित प्रकृति हो। गो-रक्षा के आग्रह को हिन्दू सांप्रदायिकता ठहराया गया और मुसलमानों के अस्तित्व के लिए खतरा बताकर मन में शंका के बीज रोपे गए। भारत के विभाजन का प्रमुख कारण होने का एक गंभीरतम् आरोप भी दुर्भाग्यवश इस नेक आग्रह पर मढ़ा गया। आज भी जब कभी गो-हत्या पर कानूनन प्रतिबंध की बात आगे बढ़ती है तो सबसे बड़ी चुनौती मुस्लिम समाज में अंग्रेजों द्वारा रोपी गई शंका से पार जाना ही होती है।

स्वातंत्र्योत्तर भारत

संघर्षो को सफलता मिली। भारतीयों को स्वराज्य मिलना सुनिश्चित हुआ। ब्रिटिश सत्ता की हुकूमत तो 15 अगस्त 1947 को समाप्त हो गई लेकिन संविधान तो अब भी ब्रिटिश ही था। इससे मुक्ति के लिए एक अभियान भी भारत ने अपने लोगों में से चुनकर बनाई गई संविधान सभा के माध्यम से चलाया था जिसका वाक्य था "संविधान सभा भारत को स्वतंत्र प्रभुतासंपन्न गणराज्य के रूप में घोषित करने के अपने दृढ़ और सत्यनिष्ठ संकल्प की और भारत के भावी शासन के लिए संविधान बनाने की घोषणा करती है"27। इस अभियान की पूर्णाहुति पर भारत को मिलना था एक स्वयं का 'लोक से व्युत्पन्न' संविधान जिसमें हो उसके ही सांस्कृतिक, ऐतिहासिक और सामाजिक तत्वों व सत्यों से अनुप्राणित एक आत्मा। इनके संलयन (फ्यूजन) से उगाना था एक समर्थ सूरज जो गतकाल के अंधेरों को चीरकर ला सके एक सर्वसुखकर बिहान। और दुनिया ने देखा कि भारत ने उसे पा लिया। संविधान सभा में 'अंगीकृत, अधिनियमित और आत्मार्पित' यह संविधान 'भारत को एक संपूर्ण प्रभुत्व-संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य बनाने के लिए'28 एक सुस्पष्ट दिशायुक्त, 'तथा उसके समस्त नागरिकों को सामाजिक, आर्थिक और राजनैतिक न्याय; विचार अभिव्यक्ति, विश्वास, धर्म और उपासना की स्वतंत्रता; प्रतिष्ठा और अवसर की समता प्राप्त कराने के' लक्ष्योन्मुख, विषद् उपस्कर था जिसमें भारत के भविष्य को आलोकित करने में समर्थ अतीत की रश्मियाँ भी जगमग थीं। 'एकम् सद् विप्राः बहुधा वदन्ति' की प्राचीन भावना के सर्वथा अनुकूल ही जहाँ एक ओर राज्य का स्वरूप 'पंथनिरपेक्ष' रखते हुए विश्वास के विषय पर राज्य द्वारा हस्तक्षेप न करने का व 'सभी व्यक्तियों को अंतःकरण की स्वतंत्रता का और धर्म के अबाध रूप से मानने, आचरण करने और प्रचार करने का समान हक'29 प्रदत्त किया गया; कहा गया कि 'राज्य, किसी नागरिक के विरूद्ध केवल धर्म... के आधार पर कोई विभेद नहीं करेगा'30 वहीं दूसरी ओर गो-हत्या के विधिक प्रतिषेध के लिए प्रयास करने का निदेश भी राज्य को दिया गया31-

48. राज्य, कृषि और पशुपालन को आधुनिक और वैज्ञानिक प्रणालियों से संगठित करने का प्रयास करेगा और विशिष्टतया गायों और बछड़ों तथा अन्य दुधारू और वाहक पशुओं की नस्लों के परिरक्षण और सुधार के लिए और उनके वध का प्रतिशोध करने के लिए कदम उठाएगा।"

यह शासन की नीति का मूलभूत तत्व भी नियत किया गया32। यद्यपि कि पश्चात् कथित् इन निर्देशो की व्यवस्था को संविधान में न्यायालय द्वारा अप्रवर्तनीय बताया गया पर संविधान सभा की मंशा यह नहीं थी कि न्यायालय इनकी भावना का प्रयोग संविधान की व्याख्या में भी न करें। पश्चात्वर्ती घटनाक्रमों ने इसे पुष्ट भी किया जब इस विचार को आधार बनाकर सर्वोच्च न्यायालय ने अनेक विवादों का निपटारा किया। इनमें उन मूल अधिकारों के उल्लंघन के प्रश्न भी थे जिनकी रक्षा का महत कर्तव्य न्यायालय को सौंपा गया है। न्यायालय ने अपने मत का आधार तैयार करने में इन निदेशक तत्वों की व्याख्या की है और उनका आश्रय भी लिया है33। उपरोक्त वर्णित आधारभूमि में एवं सांविधानिक निर्देशों के अनुपालन में अब विधायिका द्वारा कार्यपालिका की सुविधा का ध्यान रखते हुए गो-हत्या प्रतिषेध के लिए देश के भीतर अनेक राज्यों के द्वारा विधायनों की रचना की जा चुकी है। जब भी इन्हें न्यायालयों के समक्ष चुनौती दी गई तब लगभग हर बार न्यायालयों ने इन विधायनों को सांविधानिक निर्देश, समाज की नैतिकता और लोकनीति आदि के अनुरूप बताकर संवैधानिक करार दिया है34। इस बात को स्पष्ट करने हेतु कुछ प्रमुख वादों का हवाला दिया जाना उचित होगा। मुहम्मद हनीफ कुरैशी ब. बिहार राज्य35 के वाद में (23. 04. 1958 को निर्णीत) सी पी एवं बरार पशु संरक्षण अधिनियम, 1949; बिहार पशुधन संरक्षण एवं संवर्द्धन अधिनियम, 1955 तथा उ0 प्र0 गोवंध प्रतिशोध अधिनियम, 1955 की विधिमान्यता को चुनौती दी गयी थी। न्यायालय के समक्ष विचारार्थ यह प्रश्न लाया गया कि क्या विचाराधीन अधिनियमों द्वारा गाय, भैंस, सांड़ इत्यादि पशुओं के वध पर लगाया गया पूर्ण प्रतिबंध संवैधानिक है? न्यायालय ने अभिनिर्धारित किया कि उपरोक्त अधिनियमों द्वारा किसी भी उम्र की गाय तथा भैंस के नर या मादा बछड़ों के वध का प्रतिशोध करना अनुच्छेद 25 में प्रदान किए गए अधिकार का उल्लंघन नहीं करता क्योंकि गाय का बलिदान मुस्लिम

धर्म का आवश्यक अंग नहीं है। फलतः गोर्वध पर प्रतिबंध लगाने वाले प्रावधान संवैधानिक घोषित किए गये। दूसरे पक्ष पर विचार करते हुए न्यायालय ने यह सिद्धांत दिया कि भैंस, सांड़ और बैलों के, जबकि वे दूध देने या संतति उत्पन्न करने या भारवाही प्शु के रूप में कार्य करने की अपनी क्षमता खो देते हैं, वध पर लगाया गया पूर्ण प्रतिबंध असंवैधानिक होगा। ऐसा प्रतिबंध संविधान के अनुच्छेद 19(1)(छ) में प्रदत्त 'किसी वृत्ति, उपजीविका, व्यापार या कारोबार करने' के अधिकार को छीनता है। ध्यातव्य है कि यह अभिनिर्धारण व्यापक वाद-विवाद का विषय रहा है। वस्तुतः यह अभिनिर्धारण न्यायालय के समक्ष गोवंश के संबन्ध में सही स्थिति न रखे जाने के कारण ही किया गया प्रतीत होता है। बाद में उच्चतम न्यायालय ने गुजरात राज्य ब. मिर्जापुर मोती कुरेशी कसाब जमात अहमदाबाद व अन्य36 के मामले में गोवंश की उपयोगिता के संबन्ध में अपने समक्ष प्रस्तुत सही स्थिति का विचार करने के पश्चात हनीफ कुरैशी वाद में दिए गए अपने उक्त निर्णय को पलट दिया और इस विधायन को सांविधानिक निर्देश, समाज की नैतिकता और लोकनीति आदि के अनुरूप बताकर संवैधानिक करार दिया। संदर्भित वाद में बाम्बे पशु संरक्षण (गुजरात संशोधन) अधिनियम, 1994 के उस प्रावधान की संवैधानिकता को चुनौती दी गयी थी जो सभी गोवंशाीय पशुओं के वध पर पूर्ण प्रतिबन्ध लगाता था।

मूल अधिकारों और नीति के निदेशक सिद्धान्तों के मध्य संघर्ष तब देखने को मिल जाता है जबकि राज्य किसी निदेशक सिद्धांत को अग्रसर करने हेतु कोई ऐसा कदम आगे लेता है जो कुछ मात्रा तक मूल अधिकारों को प्रभावित करता है। वस्तुतः मूल अधिकारों की न्यायिकतः प्रवर्तनीयता तथा दूसरी ओर नीति निदेशक तत्वों की स्थिति ऐसी न होने को आधार बना कर मूल अधिकारों को अपेक्षाकृत ज्यादा अधिमान देने की प्रवृत्ति प्रारम्भ में विद्यमान रही। गुजरात राज्य ब. मिर्जापुर मोती कुरेशी कसाब जमात अहमदाबाद व अन्य 37 (26.10.2005 को उच्चतम न्यायालय द्वारा निर्णीत) के मामले में न्यायालय के समक्ष इसी प्रकार का एक महत्वपूर्ण प्रश्न था कि क्या कोई अधिनियमिति राज्य की नीति के निदेशक सिद्धांतों को आगे बढ़ाने के लिए नागरिकों को अनुच्छेद 19(1) में प्रदत्त मूल अधिकारों की अनदेखी कर सकती है व उन्हें छीन सकती है? इस प्रश्न के उत्तर में न्यायालय द्वारा पुनः समन्वयकारी दृष्टिकोण को अपनाते हुए यह मत प्रतिपादित किया गया कि जबकि अधिकारों और निबंधनों के पारस्परिक अंतक्रियाओं की व्याख्या करनी हो तब भाग-3 (मूल अधिकार) और भाग - 4 (निदेशक सिद्धांतों) को एक साथ पढ़ा जाना आवश्यक होगा। जिन निबंधनों को अनुच्छेद 19(1) में प्रदत्त अधिकारों की सूची पर लागू किया जा सकता है वे अनुच्छेद 19(2) से 19(6) तक सीमित नहीं हैं; जब कभी अधिकारों पर लगाए गए प्रतिबंधों की युक्तियुक्तता का अभिनिर्धारण करना होगा उस समय राज्य की नीति के निदेशक सिद्धांतों के अध्याय में विहित प्रावधानों भी सहायक होंगे और उन पर निर्भर करना उचित होगा। (पैरा-52)

अनेक अधिनियमितियों के द्वारा गोवध को अपराध घोषित किया गया है। न्यायालयों के द्वारा न केवल इनकी संवैधानिकता की घोषणा की गयी है वरन् यथासमय अपराध की विचारण-प्रक्रिया को स्पष्ट करने के लिए आवश्यक सिद्धांतो को भी प्रतिपादित किया है। इस क्रम में अपराध की सूचना सहित कई बिंदु शामिल हैं। यथा; हरियाणा राज्य ब. भजनलाल38 के वाद में अपराध की रिपोर्ट दर्ज किए जाने के संबन्ध में सिद्धांत अधिकथित किए गए। यदि किसी थाने के भारसाधक अधिकारी को किसी बात की सूचना दी जाती है जोकि एक संज्ञेय अपराध है तब वह उसे अपने पास दर्ज करेगा। सूचना के संबन्ध में विश्वास दृढ करने के लिए रिपोर्ट दर्ज करने को टाला नहीं जा सकता है। चूंकि धारा 154(1) में इत्तिला को विश्वसनीय अथवा युक्तियुक्त के रूप में विशेषित नहीं किया गया है अतः पुलिस अधिकारी रिपोर्ट दर्ज करने से, सूचना की विश्वसनीयता अथवा युक्तियुक्तता के आधार पर, इंकार नहीं कर सकता है। फलतः पुलिस अधिकारी के लिए यह आबद्धकर हो जाता है कि वह दी गई सूचना के सार को लिखकर विहित प्रारूप में मामला दर्ज करे। (पारा-31)

विचारण की प्रक्रिया के दौरान गोवंश की अभिरक्षा को लेकर भी अनेक अवसरों पर संशय पैदा हुए हैं। दण्ड प्रक्रिया संहिता, 1973 की धारा 451 द्वारा संविधि विहित नियम यह है कि न्यायालय विचार के पूर्ण होने तक उसमें पेश की गयी सम्पत्ति की अभिरक्षा हेतु ठीक आदेश कर सकेगा। कृषि गोसेवा संघ व अन्य ब. महाराष्ट्र राज्य39 के मामले में मुम्बई उच्च न्यायालय ने इस बिंदु पर विधिक सिद्धांत को और भी स्पष्ट किया। अभिनिर्धारित हुआ कि यह आदेश ऐसे जानवर के संरक्षण के लिए होना चाहिए न कि उसके वध या विनाश के लिए। हत्या के लिए

तात्पर्यित जानवर की अभिरक्षा प्रदान करते समय समाजसेवी संगठनों को वरीयता देनी चाहिए और अभिरक्षा प्रदान करने से पूर्व ही ऐसे संगठनों की योग्यता और संरक्षण तथा भरण-पोषण के इंतजामों के बारे में सुनिश्चित हो जाना चाहिए। (पैरा 6)

अपने पश्चातवर्ती निर्णय में उच्चतम न्यायालय ने भी इसी प्रकार का सिद्धांत अभिकथित किया है। 22.02.2002 को उच्चतम न्यायालय द्वारा निर्णीत उत्तर प्रदेश राज्य ब. मुस्तकीम40 के मामलें में न्यायालय ने कहा कि अभियुक्तों को ही पशुओं की अभिरक्षा सौंप देने का इलाहाबाद उच्च न्यायालय का आदेश घोर आश्चर्यजनक और गलत है। पशुओं को गोशाला की अभिरक्षा में सौंपने का आदेश हुआ और राज्य को यह भी निर्देश दिया गया कि वह जब तक कि मामले का विचारण जारी है तब तक उनके (गायों के) संरक्षण का समस्त भार वहन करे।

निष्कर्ष

प्रारंभ में धर्म विश्व के सभी समुदायों में विधि के उद्भव का पवित्र स्त्रोत था। इसे ईश्वर द्वारा या देवों के द्वारा प्रदत्त तथा मनीषियों द्वारा प्रतिपादित माना गया जो धीरे धीरे चिंतनशीलता द्वारा परिमार्जित एवं विकसित हुआ। आगे चलकर परिस्थितियों की भिन्नता के कारण पश्चात्य देशों और भारत में भिन्न रूपों व क्रम में निरपेक्ष विधि का विकास हो सका। भारत एक लम्बी ऐतिहासिक यात्रा से गुजरते हुए और अपनी विशिष्ट भौगोलिक प्रकृति के संरक्षण में आकार ग्रहण करता हुआ वर्तमान तक पहुंचा है। अपनी मौलिक धारा से विचलन वैसे तो अनेक कारणों से इतिहास के कई खण्डों में देखने को मिलता है लेकिन गोरक्षा के प्रश्न को यदि वहां ढूंढा जाए तो हर बार यह स्वयं को समाज के स्थापित विचार के रूप में उद्घाटित करता हुआ मिलता है। भारत पर विदेशी आक्रमणों के आरम्भ होने से बहुत पहले ही बहुविध स्थापित यह विचार आक्रमणों व विभिन्न परिवर्तनकारी प्रभावों के बावजूद भी अपना अस्तित्व कायम रखने में सफल हो सका। यह तथ्य इस बात का पुख्ता प्रमाण है कि यह विचार भारत की मुख्य चेतना के भीतर रचता बसता है। न केवल लोक में वरन् यह भाव लोक की आधुनिक प्रतिनिधि संस्थाओं के माध्यम से भी मुखरित हुआ है। न्यायिक अधिष्ठान द्वारा भी इसका समर्थन हुआ है। यह कहना सर्वथा उपयुक्त होगा कि मौजूदा समय की उथल पुथल समाज की अन्तर्निहित सनातन समावेशी चेतना की प्रकृति के प्रभाव में अंततः तिरोहित हो जाएगी। गोरक्षा भारत में एक अति प्राचीन संस्कार और सांस्कृतिक मूल्य है, यह विचार विविध भांति अधिष्ठायी हो रहा है।

संदर्भ सूची

11 जुलाई 2017 को भारतीय उच्चतम न्यायालय ने एक आदेश के माध्यम से केन्द्र सरकार के द्वारा निर्गत वध हेतु मवेषियों की खरीद बिक्री को प्रतिबंधित करने वाले नियमों का प्रवर्तन पूरे देश में स्थगित कर दिया है। वस्तुतः न्यायालय ने मद्रास उच्च न्यायालय के द्वारा एस. सेल्वागोमती ब. भारत संघ के मामले में निर्गत स्थगन-आदेश की व्यापकता का सम्पूर्ण देश में विस्तार किया है। निर्णय से उत्पन्न गतिरोध में दोनों पक्ष आमने सामने हैं और सामाजिक प्रतिकियाओं का क्रम जारी है।

Jha, D. N.(1989). Ancient India: In Historical Outline .Manohar P.39.

Fairservis W. Jr. (1986). Cattle and the Harrapan Chiefdoms of the Indus Valley. Expedition, 28(2) PP. 43-50.

Rig-Veda, X.28.3: अद्रिणा ते मन्दिन इन्द्र तूयान सुन्वन्ति सोमान पिबसि तवमेशाम | पचन्ति ते वर्षभानत्सि तेषां पर्क्षेण यन्मघवन हूयमानः ||

Rig-Veda, X.91.14: यस्मिन्नश्वास रषभास उक्षणो वशा मेषावस्रष्टास आहुताः | कीलालपे सोमप्रष्ठाय वेधसेह्रदा मतिं जनये चारुमग्नये ||

"It is worth noting that in none of his (Pundit Dayanand) books has the Pundit written that beef is forbidden and impure, nor has he proven that eating beef and slaughtering cows are forbidden according to the Vedas. Rather, he says that the slaughter of the cow was forbidden in order to lower the price of milk and ghee. He also believes that there may be times when slaughtering of cows may be permissible, as is evident from his books Satyarth Prakash and Ved Bhash". Ahmad H M G, *Barahin-e-Ahmadiyya* (Part IV, First published in Urdu in Qadian, India, 1884, Islam International Publications Ltd. UK 2016 ISBN 978-1-84880-880-5), 9.

Jha D. N. (2009). Myth of Holy Cow. Navayana Publishing: New Delhi , P.30

Rig-Veda, X.16.4: अजो भागस्तपसा तं तपस्व तं ते शोचिस्तपतु तं तेर्चिः | यास्ते शिवास्तन्वो जातवेदस्ताभिर्वहैनंसुक्रतामु लोकम ||

"One who partakes of human flesh, the flesh of a horse or of another animal, and deprives others of milk by slaughtering cows, O King, if such a fiend does not desist by other means, then you should not hesitate to cut off his head." *Rig-Veda* (10.87.16)

Rig-Veda, I.1.4. अग्ने यं यज्ञमध्वरं विश्वत: परि भूरसि स इद देवेषु गच्छति

Rig-Veda 1-64-27; 5-83-8; 7-68-9; 1- 164-40; 8-69-2; 9-1-9; 9-93-3; 10-6-11; 10-87-16.

अघ्न्या यजमानस्य पशून्पाहि. (*Yajurveda 1.1); Yasmintsarvaani bhutaanyaatmaivaabhuudvijaanatahTatra ko mohah kah shokah ekatvamanupasyatah* (*Yajurveda 40.7*) (Those who see all beings as souls do not feel infatuation or anguish at their sight, for they experience oneness with them); *Ya aamam maansamadanti paurusheyam cha ye kravih Garbhaan khaadanti keshavaastaanito naashayaamasi* (*Atharvaveda 8.6.23*) – (We ought to destroy those who eat cooked as well as uncooked meat, meat involving destruction of males and females, foetus and eggs.)

Anumantaa vishasitaa nihantaa krayavikrayee Samskartaa chopahartaa cha khadakashcheti ghaatakaah (Manusmrithi 5.51) : (Those who permit slaying of animals; those who bring animals for slaughter; those who slaughter; those who sell meat; those who purchase meat; those who prepare dish out of it; those who serve that meat and those who eat are all murderers.)

Thapar, R. (2001). The Penguin History of Early India. Penguin Books, P. 167.

Ibid. 296

Seshagiri Rao (ed.) (2010). Encyclopedia of Hinduism,Vol. III, p. 248.

"In sum, the interaction of Islam and Hinduism created a new feeling amongst the Hindus and some of their religious preachers started defensive religious movements against Islam".

Dr. S. H. Mirza, Hindu-Muslim Confrontation A Case-Study of Pakistan 712-1947 (Lahor, Nazaria-i-Pakistan Trust 2009). 12.

राष्ट्रीय संग्रहालय में संरक्षित बाबर की वसीयत का हिंदी रूपांतर

डा एम. पी. जैन, 2014 "विभिन्न सामाजिक वर्गों पर उपनिवेषवाद का प्रभाव": डाॅ सत्या एम. राय (संपादित) भारत में उपनिवेषवाद और राष्ट्रवाद, हिंदी माध्यम कार्वान्वयन निदेशालय, दिल्ली विष्वविद्यालय, 125.

सुषमा यादव, 2014 "ब्रिटिश उपनिवेषवाद का सामाजिक जीवन, शिक्षा तथा संस्कृति पर प्रभाव":डा सत्या एम़. राय (संपादित) भारत में उपनिवेषवाद और राष्ट्रवाद, हिंदी माध्यम कार्वान्वयन निदेशालय, दिल्ली विश्वविद्यालय, 143.

तदैव, 146

तदैव, 148

"The reports about the mixing of bones dust in atta and the introduction of the Enfield rifle enhanced the sepoys' growing disaffection with the Government. The cartridges of he new rifles had to be bitten off before loading and the grease was reportedly made of beef and pig fat.the army administration did nothing to allay these fears, and the sepoys felt their religion was in real danger."Bipan Chandra et al.(1989), India's Struggle for Independence, Penguin Books, p. 34

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पूर्वोद्धृत नोट 17, पृ. 64।

See, Bipan Chandra et al. (1989), India's Struggle for Independence, Penguin Books, p. 408

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Corresponding Author

Haricharan Singh Yadav*

Research-Scholar, Law Department, M.J.P. Ruhalkhand University, Bareilly (UP) India

E-Mail – dksingh@bareillycollege.org

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Survival Strategies of Unorganized Food & Grocery (Kirana) Stores in Bhopal City

Kumar Siddhartha[1]* Dr. D. K. Dubey[2] Dr. Neeraj Singh[3]

[1]Barkatullah University, Bhopal (M.P.) India

[2]Principal, Sadhu Vaswani College, Bhopal (M.P.) India

[3]Professor & Vice Principal, VNS Institute of Management, Bhopal (M.P.) India

Abstract – This study attempts to explain why the customers choose an unorganized retail outlet for their daily grocery needs and moreover discusses the challenges faced by Kirana stores (unorganized food & grocery retailers) in the proximal growth of organised grocery retailers who pose a threat of survival in Bhopal market. This descriptive and exploratory study has focused on the strategies being followed by unorganized (branded) food & grocery retailers in Bhopal City to survive. Convenience sampling technique, percentage method and chi-square test have been applied to reach on decision making in relation to subject. Study has focused on the proximity of outlets, opening up of a store, location advantage of store and other various significant elements have been covered to justify the survival of unorganized fast moving consumer goods (FMCG) outlets in Bhopal city. Objective of this study is to understand the reasons for outlet visit by shoppers, challenges of kirana stores and their strategies to cope with the competition. The elements of changes in demography have led the study to identify the significant reasons to witness choice and selection of outlet (Kirana or unorganized outlet) to shop at that provides to sustain with posed challenges by organised food & grocery retailers.

Keywords: Unorganized; Demography; Descriptive Analysis; Convenience; Survival; Chi-Square

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I. INTRODUCTION

The retailer is an entity or organization through which goods produced by the manufacturer flow to their consumers. These organizations perform various roles as a member of marketing intermediaries (distribution channel). Channel members take on activities that a manufacturer does not perform e.g. displaying of the product or locating alternative items in a convenient fashion for a consumer to access during shopping. Retailing industry has been divided into two sectors: Unorganized Retail and Organised Retail. Unorganized retailing refers to traditional format of low cost retailing, for example the kirana i.e. grocery shops, owner manned general stores, paan and beedi shops, cigarette shops, convenience store, hand cart, pavement vendor etc.

The developing aspirations of Indian buyers have paved the way for a faster growth in the organized retail in the country. Deloitte, 2013, has mentioned that as of today, organized retail in India contributes 8 per cent of the total retail market and it is growing much faster than traditional (unorganized) retail. Various survey and research outcome has estimated the share of organized retail as 20 per cent by 2020. Income, technology and lifestyles of consumers. The location where they buy is changing; the shops are opening close for the convenience of the buyers.

The purchasing function has gained great importance and the desires, expectations and preferences of consumers have been changing rapidly in the competitive markets due to globalization and technological change recently. In smaller towns and urban areas, there are many families using kirana shops/ 'mom and pop' stores offering a wide range of merchandise mix. Kirana shops are having their own efficient management system which efficiently fulfilling the needs of the customer. This is one of the good reasons why the customers don't want to change their old loyal kirana shop. A large number of working class, daily and seasonal workers in India, even during their unemployment period use to purchase from kirana store in credit to fulfill their needs because so small purchase quantity would not be entertained by big retailers. Another reason might be the proximity and so the convenience store for the customer. The share of organised retailing is 4 per cent whereas unorganized retailing is dominating the industry with a share of 96 per cent. When compared with unorganized retailing, organised retailing is growing in an amazing speed. Against the massive

growth of organised sector, unorganized retailers are fighting to survive. Under this scenario of organised retail growth and consumer shift, this article focuses on the various survival strategies adopted by the unorganized retailers in Bhopal city. Unorganized retailers have dominated Indian retail market with a vast potentiality untapped in the organised retail sector. In the context of massive growth of organised retailing, the small unorganized retailers are constantly receiving pressure to survive against big organised brands and chains. Hence in order to survive these small stores have started adopting various strategies with great challenges. FMCG goods are popularly known as consumer staple goods. Items in this category include all consumables (other than groceries/pulses) that people frequently buy to consume at regular intervals and have a high return; e.g., toilet soaps, detergents, shampoos, toothpaste, shaving products, shoe polish, packaged foodstuff, and household accessories and extends to certain electronic goods. Urban areas witness a hike in disposable incomes, mid- and high-income consumers that have shifted their trend of buying from essential to premium products. This prompted firms to enhance their premium products portfolio. Retail consumers are changing every day in modern time that has put tremendous pressure on unorganized retailers to look into their competitive needs to survive in market as the store loyalty or brand loyalty now seems to be a myth. Hence it becomes necessary for unorganized retailers to understand know what are the challenges they face posed by the organised retailers to survive in the city market.

II. REVIEW OF LITERATURE

The advantages for unorganized retail sector or traditional retailing are low cost structure, low real estate and labor costs. In addition, location proximity, convenient timings, home delivery facility, sales on credit and familiarity and social relation with regular customers; which add to positive values of this retail sector. The various previous research observation about the unorganized retailers in the vicinity of organized retailers have experienced a decline in their sales volume and profit in their beginning years of outlet after the organized retailers entered. This adverse impact on sales and profit weakened over time (Rupa Shah, 2015). In India, next to agriculture, Unorganized Retail Sector provides employment to 4 crore of individuals directly. Unorganized retail market is estimated to Rs. 4, 00, 000 crore, whereas Organised Retail's share is only Rs.20, 000 crore. Ritika & Naved (2014) further view that price is the most influencing factor that drives the customers to purchase from informal/ unorganized retailer, whereas, rest of other factors doesn't seem to be influencing to a great extent. In their study they suggested for impulsive purchase, improved ambience, customer relationship management (CRM) and customer care. Pricing of the product has a great impact in deriving consumer perception while shopping for grocery especially in unorganized retail market. The extent to which consumer's perception is effected, decides the nature of the particular consumer's buying behavior. Priya Vij (2013) expressed that the unorganised retailers have adversely affected by the growth of organised retailers in terms of their volume of business and profit. The major factors that attract the customers towards unorganized retailers are proximity, goodwill, credit sales, bargaining, loose products, convenient timing and home delivery. The adverse impact on unorganized retailers taper off over time. There is clear evidence of a competitive response from traditional retailers who are gearing up to meet the threat from traditional retailers who are gearing up to meet the threat from organized retailers. Hamil & Priyadarshini (2014) studied the type of "Persons Assisting" in the "Conduct of Shop" and "Status of Workers Employed" in the "Conduct of Unorganized Retail Stores" before and after "Commencing Supermarkets" as tools. In the opinion of the unorganized retailers upper class buyers never patronize the unorganized retail stores. Majority of the unorganized retail stores there is shift of segment of customers from middle class to lower class after the commencement of supermarkets. They further mention that since the sales level normally higher during holidays or Sundays for traders, the reduction of customer base during the Sundays and holidays has made a negative impact on unorganized retail stores leading to reduction of sales and profit. The attractive features and size of Supermarkets and inability to keep more varieties in unorganized retail stores are the major reason for unorganized retailers to see drop in buyers visit. Majority of the unorganized retail stores have not made changes on the weekly holidays of the shops and their store opening time and the duration of working hours even after the origination of Malls, Hypermarket or Supermarkets. Supermarkets and hypermarkets globally account for the highest distribution share with more than 50% of the food being sold worldwide through these formats. Future demands the growth of smaller stores closer to the consumers and new formats like discounters & warehouse clubs. Large global retailers are seen moving that way. Besides these traditional channels, online retailers are also growing at a fast rate (Wazir analysis, 2015). The penetration of modern organized retail in food is currently one of the lowest at 2-3%. However, as organized retailers have started penetrating the markets this is expected to witness dramatic change over the next fold of future, e.g. by 2025, organized retail is expected to capture at least 8-9% of the food & grocery market and be worth US$ 90-100 Bn. (Rs. 5,600-6,200 Bn.), growing at a compound annual growth rate (CAGR) of 25-30% from the current levels. Supermarkets and other organized formats attract the affluent consumers, especially for bulk or less regular purchases such as

packaged foods, few FMCG goods and staples, such as rice and pulses. Even affluent consumers otherwise prefer traditional stores, as they are closer to home and many even deliver the purchased items with no additional charge and with very little threshold bill value (source: India food report,2015). By 2025, the food & grocery retail market is expected to grow over 3.5 folds and be worth US$ 1,150 Bn. (Rs. 71,000 Bn.). Urbanization, increasing population leading to the balance by demand growth, price increase, increasing incomes resulting into high spending on foods that changes food habits, have led to retail's large growth. The penetration of modern organized retail in food is currently one of the lowest at 2-3%. To a large extent this co-existence will be driven by the consumer who will not shun one channel for the other and will seamlessly switch between channels. The consumer approach to channel selection will thus be "inclusive" and not "exclusive" (source: India food report, 2015). Mr. Manish Jain & et. al. from Acropolis Institute of Management, Indore mentioned the contribution of Mridula Mishra &Umakanth Dash (2008), in his paper mentioned that independent and unorganized retailers have increasingly been under threat with the growth of major multiple retailers in the organized retail scene, but independent small shops operating in local community locations do serve a function whether it be a social or community one and provide a vital service to certain groups of consumers. Authors have also opined that the retailers are facing threat from new discounters respond with lower prices and increased promotions. The authors, Mishra and das (2008) have also highlighted that the consumer behavior has been affected due to convenience and variety of products provided by organised retailers.

III. OBJECTIVES AND METHODOLOGY

(a) Objectives-This research study attempts to find out:

(i) Demographic factors influencing the unorganized store's (Kirana) business

(ii) Reasons for customers to visit unorganized retailers against organised outlet

(iii) Challenges, faced by Kirana stores, posed by organised outlets

(iv) The strategies of the unorganized food & grocery retailers (Kirana stores) facing survival threat posed by the fast and penetrative growth of organised retailers in Bhopal city.

(b) Research Methodology-The study is descriptive in nature with exploratory texture. The unorganized retailers in Bhopal City were chosen for this study. Convenience (purposive) sampling technique has been adopted to select the samples and its size is 105 respondents (unorganized food & grocery-Kirana stores). A structured personal interview was conducted along with a designed schedule to collect primary data from the retailers (Kirana shops). Simple percentage and chi sq. test were used as statistical tools to analyze the data. Data were collected during the period of December 2016 to April 2017 only.

IV. RESULTS AND DATA ANALYSIS

Table 1

Demographic Factors (urban and semi-urban areas)

Variables	Particulars	Frequency	Percentage
Age	<30yrs	7	6.67
	31-35	16	15.23
	36-40	22	20.95
	41-45	28	26.66
	46 & above	32	30.47
Location	Urban	67	63.80
	Semi-Urban	38	36.19
Education	12th & Below	53	50.47
	Undergraduate	39	37.14
	Post Graduate & Diploma	23	21.90
Internet savy	Yes	31	29.52
	No	74	70.47

Variable	Particular	Frequency	Rank	Mean Rank
Customer's Income Group	**High**	15	3	2
	Middle	57	1	2
	Low	33	2	2

Table 1, exhibits that 30.47 per cent of the unorganized retailers fall in the age group of 46 and above. 26.66 per cent retailers are between 41 to 45. It has been found that 63.80 per cent of the retailers have their stores in the urban areas and the remaining 36.19 per cent have stores in the semi-urban areas. 50.47per cent of the retailers are educated in the bracket of 12th and below standard and 37.14 per cent are undergraduates. Internet has moved up retail industry and it facilitates customers' life to know more about products, its utility and promotions. It has been found that most of the unorganised retailers do not know how to surf internet (70.47 percent) and the remaining 29.52 per cent

internet active. Mostly middle income group customers visit the kirana stores, low income group customers ranked second and high income group customers rank third. Now, it is evident that the kirana stores (unorganised food & grocery retailers) mostly bank on middle and low income group customers for their business.

Table 2

Business Related Information

Variables	Particulars	Frequency	Percentage
Nature of Outlets	Leased	21	20
	Rented	37	35.24
	Own	47	44.76
Sizes of the Store (sq.ft)	150-200	44	41.90
	201-250	31	29.52
	251-300	21	20
	>301	9	8.57
Number of Years in Business	5 & below	7	6.67
	6-10	13	12.38
	11-15	40	38.09
	16-20	30	28.57
	21 & above	15	14.28
Family Business	Yes	91	86.67
	No	14	13.33
Nature of Business	Partnership	17	16.19
	Sole Proprietor	88	83.81
Annual Turnover (in Lacs)	3,00,000/- and below	63	60
	3,00,001/- to 4,00,000/-	16	15.24
	4,00,001/- to5,00,000/-	15	14.28
	5,00,000/- & above	11	10.47
Investments (in Lacs)	5 & below	51	48.57
	6-12	32	30.47
	13-20	10	9.52
	21 & above	12	11.43
Generation	1st	41	39.04
	2nd	64	60.95
No of working Employees	01	17	16.19
	03	47	44.76
	More	41	39.05

Table 2: it is found that 48.57per cent of retailers have invested Rs.5 Lac and below and retailers those who invested between Rs.6 to 12 lacs are 30.47 per cent. It is inferred that 44.76 per cent of the retailers have their own outlets, whereas 35.24 per cent have rented shops and 20 per cent of retailers have leased shops. 41.9 per cent of the stores have 150 -200 Sq. Ft and 29.52per cent of the stores have 201-250 Sq. Ft and 28.57 are above 250 sq.ft. of store size. It has also been found that 60 per cent of the retailers have a turnover of Rs.3 Lac and below .Retailers having a turnover between Rs.300001 to 4 lac are estimated to 15.24 per cent. 24.75 percent retailers do earn above 4 lac per year. Out of the sample retailers, approx 87 per cent own this as their family business and rest 13.33 per cent do not. Almost 66.66 per cent of the retailers have been doing this business between 11 years to 20 years and 14 percent are above 21 yrs. From this table 2, it is evident that 61 per cent of the retailers are second generation retailers and understands that the business has become a career now.

Most of the retailers (83.8%) are sole proprietor means that the business seems to be more stable and profitable with mostly 03 (45%) and above (39%) employees.

Table 3

Customer tapping Strategies of Unorganized Retailers

Variables	Particulars	Frequency	Percentage
Display Boards	Yes	42	40
	No	63	60
Discount	Yes	41	39.05
	No	64	60.95
Register to note Requirements	Yes	37	35.24
	No	68	64.76
Billing Machines	Yes	31*	29.52
	No	74	70.48
Accepting Credit / Debit Cards	Yes	17**	16.19
	No	88	83.81
Credit facility	Yes	88	83.81
	No	17	16.19
Home Delivery	Yes	71	67.62
	No	34	32.38
Customer support System	Yes	16	15.24
	No	89	84.76

Note: Number of Billing machine* and practice of accepting plastic money ** may vary because of current effect of demonetization.

Table 3: Retailers do lack in various important areas e.g. display board, discount, requirement register, billing machine, plastic money facility, and customer support to pick items. Though it affects the purchase / selling process for the changing customers still the credit and home delivery to local shoppers (due to social relationship & trust level they hold to retain customers) manages the sale comfortably.

Table 4

Reasons for Customers to Visit Kirana (Unorganized) Retailers

Factors	Observed Frequency	Expected Frequency	Rank	Mean Rank
Convenience	13	8.75	1	6.5
Discount / offers	6	8.75	12	6.5
Emergency purchase	9	8.75	6	6.5
Credit facility	9	8.75	3	6.5
Availability of small quantity items	13	8.75	4	6.5
Personalized Service	7	8.75	11	6.5
Flexible timing	6	8.75	10	6.5
Availability of smaller packets	10	8.75	5	6.5
Easy replacement	7	8.75	8	6.5
No waiting time	4	8.75	9	6.5
Goodwill	9	8.75	7	6.5
Location proximity	12	8.75	2	6.5

Test Statistics:
Chi-Square: 19.675(table value) Chi Sq: 56.0 (Calculated Value)
Df : n-1= (12-1) =11 Sig. : 0.05

Most of the customers have the main reasons of "convenience" (R-1), "location proximity" (R-2), "credit facility" (R-3), "small quantity items" (R-4) and "small packet" (R-5) and emergency purchase(R-6) to choose unorganized Kirana retailers. These reasons have enhanced Kirana retailer's goodwill (Rank-7) that has been caused by relationship maintained by Kirana stores. Organised retailers do not provide such credit facility to their customers. For urgent and emergency needs, customers visit the nearby unorganized retailers only. The test statistics declares that the factors considered impact significantly on customer's choice to visit unorganized (Kirana) grocery retailers

Table 5

Challenges faced by Unorganized Retailers

Factors	Observed Frequency	Rank	Expected Frequency	Mean Rank
Lack of Capital	19	2	15	4
Shortage of inventory	14	4	15	4
Poor Standardization	17	3	15	4
Poor Infrastructure	22	1	15	4
Lack of Skill & Training	10	7	15	4
Competition posed by organised retailers	11	6	15	4
Customer shift to organised retailers	12#	5	15	4

New generation customer #

Test statistics:
Chi-Square : 12.592(table value) Chi Sq: 8.55(cal. val.)
Df : n-1= (7-1) =6 Sig. : 0.05

While analyzing the challenges faced by unorganized retailers, infrastructure, inventory level and standardizations have been considerable challenging the unorganized retailers (Kirana stores) as the lifestyle has been changing considerably w.r.t. to consumption habit & trend at Bhopal. "Shifting of customers to organised retailers" and "Lack of capital" at Bhopal are not much challenging areas and so have not significantly impacted on survival of retailers as a challenge for the unorganized retailers. Skills and training is as of now no more concern to retailers. The test statistics declares that the factors considered pose significant challenges that unorganized retailers (Kirana) face.

Table 6

Insecurity Feeling Among the Retailers

SN	Insecurity Felt	Frequency	%age
1	Yes	36	34.29
2	No	69	65.71
		105	100%

The growth of organised retailing at Bhopal is not a big threat to unorganized retailing i.e. Kirana stores. 65.7 % of Kirana stores (unorganized retailers) do not feel insecure though big organised retailers have opened stores in the city.

V. MAJOR FINDINGS

(a) The calculated chi sq value (56) has been found higher than table value (19.675) explains that the mentioned factors (table 4) have not significantly provided sufficient reasons to visit a Kirana stores with more weighted factors like convenience, small quantity and packets, location proximity to reach them. That is why the Kirana stores might be facing other challenges to counter threats posed by organised food & grocery retailers (The test statistics declares that the factors considered impact significantly on customer's choice to visit unorganized (Kirana) grocery retailers)

(b) The calculate chi square value (8.55) has been found lower than the table value (12.592) understands that the tabulated factors (table 5) are posing great challenge to Kirana stores to survive into competition in Bhopal market (The test statistics declares that the factors considered pose significant challenges that unorganized retailers (Kirana) face)

(c) While analyzing the challenges faced by Kirana stores the infrastructure (rank 1), capital (rank 2), standardization (rank 3), inventory (rank 4) and shifting of new

generation customers to organised retailers (rank 5) are the main and important challenge for the Kirana stores.

(d) They treated "stiff competition given by organised retailers" as the last important challenge to the unorganized Kirana retailers.

The Bhopal market observes that as of now Kirana stores do not feel insecure (66%) even when big retailers open stores in their locality though in limited numbers around city. Whereas 34.29 per cent have expressed that they feel insecure in those situations as the organised sector in food & grocery are coming up with all necessary inputs and facilities to attract customers.

RECOMMENDATIONS

So the survival strategies that unorganized retailers should adopt to counter competition are:

(a) Required to be more internets savy to be adequately informed about national and international changes into the grocery business

(b) Billing and payment system (plastic money/point of sale (POS)) must be a modern approach with Kirana stores

(c) Offers and discounts are one of the customers pulling strategy of organised grocers. This must be a significant strategy for food & grocery Kirana stores (unorganized) to counter competition.

(d) Personalized and standardized services must be included in Kirana store's strategy to counter competition.

(e) Required to improve CRM to retain customers (avoiding customer switching)

(f) Require trained manpower and inventory on time.

Summarily, Kirana stores (unorganized food and grocery outlets) must focus on building CRM with strong customer pulling components to retain them for long in order to survive in the Bhopal city market as the organised retailers are growing fast with an advantage of new generation shopper's attitude and modern approach.

VI. LIMITATIONS

For this research Bhopal city has been taken into account because of low trend of lifestyle (demographic) change and growth.

(a) FMCG comprises a major range of ten and above consumable items and have varieties of factors of buying behavior. Out of them only the food and grocery has been considered in order to control the complete research.

(b) This is why only Kirana stores and primary factors of food and grocery have been taken into account.

(c) This study is limited to a retailer's experience and performance evaluation of unorganized retail formats (Kirana stores).

(d) This study is limited to unorganized retail format hence cannot be applicable to online food & grocery retail.

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Corresponding Author

Kumar Siddhartha*

Barkatullah University, Bhopal (M.P.) India

E-Mail – kumars.mktanalyst@gmail.com

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Efficient Implementation of Hybrid System Using Solar PV and Biomass

Naiyer Mumtaz[1]* Dr. S. R. Awasthi[2]

[1]Dept. of EE, RNTU, Bhopal (M. P.) India

[2]Dept. of EE, RNTU, Bhopal (M. P.) India

Abstract – One of the primary requirements of our modern civilization in any aspect is the procurement of reliable electricity supply systems. Vast part of world's population resides in rural areas. This paper discusses the renewable hybrid power generation system which is suitable for Baheya village situated in Jharkhand. All the load details of the village are collected and accordingly the amount of power to be generated is calculated. The technical, economic and C02 mitigation potential of solar PV-bio hybrid system is evaluated. Off grid hybrid power system is an attractive method to supply electricity to rural areas, especially for communities living far away from the main grid, where the grid extension is not possible. In this paper, a PV-biogas hybrid system has been modeled for the people of Baheya Village, which is located in the north eastern area of the Suwarnrekha River Ranchi. This village is under developed and lacks the electricity supply from the main grid due to its remote location. The PV-biogas hybrid system makes use of biogas and solar power to generate a major portion of the electricity as both solar irradiation and biomass is abundant in the village and it provides a green solution to the electricity shortage. The diesel generator is used to meet the energy demand at night which cannot be met by the renewable energy alone. In order to get a practical idea about technical and economical feasibility of setting up a hybrid renewable based power system in Baheya Village, some of the renewable based power plants located in different parts of the country were visited. Furthermore, a field survey is done in order to collect information about the population, load demand and to understand the socioeconomic condition of the village. The proposed PV- biogas hybrid system is able to provide cost effective, reliable and clean energy to the residents of the village.

Key words: Biomass, Solar PV, Economic Considerations, Hybrid System

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I. INTRODUCTION

Method of Hybrid power generating system enables us to improve the power system efficiency and encourage us to implement this system with renewable energy sources. To fulfil the load demand with change in load scenarios requires no's of non-conventional energy sources as Sunlight, bio-gas/bio-mass, Wind, Energy from waste of municipal, Geothermal, Ocean energy, Fuel cell, Hydro power plants etc., are needed to be combined together. After, various analysis of different renewable energy sources we found that Bio-gas is the most reliable for generating energy either in form direct heat or through generation of electric energy. The use bio-gas is associated with various advantages like it can be generated locally, reduces the emission of greenhouse gases means can contribute a large to minimise global warming effect. The rate of development of any country is directly associated with per capita Income and consumption of Energy. Energy consumption per capita is the development gradient for any nation therefore we are making an effort to increase the per capita energy consumption by utilising non-conventional energy sources. Generally, Hybrid electrical network are the integration of Solar PV array with Hydro turbines, wind turbines and/or generators running on diesel or bio-fuels/biogas. Electrical power by PV array only produced during day hours that can be stored in battery bank of suitable capacity through a special device which manages the distribution of available energy called energy manager. It also controls the whole system. The quick responsive generating units like Diesel generators are expensive to run whole the time therefore they are only employed to fulfil the frequent load demand to support the system during pick demand hours. A suitable combination of solar and other renewable energy generating technologies, coupled with a diesel generator or grid, can offer a techno-commercially efficient solution that will prove the backbone of rural connectivity. This system will offer a reliable and optimal solution at a reasonably lower cost. It can be employed economically for electrification of Indian villages. Evolution of this

technology to combine more than two power sources efficiently is based on latest research. Future scope of Hybrid power network with solar system and bio-gas is very useful. The concept used for hybrid system by using biogas and solar panel is depicted in fig (1). The energy generated by both systems is controlled by the DC control unit where we are interested to integrate both powers at same frequency level and depending upon requirements, it may be converted into AC by using an inverter for operation of various loads This study deals with assessing the technical and economic feasibility of solar- biomass hybrid system for Baheya village, Jharkhand, India.

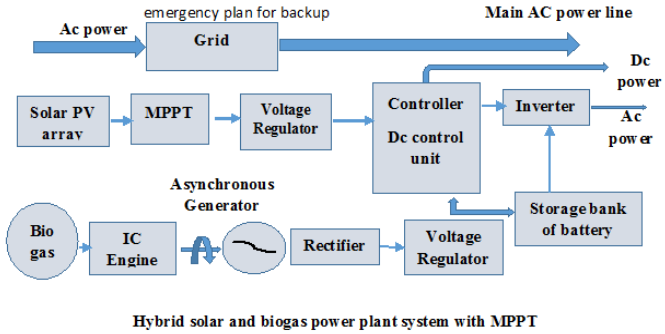

Fig. 1 Functional Block Diagram of Hybrid System

(a) Specific objectives:

(i) Analysis of availability of sun light and biomass round the year in rural areas of India.

(ii) Study of loads demand for rural areas of India

(iii) Designing hybrid power system for remote village of India.

(iv) Selection of renewable as well as reliable power generating technologies.

A survey was done to find information on energy consumption, data were collected from all 200 houses in Baheya the total animal dung collectable was also calculated.

Village Profile: Baheya Village Ranchi

Particulars	Total	Male	Female
Total No of Houses	200		
Population	974	500	474
Child	170	95	75
Literacy	71.14%	82.47%	59.65%
Total Workers	643	320	323
Main worker	286	0	0
Marginal Worker	357	89	268

Baheya is endowed with more land (0.28 ha/capita). The animal density is 0.7/capita as far as cooking fuel is concerned small quantity of kerosene is used with biomass.

II. SOLAR PV

In our world, energy from Sun in form of electromagnetic radiation is only the source, which is redial and most freely available source of energy. It is renewable, non-exhaustible and echo-friendly. The geographical condition of India is such that solar energy is available in abundant round the year. The average power from sun is about 490W/m^2/day. Batteries charged from electricity produced by solar PV systems provide power supply for 24hours. Solar Cells are photo voltaic cell which converts the energy contained in sunlight directly into D.C electricity. The special semiconductor materials like silicon, germanium and some alloys are used to manufacture solar cell of PV module. The electrical power produced from PV cell can be used to drive loads or can be stored in a battery. Generally, PV systems are robust, cheaper and most maintenance free and can be easily installed in rural areas.

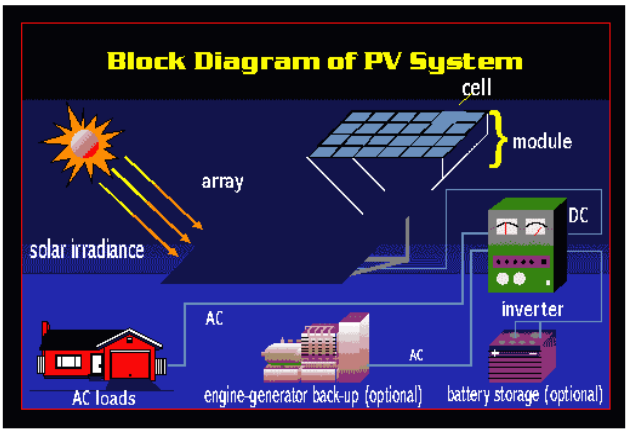

Fig. 2 Solar PV plant

The major components are PV modules, DC to DC converter, battery and inverter. The capacity of these components can be determined by estimating the load demand. The estimation of size of battery bank depends on energy to be stored, capacity of each battery, the rate at which batteries discharges and the operating temperature at which batteries are used. Usually, Lead-acid batteries are in use with Photovoltaic system.

PV cells are individual and independent units of solar PV module. Each PV cells have definite rating of voltage and current are made up of special semiconductor materials like mono crystalline silicon, polycrystalline silicon, amorphous silicon, cadmium Telluride, and copper indium gallium sulfide. These materials have the property to produce electric current when exposed to light of definite energy. Each

PV cell produces small specific amount of power with particular voltage. By combining these cells in series and parallel manner a large power rating solar PV module is constructed. In our present day with advancement of technology and manufacturing technique the efficiency of PV cells are considerably improved. Now, it is about 20-25% for polycrystalline PV cells and 40-45 for Concentrated PV cells. When light incidents on a PV cell, some part of it reflected back, absorbed or pass right through. But only the light which is being absorbed by PV cells is capable to produce electricity. The energy of the absorbed photons are transferred to electrons of atoms of semiconductor material of the PV cell. Acquiring energy from incident photons, the electrons of atoms goes to valance band to conduction band and may participate in conduction of electric current when connected to external path with some lode as bulb.

(a) **Storage battery**: Batteries or accumulators are the type of electrical storage. These are the devices which store electrical energy and may supply the stored energy whenever required. It consists of one or more electrochemical cells, and is a type of energy accumulator. It is known as a secondary cell because its electrochemical reactions are electrically reversible. Rechargeable batteries come in many different shapes and sizes, ranging from button cells to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of chemicals are commonly used, including: lead–acid, nickel cadmium (NiCd), nickel metal hydride (NiMH), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer).

Rechargeable batteries have lower total cost of use and environmental impact than disposable batteries. Some rechargeable battery types are available in the same sizes as disposable types.

(b) **Charge Controller**: This is the devices which continuously monitor the flow of charges from battery to load and PV system to batteries. It is also called charge regulator and constitute the core of every solar system. It manages the flow of power from solar panel to the battery and running loads to ensure that the battery is neither overcharged nor deep-discharged to avoid any damage in battery.

A **solar inverter** is a electrical equipment employed to transform the DC output of a solar panel into AC of frequency same as utility grid supply frequency. Some investors are specially designed for Battery backup these inverters draw energy from a battery as well as balance the battery charge via an onboard charger the excess charge is exported to the utility grid.

III. BIOMASS AND BIO-GAS RESOURCES

Biogas is a mixture of different gases in different proportion. It's constituting elements are Methane, Carbon-dioxide, Nitrogen, Sulpher-dioxide and moisture. Largest proportion of biogas is occupied by methane v/v. Bio-gas is, produced during the natural decomposition of organic matter by the process of anaerobic and aerobic digestion of in an airtight container. Aerobic and anaerobic digestion of biodegradable materials such as biomass, manure, sewage, waste, green plant material, and crops is carried out by bacteria called fermentation. Typical composition of biogas is as below:

Material	Composition of the gas (percentage)		
	Methane	Carbon dioxide	Hydrogen Sulphide etc
Cattle dung	55-80%	40-45%	Negligible
Night soil	65%	34%	H_2S 0.6% other gases0.4%

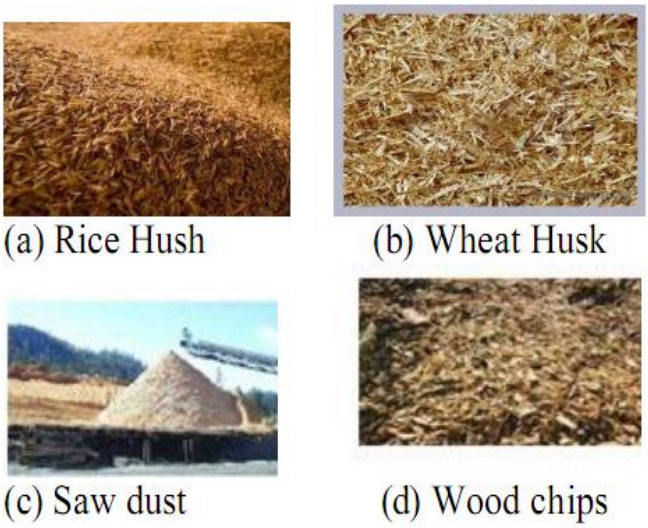

Fig. 3 Biomass Crops and wood chips

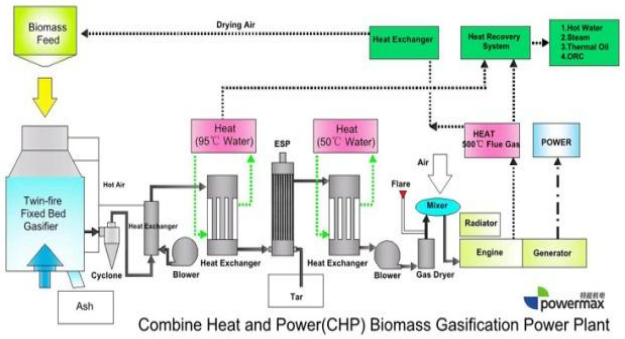

Fig. 4 Biomass Gasifier plant

Energy demand of future can be most probably answered by availability of Biomass. However, Bio-mass is available in plenty but not all biomass can be used for generation of rate electricity. Only small fraction of available biomass can be utilized to produce substantial amount of energy. Although, the energy efficiency of bio-mass electrification technology is limited and the operating and investment costs are high. Consequently financial returns are low. The range of Biomass power plants varies between 2-50 MW. The larger plant produces comparatively higher benefit because of greater energy efficiencies (usually up to 22-23 %) but have to face the bulk requirement of biomass. A suitable bio-mass can be characterized by following features as:

(i) It's increasing scarcity.

(ii) High cost and seasonal availability.

(iii) Size of biomass particles ranges from 5 cm to few mm.

(iv) The biomass stocking yard should be airy and enough open to provide necessary heat to vaporize the water content from particles.

(c) Electric Load Design Analysis:

The storage capacity, S_c, of the battery can be obtained by (4 x Total energy to be stored per day)/ (Battery voltage x battery current).

Number of panels required, N_P = Rating of solar PV plant / Rating of solar pv panel The charging controller can be designed using the following formula:

Controller current, $I_{C,}$ Total power to be stored per day / V_B

The number of batteries required can be obtained by, N_B , Total power to be stored / (V_Bx I_B) where, V_B, I_B are the voltage and current rating of each battery.

IV. LOAD ESTIMATION

Table1

Domestic load of the village

S. No.	Gadget	No	Rating (W)	Total rating(W)	Duration (hrs)	Load (kWh)
1	CFL	200	15	3000	8	24
2	Fans	200	60	12000	8	96
3	Water Pumps	7	1500	10500	4	42

Due to domestic loads units consumed per day are 162 units.

S. No.	Gadget	No	Rating	Total Rating	Duration	Load (kWh)
1	T.V	1	300	300	8	2.4
2	Computer	1	600	600	4	2.4
3	TFL	4	55	220	8	1.76
4	C.D.Player	1	100	100	8	0.8
5	Fans	4	60	240	8	1.92

Table 2

Community load of the village

(a) Energy Consumption of Village:

For community hall design the load consumed per day is 9.28 for street lighting we are using 30 T.F.Ls and these are operating 8 hrs per day, so these consume 13.2kWh per day. So the total units consumed per day are 185 units. For economic designing of system the contribution of solar PV system and bio-gas generating system must be in proper ratio. Here, our design ratio is (2/3) which is equivalent to (40/60) which means that 40% of demand is satisfied by solar PV and 60% is managed by biomass electrification. Since, 40% of total demand (185kW) is 74kW, which can be generated by installing 15kW PV plant (with 70% efficiency of rated) rest 60% can be produced by installing 10kW biogas electrification.

V. DESIGN RESULTS

(a) Modeling of PV System

Suitable PV Power Plant Rating = 15KW

Duration of operation = 7hrs

Then, total Electrical Energy Produced (Watt-hours) = 15×7= 105KWhr

The operating period of the PV module exposed to the sun is usually 9:00AM to 4:00 PM

For this design 150W power rating panels are desired.

Therefore total number required PV panels = (15000/150) =100 nos.

(b) Charging Controllers

For modeling of 15KW solar PV system, Let P is the total power to supply. Therefore P =(I x V) Where I is the charging current and V is the voltage of the battery. If voltage rating of each battery is 12V. Normal, availability of sunshine in a day is about 7 hours. Solar PV array can generate maximum 15 X 7= 105 units. It is general observation that solar PV panels only 70% of their rated capacity. Hence, designed PV system will generate 73.5 units per day. In day time we can directly feed consumers from solar power plant. To make the charging process fast we can feed directly 32% available solar power. Therefore, about 24KWh can be directly distributed without storing it. Remaining 50KWh is stored in the battery banks. *Hence* I = P/V= 50000/12=4166*Amps.*

Since, the 5KA charging controller is needed to charge the battery banks.

(c) Battery capacity

Battery capacity plays a vital role in PV system. So the battery capacity should be maintained in PV system.

So our Watt-hour capacity of the battery should be 50 kWh

To make the battery life long, we should discharge electrical energy $(1/4)_{th}$ of total battery capacity. So, we have to choose the battery capacity four times of required electrical energy.

So, desired battery capacity will be = 50,000 X 4 = 2, 00 kWh

Now, the selection of battery depends on A-H capacity of battery. For example, if we choose a battery of 500Ah having 12V voltage rating. Hence, number of batteries needed to design battery bank 2, 00,000/ (12 X 500) =34 batteries.

(d) Inverter

As analyzed above, the maximum instantaneous load on Solar PV and battery system is 30kW. Hence, required rating of pure sine wave inverter will be 30kVA for long life, reliability and consistence performance

(e) Biomass power plant

(i) Biomass resource availability-In Baheya the biomass availability is 0.36 kg/cap/day Population of the village is 1196. The total biomass availability in the village is around 420 kg; from this we can generate the sufficient power, to satisfying the load requirement of Baheya village.

(ii) Plant rating- Here we are installing the power plant is 10 kW and we are connecting to the synchronous generator, so it will gives the rated voltage and frequency and Gasifier can give the gas 12 hrs/day from this we can generate 120 units minimum per day, biomass plant is working at peak loads and solar is working at day time and solar power we are storing through batteries and one controller also we are placed so that it will control the power flow to the consumer load.

VI. ECONOMIC CONSIDERATION

Table 3

Summary of biomass

Gasifier plant capacity	10 kW
Cost of installation	Rs. 5, 00,000
Maintenance cost	Rs.10, 000
No of consumers	200
Operation hours	12 hrs
Fuel efficiency	1.5 kg of crop residue/kWh
Cost of fuel	Rs. 0.30/kg
Operating period	20 years

Table 4

Operation cost per unit electricity

Description	With grid system	With gasifier system
Electricity	Rs.4.7/kWh	Rs.0.45/kWh
Labour cost	Rs.0.48/kWh	Rs.0.66/kWh
Maintenance cost	Rs.0.1/kWh	Rs.0.28/kWh
Total	Rs.5.28/kWh	Rs.1.39/kWh

Table 5

Summary of Solar PV power plant capacity 15 kW

Cost of installation	Rs. 26,25,000
Maintenance cost	Rs 26,250
No of consumers	196
Operation hours	7 hrs
Operating period	15 years

(a) Hybrid system cost:

(i) Biomass:

Total installation cost of biomass = Rs 5, 00,000

Maintenance expenses for biomass plant = 2 % of the installation cost

Cumulative cost (installation and maintenance) of the plant installation

= 5, 00,000 + (0.02 X 5, 00,000)

= Rs.5, 10,000

Operating years = 20 years

Per day we can generate = 120 units

So, per unit cost = 5, 10,000/ (20 X 120 X 365) = Rs 0.582.

Total cost per unit generation = Installation and maintenance costs + operation cost = 0.582 + 1.39 = Rs 1.972.

(ii) Solar:

Total installation cost = 175 X 15,000 = 26, 25000. (Per watt installation cost is Rs.175)

Maintenance expanses of the solar PV power plant = 1 % of the installation cost = 26, 25,000 + (0.01 X 26, 25,000) = Rs.26, 51,250

Operating years = 15 years.

Per day we can generate = 73.5 units.

Per unit cost = 26, 51,250/ (15 X 365 X 73.5) = Rs 6.588.

(iii) Hybrid

Per unit cost from hybrid system = (2400 X 1.972 + 1102.5 X 6.588)/(2400 + 1102.5)= Rs 3.425.

Through hybrid system, per unit generation and distribution charge is not beyond Rs 4. But through main grid connection per unit tariff is minimum Rs5.50.

So, through hybrid system of generation and distribution is cheaper than conventional energy.

(iv) Carbon Reduction Potential

Co_2 emission from biomass per unit generation = 6 g/kWh Co_2 emission from solar PV plant per unit generation = 68 g/kwh

Per day we can generate power from biomass = 120 X 365 = 43,800 kWh

Per year we can generate the power from solar PV plant = 73.5 X 365 = 26,827.5 kwh Carbon emission from solar pv plant per year = 26827.5 X 0.067 = 1824.25 kg= 1.825 tonnes/year

= 1.825 carbon credits Carbon emission from biomass plant/year = 43,800 X 0.006 = 262.8 kg

= 0.2628 tones/year

= 0.2628 carbon credits from total hybrid system, the carbon emitted per year = 1.825 + 0.2628 = 2.0878 tonnes/year If the same energy is generated through conventional (coal), then carbon emitted per year = 1.5*(43,800+26827.5) = 105.94 tonnes/year. So by installing renewable hybrid system, the carbon emission reduction = 105.94 – 2.0878 = 103.85 tonnes/year = 103.85 carbon credits. Total money earned through carbon credits = 103.85* 30 = Rs 1, 36,048 per year.

A 15kw standalone solar photovoltaic system has been considered to evaluate the unit cost of energy generation. Assuming the sunshine hours of 6 hrs per day and 365 days of operation. Capital cost of solar PV is Rs 26, 51,250 and the total cost of bio energy system is 5, 10,000. Therefore, the total cost of installed capacity is Rs 31, 61,250 which is shown in

Table 3 and Table 5. The unit cost of the solar-biomass hybrid energy system is calculated above and it was found to be Rs 3.425.Here we are installing the power plant is 10 kW and we are connecting to the synchronous generator with the rated voltage and frequency. Gasifier can produce the gas 6-7 hrs/day, from this we can generate 120 units minimum per day. Biomass plant is working at peak loads. Similarly solar plant can generate power at day time for 7 hrs(from 9 a.m to 4 p.m)and at night time, batteries will discharge the stored electricity and one controller also we are placed so that it will control the power flow to the consumer load. So during clear sunny day the net power generated from solar plant is 73.5 kWh. Charge controller is placed in between solar panels and batteries to control the power flow.

CONCLUSION

Some of the remote villages are far away from the main grid so they are still unelectrified. Due to the distance problem, losses increase and transmission line installation cost also goes high. This paper discusses the renewable hybrid system with solar PV and biomass which helps in overcoming many of the problems. In this paper the load requirement of Baheya village is calculated and in order to satisfy this load the energy requirement is predicted. It can be concluded that solar and biomass hybrid system is a viable green technology source for rural electrification.

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Corresponding Author

Naiyer Mumtaz*

Dept. of EE, RNTU, Bhopal (M. P.) India

E-Mail – naiyermumtaz@gmail.com

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Detection Black Hole and Sybil Attack in GPCR-MA VANET based on Road Network

Naziya Hussain[1]* Dr. Priti Maheshwary[2] Dr. Piyush Kumar Shukla[3] Anoop Singh[4]

[1]IPS Academy, Indore (M.P.) India

[2]RNTU, Bhopal (M.P.) India

[3]UIT , Bhopal (M.P.) India

[4]Director, CMCC, Mhow, Indore (M.P.) India

Abstract – Vehicles can be directly communicated with each other if this Vehiclescomes in transmission range; the sender vehicles which send packets to the receiver's vehicle.We focused on enhancedand modified Vanet protocol Greedy Perimeter Coordinator Routing with mobility awareness (GPCR-MA) and presented the security for Blackhole and Sybil Attacks in the GPCR-MA. The solutions of blackhole and Sybil attack are verified with the help of implementation and simulation using network simulator (NS-2.35). Our investigation demonstrates the comparison between GPCR-MA, blackhole GPCR-MA (BH-GPCR-MA) and Sybil GPCR-MA (Sybil-GPCR-MA) attack in the network. This comparison carried between the simulation time and number of nodes established on QOS parameter presentation of network delay, Delivery Ratio (PDR), Average throughput and energy consumption. The packet deliver ratio performances are decreased in BH-GPCR-MA and Sybil-GPCR-MA with respect to rapidly change network state and network density of the network. The simulation results show that GPCR-MA is better than BH-GPCR-MA and Sybil-GPCR-MA.

Keywords—GPCR-MA, BH-GPCR-MA, Sybil-GPCR-MA, Vanet, Security.

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I. INTRODUCTION

VANET incorporate, vehicle to vehicles, Networks-on-Wheels and security Communication pool (Yan, et. al., 2010). Although, all at once for these advances to create them to the arrangement organize, potential security and protection problems (Hussain, Rasheed, et. al., 2013. Rostami, et. al., 2014), should be address. Since protection may be a twofold edge weapon thanks to its rivalry with different security requirements, a restrictive and exchange arrangement ought to be at the place keeping in mind the top goal to regulate the impact of rivalry. For example, if there ought to be an incident of Sybil attack and security preservation, simply associate exchange off arrangement is feasible to discourage the impact of the Sybil attack and moderate the contingent protection of the shoppers within the meanwhile (Ismail, et. al., 2007). while not tending to those problems, client loyalty are going to be a tested, which is able to foursquare influence the chance of those advances.

In this manner, on the receipt of various RREPs, the one with the most noteworthy devotion level is chosen. In any case, if numerous nodes have a similar dedication level, the RREP with the insignificant is picked. At last, directing is refined through the chosen way. Upon information delivery, the node sends an affirmation to the neighbor node inside the boundary. Next, the constancy level of RREP node is augmented as an honor for legit vehicular routing for both RREP node.Anyway, it is considered as a dark opening and the nearness of attacks is implied to all utilizing caution packets. In spite of the way that this technique handles both single and community dark opening attacks, it includes expanded capacity overhead, directing overhead and deferral.

II. METHODOLOGY

There is a form of attacks like part Attack and Sybil Attack. Black Attack is a miscalculation node procedure; it's defeating protocol to market itself taking the shortest path towards the destination node. On purpose route is about up, then the error node forwards it to the malicious attacks needs addressing (Zeadally, Sherali, et. al., 2012. Bibhu, Vimal, et. al., 2012). Nodes decline to understand the system or once a group of node drops out. The system traffics

are occupied by a random node, that doesn't exist to makes those knowledge be lost. Since this vehicle taking part in out the routing task, varied vehicles were associated with it because the switch client in (figure 1)

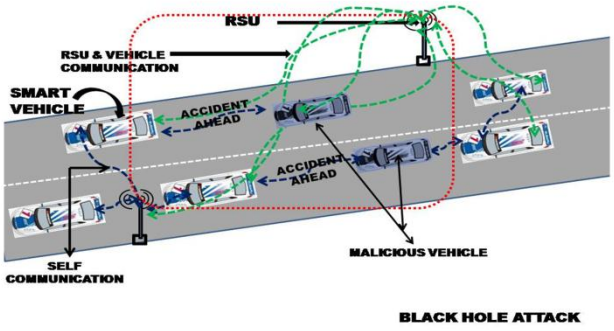


Fig. 1– Black Hole Attack (Hussain, Naziya, et. al., 2016).

The Black Hole Attack should build RREP with Destination arrangement additional noteworthy than the destination arrangement of the receiving node and sender node trusts that part node and extra interconnects with a black hole node in its place of the real destination node. This mischievous, often hurt node's interface and so waning all quality usage in accumulation to losing packets (Rawat, et. al., 2012. Bhoi and Pabitra, 2013).

Blackhole has been a dynamic zone of research and modified 'next hop information' (Hiremani & Jadhao, 2013). Many researchers proposed blackhole attack with different algorithms and security system for recognizing and handle a black hole attack. However, only a couple of researches are identifying multiple black holes in the wireless sensor or vehicular network. In (Wahane & Lonare, 2013) proposed network system thought the 'Loyalty Table. In the vehicular network, every vehicle is allotted a specific constant level, and measure the dependability of the vehicle in the network. At that point when source vehicle communicates a RREQ and carry the acknowledgement, the approach of acknowledgement (RREPs) are assembled in its routing Response Table. When average of dependability level of RREP forsource vehicle and its destination vehicleon the available routehigher than the prearranged threshold, than RREP vehicle is shownresponsible.

In Sybil attack, malicious vehicletransmitnumber of messages to other vehicles and each message comprehends asubstituteproduced source behavior is not known source or predefined source in the network. The basic destinations of the attacker vehicle are offered confusion to different nodes by sending incorrectly messages and to approve unique or (smart vehicle) headed straight on road to leave the street for the benefits of the attacker vehicle. Numerous messages containing an alternate source vehicle of created character sending by attacker vehicle to another vehicle. The attacker vehicle make numerous vehicles out and about by utilizing incorrectly messages with same personality and illusions of network traffic overload position. It's upholding another vehicle to leave the street for the advantage of the attacker vehicles shown in (figure 2).

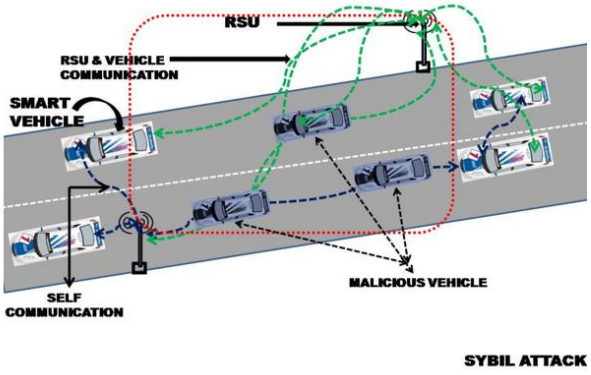


Fig. 2- Sybil Attack (Hussain, et. al., 2016).

III. RESULTS AND ANALYSIS

After the mathematics, integration and algorithms, simulated the performance of BH-GPCR-MA, Sybil-GPCR-MA and GPCR-MA with the help of network simulator 2 (NS-2.35) [13]. Here used a real road network topology. The scenario consists of 100, 200, 300, 400 and 500 numbers of Vanet nodes which is shown in figure. The movement of presenting road network nodes was generated with Vanet network simulator (Hussain, et. al., 2016). For the evaluation considered two protocols of the Vanet networks-GPCR-MA, BH-GPCR-MAand Sybil-GPCR-MA Protocol with black hole attack is developed and design for comparative study of the basic of QOS performance parameter (Hortelano, et. al., 2010).

Table 1:

Simulation parameter

Parameters	Values
Operating System	Linux (Ubuntu 12.04)
NS-2 version	NS-2.35
No. of Node	20, 40, 60, 80, 100
Packet Size	512
Traffic Type	UDP/CBR
Simulation Time	100, 200, 300, 400, 500 Second
Antenna Type	Omni-Antenna
Transmission Range	1000*1000 m
Mobility Model	Reference Point Group Mobility (RPGM)
Routing Protocol	GPCR-MA [18-19], BH-GPCR-MA, Sybil-GPCR-MA

(a) Performance Metrics

(i) Average end-to-end delay: The mathematical formula of average end-to-end delay (D) and total number of packet delivery successfully (n) in this scenario shown in equation (1).

$$\text{Average end2end delay} = \frac{\sum_{i=1}^{n}(\text{Received Packet Time} - \text{Send Packet Time}) * 1000(ms)}{\text{Total Number of Packets Delivery Successfully}} \quad (1)$$

(ii) Average network throughput: The average network throughput expressed the total amount of data packets which successfully arrived at final destination as per given simulation time. The mathematical calculation of throughput shown in equation (2).

$$\text{Throughput} = \frac{\text{PacketSize}}{(\text{PacketArrival} - \text{PacketStart})} \quad (2)$$

(iii) Packet Delivery Ratio (PDR): Packet Delivery Ratio expressed the ratio of total packets positively reached at the destination nodes source nodes. The network performance is high, when packet delivery ratio is high in the network. The mathematically calculation of packet delivery ratio shown in equation (3)

$$\text{Packet Delivery Ratio} = \frac{\sum \text{Total packets received by all destination node}}{\sum \text{Total packets send by source node}} \quad (3)$$

Average Energy Consumption: The Average spent energy is calculated by total number of energy is consumed for transmitted and received packets during the simulation in the networks. The total energy consumption is the summation of spend energy of overall nodes in the network, where the spend energy of node is the summation of energy spend for communication, packet transmit (Pt), received packet (Pr), and idle packet (Pi).

(b) Simulation Results

Several simulations scenarios on the different approaches were done. Here represent two different comparison scenarios of the present work.

Table 2:

Delay comparison table for GPCR-MA, blackhole attacks and Sybil using GPCR-MA with respect to Simulation Time and No. of Node respectively.

Simulation Time	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
100	126.09	111.74	168
200	127.14	118.73	174
300	122.9	119.74	169
400	126.66	118.73	175
500	122.45	118.73	168

No. of Node	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
20	125.82	120.73	159
40	129.94	121.73	163
60	124.55	123.74	169
80	128.01	125.74	171
100	121.29	123.73	167

Table 3:

PDR comparison table for GPCR-MA, blackhole attacks and Sybil using GPCR-MA with respect to Simulation Time and No. of Node respectively.

Simulation Time	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
100	98.75	62.99	58
200	48.78	65.7	51
300	48.86	66.46	53
400	98.71	66.9	50.6
500	48.86	68.79	56

No. of Node	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
20	98.59	70.78	61
40	98.71	72.02	59
60	98.68	73.38	57
80	98.66	71.86	59.8
100	98.7	71.98	62

Table 4:

Throughput comparison table for GPCR-MA, blackhole attacks and Sybil using GPCR-MA with respect to Simulation Time and No. of Node respectively.

Simulation Time	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
100	59.58	51.66	1.8
200	56.87	51.44	0.82
300	72.21	52.31	1.94
400	57.65	51.52	0.92
500	71.24	52.31	1.86

No. of Node	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
20	60.36	51.61	1.02
40	76.33	55.92	2.04
60	161.76	55.38	5.81
80	215.53	55.57	6.53
100	229.45	58.08	8.67

Table 5:

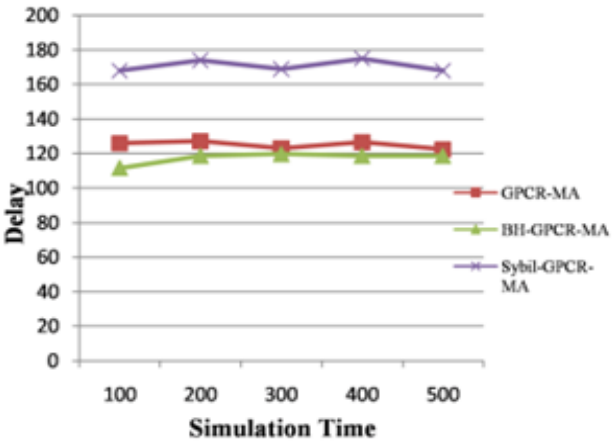
Energy comparison table for GPCR-MA, blackhole attacks and Sybil using GPCR-MA with respect to Simulation Time and No. of Node respectively.

Simulation Time	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
100	19.8	40.5	9
200	19.8	40.5	9
300	19.8	40.5	9
400	19.8	40.5	9
500	19.8	40.5	9

No. of Node	GPCR-MA	BH-GPCR-MA	Sybil-GPCR-MA
20	19.8	10.5	9
40	19.8	12.6	4.5
60	19.8	13.5	3
80	19.8	10.12	2.25
100	19.8	8.1	1.8

Average end-to-end delay: The average delay of GPCR-MA lesser the Sybilattack and higher that blackhole attack because both attach have differed behavior. Blackhole attack chose shortest route to pretend a perfect destination so average delay to setup routing is less on other side Sybil attack sends various messages to other network in network and created the a source to provide a misconception for all other nodes by this wrong messages in (Figure 3).

(Table 2) clearly indicate the performance difference between these three routing. Average delay values clearly indicating Sybil-GPCR-MA>GPCR-MA>BH-GPCR-MAwith respect to number of nodes variation or simulation time.



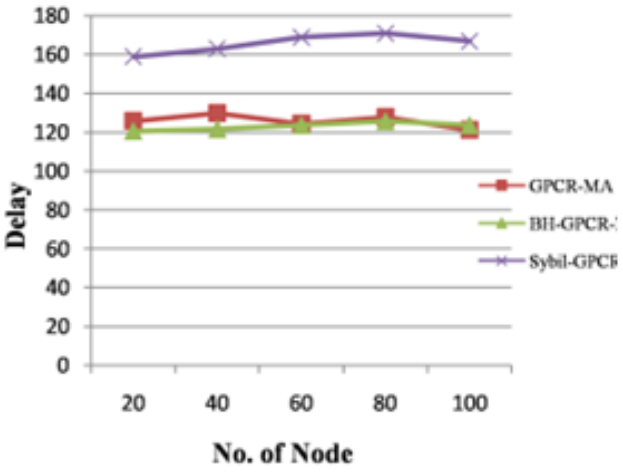


Fig.-3 Delay comparison for GPCR-MA, blackhole attack on GPCR-MA (BH-GPCR-MA) and Sybil attack on GPCR-MA (Sybil-GPCR-MA) with respect to number of node variations.

Packet Delivery Ratio: The Performance of packet delivery ratio of black hole-GPCR-MA is increased with 200 second simulation time and 20 nodes. With the variation of number of node GPCR-MA routing protocol packet delivery ratio is similar same as black

hole GPCR-MA but with respect to simulation time, GPCR-MA is better the BH-GPCR-MA

(Figure 4).

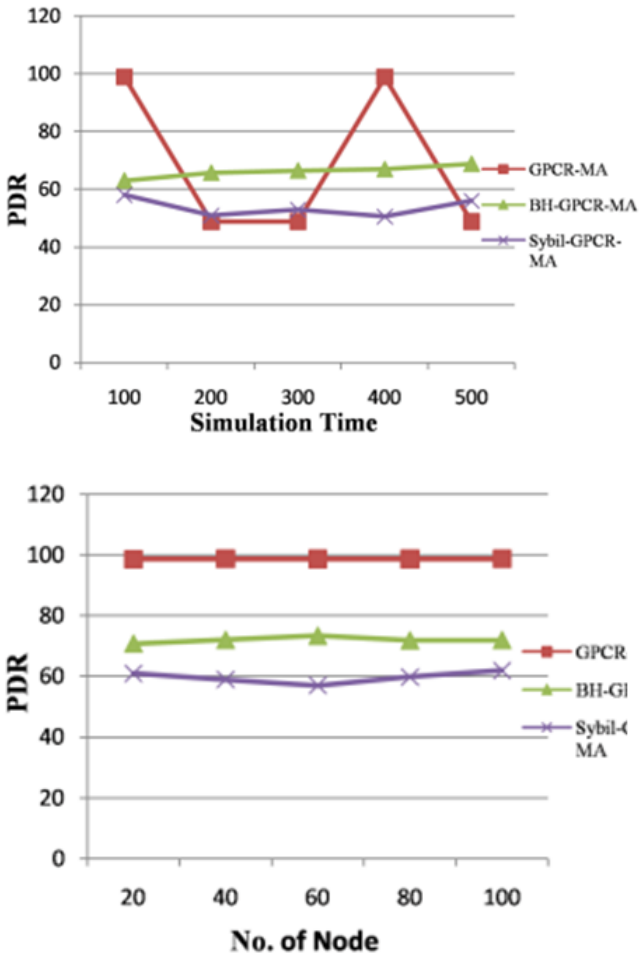


Fig.-4 Packet Delivery Ratio comparison for GPCR-MA, blackhole attack on GPCR-MA (BH-GPCR-MA) and Sybil attack on GPCR-MA (Sybil-GPCR-MA) with respect to number of node variation.

(Table 3) shows the packet deliver ratio among these three Vanet routing. GPCR-MA have highest packet delivery ratio as compare to BH-GPCR-MA and Sybil-GPCR-MA. Table-3 indicate GPCR-MA >BH-GPCR-MA>Sybil-GPCR-MA> with respect to number of nodes variation or simulation time.

Throughput: The performance of throughput for BH-GPCR-MA and BH-GPCR-MA almost same for nodes 40, 60 and 300, 400 simulation time but throughput at 20 nodes is showing the different performance as GPCR-MA decreased (Figure 5).

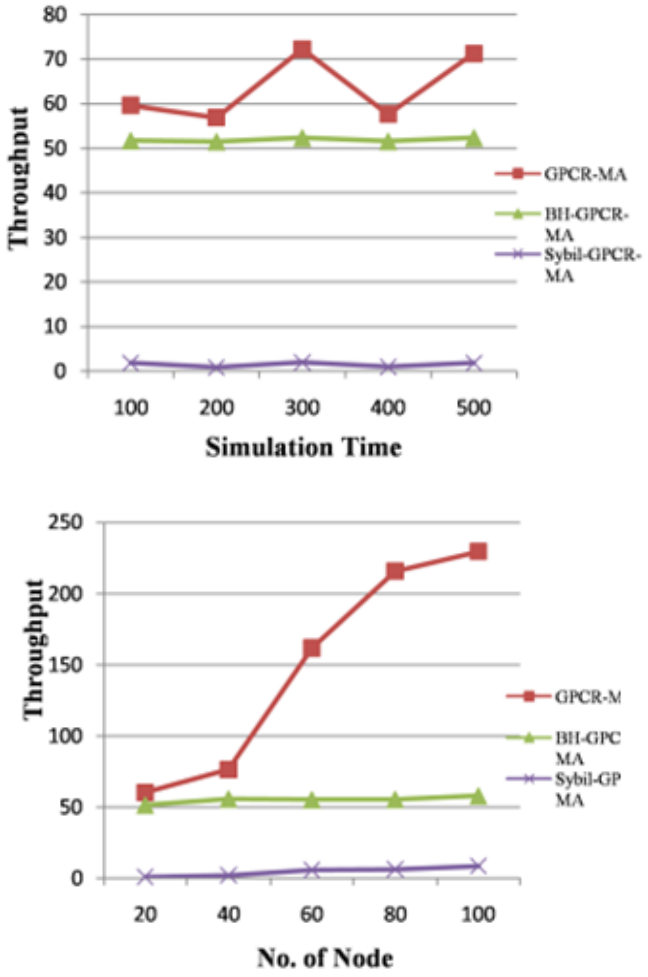


Fig.-5 Throughput comparison for GPCR-MA, blackhole attack on GPCR-MA (BH-GPCR-MA) and Sybil attack on GPCR-MA (Sybil-GPCR-MA) with respect to number of node variation.

(Table 4) shows the throughput state the amount of data message which arrived at destination as per given simulation time and number of node in Vanet Network. GPCR-MA have highest average network throughput as compare to BH-GPCR-MA and Sybil-GPCR-MA. Average network throughput for GPCR-MA >BH-GPCR-MA>Sybil-GPCR-MA> with respect to number of nodes variation or simulation time in table 4.

Energy Consumption: The Performance of energy consumption of black hole in GPCR-MA network is continuously increased as compare to GPCR-MA and Sybil-GPCR_MA have constant energy consumption (Figure 6). Each vehicle maintain the route from source to destination inside the network area with the transmission process for every data packets consumed the unit energy so based on that consumed energy increased. If traffic density and network range increase then energy consumption

also increased but BH-GPCR-MA consumed more than ten times energy as compare to the GPCR-MA.

(Table 5) energy consumption presented the total consumed energy during the network transmission during the network simulation based on the given scenarios. The total consumed energy in the network is calculated based on the all nodes, based on the transmitting, receiving and dropped packet energy.

BH-GPCR-MA consumed higher energy as compare to the Sybil-GPCR-MA and GPCR-MA routing in both the scenarios.Consumed energy in these scenario represent this combination for BH-GPCR-MA >Sybil-GPCR-MA>>BH-GPCR-MA with respect to number of nodes variation or simulation time in table5.

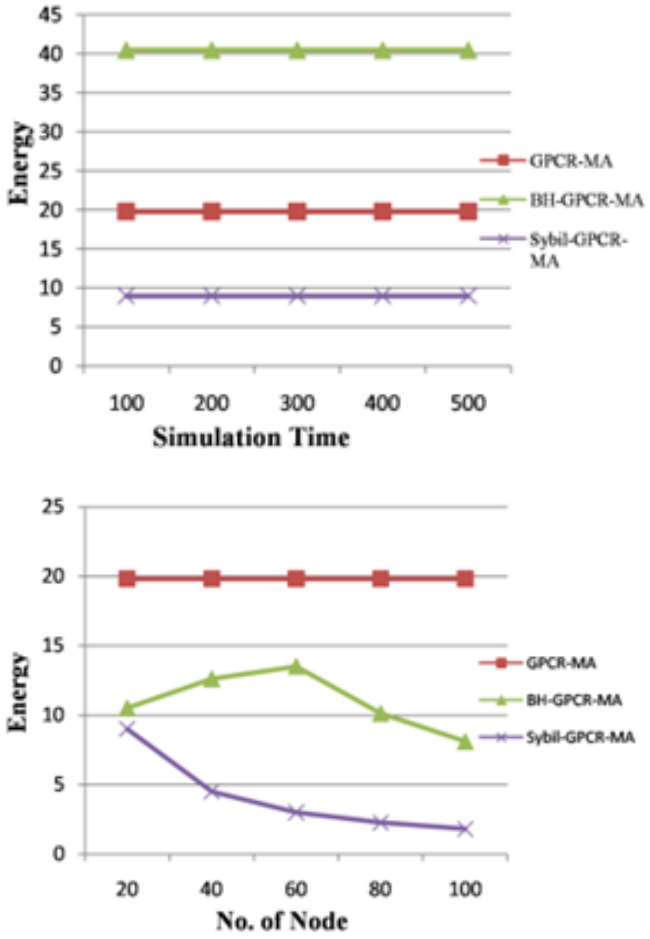


Fig.-6 Energy Consumption comparison for GPCR-MA, blackhole attack on GPCR-MA (BH-GPCR-MA) and Sybil attack on GPCR-MA (Sybil-GPCR-MA) with respect to number of node variation.

CONCLUSION

A Black Hole attacks is one of the genuine security issues in Any Vanet Network. It is an attack where a vindictive hub imitates a goal hub by sending fashioned RREP to a source hub that starts course disclosure, and therefore denies information movement from the source hub. In this paper a review on various existing strategies for identification of dark opening attacks in Vanet with their deformities is displayed. The discovery methods which make utilization of responsive directing conventions have low overheads, yet have high parcel misfortune issue. In light of the above execution correlations, it can be presumed that black Hole attacks influences organize adversely. The recognition of Black Holes in impromptu systems is as yet considered to be a testing errand. Future work is expected to a productive Black Hole attacks discovery and disposal calculation with least postponement and overheads that can be adjusted for impromptu systems helpless to Black Hole attacks. The overall performance of average end to end delay, packet delivery ration, and throughput for blackhole attack with respect to number of nodes variation are -GPCR-MA performance better to BH-GPCR-MA protocols.

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Corresponding Author

Naziya Hussain*

IPS Academy, Indore (M.P.) India

E-Mail – naziyahussain@gmail.com

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Quantitative Estimation of Photochemical in the Whole Plant Extract of Lycopus Sinnatus (Nutt.) Benth and Their Tests for Allelopathic Effect on Crop seed Germination

Parimita Purohit[1]* Abinash Pradhan[2]

[1]College of Basic Science and Humanities, O.U.A.T., BBSR (Odisha) India

[2]College of Basic Science and Humanities, O.U.A.T., BBSR (Odisha) India

Abstract – The plant authenticated as Lycopus sinnatus (Nutt.) Benth is a common weed of crop fields collected from near the maize crop field of O.U.A.T. farm campus during September 2015 to October 2015.The aquous extract of the whole plant was prepared by Soxhalation. The quantity of Alkaloids, Flavonoids and Phenols estimated are 980.46mgATE/100gmDW, 713.06mgQUE/100gmDW and 827.66mgGAE/100gmDW respectively. Two different concentrations of water solution of the extract i.e. 0.906% and 1.188% were tested for their effect on seed germination of Helianthus annus L., Lycopersicon esculentum L.,Triticum aestivum L., Oryza sativa L. and Vigna mungo L. The % of germination in control is 96 in H.annus,90 in L.esculentum,96 in T.aestivum,80 in O. sativa,28 in V.mungo. The % of germination in treatment with0.906% solution was found to be 54% in H.annus,20% in L.esculentum,58% in T.aestivum,30% in O. sativa and 16% in V.mungo whereas the % of germination in treatment with 1.188% solution was found out to be68% in H.annus,20% in L.esculentum,66% in T.aestivum,88% in O.sativa and 24% in V.mungo. Statistical analysis shows significant inhibition of germination in all cases with a good correlation between the concentration and germination percentage except in cases of O.sativa and V. mungo. The extract may be stimulatory at higher concentration. Field treatment to eliminate or prevent the formation of phytotoxins after the crop harvest may be suggested to minimize the autointoxication exhibited by some crop residues like the above.

Keyword: Common Weed, Soxhalation, Estimation,% of Seed Germination, Phytotoxin.

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I. INTRODUCTION

Human development is dependent upon the best utilization of his plant resources. Natural plants have limitless abilities to synthesize chemical substances. More than 12,000 of such chemicals have been isolated so far. These products are non-nutritive, non-essential, bioactive compounds such as Alkaloids, Phenols, Flavonoids, Tannin, and Phenolic acids etc., which serve for the defence mechanism of plants against predation by microorganisms, insects, harmful weeds and herbivores. Today due to the increasing importance of bioactive phytochemicals in human life several of them have been isolated and studied for their pharmacological activities as neutraceutics as well as their utilization in industry and Nano-biotechnology. Various environmental factors such as climate, altitude, rainfall and other conditions may affect growth of plants which in turn affect the quality of herbal ingredients (bioactive compounds) present in a particular species even when it is produced inside the same geographical boundary. Phytochemical screening techniques will help to understand a variety of chemical compounds produced by plants and quantification of those metabolites will help to extract, purify and identify the bioactive compounds for useful aspects.

Several reports says that the present day demands of increased productivity of crops using chemical herbicides or weedicides is toxic to the consumers transferred through the food chain because of bio-accumulation, bio-magnification, etc. This imposes to find out a natural way of weed management alongwith increased productivity and maintenance of sustainable environment for development.

There were reports that a large number of plants possess inhibitory effects on the germination and growth of neighbouring or successional plants by releasing allelopathic chemicals into the soil either as exudates / leachates from living tissues or by

decomposition of plant residues (Inderjit & Duke, 2003) (Lovett & Hoult, 2013). (Putnam & Tang, 1986). Allelopathic activity of plants should be the major factor enabling implementation of growth management between neighbours and defence mechanisms developed during long co-evolution with their competitors and enemies. Allelopathy gives the knowledge about allelotoxicity which helps in avoiding unexpected harvest loss. In order to construct a sustainable ecosystem the relationship between allelochemicals, microorganisms and biodegradation processes must be known, High specificity and low doses needed for allelochemicals to control crop behaviour facilitates waste water management and vegetable resource management. The election of plant species or allelochemicals with germination and growth stimulation capabilities will be crucial to assure a success in space crop establishment (Francisco, et. al., 2003).

Being the major part in the array of natural plants, the weeds seek maximum attention due to their richness in possesing maximum varieties of phytochemicals [20]. .They are mainly used because of their wide distribution, easy availability, easy storage and handling. Being undesirable materials for farmers it can be availed free of cost. As they contain wide range of chemicals,they show wide range of applications with different impacts and thereby open various options for experiment s.

Basing upon the above facts the present work takes interest in a systematic approach towards the quantitative estimation of phytochemicals like alkaloids, phenols and flavonois of a selected a common crop field weed authenticated to be in the group of Lycopus sinnatus (Nutt.)Benth. and its' unexplored allelopathic properties at the first stage of analysis. As per the literature, these weeds are native to Europe, Asia, Australia and North America and its' related species are rich in the phytochemicals like tannins, lithospermic acid, lycopene, flanvoneglycosides, phenolic derivatives, essential oils, magnesium and resin and are expected to be present in this weed. The medicinal use so far known, is for the control of hyperthyroidism etc. and ethnobotanical history of Lycopus says about the preparation of black dye from the juice of these weeds. The germination of treated seeds of crops belonging to ., Helianthus annus L., ., Lycopersicon esculentu L. ., Triticum aestivum L., Oryza sativa L. and Vigna mungo L. were taken as test materials for allopathic study

II. MATERIALS AND METHOD

(a) Collection of Plant Materials : The plant material of Lycopus sinnatus (Nutt.)Benth. was collected at their stage of flowering from near the maize crop field of OUAT farm campus at the beginning of winter season during September 2015 to October 2015. They were then washed thoroughly to remove any dirty particles attached to their body and soaked with paper towel to absorb excess of water stick to their surfaces. Thereafter the fresh weight was taken till constancy and recorded(table-I) and then, they were subjected for description and authentication. The test crop seeds were purchased from local market.

(b) Description & Authentication: This is perennial herb growing along the edges of the maize crop field with hairy and quadrangular stem, reaching upto 30-80cm tall. The oppositely arranged green leaves have oval to lanceolate blades with sinnuate margin. The leaves have reticulate venation. Cluster of tiny white flower occur in the leaf axils showing verticellaster arrangement. The plant have a minty scent. Root is tap root system (fig.1).

The plants were identified with reference to the herbarium specimens no. 247662 of Michigan state university herbarium catalogue, herbarium specimen no. NY: herbarium: 01191653 of New York botanical garden, online virtual flora of Wisconsin state herbarium, Madison no. V0079425WIS and Kew herbarium catalogue herbarium no K000929982, K000929980, K000929970, K000929981, K000929982, K000929983,GBIF ID-5605581,GBIF ID-786926 and confirmed to be the Lycopus sinnatus (Nutt.) Benth. The synonym is Lycopus americanus Muhl ex WPC Barton and the basionemes are L.vulgaris Nutt. &Lycopus vulgaris Pers.

Fig.1 Plant of Lycopus sinnatus (Nutt.) Benth

Lycopus sinnatus (Nutt.)Benth (Fig.I)is a species of flowering plants in the mint family. It is also known as bugleweed, Virginia water horehound, American water horehound. They are herbaceous plants native to Europe, Asia, Australia, and North America. The species are most often found in wetlands, damp meadows, and stream banks. Some of the wetland

species have become endangered. (From Wikipedia, the free encyclopedia for the spider genus Lycopus.

(a) Preparation of Plant Materials for Subsequent Use : After taking the fresh weight, the plant materials were oven dried between 40-45℃ for12 to 16 hours till complete drying and then the dry weight was taken till constancy and recorded in table-I. The oven dried plant materials were ground to form a coarse powder using a domestic grinder and stored airtight inside a container under dark for further utilization.

(b) Determination of Physicochemical Characters:

(i) Loss on drying: It was calculated by the following formula and recorded in Table-1% of loss =[(Fresh weight –Dry weight)/ Fresh weight]⁄100

(ii) Colour of the dried powder was observed to be Broom yellow by comparing with the colour chat and recorded in Table-1.

(iii) Texture was observed to be coarse texture by visual observation and recorded in Table-1.

(iv) Test for solubility: 0.5gms of powdered plant material was added to two stoppered glass tubes one containing 10ml. of distilled water and the other containing 10ml. of ethanol and shaken thoroughly. The tubes were then left for complete solubilization for four days. Thereafter the solutions of both the tubes were filtered by preweighed Whatman's No.1 filter paper., Residues were oven dried and weighed again. The percentage of solubility was calculated by the following formula and recorded in the table-1 % of solubility= [(Initial weight of the sample—weight of the residue)/ Initial weight of the sample]⁄100.

(v) Test for fluorescence activity:-The method followed by Rama swami Nanna et. al., 2013, was followed here. 0.5gms of powdered plant materials were taken in three stoppered glass tubes containing 10ml. of distilled water, 10ml. of ethanol and 10ml. of acetic acid (Glacial acetic acid, 100%) in each and left for four days for the release of the phytochemicals into the solution [Fig.2.(A)]. Thereafter they were placed under UV light of 30 watt capacity inside a UV chamber and the response of the chemicals to the ultra violet radiation was observed [Fig.2.(B)] and recorded in the table-1.

Sl. No.	Plant Name	Growth status	f.w. in gm.	d.w.in gm.	% of loss in d.w.	Colour	Texture	Solubility		UV fluorescence activity					
								Water	Alcohol	Water		Alcohol		Acetic acid	
										Before exposure (visible light)	After	Before (visible light)	After	Before (visible light)	After
1	Lycopus sumatus(nutt.) Benth.	Perennial,Flowering stage	511.33 gm.	125.44g m.	75.47 %	Broom yellow	Coarse	8%	28%	Burgundy	Bistro green	Mid night blue	Mid night blue	Mid night blue	Mid night blue

Table-I - Physicochemical characteristics

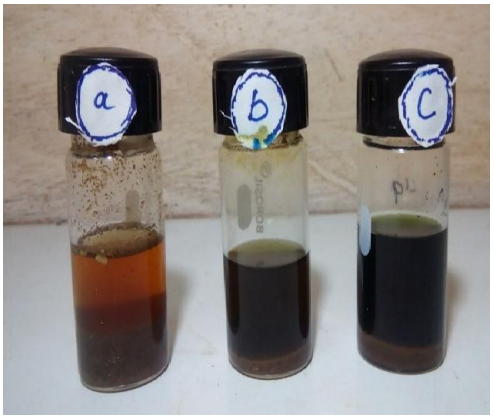

Fig. 2(a) Phytochemicals in solution before exposure to UV

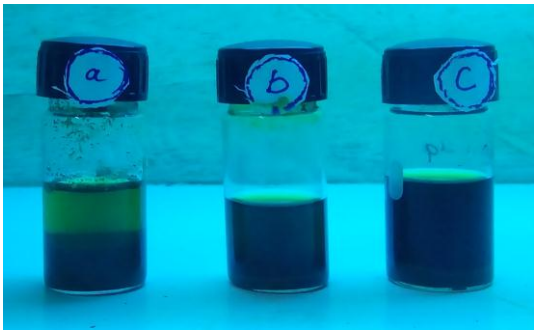

Fig. 2(b) Phytochemicals in solution after exposure to UV

(a) Extraction by Soxhalation

The extraction was carried out two times i.e.Extract 'A',prepared during February of 2016 and Extract-'B' prepared during February of 2017.The phytochemicals from powdered plant material was extracted using the soxhlet apparatus.For extract 'A' 15gm of powdered plant material(inside the thimble) was extracted with 250 ml. of distilled water(inside the flask) whereas for extract'B' 15gm powdered plant materials(inside the thimble) was extracted with 300ml of distilled water (inside the flask). This was boiled inside the soxhlet apparatus at 60^{o} C for 83hrs. .After completion of the extraction process the solution was filtered through the Whatman's No.1 filter paper into a clean dry conical flask to filter out the insoluble substances. Then the volume extracted is 191 ml for extract 'A' and 287 ml for extract 'B'. Extract 'A' was used directly for quantitative

estimation of phytochemicals . Extract 'B' was evapourated into a semisolid concentrate by boiling for 6hr and 30 minutes inside the flask of the soxhlet apparatus and weighed to a measure of 4.5059g. The apparent extractability for extract 'B' was calculated by the following way:- % of extractability=[4.5059/15]⁄100 = 30.03

(b) Estimation of Total Alkaloids:-

(i) Previously prepared extract 'A' was used here.The method followed by Rajendra Patel et al.,2015[17], was followed with slight modification. A part of extract-'A'(5ml) was treated with 2N HCl and then filtered.This solution was transferred to separating funnel and washed with 10 ml. of chloroform up to 3 times. The P^H of the solution was adjusted to neutral with 0.1N NaOH. Then 5ml. of BCG(69.8mg of bromocresol green heated with 3ml of2N NaOH and 5ml of distilled water and then diluted to1000ml with distilled water)solution and 5ml. of phosphate buffer(pH 4.7) were added to this solution. The mixture was shaken and the complex extracted with 1, 2, 3, 4 ml. chloroform by vigorous shaking. The extract was then collected in a 10ml. volumetric flask and diluted with chloroform to make up the volume.The absorbance of the complex in chloroform was measured at 470 nm. OD was taken 3 times and average was recorded.

(ii) **Preparation of Standard Curve: -** Accurately measured aliquots of 0.4, 0.6, 0.8, 1.0 and 2.0 ml. of Atropine standard solution (1mg of pure atropine dissolved in 10ml of distilled water) was transferred to different separating funnel. Then 5ml. of phosphate buffer of P^H 4.7 and 5ml. of BCG solution was added and the mixture was shaken and the complex with extracted with 1, 2, 3, 4ml. of chloroform. The extracts were then collected in 10ml. volumetric flask and diluted to make up the volume with chloroform. The absorbance of the complex in chloroform was measured at spectrum of 470nm in UV spectrophotometer (Systronic-118) against the blank prepared as above but without Atropine. The values were plotted on the graph (conc. verses absorbance) and by comparing with this standard graph the alkaloid content of the whole plant extract was found out and recorded in the table-2, Fig-3 & fig.-4 .

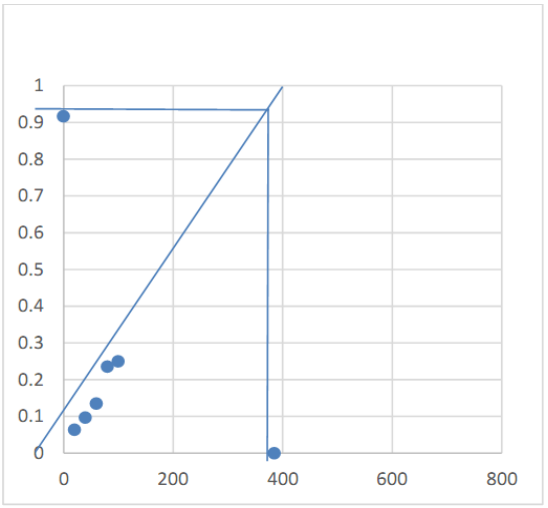

Fig. 3 Standard Graph for estimation of Alkaloids

(a) Estimation of Total Flavonoids

Previously prepared extract "A" was used here. The method followed by C.T. Sulaiman & Indira Balachandran, 2012,was followed. Total flavonoid content was measured by Aluminium chloride chlorimetric assay. An aliquot of 1ml.of the extract-'A' or of standard solution of Quercetin (0.02, 0.04, 0.06, 0.08, 0.1mg/ml.) was added to volumetric flask containing 4ml. distilled water. To the flask 0.3ml. of 5% $NaNO_2$ was added and after 5min, 0.3ml. of 10% $AlCl_3$ was added. 2ml. of 1M NaOH was added and the volume was made up to 10ml. with distilled water. The solution was mixed and absorbance was measured against the blank at 510nm.OD was taken for 3 times and average was taken. The total flavonoid content was expressed as mgQuercetin equivalent per 100gm dry weight and recorded in the table-2 &fig-4

(b) Estimation of Total Phenols:-

Previously prepared extract "A" was used here. The method as followed by C.T. Sulaiman & Indira Balachandran,2012, was followed. The total phenolic content was determined by using follin ciocalteu reagent. An aliquot 1ml. of the extract-'A' or standard solution of Gallic acid (0.02, 0.04, 0.06, 0.08, 0.1mg/ml.) was added to 25ml. of volumetric flask containing 9ml. of distilled water. 1ml of follin ciocalteu reagent was added to the mixture. The volume was then made up to mark. After incubation for 90min at room temperature the absorbance against reagent blank was determined at 550nm. Total phenolic content was expressed as mg Gallic acid equivalent per 100 gm dry weight and recorded in the table-2 &fig-4.

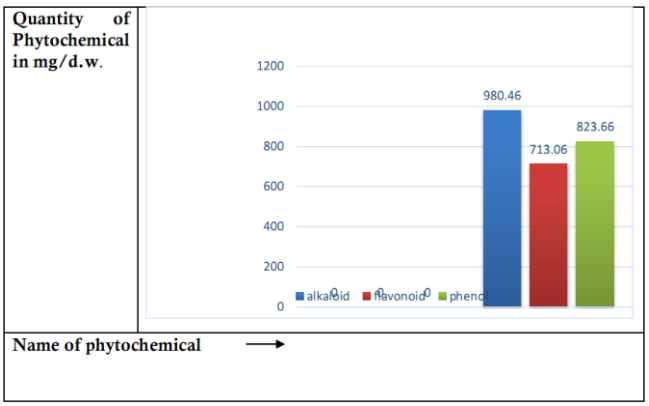

Fig. 4 Histogram for quantitative estimation of phytochemicals

Table-2

Quantitative Estimation of Phytochemicals

Name of the plant	Quantity of Alkaloids	Quantity of Flavonoids	Quantity of Phenols
Lycopus sinnatus (nutt.) Benth.	980.46mgATE/100gm DW	713.06mgQUE/100gmDW	827.66mg GAE/100 gmDW

(a) Test for Allelopathic Effect:

For this the method followed by Garcia-Mateos,R. et al.2002[7], Sangita chandra et. al., 2012 and Aan Beatriz Gatti et al.,2010, with slight modification was followed. In the process the concentrated extract-'B' was made into two different concentration of 1.188% or 0.89gm/75ml and 0.906% or 0.68gm/75ml by adding 75ml of distilled water to each. Each concentration was equally distributed into five clean stoppered glass tubes each containing 15ml of the solution. Another set of five clean stoppered glass tubes were taken each containing 15ml of distilled water.

To the tubes containing distilled water, 50 no.s of untreated seeds of each of Oryza sativa L., Triticum aestivum L., Lycopersicon esculentu L., Helianthus annus L., and Vigna mungo L., were added for soaking for around 6days.Thereafter 50 soaked seeds of each kind were transferred to each glass tube containing 15ml of both 1.118% concentration and 0.906% concentration. The rest 50 seeds in each of the 5 glass tubes containing distilled water were left for control treatment. After 6 days of this treatment of soaking, all the soaked seeds were placed evenly in 15 separate mud pots with well aerated garden soil. They were allowed for germination for 8 days with frequent watering by water spray to avoid drying. Percentage of germination was calculated and recorded(Table-3) at regular interval for 8 days to screen the allelopathism (fig-5& fig- 6).All the readings were statistically analyzed by coefficient of variation,, variance ratio, F-ratio, Correlation coefficient ,and chi square value and recorded in table-3.

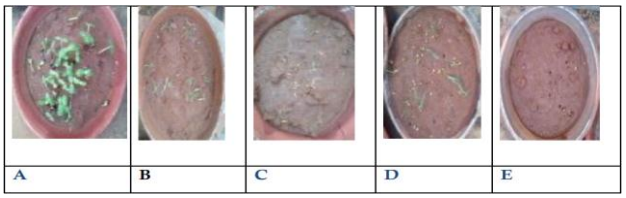

Fig.-5 Seed germination in control

(i) Helianthus annus L.,

(ii) Lycopersicon esculentu L.,

(iii) Triticum aestivum L.,

(iv) Oryza sativa L.,

(v) Vigna mungo L.

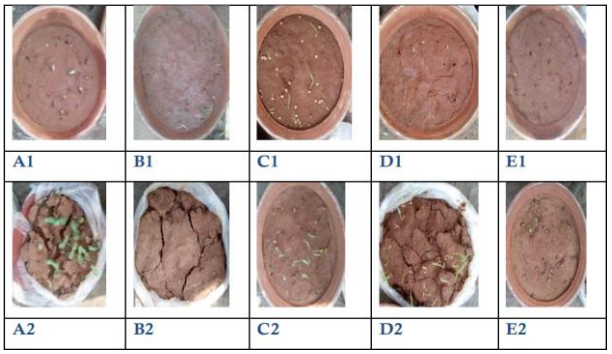

Fig. 6 Effect of plant extract on seed germination

(a) Treatment with plant extract of 0.906% concentration

(b) Treatment with plant extract of 1.188% concentration (A1), (A2)-Helianthus annus L.(B1), (B2)-Lycopersicon esculentu L.; (C1), (C2)- Triticum aestivum L.;(D1), (D2)-Oryza sativa L.;(E1), (E2)- Vigna mungo L.

3. RESULT

(a) Physicochemical Charactristics And Quantitaative Estimation of Phytochemicals :

The physico-chemical characteristics recorded in the Table- I showed that the collected plant material measured to 511.33 gm in fresh weight and 125.4 gm. in dry weight. After drying the dry powder made was broom yellow in colour & the texture was coarse. The loss on drying was calculated to be 75.47%. The solubility in water and alcohol was determined to be

8% and 28% respectively. The colour of the fluorescence of the dry powder in water was observed to be Burgundy before exposure to UV and Bistro green after exposure to UV, whereas the colour of the fluorescence of dry powder in both alcohol and acetic acid remained same (Mid night blue) both before and after exposure to UV. The result in table- II showed that the quantity of alkaloids, flavonoids and phenols are 980.46mg, 713.06 mg and 827.66 mg respectively (fig 3 &4).

(b) Tests for Allelopathism

Result recorded in the table-3 and figure- 5 & 6 showed the percentage of germination for H.annus L. in control ,in treatment with 0.906% of extract 'B' and in treatment with 1.188% of extract 'B' were 96%, 54% and 68% respectively. For Lycopersicon esculentum L. The % of germination was 90% in control, 20% with 0.906% treatment and 20% with 1.188% treatment. The % of germination in Triticum aestivum L. was 96%, 58% and 66% in control,in treatment with 0.906% and in treatment with 1.188% respectively. In Oryza sativa L. the % of germination was 80% in control, 30% with 0.906% treatment and 88% with 1.188%. In Vigna mungo L., 28% in control, 16% with0.906%treatment and 24% with1.188%treatment. The values were statistically analysed using the functions like % of variation, variance ratio, F-ratio, correlation coefficient and chi square technique. The % of variations for Helianthus anus L. is 29.1 at 1.1885conc and 43.7 at 0.906%conc., for Lycopersicon esculentum L.it is 77.7 at both 1.188% conc. and 0.906% conc., for Triticum aestivum L. it is 31.2 at 1.188% conc. and 39.58 at 0.906%conc., for Oryza sativa L. it is 10% at 1.188%conc. and 62.5 at 0.906%conc., for Vigna mungo L. it is 14.28 at 1.188% conc. and 42.85 at 0.906%. The correlation coefficient for Helianthus anus L. is -0.85, for Lycopersicon esculentum L. is -0.97, for Triticum aestivum L. is -0.91, for Oryza sativa L. is -0.17and for Vigna mungo L.it is -0.59.The chi square values for Helianthus anus L. is 26.54, for Lycopersicon esculentum L. is 108.89, for Triticum aestivum L. is 24.42, for Oryza sativa L. is 32.05, for Vigna mungo L. is 5.71.The variance ratio for H.. annus L. is 2.25 ,for Lycopersicon esculentum L. is 1.0 ,for T. aestivum L. it is 1.6 ,for O. sativa L. it is 39.06 and for V. mungo L. it is 9.0.The F-ratio is 457.35,1088.9, 414. 85, 988, 37.35 for H. annus, L. esculentum, T. aestivum, O. sativa and V. mungo respectively.

Sl No.	Name of plants	TREATMENTS									% of Variation.		Variance ratio	F-ratio between treatments	Correlation coefficient	Chi square value
		Control			0.906% of extract "A"			1.188% of extract "A"								
		Total No. of seeds	Total No. of seeds germinated	% of germination	Total No. of seeds	Total No. of seeds germinated	% of germination	Total No. of seeds	Total No. of seeds germinated	% of germination						
1	Helianthus annus L.	50	48	96	50	27	54	50	34	68	In0.906%	In 1.188 %	2.25	457.35	-0.85	26.54
											43.75	29.1				
2	Lycopersicon esculentuL.	50	45	90	50	10	20	50	10	20	77.7	77.7	1.0	1088.9	-0.97	108.89
3	Triticum aestivum L.	50	48	96	50	29	58	50	33	66	39.58	31.25	1.6	414.85	-0.91	24.42
4	Oryza sativa L.	50	40	80	50	15	30	50	44	88	62.5	10	39.06	988	-0.17	32.05
5	Vigna mungo L.	50	14	28	50	8	16	50	12	24	42.85	14.28	9.0	37.35	-0.59	5.71

Table No. 3: The Effect Of Plant Extract On Seed Germination

IV. DISCUSSION

(a) Analysis on physicochemical characteristics:

The physicochemical characteristics recorded in the Table- 1 showed the loss on drying is 75.47%. This is quite reasonable for susceptibility of the plant to environmental interaction to compete with the nearby crops. It is supportive to its perennial habitat. According to Nilsen, 2002, allelopathic interactions are primarily based on the synthesis and release of secondary metabolites by higher plants that initiates a wide array of biochemical reactions which induce several biological changes. In nature many plant species grow together and interact with each other by inhibiting or stimulating the growth and development through allelopathic interactions in an ecosystem the dominant plants growing within it are exhibited in the form of pure stands or monothickets. Such ecosystem always show the zones of inhibition around them. The ecosystem infested by dominant weed show drastic alteration in their structure and functions. The weeds of the dynamic ecosystems like crop fields originate in natural environment and become hurdle to the crops. The colour (Broom yellow) speaks about the properties of the phytochemicals present in the dry powder that it is a mix of both acidic and basic types. However the solubility test shows that those are having low solubility. This may be due to coarse texture of the prepared powder. More solubility in alcohol indicates the nonpolar nature of the phytochemicals.Fluorescence Activity of the plant materials : The result of fluorescence study in table- 1 & fig. 2(A) & 2(B) showed that there is change of colour with water solution on exposure to UV light where as there is no colour change in solution with alcohol and acetic acid on exposure to UV light. Change of colour is an indication of positive fluorescence activity. This is correlated to the fact as described by Rama Swamy Nnna et. al. 2013, that the phytochemicals present in the plant material are UV sensitive. Under UV those phytochemicals converted into fluorescence derivatives which fluorescences. This is an important parameter for

pharmacognostic evaluation. It justifies the ethnobotanical use of this plant in the preparationof black dye[14].

(b) Quantitative estimation of phytochemicals:

The quantity of alkaloid (980.46mgATE/100gmD.W.), flavonoid (713.06mgQUE/100gmD.W.) and phenols (827.66mgGAE/100D.W.) as recorded in the table- 2 & fig.3 & 4, is quite considerable. It is rich in phytochemicals. This is in favour of its perennial habit. This is also in accordance with the report of John R. Steep & Daniel E. Moerman, 2001, that means in perennial weeds which grows under dynamic ecosystem or in drastical areas, always invest more in the quantity than quality of phytochemicals.

(c) Analysis on test for allelopathic effect:

The result recorded in the table -3 and figure- 5 & 6 showed that the percentage of germination is 96% in control for Helianthus anus, 90% for Lycopersicon esculentum, again 96% for Triticum aestivum, 80% for Oryza sativa and 28% for Vigna mungo whereas with 0.906% conc. of extract 'B' it is 54% for H.anus, 20% for L.esculatum, 58% for T.aestivum, 30% for Oryza sativa and 16% for Vigna mungo and with 1.188% conc. of extract 'B' it is 68 % for H.anus, 20% for L.esculatum, 66% for T.aestivum, 88% for O.sativa and 24% for V.mungo. The values are significant at all probability levels of chi square tests. The % of germination in control is higher than the treatments in all cases except in O.sativa at 1.188% conc. This correlates to the fact that there is inhibitory effect at the present concentration, but with 1.188% conc., all shows significant increase in the percentage of germination than at 0.906% conc. of extract. It correlates to the fact that there is inhibitory effect at low concentration and may be stimulatory at higher doses. The inhibition is concentration dependent. This slightly differed from the view of Mallik and Williams, 2005. According to them the higher concentrations of allelochemicals usually inhibit the growth of recipient plants and soil microorganisms or both. However they have stimulatory effects at lower concentrations on growth, development flowering, fruiting and yield. Nie et. al. 2003 (a,b) also reported the inhibitory effect of aqueous extract of Wedelia trilobata on Brassica parachinensis where they found the reduction in seed germination percentage fresh weight of roots and aerial parts, plant height, and chlorophyll contents. They claimed these effects are due to inhibited activities of peroxidase, superoxide dismutase, nitrate reductase and disruption of nitrogen metabolism. Similarly Penna et al., 2003, reported the inhibitory effect of aqueous extracts of Chenopodium ambrosioides on seed germination of Bidens pilosa. Sangita Chandra et al.,2012, reported that hydroalcoholic extract of root of Withania sominifera exhibit remarkable negative allelopathic effect on seed germination and radical growth of Cicer arietinum and Triticum aestivum .Triticum aestvum was found to be more sensitive than Cicer arietinum. In the present report more sensitivity was found in Vigna mungo According to Sangita Chandra et al. plnt exhibit allelopathic activity due to release of allelochemicals of different classes mainly plyphenolic compounds(flavonoids, tannins), Cyanogenic glycosides and alkaloids. The quantitative estimation of phytochemicals in the table - 2 of the present work justified this. Rice,1984 and Mandava,1986, indicated that the allelochemicals act through negative or positive impact on i) cell division and cell elongation, ii) phytochrome induced growth iii) membrane permeability iv) mineral uptake v) stomatal opening and photosynthesis vi) respiration vii)protein synthesis and changes in lipid and organic acid metabolism viii) inhibition and stimulation of specific enzymatic activities. The values of coefficient of variation shows the is consistent. The values of correlation coefficient in cases of H.anus, L. esculentum and in T. aestivum is significant except in o. sativa and Vigna mungo is insignificant. This indicates good correlation (positive/negative) between the conc. and the percentage of germination. The chi square values shows significant property of the result at all probability levels excepting the case of V.mungo where it is significant at 0.05 level only. The variance ratios and F-ratios are all significant at 0.05 and 0.01 probability levels which justifies that there is definite effect of the phytochemicals over the percentage of germination of crop seeds and justify them as allelopathic.

V. CONCLUSION

The physicochemical characteristics said that the phytochemicals present in the extract are able to absorp the UV range of electromagnetic radiation. It is a pharmacognostic character which will be helpful for the diagnosis of right drugplant during drug dulteration. However the use of uv absorbing phytochemicals should be restricted in case of use in cosmetics etc. The presence of good amount of phytochemicals in the plant may be subjected to isolation and purification and identification for further use in medicineindustry or pharmacological industry.

The allelopathic property of the phytochemicals on test crops H. annus, L. esculentum, T. estivum, O. sativa, V. mungo in 2 different concentrations says that they may be stimulatory at higher concentrations and subjected to further research for positive allelopathism over the crops.However according to Khalid , S. et al.,2002, this weed can be used for field treatment to reduce the autointoxication by some crops like the test crops.

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Corresponding Author

Parimita Purohit*

College of Basic Science and Humanities, O.U.A.T., BBSR (Odisha) India

E-Mail – parimitapurohit@gmail.com

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Study and Analysis of Various Solar Tracking Systems

Prof. Shrikant Vaishnav[1]* Dr. S. R. Awasthi[2] Prof. Nitin Mishra[3]

[1]Dept. of Electronics & Communication, RNTU, Bhopal (M.P) India

[2]Center for Renewable Energy, RNTU, Bhopal (M.P) India

[3]Dept. of Electronics & Communication, RNTU, Bhopal (M.P) India

Abstract – Energy requirement continues to increase with the growth in population. The fossil fuel based conventional sources of energy are widely used but they are polluting and depleting fast. Whether it is the conventional or non-conventional source, solar energy is the mother of all these forms of energy. It gives light and heat energy in such a manner that doesn't harm the environment. Power obtained from the fixed solar mounting system due to its fixed arrangement is very little. The power generation from solar panels can be increased with the help of tracking systems in such a manner that panels face the sun during the day in all the seasons. A comparative analysis and study of various solar tracking systems are presented in this paper.

Keywords- Solar Tracker, Photovoltaic System, Sensor, Solar Energy, Renewable Energy.

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1. INTRODUCTION

In the modern era, energy is needed in different forms for day to day activities. The fossil fuel reserves are depleting fast and also, they are primarily responsible for climate change which has emerged as the biggest challenge of 21st century. In the modern lifestyle, energy consumption is increasing rapidly and hence the situation compels to minimize dependence on fossil fuel-based power generation and adopt renewable sources of energy. The fossil fuels emit greenhouse gases that are responsible for global warming which has been established as the main cause of climate change. Sun is a free source of other renewable energies sources such as wind, water, biomass etc.

Solar energy reaches earth in the form of light and heat. Solar cell itself does not produce much power when used alone. The cells are assembled and interconnected to form panels. The main drawback in the use of solar energy is that energy density and efficiency of solar PV cell are low. The solar panel of fixed mounting structure cannot be facing towards the sun all the time. The power generation from solar panels can be enhanced if the panels track to face the sun. In a dual axis tracking system, the enhanced power generation of 30 to 40% can be obtained in a year.

The initial cost of fixed type solar panels is very less but on the other hand, generated power is also very less.

In view of this, tracking systems may offer a way to enhance power generation. A solar PV panel facing the sun in the morning, noon and, evening is shown in Figure-1.

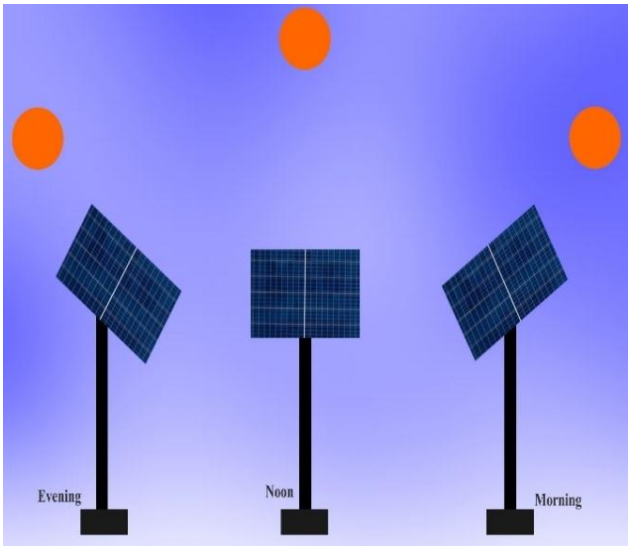

Fig.1 Solar Tracking System

2. TYPES OF SOLAR TRACKING SYSTEM

For several years, developments are taking place in the field of tracking systems and the process continues with innovative ideas. The classification of solar trackers on the basis of axis, feedback, and energy are given in Figure-2.

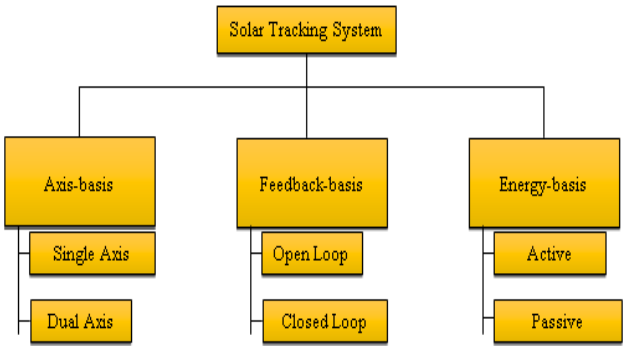

Fig.2 Classification of Solar Tracking System

(i) **Axis basis:** The solar tracker are single or dual axis type.Single axis tracking system moves only in one direction (x or y-axis).It is simple, cheap, easy to install and has less number of moving or electronic parts to control and handle the tracking. The dual axis tracker moves both in vertical and horizontal directions (x and y-axis). It is complex, difficult to install, costlier and has a larger number of moving parts to control and handle the tracking.The condition where generation is of prime importance, dual axis tracking system is prefered due to its higher generation capability.

Both the single and dual axis can be astronomical or sensor based.

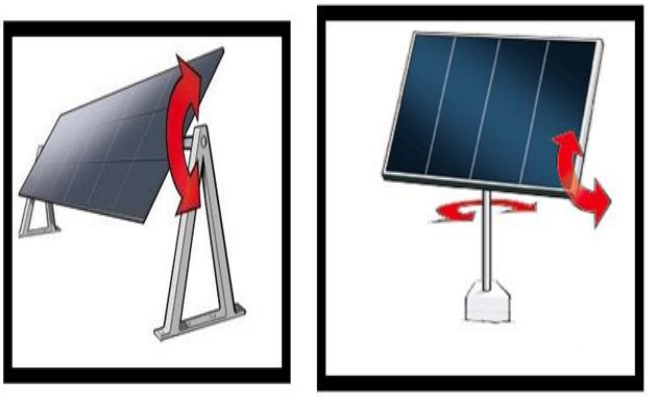

Fig 3 Single and Dual Axis Solar Trackers

(ii) **Feedback-basis:** It may be possible that the type of solar tracker can be open loop or closed loop. An open loop tracking system is one in which controller doesn't receive any information related to the output and proper working as there is no feedback system. While the closed-loop system is one in which output is connected to the input and this time each and every information related to output is in the knowledge of the controller.Thus the closed-loop system is recommended in every case.The sensor-based tracking system is a good example of the closed loop tracking system.

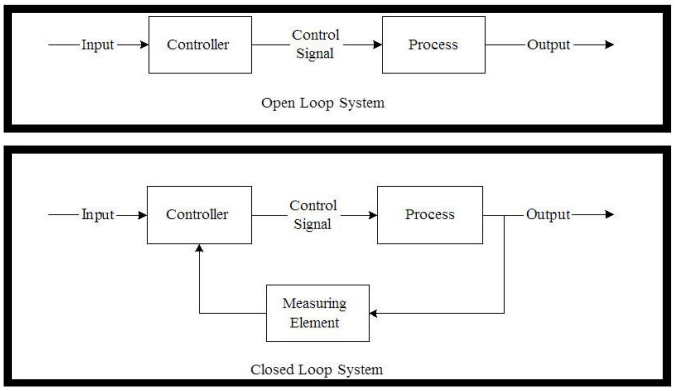

Fig 4 Open and Closed Loop Solar Tracker

(iii) **Energy-basis:** the solar trackers are active or passive types.An active solar tracker is one that needs electrical energy (AC or DC) to move solar panels. The passive solar tracker is not dependent on electrical energy. It makes use of solar heat to increase the pressure of gas with a low boiling point. The movement of solar panels towards the sun depends on the pressure of gas.For higher reliability, active system is preferred. The reliability of active system is lower due to several electrical and mechanical components.

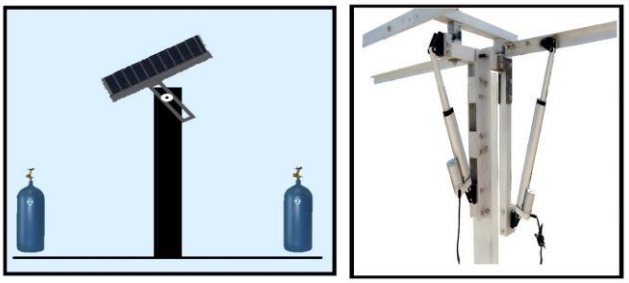

Fig 5 Passive and Active Solar Tracker

A comparison of different types of solar tracking systems is given in Table-1.

Table 1 Comparison of Different Tracking Systems

Parameters	Axis		Feedback		Energy	
	Single Axis Tracker	Dual Axis Tracker	Open loop Tracker	Closed Loop Tracker	Passive Tracker	Active Tracker
Reliability	High due toless number of moving parts	Low due to large number of moving parts	Depends on the mechanical support structure	Depends on the mechanical support structure	Unreliable	Depends on mechanical Support structure
Tracking method	Either astronomical or sensor based	Either astronomical or sensor based	Astronomical	Sensor based	Either astronomical or sensor based	Either astronomical or sensor based
Tracking Accuracy	Depends on the selection of tracking method	Depends on the selection of tracking method	Lower but higher than passive tracker	High	Low	Highest
Cost	High but lower than dual axis	Highest	Medium	High	High	Low
Power Consumption	Low	High	Depends on number of motors	Depends on number of motors	Highest	High
Availability	Easily available	Easily available	Easily available	Easily available	Difficult	Easily Available
Feedback	Depends on the selection of tracking method	Depends on the selection of tracking method	No	Yes	Depends on the selection of tracking method	Yes
Tracker Driving Device	Actuator or drives	Actuator or drives	Actuator or drives	Actuator or drives	Gas cylinder	Actuator or drives
Electronics Part Count	Small number	Large number	Small number	Large number	Little or none	Large number
Generation	High but lesser than dual axis	Highest	Depends on the number of axes adopted	Depends on the number of axes adopted	Lowest	Depends on the number of axes adopted
Driving Energy	Electric energy	Electric energy	Electric energy	Electric energy	Mechanical energy(gas driven)	Electric energy

3. CONCLUSION

After study and analysis of various tracking systems. It has been observed that there is no single tracker to suit all the situations. Hence, an appropriate decision needs to be taken on the project to project basis.

Small-scale rooftop installations for local use may not be provided with any tracking system to minimize capital investment. This system is totally stationary and hence more sturdy and reliable.

While selecting the tracker, extreme climatic conditions at the site must be taken into consideration. To obtain higher generation, the options of the single axis, as well as double axis tracking are available. With some extra coast, the single axis tracking system may be considered to enhance generation. Dual axis tracking system increases the cost but is desirable to maximize generation at a site with land constraint. A quality work in tracking and support systems and their O&M is necessary to ensure smooth functioning of tracking systems to improve reliability.

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Corresponding Author

Prof. Shrikant Vaishnav*

Dept. of Electronics & Communication, RNTU, Bhopal (M.P) India

E-Mail – shrikantvaishnav@hotmail.com

Implementation of Mobile Agent Intrusion Detection System Based on Significant Parameters

Aumreesh Kumar Saxena[1]* Dr. Sitesh Sinha[2] Dr. Piyush Shukla[3]

[1]Asst. Prof. (AP) in CSE Dept of SIRTS, Bhopal (M.P.) India

[2]Prof. CSE Dept. RNTU, Bhopal (M.P.) India

[3]Prof. CSE Dept. UIT RGPV, Bhopal (M.P.) India

Abstract – Unauthorized accesses of computer application and network are biggest issue in the field of computer security. Due to the popularity of the computer system and computer applications, new kinds of attacks are emerging rapidly. The Intrusion Detection Systems (IDS) detects this type of intrusion activity. This paper is design and development of IDS using mobile agent to enhance the efficiency as compared to previous IDS based on Mobile Agents. Furthermore this paper is also the deep study of significant parameters called features of NSLKDD data set and its values. On the basis of deep analysis of 41 feature of NSLKDD dataset, 13 significant features and its threshold values identified by proposed IDS. Total five rules for the identification of normal and abnormal (DOS, U2R, Probe, R2L) packet is designed which is based on 13 significant features. Our deep analysis of significant parameters and experiments clearly shows that proposed IDS is more effective and accurate which is also reducing response time and false alarms rate.

Keyword—Intrusion Detection System (IDS), Network, Host, Agent, Mobile Agent (MA), Alert Agent, Network Agent, Packet Capture Agent, Tenet Agent

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I. INTRODUCTION

The Internet is a network of computer networks. It has evolved from the interconnection of networks around the globe (Naser Fallahi, et.al. 2016). Internet connection may be used by hackers (or as some would rather call them crackers) to gain unauthorized access to local network (Audrey 2016). Availability of computing facilities can also be targeted by Denial of Service (DoS) attacks numerous techniques have been produced to secure the network infrastructure and correspondence over the Web, among them the utilization of firewalls, encryption, decoding and virtual private networks systems (Zhang Ran 2012). Intrusion detection is a new extension to such techniques. Intrusion detection system began showing up over the most recent couple of years. Utilizing intrusion detection system, we can gather and utilize data from known sorts of attacks and see whether somebody is attempting to access system or specific hosts (Gidiya Priyanka et.al. 2012). IDS are commonly mistaken for a firewall or as a substitute for a firewall. While they both relate to network security, IDS differs from a firewall in that a firewall looks out for intrusions in order to stop them from happening (Gidiya Priyanka et.al. 2012).

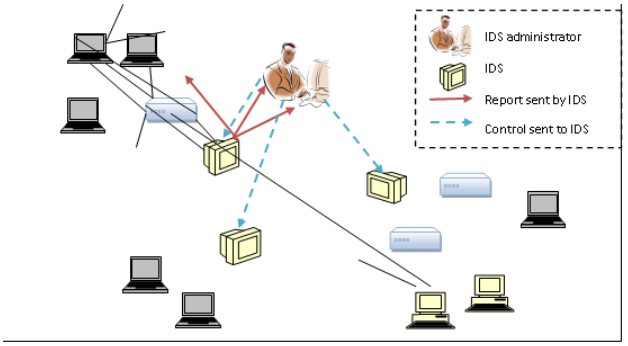


Fig. 1: Working of IDS

The firewall limits the access between networks in order to prevent intrusion and does not signal an attack from inside the network. Figure 1 shows the working of IDS in a network. The Major IDS Classifications (see figure 3) are Active IDS, Passive IDS, Network Intrusion Detection Systems (NIDS) and Host Intrusion Detection Systems (HIDS) (Anuradha Sainiand Neelam Malik 2012). On The

Bases of Detection Method IDS are Anomaly Detection Based and Signature Detection Based.

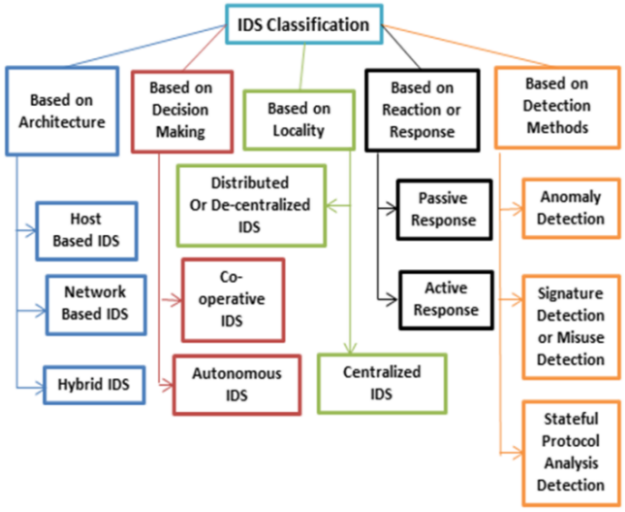


Fig. 2: IDS Classification (Anuradha Sainiand Neelam Malik 2012)

2. RELATED WORK AND PROBLEM FORMULATION

Earlier research introduced a methodology to identify attack intrusion using agent based, time based and many more type detection. The method used to identify anomalies based and misuse on the number of connection made in predefines threshold values (Rajashree Shedge, 2012, Djemaa 2012). In this they have capture approximately one thousands of packet in given value but they have not cleared about packets due to unreliable in nature, so this is very difficult task to identify normal and abnormal behavior of packet with accurate way. In existing misuse detection IDS unknown type of attacks may not be detected or may be improperly classified (Bin Zeng, et.al. 2010). The major issues of misuse based IDS are database must be continually updated and maintained (Bin Zeng, et.al. 2010, LIN Ying, 2010). Anomaly detection is another important problem that has been researched within diverse research areas. The main limitation is that it may not be able to describe attack pattern and may have high false positive rate (DuXianFeng 2010). There are numerous issues in existing anomaly detection IDS like anomaly detection IDS produces usually large number of false-positive alarms, which events are signaling an IDS to produce an alarm when no attack has taken place (Weijian Huang 2010). Another issue is a legitimate system behavior may also be recognized as abnormal patterns (Wang Yu 2011). Since normal behavior can change easily, anomaly-based IDS systems are prone to false positives where attacks may be reported based.

3. PROPOSED WORK

Basically proposed IDS is divided into two phase. In first phase we design and developed mobile agent (Jitendra et.al. 2012) based IDS and in second phase we design rules on the basis of 13 sleeted features out of 41 from NSLKDD data sets (L. Dhanabal 2015).

(a) Phase-I

This is the phase one of proposed IDS wherein one mobile agent and three other agents designed by the proposed IDS and working of each agent is separate from other. These all agents will work autonomously however they all are reliant with each other at whatever point one agents won't pass signal regarding object then second agent won't work and at same as second operator won't pass signal to third one agent then it will also not work. Figure 3 shows the Mobile Agent over Client Server Architecture where mobile agent move over clients in the network and collected all related information with normal and abnormal packets which is captured at particular clients. After that it sends compiled report to sever for further action. Once this report received by server then it send a suitable alarm if abnormality finds. The aim of the presented work is to use a mobile agent based approach for intrusion detection system, together with low-level high-speed traffic acquisition and reprocessing layer based on dedicated adaptive hardware and high-level operator interface.

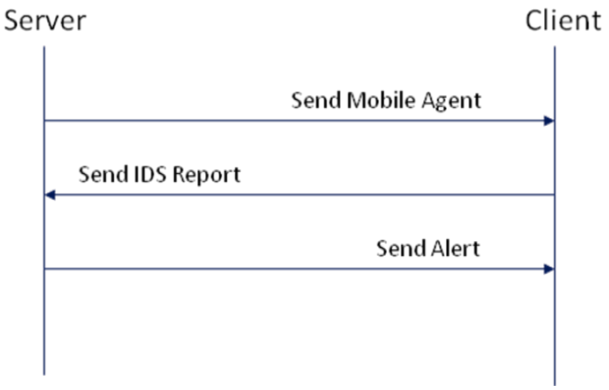


Fig. 3: Mobile Agent over Client Server Architecture

Architecture of proposed IDS is shown in figure 4**.** In this four agents like Mobile Agent, network agent, rule agent and alert agent works together but they do not procure the information from the network directly, yet get/catch the pre prepared information in legitimate path, with the level of detail that is proper for network-based intrusion detection. Agents are conveying among specialists on network systems in network mode.

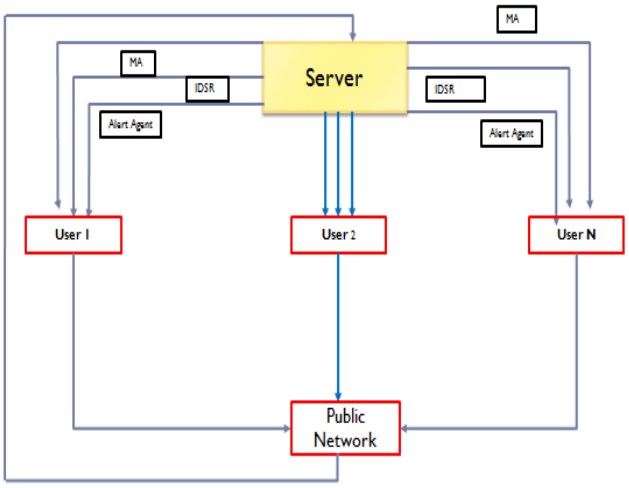


Fig. 4: Architecture of Proposed IDS

Agent Structure: There are four types of agents that are involved in Proposed IDS:

(i) **Mobile Agent (MA):** Mobile Agent is the main agent is which roams in the network system and activates IDS at host.

(ii) **Network Agent (NA):** In this primary assignment of Network agent is to sniffing the flows of traffic of the network. Network agent captures network packets from the network and sniff different types of traffic like TCP, UDP.

(iii) **Rule Agent (RA):** Captured packet is normal or abnormal is identified by rule Agent, they match rules from received packet which is stored in database to find out normal or attacked packets.

(iv) **Alert Agent (AA):** In case of any coming network intrusion, alert agent sends signal to network system to make the system aware of coming intrusion.

To adapt to a wide size of system threats and anomalies, any IDS depends on secure specialist mobile agent IDS which is center some portion of the IDS. To essential components system efficiency and accuracy is contemplated while planning the system and work on to enhance both the elements in proposed IDS. So as to keep the spread of novel threats, the proposed IDS which is deployed on rapid system interface suggests the need to prepare on packet capturing. Figure 5 is showing the working model of proposed IDS based on real time. In this model each agents working is defined that mobile agent (MA) move to clients over network and activated client IDS, once it is activated then it start sniffing and capturing network packets through Network Agent (NA) and stored in database. To find intrusion among the network packets, Rule Agent used database which is known as rule based database. Rule base database has predefined rules related with intrusions in a packet or log file in this work. A consolidate report send by the client to sever and then Alert Agent send alert by the server if any abnormality find in captured packets.

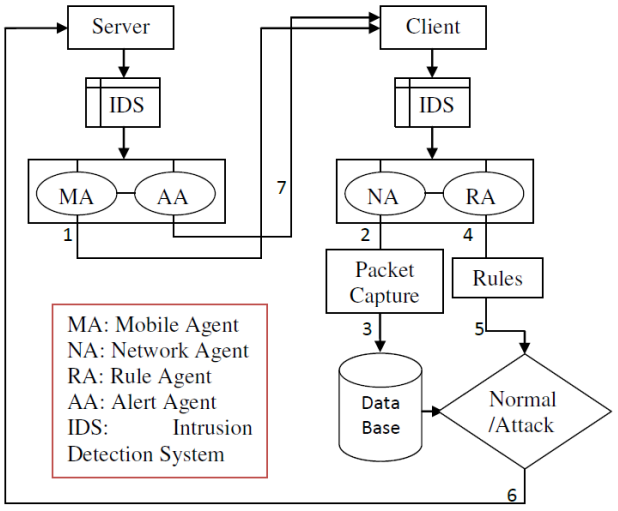


Fig. 5: Working Model of Proposed IDS.

(i) Step wise step processes of working model are as follow:

(ii) Run ➔ IDS at Server.

(iii) Initialize ➔ Mobile Agent ➔ Initialize (MA) at Server.

(iv) Client ➔ Mobile Agent Move to All Client System over network and activate Clients IDS.

(v) Client ➔ IDS ➔ Activate.

(vi) Sniffing ➔ Network Agent sniffing the flow of Network Packet and Capture Packet.

(vii) Data Base ➔ Captured Packets Stored in Data Base.

(viii) Rules Matching ➔ Rule Agent Checked and Verified to Capture Packets with pre-defined rules. And Send Report to the Server

(ix) Alert ➔ Alert Agent Send Alert to Clients.

(b) **Phase-II**

This is the second phase of the proposed IDS wherein, we used NSLKDD dataset which is a enhance version of KDDCUP-99 dataset [17]. NSL-KDD data has 41 features these features include numeric, symbolic, and binary where features 2, 3,

and 4 are nominal, features 7, 12, 14, 15, 21, and 22 are binary, and the rest of the features are numeric type attributes recommended by. During the study of NSL KDD data set it is observed that one of the most important features of NSL KDD is flags feature which has some different values; it is a very important feature to identify intrusion at initial level. The description of the different 'flag' values are listed in Table 1.2.

Table 1.2 NSL KDD Dataset Features Flags Description

Flag	Description
RSTOS0	Originator sent a SYN followed by a RST, never see a SYN ACK from the responder
RSTR	Established, responder aborted
RSTO	Connection established, originator aborted (sent a RST)
OTH	No SYN seen, just midstream traffic (a "partial connection" that was not later closed)
REJ	Connection attempt rejected
SF	Normal establishment and termination Originator sent a SYN followed by a FIN (finish 'flag') ,

Now NSL-KDD dataset contain various types of attacks which categorized in four major categories are as follow:

(i) **DOS Attack**: full name of DOS is Denial of Service by this attack hackers or outsiders makes a processing or memory assets excessively busy or too full.

(ii) **Probe Attack:** where the hacker is scans to the network and find out the active port on a machine with the aim of exploiting is a known vulnerability.

(iii) **Remote-to-Local (R2L) Attack**: attacks, where an attacker tries to gain local access to unauthorized information.

(iv) **User-to-Root (U2R) Attack:** where an attackers picks up root access of network to utilizing his ordinary client account to endeavor vulnerabilities.

After the deep analysis NSLKDD data set (50000 approx.) database packet, proposed IDS identify threshold values of 13 features out of the 41 feature set that have significance esteem over zero. Table 1.3 is showing the threshold value of these 13 features for various types of attacks and normal packet.

Table 1.3 Selected 13 Feature out of 41 for attack and its threshold value

Features	Dos	Normal	Probe	R2l	U2R
Protocol_Type (2)	Tcp, Udp,	Tcp, Udp	Tcp, Udp	Tcp	Tcp
Flag (4)	SF,REJ,RSTO	SF,REJ,RSTR,RSTO, OTH	,SF,SH,REJ ,RSTR, RST0S0,OTH	SF,RSTO	SF
Src_Bytes (5)	0 To 54540	0 To 76355876	0 To 215	0 To 7045	0 To 6274
Land (7)	0 ,1	0	0	0	0
Wrong_Fragment (8)	0,1,3	0	0	0	1 ,2,4
Hot (10)	0 To 2	0 To 77	0 To 1	0 To 28	0 To 5
Logged_In (12)	0,1	0,1	0,1	0,1	0,1
Count (23)	0 To 511	0 To 511	0 To 511	1 To 4	0
Diff_Srv_Rate (30)	0 To 0.75	0 To 1	0 To 1	0	0 To 0.5
Dst_Host_Same_Srv_Rate (34)	0 To 1	0 To 1	0 To 1	0 To 1	0 ,1
Dst_Host_Diff_Srv_Rate (35)	0 To 0.75	0 To 1	0 To 1	0 To 0.20	0 To 0.02
Dst_Host_Same_Src_Port_Rate (36)	0 To 1	0 To 1	0 To 1	0 To 1	0 ,0.5,1
Dst_Host_Srv_Diff_Host_Rate (37)	0 To 0.54	0 To 1	0 To 1	0 To .31	0 To 0.4

Proposed IDS used these selected 13 features that is used for experiment and implementation of mobile agent based IDS. On the basis of 13 features proposed IDS designed total five rules which are used by Rule Agent see figure 6, 7, 8,9,10.

Rule-1 For Dos Attack

IF

(Cap_Packet.Protocol_type="TCP"||"UDP"||"ICMP")

IF (Cap_Packet.Flag = "S0" || "SF" || "REJ" ||"RSTO")

IF (Cap_Packet. Src_bytes < 0 to 54540 >)

IF (Cap_Packet_Land <0 || 1 >)

IF (Cap_Packet_ Wrong_fragment <0 to 3>)

IF (Cap_Packet_Hot <0 to 2>)

IF (Cap_Packet_logged_in <0 || 1>)

IF (Cap_Packet_Count <0 to 511>)

IF (Cap_Packet_ Diffrent_srv_rate <0 to 0.75>)

IF (Cap_Packet_ Dst_host_same_srv_rate <0 to 1>)

IF (Cap_Packet_ Dst_host_diff_srv_rate <0 to 0.75>)

IF (Cap_Packet_ Dst_host_same_src_port_rate <0 To 1>)

IF (Cap_Packet_Dst_host_srv_diff_host_rate <0to 0.54>)

Fig. 6: Rule-1 for DoS Attack

Rule-2 For Probe Attack

IF(Cap_Packet.Protocol_type="TCP"||"UDP "|| "ICMP")
IF(Cap_Packe.Flag = "S0"||"SF"||"SH"||"REJ"||"RSTR" ||"RSTO"|| "RST0S0" ||"OTH ")
IF (Cap_Packet. Src_bytes < 0 to 215 >)
IF (Cap_Packet_Land < 0 >)
IF (Cap_Packet_ Wrong_fragment <0 >)
If (Cap_Packet_Hot <0 ||1>)
IF (Cap_Packet_logged_in <0 || 1>)
IF (Cap_Packet_Count <0 To 511>)
IF (Cap_Packet_ Diff_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_same_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_diff_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_same_src_port_rate <0 to 1>)
IF (Cap_Packet_ dst_host_srv_diff_host_rate <0 to 1>)

Fig. 7: Rule-2 for Probe Attack

Rules-3 For R2L Attack

IF (Cap_Packet. Protocol_type = " TCP")
IF (Cap_Packet.Flag = "S0" ||"RSTO ")
IF (Cap_Packet. Src_bytes < 0 to 7045 >)
IF (Cap_Packet_Land <0 >)
IF (Cap_Packet_ Wrong_fragment <0 >)
If (Cap_Packet_Hot <0 To 28>)
IF (Cap_Packet_logged_in <0 || 1>)
IF (Cap_Packet_Count <0 To 4>)
IF (Cap_Packet_ Diff_srv_rate <0>)
IF (Cap_Packet_ dst_host_same_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_diff_srv_rate <0 to .20>)
IF (Cap_Packet_ dst_host_same_src_port_rate <0 to 1>)
IF (Cap_Packet_ dst_host_srv_diff_host_rate <0 to .31>)

Fig. 8: Rule-3 for R2L Attack

Rules-4 For U2R Attack

IF (Cap_Packet. Protocol_type =" TCP")
IF(Cap_Packet.Flag ="SF")
IF (Cap_Packet. Src_bytes < 0 to 6074 >)
IF (Cap_Packet_Land <0 >)
IF (Cap_Packet_ Wrong_fragment <0>)
If (Cap_Packet_Hot <0 To 5>)
IF (Cap_Packet_logged_in <0 || 1>)
IF (Cap_Packet_Count <1 to 5>)
IF (Cap_Packet_ Diff_srv_rate <0 to 0.5>
IF (Cap_Packet_ dst_host_same_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_diff_srv_rate <0 to .02>)
IF (Cap_Packet_ dst_host_same_src_port_rate <0 to 1>)
IF (Cap_Packet_ dst_host_srv_diff_host_rate <0 to .4>)

Fig. 9: Rule-4 for U2R Attack

Rules-5 For Normal Packet

IF (Cap_Packet.Protocol_type="TCP'||'UDP' ||' ICMP")
IF (Cap_Packet.Flag ="SF" || "REJ" || "RSTR" ||"RSTO")
IF (Cap_Packet. Src_bytes < 0 to 76355876>)
IF (Cap_Packet_Land <0 >)
IF (Cap_Packet_ Wrong_fragment <0>)
If (Cap_Packet_Hot < 0 to 77>)
IF (Cap_Packet_logged_in <0 || 1>)
IF (Cap_Packet_Count <0 to 511>)
IF (Cap_Packet_ Diff_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_same_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_diff_srv_rate <0 to 1>)
IF (Cap_Packet_ dst_host_same_src_port_rate <0 to 1>)
IF (Cap_Packet_ dst_host_srv_diff_host_rate <0 to .1>)

Fig. 10: Rule-5 for Normal Packet

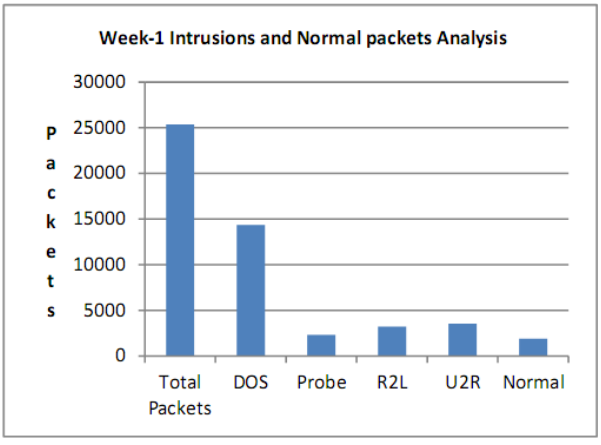
4. RESULTS

To evaluate the performance of the proposed IDS we set machine configuration which is (Intel core i5 second generation with 4GB RAM at Window platform). Proposed IDS is developed at java language with JDK1.8 version, which easiest the development of mobile agent and other agents. During experiment, real time network has developed where two machines were setup, one for client and other for sever and both machine connected through public network like internet. At this scenario proposed IDS prepared data record set of two week. First week data collection was 25368 packets in which 23463 packets were intrusion packets and 1905 packets were normal packets. Time duration of data collection of first week was 9 am to 10 am in which data traffic load are average. Second week data collection was 40766 packets in which 39233 packets were intrusion packets and 1339 packets were normal packets. Time duration of data collection of first week was 2 pm to 3 pm in which data traffic load are high. Detail descriptions of intrusion are as follow: Table 1 shown week 1 analysis where total packet received 25368 in which we have found 14372 DOS attacks, 2315 probe attacks, 3231 R2L attacks , 3345 U2R attacks and 1905 normal packets.

TABLE 1: WEEK-1 INTRUSION AND NORMAL PACKETS ANALYSIS

Total Packets	DOS	Probe	R2L	U2R	Normal
25368	14372	2315	3231	3545	1905

Graph 1 is showing graphical analysis of intrusion of week 1



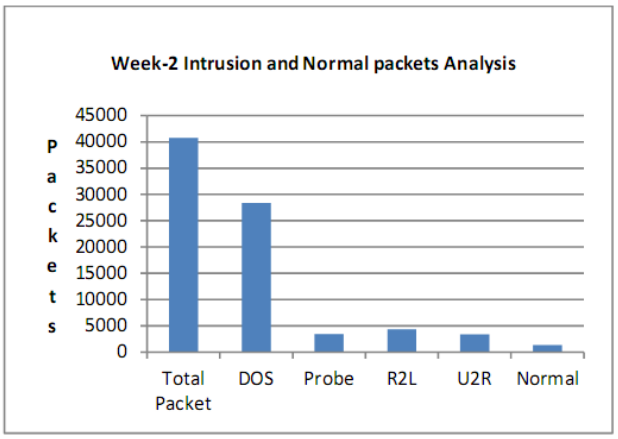
Graph 1: Intrusion Vs Normal Packet in Week 1

Table 2 shown week 2 analysis where total packet received 40766 in which we have found 28354 DOS attacks, 3411 probe attacks, 4321 R2L attacks , 3341 U2R attacks and 1339 normal packets.

TABLE 2: WEEK-2 INTRUSION AND NORMAL PACKETS ANALYSIS

Total Packet	DOS	Probe	R2L	U2R	Normal
40766	28354	3411	4321	3341	1339

Graph 2 is showing graphical analysis of intrusion of week 2.



Graph 2: Intrusion Vs Normal Packet in Week 2

5. CONCLUSION AND FEATURE WORK

In this paper Proposed IDS that is more successful than current IDS and with nonstop runtime and least human intervention because of the utilization of multi-agents technique can also acts as an intelligent fault tolerant self-managed intrusion detection system. With the self-adjustable and manageable nature of the system it can dynamically change environments, monitor resources automatically without human intervention, diagnose, discover and react automatically. In Future with the advancement in the network system the mobile agent's parameter is to be reconfigured to cope of various types of intrusion and also make it more and more effective.

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Corresponding Author

Aumreesh Kumar Saxena*

Asst. Prof. (AP) in CSE Dept of SIRTS, Bhopal (M.P.) India

E-Mail – aumreesh@gmail.com

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Reliable Algorithm for Enhancing QoS in Privacy Preserved Mobile Social Cloud Computing using CAN

Kiran Patidar[1]* Priti Maheshwari[2] Piyush Kuamr Shukla[3] Anand Motwani[4]

[1]RNTU, Bhopal (M.P.) India

[2]RNTU, Bhopal (M.P.) India

[3]RGPV, Bhopal (M.P.) India

[4]SISTec-R, Bhopal (M.P.) India

Abstract – The Mobile Social Cloud Computing (MSCC) paradigm is evolved keeping mobility in mind. MSCC essentially includes several user requirements including Quality of Service (QoS), which is largely affected by faults and malicious behaviour of mobile nodes. QoS is a necessary metric to evaluate the quality of MSCC. Depending on the research areas, different researchers defined QoS in different ways. Most of the schemes are proposed against random faulty clouds and works well, but these do not protect from malicious nodes present in MSCC. In MSCC, malicious users are those who take cloud services from other devices and avoid providing services to others due to one or the other reason. This paper outlines major technical challenges (problems) in MSCC and the opportunities that can be realized to overcome the challenges. The survey of related literature is also presented. Furthermore, the work proposes a Reliable Algorithm to enhance privacy and Quality of Service (QoS) in MSCC. The proposed work utilized Content Addressable Network (CAN) to give logical structure to MSCC network. The proposed algorithm is implemented in CloudSim, a renowned simulation tool. The results are evaluated on basis of QoS parameters: Execution Time and Finish Time. The experimental results are analyzed to demonstrate the efficacy of algorithm in both cases: SNS without CAN and SNS in presence of malicious environment.

Keywords: Cloud Computing, Content Addressable Network (CAN), Fault tolerance, Mobile Social Cloud Computing (MSCC), Quality of Service (QoS), Scheduling, Social Networking, Privacy, Virtualization

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1. INTRODUCTION

Nowadays, the computing systems are available in the form of Personal computers (PCs), Mobiles, Tablets and other handheld devices. Meanwhile, Virtualization for PCs started and Internet becomes more popular and accessible. Taking virtualization online proved a logical step in evolution of Cloud Computing (CC). This era is said to be the CC era. CC is not entirely a novel concept; it is in complicated connection with Grid Computing model, and few related technologies such as distributed, utility and cluster computing.

(a) Mobile Social Cloud Computing

The utilization of SNS is really soaring with increased use of wireless mobile devices (Sook Kyong, et.al. 2013). Integrating a mobile cloud into social networking infrastructure could open up automatic sharing and P2P multimedia access, and this will also reduce the need to back up and serve all of this data on huge servers (E.E. Marinelli, 2009).

Based on this relationship in the form of SN using SNS, users develop basic level of inherent trust for data and information sharing. Users share media and other files among each other with less or no authentication because users are eager to provide their data to other SN members even through mobile devices. The Paradigm is evolved keeping mobility in mind known as the **Mobile Social Cloud** (refer Figure 1).

Fig. 1: Mobile Social Cloud Computing

(b) Motivation

The sustained rise of CC offers the promise of quicker development and service delivery while providing cost benefits and faster replication of services. The Cloud can flawlessly deliver services to multiple devices such as smart-phones and tablets. The inherent problem referred to as Faults. One of the inherent faults is due to Malicious Behaviour. It may come under intentional faults in which, even after availing a service request, a device may not grant cloud service to other mobile devices. Therefore it is vital to deal with these faults.

In this work a Reliable Algorithm which comes under Fault Tolerant model is proposed to deal with malicious users, thus enhancing QoS and privacy in MSCC.

(c) CAN

Every cloud server has a CAN structure to manage mobile devices. Every mobile device is registered on CAN in the cloud server and is mapped on a point of CAN having a virtual logical address, namely CAN coordinates, for CAN routing. CANs are fault-tolerant, scalable and completely self-organizing peer-to-peer overlay network. As CAN is a distributed infrastructure that provides hash table-like functionality, it has been used as a base approach for large scale data management of frequently moving objects in various computing environments.

2. LITERATURE REVIEW

Sook Kyong Choi et al. (2013) proposed fault tolerance and QoS (Quality of Services) scheduling using CAN (Content Addressable Network) in Mobile Social Cloud Computing (MSCC). Fault tolerance and QoS scheduling consists of four sub-scheduling algorithms: malicious-user filtering, cloud service delivery, QoS provisioning, and replication and load-balancing. Under the SNS, a mobile device is used can also be used as a resource for providing cloud services. They simulated scheduling both with and without CAN and shows improvement in cloud service execution time, finish time, reliability and reduces the cloud service error rate.

Authors Qian, (2010) defined basic and extended QoS for evaluating scheduling algorithms. Time and Cost are considered in basic QoS while reliability, availability, security, and reputation covered in extended QoS.

The work M. Reza Rahimi (2013) discusses state of the art in the MSCC. Authors M. Reza Rahimi (2013) illustrated the applicability of MCC in various domains including Social Networking, learning, health/wellness and commerce. The research gaps are identified covering critical aspects of realization and effective utilization. The authors suggests that improved resource allocation can be achieved through efficient task distribution.

The paper Hoang T. et.al. (2011) presents a survey of MSCC that includes overview of the definition of MCC, architecture, and applications. MSCC issues, existing solutions, and approaches are presented. The main issues discussed includes performance (e.g., low bandwidth, storage and battery life), environment (e.g., availability, scalability and heterogeneity), and security (e.g., issues related to privacy and reliability).

Elio Goettelmann et al. (2013) proposed an approach for deploying business processes on the cloud supporting security constraints; thereby ensuring sensitive data exchange. They consider additional requirements related to data-dependencies and Quality of Service (QoS) disparities to optimize the execution of the outsourced process.

3. PROPOSED WORK

(a) MSCC Environment for Proposed Work

Figure 2 shows the MSCC computing environment. MSCC is using CAN which is type of P2P network. As an instance let us assume that User-1 and User-2 are on same social network. When User-1 requests cloud service from server, the server returns device information of User-2, finally both user connect and share the resources and / or services, without much authentication. Also a mobile device can be a member of any or every social network.

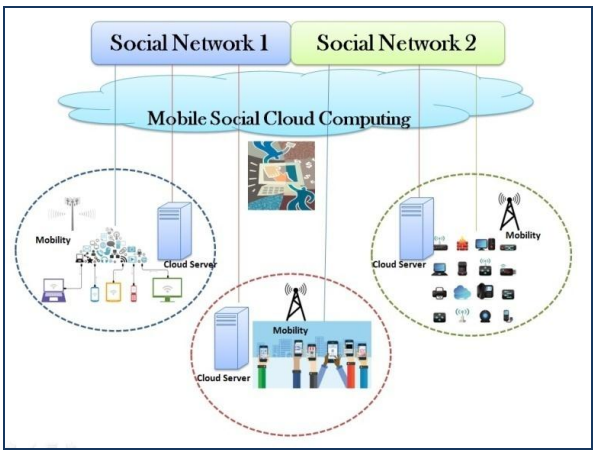

Fig. 2: Global View of MSCC Environment

(b) Proposed Reliable Algorithm for Enhanced QoS using CAN

The nodes who intend to join the network will get a unique identifier (resource_ID) and a launch message from cloud server. The server sets the primary reputation of nodes to a minimum value. The nodes that are malicious or not intend to coordinate in the network will send the negative reply. The server collects the reply and lists the status of nodes in two categories i.e. "True" and "Initial Malicious nodes" Also, the server sets the reputation of True nodes and initially detected malicious nodes to a minimum value. This is required for further authentication and filtering the suspicious True nodes. In the next step, the server sends one small test file, for storing, to all nodes. That who responds positively in the context i.e. if correct acknowledgement code is received then the reputation of such nodes is increased using formula mentioned in equation 1.

Equation 1.

$$reputation_{i+1} = reputation_i \quad (\text{if } i=0)$$

$$reputation_{i+1} = reputation_i + reputation_i * \log_{10} e^{(reputation_i)} \quad (\text{if } i>=1)$$

If mobile node is true, then its reputation value is high, if reputation value is low then higher the probability of malicious. When the reputation value is below certain threshold (minimum) value, the node would not be allowed to connect to MSCC.

4. EXPERIMENTAL SETUP AND RESULT ANALYSIS

(a) Simulation Scenario

There are various scenarios configured for experiment purpose, considering various existing and proposed work. Here, we are only showing a single case in 10 scenarios. Table 1 show for simulation scenario according to Presence of Malicious nodes, Reliable and QoS Aware Algorithm. Here the experiment presented is simulated 10 times. For each of the experiment the average of following 02 parameters: Finish time and Execution time is taken.

Table 1
Simulation Scenarios

	SNS without CAN	SNS using CAN with Malicious Nodes	SNS using CAN with Proposed Reliable (QoS) Algorithm
Case	Yes	Yes	Yes

The scenario is configured in famous cloud simulation tool: CloudSim [8], using the entities as shown in Table 2. For simulation purpose SNS is configured with 3 Data centres, 4 access points, 30 virtual machines. The users with 100 mobile devices are considered which asks for or executes 50 services.

Table 2
Simulation Configuration

Entities		Nos.
Social Network Services (SNS)	Data Centre	03
Access Points (AP)s	Brokers	04
Virtual Machines (VMs)		30
Mobile Devices	Hosts	100
Cloud services (Tasks)	Cloudlets	50

(b) Performance Parameters

(i) Service or Task Execution Time: It is referred to as time taken to execute the service that is requested by mobile device.

(ii) Cloud Service Finish Time: Finish Time represents the end of all tasks running at DC. It is also represented as Maximum Turnaround time taken by a process.

(a) Result Analysis

The performance comparison of Execution Time and Finish Time is shown in Table 3 and 4 respectively. The graphical comparison of Execution Time and Finish Time is shown in Figure 3 and 4 respectively. Figure 5 and Figure 6 are respectively showing the Average Execution and Finish Time of scenario as presented in Table 1.

	SNS without CAN	SNS using CAN with Malicious	Proposed Reliable (QoS) Algorithm
Scenario 1	301.75	317.96	310.6
2	301.75	321.6	306.9
3	301.75	318.25	307.3
4	301.75	315.24	310.7
5	301.75	316.23	314.2
6	301.75	318.3	315
7	301.75	319.26	309.1
8	301.75	316.28	300.77
9	301.75	315.81	309.74
10	301.75	317	312.12

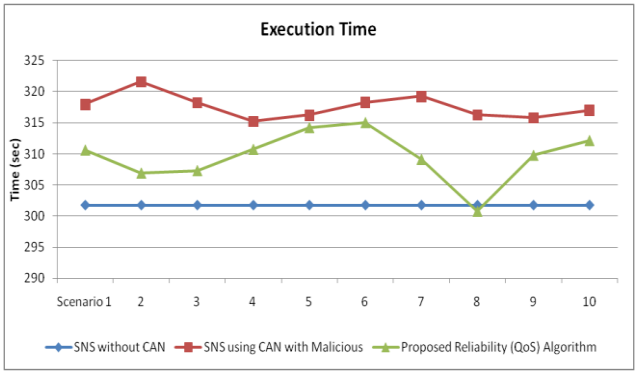

Fig. 3: Comparison of Execution Time (sec)

	SNS without CAN	SNS using CAN with Malicious	Proposed Reliable (QoS) Algorithm
Scenario 1	339.8	359.4	356.6
2	339.8	363.6	349.6
3	339.8	363.6	352.4
4	339.8	356.6	355.2
5	339.8	355.2	369.2
6	339.8	359.4	359.4
7	339.8	366.4	355.2
8	339.8	355.2	352.4
9	339.8	352.4	356.6
10	339.8	356.6	359.4

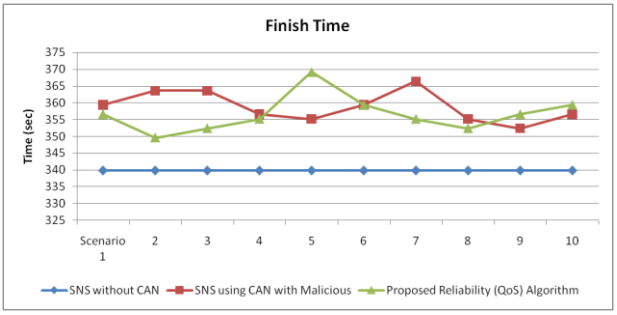

Fig. 4: Comparison of Finish Time (sec)

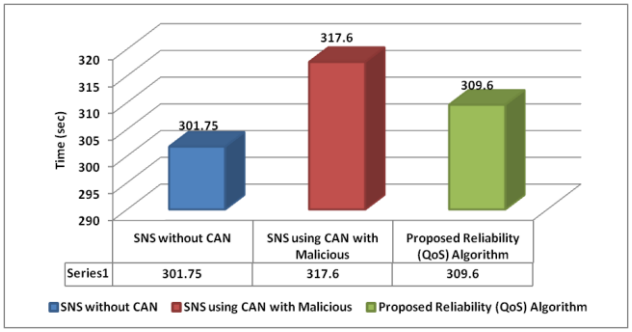

Fig. 5: Average Execution Time (sec)

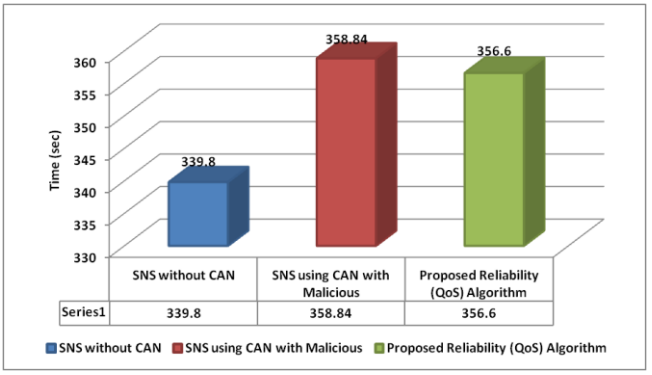

Fig. 6: Average Finish Time (sec)

5. CONCLUSION AND FUTURE DIRECTIONS

The work presents opportunities that can be realized to overcome the major technical challenges (problems) in MSCC along with the survey of related literature. The effect of malicious nodes on SNS is also shown on two QoS parameters. Furthermore, a Reliable algorithm to deal with malicious users, who intend to join the SNS, is proposed to enhance QoS and privacy in MSCC. Depending on the research areas, different researchers defined QoS in different ways. In future the work will be evaluated on the basis of various extended QoS metrics. The complete frameworks are still in need for almost all works proposed in the field. So, the framework for the algorithm can also be proposed in future. In dynamic MSCC the major challenge is to determine the effectiveness of the QoS algorithms. Almost all works proposed in the field have not evaluated their techniques against reliability. The methods to evaluate the effectiveness of the works' proposed in literature are still in need. So, in future we propose a method to evaluate the accuracy of such techniques and frameworks.

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Corresponding Author

Kiran Patidar*

RNTU, Bhopal (M.P.) India

E-Mail – kiranpatidar21@gmail.com

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Comparative Clustering Algorithms on Integrated Dataset

Atul Kumar Pandey[1]* Prabhat Pandey[2] Ajitesh Singh Bhaghel[3]

[1]Research Scholar, Dept. of Physics, Govt. PG Science College, Rewa (M.P.) India

[2]OSD, Additional Directorate Higher Education, Division, Rewa (M.P.) India

[3]Assistant Professor, Dept. of Computer Science, APSU, Rewa (M.P.) India

Abstract – Clustering is an unsupervised learning problem which is used to determine the intrinsic grouping in a set of unlabeled data and also applied in the preprocessing of datasets resulting further improvement in the next task such as classification. While clustering, grouping of objects is done on the principle of maximizing the intra-class similarity and minimizing the inter-class similarity in such a way that the objects in the same group/cluster share some similar properties/traits. There is a wide range of algorithms available for clustering in various data mining tools. This paper presents a comparative analysis of four clustering algorithms in classes to cluster evaluation mode against the three datasets where one of them is integrated. In experiments, the effectiveness of algorithms is evaluated by comparing the results among the datasets and algorithms.

Key Words: Clustering, K-mean, Farthest First, Density, Simple EM and WEKA.

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I. INTRODUCTION

Clustering algorithms are quite useful in various fields like data mining, learning theory, pattern recognition to find clusters in a data set. Clustering is an unsupervised learning technique which is used for grouping elements or data sets. It is done in such a way that elements in the same group are more similar (in some way or another) to each other than compared to those in other groups. These groups are known as clusters. Clustering is the main task of exploratory data mining, and a common technique for statistical data analysis, which is used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, marketing, libraries, insurance, World Wide Web and bioinformatics. Cluster analysis was originated in anthropology by Driver and Kroeber in 1932 and introduced to psychology by Zubin in 1938 and Robert Tryon in 1939(K. Bailey,1994) (R. C. Tryon,1939).

2. CLUSTERING TECHNIQUES

In this study various clustering techniques for data mining tool WEKA have been presented. These are:

(a) **Simple K-Means Clustering-** K-means clustering technique (J. Han. et.al. 2006). It is one of the simplest unsupervised learning techniques which aim to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean value. Initially, k centroids need to be chosen in the beginning. After this we take instances or points belonging to a data set and associate them to the nearest centers. The next step is to find k new centroids. A new binding has to be done between the same data set points and the nearest new center. Process is kept repeated until no more changes are done. Finally, this algorithm minimizes intra cluster distance (cost function also known as squared error function), automatically inter cluster distance will be maximized.

(b) **Farthest First-** Farthest first (H. Zengyou, 2006) (M. Bilenko 2004) is a heuristic based method of clustering. It is a variant of K Means that also chooses centroids and assigns the objects in a cluster but at the point furthermost from the existing cluster. However centre is within the data area. Fast clustering is provided by this algorithm in most of the cases as it needs less reassignment and adjustment. In the farthest-point heuristic, the first point highest score is selected, and remaining points are selected

in the same manner as that for basic farthest-point heuristic.

(c) **Simple EM-** Simple EM (expectation maximization) assigns a probability distribution to each instance which indicates the probability of it belonging to each of the clusters. EM can decide on number of clusters to create by cross validation, or it may be specified as to how many clusters to generate. EM finds clusters by determining a mixture of Gaussians that fit a given data set. Each Gaussian has an associated mean and covariance matrix. However, since we use spherical Gaussians, a variance scalar is used in place of the covariance matrix. The prior probability for each Gaussian is the fraction of points in the cluster defined by that Gaussian. These parameters can be initialized by randomly selecting means of the Gaussians, or by using the output of K-means for initial centers. The algorithm converges on a locally optimal solution by iteratively updating values for means and variances. The EM algorithm for clustering is described in detail in Witten and Frank (Witten I. 2005).

(d) **Make Density Based Clustered-** Make Density based clustering has been long proposed as one of the major clustering algorithm (Sander J. 1998). The make density based clustering algorithm suits in noise and when outliers are encountered. Cluster will be formed by connecting the points with same density and present within the same area. The density based method a natural and attractive basic clustering algorithm for data streams, because it can find arbitrarily shaped clusters, it can handle noises and is a one-scan algorithm that needs to examine the raw data only once. Also, the density within the areas of noise in this case is lower than the density in any of the clusters. Here the intuitive notion of "clusters" and "noise" in a database D of points of some k-dimensional space S is formalized.

3. TOOLS

WEKA (Waikato Environment for Knowledge Analysis) (E. Frank. et.al. 2005)(M. Hall, et.al. 2009) is an open source, platform independent and easy to use data mining tool portable, issued under GNU General Public License. It comes with Graphical User Interface (GUI) and contains collection of data preprocessing and modeling techniques. It is fully implemented in the Java programming language and therefore runs on almost any modern computing platform.

4. EXPERIMENTS

(a) **Data Source-** The publicly available heart disease database has been used. The Cleveland Heart Disease database consists of 303 records & Statlog Heart Disease database consists of 270 records and it is available at UCI Repository. (Website www.ucirepository.com.)

(b) **Cleaned & Integrated Datasets-** The missing values are replaced with the un-supervised filter and maintaining the consistency, datasets are made ready for the further critical investigation. The datasets so obtained after cleaning is Cleveland and Stat log which contain 303 and 270 instances with 14 features. After cleaning, the dataset Cleveland and Statlog are named H1 and H2 respectively. After that integrated dataset is created by combining the datasets Cleveland (H1) and Statlog (H2) named H11 containing all the 14 features where the number of instances is 573.

(c) **Comparison of Clustering Algorithms-**Four clustering algorithms namely EM, Farthest Fast, Make Density Based Cluster and Simple K-means were implemented to observe their performances. While clustering, the choice of testing mode for the algorithms is “classes to cluster” evaluation mode and the cluster value is two, where this mode performs clustering on classification basis resulting the two clusters 0 and 1 against the predicted (targeted) features.

The datasets with all the 14 attributes are H1, H2 and H11 (H1+H2) where H11 is an integrated dataset. The accuracy achieved and time span taken by the clustering algorithms were observed. The table 1 present the accuracy (with time span) of the four clustering algorithms against the datasets H1, H2 and H11.

Table 1 Accuracy of the Clustering Algorithms against all the 14 Features

Datasets →	H1		H2		H1+H2→H11	
Algorithms ↓	Accuracy (%)	Time (s)	Accuracy (%)	Time (s)	Accuracy (%)	Time (s)
EM	81.5182	3.88	79.2593	3.16	48.6911	25.08
Farthest First	73.5974	0.0	72.5926	0.0	80.2792	0.02
Make Density	81.5182	0.03	71.4815	0.02	82.548	0.05
Simple K-Means	80.8581	0.02	59.2593	0.0	80.6283	0.05

For the dataset H1 (Cleveland), the algorithms Make Density Based (81.51%) and EM (81.51%) have obtained the same and highest prediction accuracy, but EM ranked in the second position due to their

more time span (3.88 seconds) taken to build the model. If EM is not considered due to their time span, next algorithm perform well is simple K-Means clustering.

Similarly for the dataset H2 (Statlog), EM (79.25%) got the highest prediction accuracy among them, but it took more time again as H1 and the Farthest Fast (72.59%) got the second position. When EM is not considering, then next algorithm performed well is Make Density Based Clusters (71.48%).

At last, for the dataset H11, Make Density Based algorithm (82.54%) has the highest prediction accuracy among all the clustering algorithms where Simple K-Means is lower at (80.62%) and third one is Farthest Fast (80.27%).

Moreover, the algorithm Make Density Based Clusters performed outstanding against the datasets H1 and especially for integrated dataset H11. EM also performed well in two datasets H1 and H2, but it took more time span against all the datasets and among all the algorithms. Datasets need to be strong for the reliable prediction. Farthest First loses its performance strength on datasets H1, H11. Accuracy differs due to the nature of datasets.

5. CONCLUSION

Various clustering algorithms made on non-integrated and integrated dataset have been compared and analysed. The results have been validated using integrated datasets that ensured the reliability of analysis. It is observed that datasets are successfully clustered with quite good accuracy. Few of the clustering techniques have better accuracy, others take less time, and many others have a trade-off between accuracy and time taken. Appropriate methods can be used according to their usage and the nature of datasets. Specifically, the algorithm Make Density Based Clusters has performed better against the datasets H1 and especially for integrated dataset H11.

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Corresponding Author

Atul Kumar Pandey*

Research Scholar, Dept. of Physics, Govt. PG Science College, Rewa (M.P.) India

E-Mail – atul.pandey.it2009@gmail.com

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Cloud Computing Environment through Encryption Algorithms- A Review Paper

Jahangeer Qadiree[1]* Dr. Pratima Gautam[2]

[1]Dept. of IT, RNTU, Bhopal (M.P.) India

[2]Dept. of IT, RNTU, Bhopal (M.P.) India

Abstract – No doubt that the Cloud computing technologies are gaining the ubiquitous adaptation due to the countless features they provide. Security is the main concern of cloud that hinders its wide adaptation as well as the development. The main obstacle or hindrance of the cloud adaptation among the small or big enterprises is the privacy as well as the security of their data. In this paper we have mainly focused at the service provider's side by suggested the various cipher encryption algorithms. So as to make the cloud trusty and offer the desired security features to the cloud user's.

Keywords – Security, Encryption Algorithms, RSA, AES, DSA, Blowfish.

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1. INTRODUCTION

Cloud computing proposes a new way of computing. It provides the development of environment and the allocation as well as the reallocation of computer resources as per the demand. Virtually it satisfies the on demand needs of the user and facilitates the resources "as a service model". The cloud technology offers are we can say it another words that it provides the ability for both small as well as the big organizations to move/shift their data globally. It is a using the remote services through a network. Cloud computing allows its users to use maximum number of resources through minimum resources available at the user's end. The cloud computing environment facilitates the way to use the computing resources through a device that is capable of connect the user to the server at any location across the world and also the users are not bounded to store the data at their end because the data is stored on the server.

Cloud concept reduces the cost of hardware at the user end. Users are not bounded to store their data at the user's end because the data is stored on the cloud. Through the Cloud users can access their data through any location.

(a) Types of Clouds

The environment of cloud computing is divided into three different categories as per their usage and requirement include, private cloud, public cloud and hybrid cloud.

(i) **Private cloud**: Private clouds are owned by the single organization. The private cloud provides better control and more flexibility. They are very expensive and secure when we compare them to other clouds. The providers and the users have a very good control of the cloud infrastructure. One of the best examples of a private cloud is Eucalyptus Systems.

(ii) **Public Cloud**: They are totally hosted and maintained and are shared on a larger scale. Consumers pay for the resources that they use. Users have a little control over the cloud infrastructure. Microsoft Azure, Google App Engine is the examples of public clouds.

(iii) **Hybrid Cloud**: Hybrid clouds is the composition of two or more cloud models, linked each other in a way so that the data transfer takes place between them without affecting each other. These types of clouds are created by the large enterprise. In this model, the company outlines the main goals and requirements of services. But the major drawback of the hybrid cloud is the difficulty in effectively creating and governing such a solution.

(iv) **Community Cloud:** This type of cloud is basically managed by group of originations that have a common objective to achieve. The members share access to the data in the cloud.

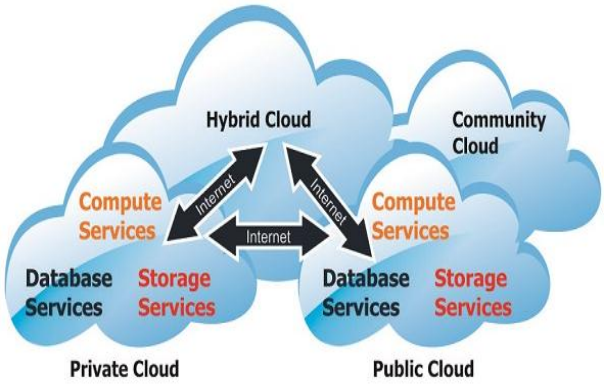

Fig 1: Deployment Models of Cloud Computing

2. MOTIVATION

In cloud computing technology the users work with the applications those are located off-premise. There are numerous organizations those are uncomfortable regarding to store their applications as well as their important data on the system that are not controlled by them personally. Our aim is to suggest a framework that will clarify the cloud computing concept easily. The suggested framework will clarify the confidentially of data, protection of data and the selection of security control needed to the data confidentially.

3. BACKGROUND STUDY

The Cloud computing environment concept is divided into three phases: namely as connectivity, storage, and application. Each part offers different services for the cloud users.. The concept of cloud paradigm allows a new way of computing that allows us to work the applications as per our need and reduces the cost for managing the hardware as well as the software resources. It allows the user's to access the applications that are cloud based through a light weight device that is capable on internet access. The main hindrance of the Cloud Computing is security concern and the Implementation. With the help of different encryption algorithms like- RSA, DSA, DES, Blowfish etc,, Users are able to enhance the security as well protect their sensitive data on the cloud paradigm.

4. ANALYSIS OF VARIOUS ENCRYPTION ALGORITHMS

The Cloud computing technology is used by various communities like, ordinary, enterprise as well as the academia as per their demand. There are various security threats and policy issues. Security is the main concern of cloud that is different from various points of views. Our review focuses mainly on analysis of various encryption algorithms to find the best method as per need.

Our proposed work analysis various available encryption algorithms so as to ensure the data security in cloud computing. The encryption algorithms that are used are analysed below:-

(a) RSA Algorithm: It is widely used for securing the data when the data is send to the network. RSA is an asymmetric cryptography technique that consists of two keys public and the second one is private.

Select two prime numbers.

Calculate $n = p * q$

Calculate $f(n) = (p-1)(q-1)$

Select e such that e is relatively prime to $f(n)$ and less than $f(n)$

Determine d such that de congruent modulo $1(\text{mod}$ $f(n)$ and $d < f(n)$

Public key = $\{e, n\}$ Private Key $= \{d, n\}$

= {d, n}

Cipher text c = message e mod n

Plain text p = cipher text d mod n

(b) DSA Algorithm: stands for digital signature and was proposed by NIST in the month of august 1991. DSA algorithm consists of two parts namely key generation, generation of digital signature and verification.

Key Generation:

(i) Choose a prime number q, known as the prime divisor.

(ii) Choose another primer number p, such that $p - 1 \bmod q = 0. p$ is called the prime modulus.

(iii) Choose an integer g, such that $1 < g <, g^{**} q \bmod p = 1 and g = h^{**}((p-1)/q)$ mod p. q is also called g's multiplicative order modulo p.

(iv) Choose an integer, such that $0 < x < q.$

(v) Compute y as $g^{**} x$ mod p.

(vi) Package the public key as $\{p, q, g, y\}$

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(vii) Package the private key as $\{p,q,g,x\}$

Signature Generation: the signer wants to sign the document $x \in \{0,1\}^*$. the signer uses the hash function

$$SHA-1:\{0,1\}^* \rightarrow \{0,1\}^{160} \quad \textbf{(A)}$$

Chooses a random number $k \in \{1,2,.....q-1\}$ computes $r=(g^k \bmod p) \bmod q,$ and sets $s=k^{-1}(SHA-1)(x)+ar) \bmod q$ **(B)**

Here, k^{-1} Is the inverse of k module q, the signature of x is $(r,s).$

Verification: when the document is received by the receiver end, the signature is verified. The receiver obtains the signer's public key $(p,q,g,A).$ and verifies

$$1 \le r \le q-1 and 1 \le s \le q-1. \quad \textbf{(C)}$$

if the above condition is violated, then the signer's signature is rejected, otherwise he verifies

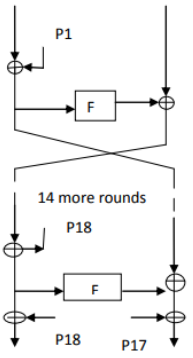
$$r=\left((g^{(s^{-1}h(x)) \bmod q} A^{(rs^{-1}) \bmod q)} \bmod p\right) \bmod q\right)$$

(D)

if the signature is constructed according as (A), (B). Then (D) holds.

The construction implies. $g^{(s^{-1}h(x)) \bmod a} A^{(rs^{-1}) \bmod q} \equiv g^{s-1(h(x)+ra)} \equiv g^k \bmod p,$

(c) Blowfish Algorithm: It was designed by Bruce Schneier in the year of 1993 as an free alternative to the existing encryption standards. It is a symmetric encryption algorithm that encrypts 64 bit block with a variable length 0f 128 to 448 bits. The main important feature of this algorithm is that it is an open source for all the users worldwide. Blowfish is a 16-round feistel cipher and uses various key dependent S-boxes and each S-box accepts the input of 8-bits and then produces the output of 32 bits.



(d) AES Algorithm: Stands for advanced encryption standard. It's a symmetric cipher standard designed and developed by Vincent Rijmen and Joan Daemen. AES consists the following features.

1. Block encryption implementation.
2. Single key for both encryption as well as decryption.
3. Easy implementation.
4. 128-bit group encryption.

Encryption Algorithms Specifications

Algorithm	Key Size	Initial vector size	Key used	Execution time
RSA	1024 bits	1024 bits	Public and Private	Maximum
AES	128,192,256 bits	128 bits	Same key for both encryption as well as decryption	Faster as compared to others
DES	56 bits	64 bits	Same key for both encryption as well as decryption	Same as AES
Blowfish	32-448 bits	64 bits	Same key for both encryption as well as decryption	Less

5. CONCLUSION

The most important part of the cloud is the security concern. This paper proposes various existing encryption algorithms to concern the security issues and make the data secure on cloud. We have also made the comparisons between the various cipher algorithms, so as to use the best cipher standard. As we know that the Encryption algorithms play a vital role in the life cycle of data security on cloud. The demand or adaptation of cloud technology worldwide is increasing. therefore, the proposed cipher's are helpful as per the demand.

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Corresponding Author

Jahangeer Qadiree*

Dept. of IT, RNTU, Bhopal (M.P.) India

E-Mail – Jahangir.ahmad17@gmail.com

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Individual and Household Characteristics of Rural Youth towards Agriculture as Their Career: A Case of Hadoti Region in Rajasthan

Dr. Geeta Gupta[1]* Mrityunjay Nagar[2]

[1]Principal, Om Kothari Institute of Management & Research, Kota (Rajasthan) India

[2]Dept. of Commerce & Management, CP University, Kota (Rajasthan) India

Abstract – Agriculture is undoubtedly the largest livelihood provider currently in India. In the rural areas it in main source of livelihood Indian's population which is predominantly rural has more than 70% employed in agriculture and a national demographic survey shows that the majority of Indian's population is young with the youth and adolescent population alone accounting for around 40.6% the total population in 2015. Youths are now the power for the growth. The overall development of any country depends mostly on their regimented, active and skilled youth. The young people normally show no desire to be farmers or to be employed in farming after receiving vocational training. A very large number of youths fee that farming is a symbol of poverty and backwardness. The broad objective of this study is to understand individual and household characteristics of rural youth towards agriculture as prospective career, with special reference to rural youth of Hadoti region in Rajasthan.

Keyword: Youth, agriculture, interest level, occupation, Media

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1. INTRODUCTION

Hadoti is a region of Rajasthan state in western India. Being a part of Rajasthan state, the region of Hadoti is agrarian and the majority of its people work in agriculture. Wheat, Soyabean, Mustered, Rice, Coriander, Sesame, Maize, Barley, Pulses, Garlicand Sugarcane are the main staple crops. The region is enriched with the resources of oil seeds and minerals. Moreover there is negative attitude of the family and the society at large toward agriculture. Informal work in urban areas is therefore preferred by rural youth of Hadoti region who are exposed to school even if it is low paying and as backbreaking as agriculture.The study therefore aims to explore the individual and household characteristics of rural youth towards agriculture and the factors that shape their agricultural attitude.

2. LITERATURE SURVEY

Most studies conducted recently in India and in foreign countries indicated that individual and household characteristics have direct link with interest levels of rural youth on agriculture as career.

Sharma and Bhaduri (2009) conducted a study in India Characteristics such as gender, age, family size; succession information and attitude towards risk were found to be playing a role in pursuing agriculture as a means of livelihood. According to them youth who possess non-farm skills are 1.4 times more likely to opt out of agriculture. The younger farmers are more open to taking risk and grab opportunity of moving out and experiment with newer jobs and unfamiliar surroundings, leaving agriculture.

National Sample Survey (2010) conducted study and it was found that over 45 per cent of farmers wanted change and quit farming. Hence, the present day challenge is to persuade educated youth including farm graduates to take up agriculture as a profession. They need to stay to help in rural area and earn a decent living in villages.

This is contrary to the study by Muhammed (2011) who observed that the more matured youths are more likely to take up agriculture as a career as compared to the younger ones. He further reasoned out that the older youths are more likely to be faced with the household issues like food security and income expenditures. This is because they do not have any office paid jobs. They take refuge on the farms to enable them to settle these domestic issues.

Ahaibwe et al. (2014) also noted that the proportion of adults (14 years and more) in the households is higher where the youth are residing. It reduces

likelihood of your undertaking agriculture. This could be explained by the fact that in a typical rural setting, most of the youths inherit agricultural related assets (e.g. farm land) from their ancestors. As the proportion of adults increases, assets like land are divided amongst the many family members and the resulting small farm sizes may not be viable and hence the reduction in the probability of undertaking agriculture.

To my knowledge, there are only few studies that address agriculture as career of rural youth in Rajasthan as well as in our country too. Therefore, this study would help understand important issues with regard to individual and household characteristics of rural youth towards agriculture as their pursuing career with special reference to Hadoti region.

3. OBJECTIVES AND METHODOLOGY

(a) Objectives

The main objective of the study is to explore a set of individual and household characteristics that determines the likelihood of youth engagement in agriculture.

(b) Methodology

Site. The Hadoti region consists of the districts of Bundi, Baran, Jhalawar and Kota, and borders the Mewar region of Rajasthan as shown in Fig. 1 the biggest cities are Baran and Kota. The name of the region derives from the Hada Rajputs, a branch of the Chauhan Rajput clan.

Fig.1 Map of Hadoti Region of Rajasthan

3. DATA COLLECTION AND ANALYSIS

(a) Sample. Participants in the study were a group of 480 youth aged 14-29 years as shown in Table 1 Participants were selected using a multi-stage random sampling technique.

Table 1 Sample of the Study

Sr. No	Data	Sample Size
1	Students aged 14 – 16 who are in upper primary school	120
2	Students aged 17 – 20 who are in high school	120
3	Students who left school (drop outs or graduates) aged 18 – 24	120
4	Young farmers aged 21 - 29	120
Total		**480**

(b) Materials. A semi-structured questionnaire was custom-made for gathering information about the demographic and socio-economic background of the youthand the amount of time youth spent with their parents.

(c) Data Analysis. SPSS wasused to analyze the data statistically. The data will be collected through Questionnaire are then entered in Statistical Package for social science.It supports many functions such as reports, charts and trends, descriptive statistics and even complex statistical analysis.

4. RESULTS

(a) Family Agriculture and Children Interest Level. As shown in table 2 and Fig. 2 most of the respondents, 82.08 %, of them have responded that their families encourage for life success. But, the family's encouragement tends to focus on non-agricultural occupation. Families consider their children are successful if they are able to achieve nonagricultural occupation. This, despites the fact that most (82.08%) of respondents parent have based their current livelihood on agricultural occupation whereas, their preference was nonagricultural career to be their future means of livelihood. As such, 82.08% of rural youth have responded that their parents prefer non-agricultural occupation and remaining 17.92% only prefer agricultural occupation.

Table 2 Respondents' family career preference for children and family encouragement

Family Career Preference for Children	Family Encouragement For Life Success									
	Aged 14 – 16 : Upper Primary School		Aged 17 – 20: High school		Aged 18 – 24: Left School		Aged 21 – 29 : Young farmers		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Non-Agricultural Occupation	111	92.50	105	87.50	101	84.17	77	64.17	394	82.08
Agricultural Occupation	9	7.50	15	12.50	19	15.83	43	35.83	86	17.92
Total	120	100	120	100	120	100	120	100	480	100

Dr. Geeta Gupta[1]* Mrityunjay Nagar[2]

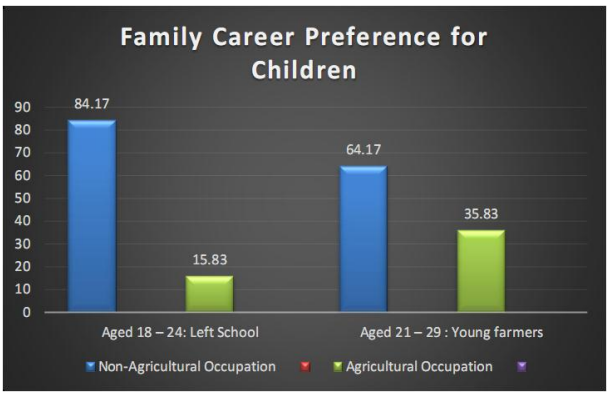

Fig. 2 Family Career Preference for Children

(b) Condition of your family's agricultural life. Despite a high level of interest in non-agricultural occupation both by youth and children, as shown in the table 3 and Fig.3 most of the respondents view their family's agricultural life as successful.

Table 3 Condition of Your Family's Agricultural Life

Family member engaged in agriculture	Family Encouragement For Life Success									
	Primary School		High school		12th School		Diploma Complete / Graduate		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Successful	109	90.83	99	82.50	81	67.50	68	56.67	357	74.38
Somehow Successful	6	5.00	13	10.83	27	22.50	37	30.83	83	17.29
Unsuccessful	5	4.17	8	6.67	12	10.83	15	12.50	40	8.33
Total	120	100	120	100	120	100	120	100	480	100

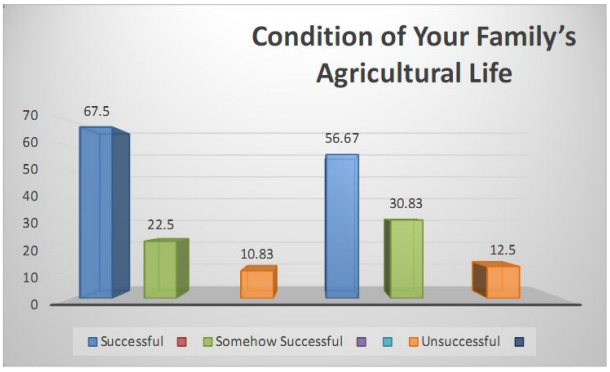

Fig. 3 Condition of Your Family's Agricultural Life

As table 3 and Fig. 3 shown 74.38%, have responded that the condition of family's agricultural life was successful". The remaining 17.29% and 8.33% of surveyed responded that the condition of family's agricultural life was „somehow successful" and „unsuccessful" respectively.

(a) Family member engaged in agriculture and their respective level of education. The whole surveyed respondents a significant numbers of individuals have close family members who have engaged in agriculture after some kind of formal education. As shown in table 3 from all close family members engaged in agriculture, more than half of them have been completed their high school education. As such from all respondents who have close family members engaged in agriculture the majority of them have the educational levels of high school graduate and above.

(b) Impact of Media on Agricultural Aspirations. The penetration of the mass media is still very low in the study area. As shown in table 4 and Fig. 4 most of the respondents surveyed have no frequent opportunities for media consumption.

Table 4 Impact of Media on Agricultural Aspirations

Level	Types of Media				Total	Percentage
	Newspaper Reading	Radio Listening	Watching TV / Mobile	Magazines		
Regular	11	222	23	3	259	13.49
Occasional	28	123	52	8	211	10.99
Never	441	135	405	469	1450	75.52
Total	480	480	480	480	1920	100

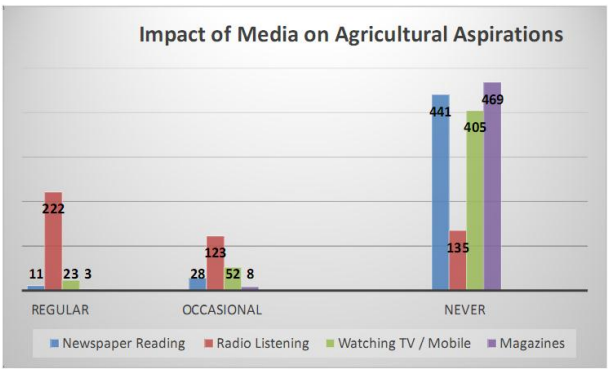

Fig. 4 Condition of Your Family's Agricultural Life

Compared to other media, radio was the most accessed means of gaining information for rural youth in Hadoti region. As such radio was the only media used regularly at least by most of respondents. Only 13.49% of respondents were media regularly. Only 10.99% of respondents have listened to agricultural program occasionally. The remaining 75.52% of respondents are those who have never use any media for agricultural program.

5. CONCLUSION

Various factors discussed in this work indicate that youth are aspired to non-agricultural career. The family members and their role model have influenced youth to aspire beyond agriculture in Rajasthan at Hadoti region. This is further influenced by the media and the strong modernization discourse among the peer group. This has led to the idealization towards urban career and the demeaning of the rural and agricultural career. In spite of the rural youth non-agricultural aspirations, there are many youth who wants to engage in agriculture for livelihood in absence of any other option. Also there are many structural problems that hinder rural youth to take up agriculture for which a some policy decisions and social activation are needed.

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Corresponding Author

Dr. Geeta Gupta*

Principal, Om Kothari Institute of Management & Research, Kota (Rajasthan) India

E-Mail – drgeeta.okimr@gmail.com

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An Extensive Review of Webs Caching Techniques to Reduce Cache Pollution

Jitendra Singh Kushwah[1]* Dr. Sitendra Tamrakar[2]

[1]Dept of CSE, ITM University, Gwalior (M.P.) India

[2]Dept of CSE, CCET, Durg (C.G.) India

Abstract – Caching has been used for decades as an effective performance enhancing technique in computer systems. The Least Recently Used (LRU) cache replacement algorithm is a simple and widely used scheme. Proxy caching is a common approach to reduce network traffic and delay in many World Wide Web (WWW) applications. However, some characteristics of WWW workloads make LRU less attractive in proxy caching. In the recent years, several more efficient replacement algorithms have been suggested. But, these advanced algorithms require a lot of knowledge about the workloads and are generally difficult to implement. The main attraction of LRU is its simplicity. In this paper we study several techniques about page replacement, cache pollution and web caching technique at the end of this paper we propose a new idea of web page scheduling.

Keywords: IP, LAN, HTML, Caching, Proxy.

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1. INTRODUCTION

Proxy server is placed between a client utility equivalent to a web browser, and a real server the request to the real server. Different key features are improving performance of proxy server like caching the documents and thread polling etc. It provides safety like firewall and security of local Area Network (LAN) from having access to of unauthorized customers. Foremost feature is caching the web documents. Caching refers to store copies of the popular documents in proxy memory and thus used it for future references and reduces the bandwidth requirement. There are different available techniques but this paper is proposing the new and better technique. It blocks all solicitations to the real server to look on the off chance that it might well satisfy the solicitations itself. If not, it forwards unique to improve the performance of Least Recently Used- Distance (LRU-D) of caching the web document in the proxy server. Proxy server is a server (a computer method or a software program) that acts as a middleman for requests from purchasers seeking resources from other servers. A client associates with the proxy server, asking for some supplier, likened to a document, association, net web page or distinctive resource, close by from an alternate server. The proxy server evaluates the request with respect to its filtering rules (Yong Woon 2001). For example, it'll filter traffic with the aid of IP tackle or protocol if the request is validated via the filter, the proxy presents the useful resource via connecting to the vital server and requesting the provider on behalf of the patron. A proxy server may just alternatively adjust the client's request or the server's reaction, and in numerous examples it might serve the demand without reaching the specific server.

A proxy server has many potential purposes, including:

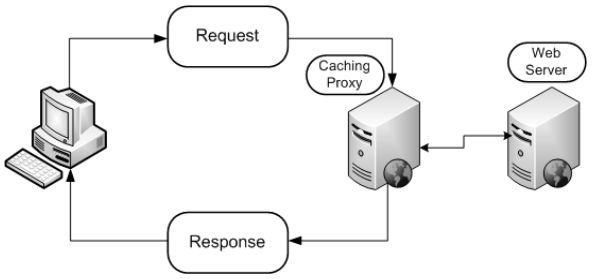


Fig.1 System with caching

(a) To keep machines in the back of it nameless (most of the time for safety)

(b) To pace up access to resources (using caching). Net proxies are often used to cache websites from an online server.

(c) To apply entry policy to network services or content, e.g. to dam undesired websites.

(d) To log / audit usage, i.e. to provide corporation employee internet usage reporting.

(e) To avoid safety/ parental controls.

(f) To examine transmitted content material before movement.

(g) To examine outbound substance material, e.g., for data leak security.

(h) To maintain a strategic distance from local limitations (Jochen Hollmann 2007).

2. PROXY SERVER FUNCTIONS

Proxy servers implement one or a greater amount of the accompanying capacities:

(a) **Caching proxy server -** A caching proxy server quickens benefit asks for through retrieving content saved from a before request made by technique for comparable supporter or even different clients. Caching proxies keep nearby copies of quite often requested resources, allowing enormous organizations to tremendously lessen their upstream bandwidth usage and cost, whilst tremendously increasing efficiency. Most ISPs and big companies have a caching proxy. These machines are worked to convey radiant document framework execution (frequently with RAID and journaling) furthermore contain hot-rod adaptations of TCP. Caching proxies were the first kind of proxy server (Wei-hsiu 2004).

(b) **Web proxy-** A proxy that focuses on worldwide wave traffic is called a "web proxy". The most well-known utilization of a web proxy is to serve as a web store. Most proxy programs give a way to deny access to URLs particular in a blacklist, hence giving substance material filtering. This is regularly used in a corporate, educational or library environment, and wherever else where content filtering is desired. Some internet proxies reformat web sites for a targeted reason or audience, akin to for mobile phone telephones and PDAs.

(c) **Content-filtering web proxy-**A content filtering web proxy server presents regulatory control over the content which might be handed-off through the proxy. It is mostly utilized in each business and non-industrial companies (peculiarly schools) to ensure that internet usage conforms to suitable use coverage. In some circumstances users can circumvent the proxy, considering that there are offerings designed to proxy (Geetha 2009).

(d) **Anonymous proxy server-**An anonymous proxy server (at times called a web proxy) for the most part endeavors to anonyms web surfing. There are diverse assortments of anonymizers. One of the more common variations is the open proxy. Because they are regularly problematic to track, open proxies are especially useful to these looking for on-line anonymity, from political dissidents to computer criminals.

(e) **Hostile proxy-**Proxies can be mounted with the intention to eavesdrop upon the dataflow between client machines and the net. All accessed pages, as good as all varieties submitted, will also be captured and analyzed via the proxy operator.

(f) **Intercepting proxy server-**A intercepting proxy consolidates an proxy server with an entryway or router (consistently with NAT capacities) Connections made by way of purchaser browsers by means of the gateway are diverted to the proxy without consumer-aspect configuration (or often knowledge) (W. Ma 2002).

(g) **Transparent and non-transparent proxy server-**The time period "transparent proxy" is most frequently utilized erroneously to signify "intercepting proxy" (for the reason that the customer does now not have to configure a proxy and can't instantly detect that its requests are being proxies). Obvious proxies can be carried out utilizing Cisco's WCCP (web Cache control Protocol). A 'non-obvious proxy' is a proxy that modifies the request or response as a way to furnish some introduced service to the person agent, such as workforce annotation offerings, media sort transformation, protocol discount, or anonymity filtering".

(h) **Forced proxy-**The time period "forced proxy" is questionable. It way both "intercepting proxy" (on record that it channels all visitors on the main close by passage to the Internet) and its detailed inverse, "non- intercepting proxy" for the reason that the consumer is compelled to configure a proxy with the intention to entry the internet) (S. Sen 1999).

(i) **Open proxy server-**Because of the fact proxies possibly used to manhandle, strategy administrators have developed an amount of strategies to refuse service to open proxies. Numerous IRC networks mechanically test customer frameworks for perceived types of open proxy. In like manner, an email server might be arranged to consequently test email senders for open proxies.

(j) **Reverse proxy server-**A reverse proxy is a proxy server that's established in the regional of a number of internet servers. All traffic coming from the web and with a destination of probably the most net servers goes by way of the proxy server (R. Tewari 1998).

3. FEATURES OF PROXY SERVER

Some of most important aspects are as given below:-

(a) **Caching-** The objective of all caching is the same – to block reacquiring data that has as of now been recovered with the goal that reaction time is enhanced and transfer speed usage minimized (R. Ayani 2003).

(i) **These are advantages of Caching like-** Web caching reduces bandwidth consumption, thereby decreases network site visitors and lessens network congestion.

(ii) **There is some Disadvantages of Caching like-** The predominant drawback is that a purchaser possibly watching at stale information as a result of the lack of right proxy updating.

- The entry latency may increase within the case of a cache pass over due to the extra proxy processing. Subsequently, cache hit rate ought to be expanded and the cost of a cache miss ought to be minimized when planning a caching system.
- A solitary proxy cache is constantly a bottleneck. A confine must be set for the amount of customers a proxy can serve. An effectivity therapist certain will need to try and be upheld.
- A solitary proxy is a solitary purpose of failure.
- Using a proxy cache will diminish the hits on the first remote server which may frustrate a considerable measure of learning suppliers, in light of the fact that they can't keep up a real log of the hits to their pages. Hence, they might decide not to allow their documents to be cacheable (Jun Pyo Lee 2008).

(b) **Web Mining-** Web caching is the temporary storage of web articles (tantamount to HTML documents) for later retrieval. Proponents of web caching announce three huge focal points to web caching: lessened data transfer capacity utilization (less demands and reactions that need to go over the network), reduced server load (fewer requests for a server to control), and diminished latency (for the reason that cached responses are available instantly, and towards the client being served). A fourth is regularly added: extra reliability, as some objects may be retrievable through cache even when the usual servers aren't reachable. Together, these features can make the World Wide Web less expensive and better performing. One predicament of caching is the talents of making use of an out-of-date object stored in a cache as a substitute of fetching the present object from the origin server.

(c) **Web Caching Techniques-**A cache is a capacity territory that is nearer to the element requiring it than the authentic source. Accessing this cache is commonly rapid than being in a position to access the understanding from its original source. A cache is most likely saved in memory or on disk. A memory cache is ordinarily more rapidly to read from than a disk cache, but a memory cache typically does not survive system restarts.

(d) **Proxy Caching-**In proxy caching, the cache server receives the request for an object from a client. If the object is present in its cache, it responds with the object. Else, it requests the source of object and ensures the client has the requested item. In the event that required, the server may likewise store the article in its cache so to bring down the network congestion consequent time the object is asked. Caching server is placed virtually customer (at network gateway) to cut back the latency and hops. The advantages of Proxy caching contain lowered latency and network traffic that makes expertise of the web higher and greater availability of the web sites. Nevertheless, the disadvantages that lie with this approach are that cache is single factor of failure, the browsers have got to be configured and no such method exists that can dynamically add more caches when required.

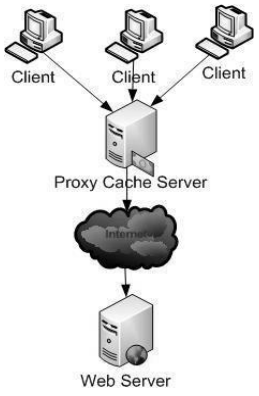


Fig 2. Proxy caching

(e) **Reverse Proxy Caching -** Alternatively of inserting cache server virtually client, the cache server is placed close to the servers in this type of variant of Proxy Caching. When a server is predicted to obtain sumptuous requests concurrently, in any such scenario, reverse proxy caching is an amazing answer because it pretends as the origin server for the requests being generated. This is advantageous because it maintains and continues uptime of the server noticeably excessive and assures high quality of service (QoS). It is a useful solution in scenarios where virtual domains have been mapped to a single physical site. Close by forward proxy caching, traffic Server offers with web data solicitations to starting servers because of the guests asking for the data. Reverse proxy caching (often referred to as server acceleration) is exclusive easily for the reason that visitors Server acts as a proxy reminiscence cache on there are two methods to set up transparent caching: switch level and router level. Part of the most vital expectation servers that keep up the data. Traffic Server is designed to behave outwardly as supply server which the patron is trying for connecting to. In a average scenario the promoted hostname of the beginning server eliminates to site visitors Server, which serves client requests instantly, taking information from the genuine beginning server when crucial.

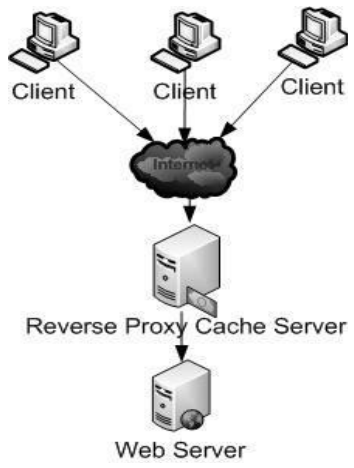


Fig 3. Reverse Proxy Caching

(e) **Transparent Caching-** The main issue with proxy server strategy is that it requires configuration of the web browser. Transparent web caching alternatively intercepts HTTP requests on the gateway without being seen and redirects them to web cache or clusters. There are two techniques to set up transparent caching: switch level and router level. Router level transparent caching makes use of coverage centered routing to direct requests to correct cache or server. Switch level transparent caching presents change to act as a committed load balancer. It is more preferable approach because switches generally cost cheaper than routers. As video streaming and rich media downloads preserve up to flood operator networks, with no result in perceive, network operators are analyzing as good as deploying transparent web caching inside of their networks to address a so much wider choice of internet content. The intent is two-fold. The first is to alleviate the network infrastructure and data transfer usage costs associated with over the top (OTT) content and the second is to distinguish their consumer broadband servicing as well as deliver better user performance. By getting rid of any skills slows down related to the web and even the content beginning, caching enables the operator to emphasize their funding being made in the access network and deliver more content material at top speeds.

(f) **Adaptive Web Caching -**Adaptive Web caching includes replacement algorithms that examine demands produced by the customer and stores the most got to objects within the cache deposit. Adaptive caching includes a couple of, disbursed caches which dynamically become a member of and leave cache companies based on content demand. The general inspiration of Adaptive Caching imagines a decent mesh of self-organizing, overlapping multicast groups of servers that adapt when quintessential to altering conditions. This mesh forms an implicit and scalable hierarchy that's used to effectively diffuse standard web content toward the demand. The two fundamental segments are basic correspondence ways between the neighboring caches and flow of solicitations for data along ways.

(g) **Push Caching-**Servers choose when and where the articles are reserved; this thought was accepted by push storing. Servers comprehend which purchasers require that data most likely and location it close to them. Knowledge is dynamically mirrored. An assumption about push caching is that the capacity to launch caches traverses administrative boundaries. Push caching is a strong answer for content material vendors. Push-caching has subsequently diminished the actual quantity of network traffic without considerably impacting almost every primary server's load. If handiest primary servers would store duplicated documents then push-caching could be of questionable fee. The abilities of push-caching, however, are that it's vitally easy so as to add extra servers. Proxy-servers, for instance, are perfect contender for tolerating copied things just on the grounds that they're unquestionably

running web caching software, ceaselessly are appended to large disks, and are usually not hidden behind firewalls. Push-caching can flow into the stress from overloaded major servers onto proxy-servers and other servers without exotic an unacceptable load given that all servers caching replicated objects could refuse replacement objects at any time.

(h) **Active Caching-**The plan makes it feasible for servers to provide cache applets to be connected with records, and obliges proxies to summon cache applets upon cache hits to outfit the imperative processing without reaching the server. Cache applets allow servers to receive the benefit of proxy caching without losing the capability to track user accesses and tailor the content presentation dynamically (Brian D. 1999).

4. LITERATURE SURVEY

V. Sathiyamoorthi et al and Dr. V. Murali Bhaskaran al (2012) define the approach that Web caching is a mechanism used to improve network performance by reducing network traffic, load on the Web Server and delay in accessing the Web page. This is achieved by storing frequently accessed Web pages on proxy cache placed within the network. Caching can be taken location either at purchaser aspect or in the proxy Server. Web proxy cache can potentially support network performance via lowering the number of requests that reaches the server, the quantity of data transferred by means of the network and the delay in getting to Web page. At the point when a requested page is not present in the cache and cache is full then removal of one or more cached documents take pace. The execution of proxy relies on upon page replacement algorithm. The decision by which document is evicted from the cache is depends on different kinds of replacement policies used. Various leaving cache replacement algorithms, which endeavor to diminish different cost measurements, for example, hit rate, byte hit rate, normal latency and aggregate cost.

Negrão et al. think about that the web extends its mind-boggling nearness in our day by day lives, the weight to strengthen the efficiency of web servers raises. A most important optimization process that allows internet-scale web servers to provider purchasers extra efficiently and with lower resource demands consists in caching requested web objects on middle cache servers. On the core of the cache server operation is the replacement algorithm, which is accountable for identifying, in step with a cache substitute policy, the cached pages. that should be removed in order to make space for new pages. Traditional replacement strategies utilized as a part of apply exploit worldly reference territory by utilizing expelling the minimum of late/as a general rule asked for pages from the cache. On this paper we endorse a brand new resolution that adds a spatial dimension to the cache substitute approach. Our answer is motivated by means of the remark that users most likely browse the net via successively following the hyperlinks on the web pages they seek advice from. This process, called SACS, measures the distance between objects in phrases of the number of links essential to navigate from one object to a different. Then, when alternative takes location, objects which can be distant from probably the most lately accessed pages are candidates for elimination; the closest an object is to an as of late gotten to page, the a great deal more outlandish it is to be evicted. We've carried out a cache server utilizing SACS and evaluated resolution in opposition to different cache substitute systems.

Shamsher Singh et al and G.L. Saini al (2015) Aims to review few caching architectures. These models join intermediary proxy caching, cooperative caching, adaptive caching, caching and active caching. Furthermore, as it has been repeatedly observed, same data is transmitted over same network links time and again to thousands of users. Such redundancies desire the need for caching algorithms that optimally utilize the finite cache space.

Rassul Ayani, Yong Meng Teo and Yean Seen Ng et al. (2003) define that Caching has been used for many years as an potent performance enhancing technique in computer methods. The Least Recently Used (LRU) cache replacement algorithm is a straightforward and by and large utilized plan. Proxy caching is a unique procedure to lower network traffic and delay in numerous WWW applications. By and by, a few attributes of WWW workloads make LRU less engaging in proxy caching. In the recent years, several more efficient replacement algorithms have been suggested. Yet, these advanced algorithms require a great deal of learning about the workloads and are by and large hard to execute. The principle attraction of LRU is its effortlessness. In his work, he present two modified LRU algorithms and compare their performance with the LRU. Their results indicate that the performance of the LRU algorithm can be improved substantially with very simple modifications.

Harshal N. Datir et al. (2011) define the major challenges associated with the Internet is the problem of increased response time caused due to the ever – increasing traffic on the Internet. Numerous arrangements, both hardware and software, have been proposed to defeat this test. The famous hardware choices are to expand the data transmission of the Connection and recreate the net archives at numerous areas. Increasing the bandwidth will increase the data transfer rate, and hence decrease the response time. The replication of

records will facilitate the nearest record to be fetched, minimizing the response time. Just lately, much research has concerned about making improvements to web performance through lowering the bandwidth consumption and WWW traffic. It means that fewer requests and responses need to go over the network and fewer requests for a server to handle.

Williams et al (1996) et al. discussed that measurement outperforms than LFU, LRU and a number of LRU variants in terms of distinct performance measures cache hit ratio and byte hit ratio. In their experiments, they fail to do not forget object frequency in decision making method.

Rachid et al (1988) proposed a procedure referred to as class-based LRU. C-LRU works as recency-founded as good as size-based, aiming to obtain a well-balanced combo between enormous and small documents in the cache, and for this reason, just right performance for each small and massive objects requests. The caching procedure classification-headquartered LRU is a change of normal LRU.

Cao Pei et al proposed that caching algorithms should address the network cost.

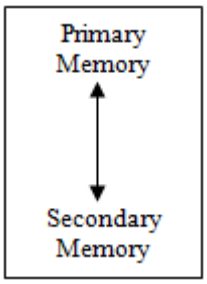
They proposed another calculation known as Greedy Dual-Size that joins region, size and cost together. The cost can be defined as the downloading latency, the network cost or other variables depending on the goal of the algorithm. Authors introduced two versions of the Greedy Dual-Size algorithm, GD-Size (1) and GD-Size (packets). GD Size (1) sets the cost for every report to 1, and GD-Size (bundles) sets the cost for every record to 2+ (size/536). GD Size (1) tries to minimize miss ratio, and GD-Size (packets) tries to curtail the network traffic as a consequence of the misses. The results show that clearly, GD-Size (1) achieves the best hit ratio among all algorithms across traces and cache sizes.

Martin et al (1997) used trace-driven simulations to assess the performance of different cache replacement policies for proxy caches and utilized a trace of client requests to Web proxy in an ISP environment to determine the performance of several present alternative replacement policies. The outcome on this paper are based on probably the most large web proxy workload characterization yet suggested within the literature.

5. PROPOSE WORK

The goal of all caching is the same – to avoid reacquiring data that has already been retrieved so that response time is improved and bandwidth utilization minimized. The caching technologies detailed here are designed to achieve that goal by caching data locally and serving it immediately when a request for the data is received. Literature survey shows that main cause of cold cache pollution is due the objects present in the cache that is once accessed and not accessed again. For that replacement algorithm used in previous work. In literature survey, there are many algorithms like LRU, SLRU, LRU-Distance etc. are used to remove cold cache pollution but they were not able to fully remove cold cache pollution. Our proposed work is to compare these replacement algorithms on the proxy server. We proposed a modified LRU-Distance algorithm to remove cold cache pollution better than previous algorithms.

In our proposed algorithm beginning we divide cache into two parts primary cache and secondary cache in primary cache data store using least recently use manner, data which used least, shift into the secondary memory.



When a user accesses data from the server it put it into primary memory when data is least used it shifted to secondary memory using LRU-D, data take position using LRU-D

Total size allocated for caching of document is CS.

PM = CS/2

SM = CS/2

Size of total information stored at any time is IS in primary memory.

Total number of web objects stored at any time is TNO.

Size of object to be inserted is OS.

Top of stack is represented by TOSP for primary and TOSS for secondary memory.

Jumping of web document is represented by JB.

Position of web document returned using index area in secondary memory and Position of web document returned using sequential algorithm in primary memory.

Significance of D is described as SM/2. At start web page contain first location and then second take D position of web page but in this situation there are wastage of memory location so that we do memory compaction after find out all D location we compact

the memory and create new segmentation so that we create another D locations.

Searching for primary memory

Input: Requested objects from Proxy

Output: Total caching

Steps:

(1) Receive request for object I

(2) IF I is already present in primary THEN

(3) Serve request internally from cache

(4) Go to 13

(5) ELSEIF I is not present in primary search for secondary memory

(6) Serve request internally from cache

(7) Go to 13

(8) ELSE Serve request from origin server

(9) IF I can be accommodated in primary cache THEN

(10) Bring I into cache

(11) ELSE I cannot be accommodated in cache

(12) Evict least recently requested object from primary cache and put it into secondary memory Dth location or replace it with I

(13) END IF

(14) END IF

(15) Repeat steps 1 to 12 for next object request

(a) Searching for secondary cache

Step 1. If (OS> (CS-IS)) then do the following

(a). "Delete one or more web documents from bottom of stack, sum of whose size is just greater than or equal to object to be inserted.

(b). Go to step 2.

Step 2. Do the following

(a). "Insert the document at the distance D from bottom of stack".

(b). IS = IS + OS.

Step 3. If (D! = TOS)

JB=1;

Step 4. Exit.

Step5. If (JB == 0) then do the following

"Put the accessed object at the top of Stack", and go to step 3.

Else

Pos = Index / 2.

Step6. "Put the object at the position pos in the stack".

Step7. If (pos == TOS) then do

JB = 0.

Step 8. Exit.

6. COMPACTION ALGORITHM

(i) Compute the forwarding location for live objects.

(ii) Keep track of a *free* and *live* pointer and initialize both to the start of heap.

(iii) If the *live* pointer points to a live object, update that object's forwarding pointer to the current *free* pointer and increment the *free* pointer according to the object's size.

(iv) Move the *live* pointer to the next object

(v) End when the *live* pointer reaches the end of heap.

(vi) Update all pointers

(vii) For each live object, update its pointers according to the forwarding pointers of the objects they point to.

(viii) Move objects

(ix) For each live object, move its data to its forwarding location.

For all designing we consider memory as a doubly linked list so that access of memory and compaction become easy.

Linked list algorithm

p->info = x

current = head

while current is not null and current->info < x

previous = current

current = current->link

if current is head

p->link = head

head = p

else

previous->link = p

p->link = current

7. CONCLUSION

The widening gap between processor and memory speeds makes data locality optimization a very important issue in modern cache systems. Computer architects focus on optimizing data cache locality using intelligent cache management mechanisms. In this paper we study several techniques to remove cache pollution at end we propose a new technique to handle cache pollution.

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Corresponding Author

Jitendra Singh Kushwah*

Dept of CSE, ITM University, Gwalior (M.P.) India

E-Mail – jsk2474@gmail.com

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Congestion Management by Optimally Locating the Facts Devices: A Review

Bharti Sharma[1]* Dr. S. R. Awasthi[2]

[1]HOD, Dept. of Electrical, S.V. Polytechnic College, Bhopal (M.P.) India

[2]Dept. of Electrical Engineering, RNTU, Bhopal (M.P.) India

Abstract – This paper presents the brief overview on congestion in power system, its causes, effects and remedies. It also deals with congestion management. Congestion management is a significant feature of power system. In power system, when power flows through transmission lines and transformers exceeds the power transfer capability of transmission lines, congestion takes place. Reactive power is one of the key factors for controlling congestion in transmission lines. It is mainly provided by regulating tap changing transformers shunt capacitors and generators excitation. Flexible AC transmission system (FACTS) devices are another effective means of controlling reactive power flow in transmission lines. They change the reactance across the transmission line by using fast acting power electronic switches along with inductors and capacitors. As a result, line loadability increases, system losses decline, power system's security enhances and overall cost reduces. This paper also gives a brief literature review on finding optimal location for placing FACTS devices.

Keywords— Congestion; Congestion Management; Reactive power; FACTS.

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I. INTRODUCTION

Congestion in power system is derived from the word conjunction in economics along with deregulation. The term congestion is used in power system much earlier than deregulation. Previously it was conferred on power system security and stability at the minimum cost (Singh, et. al., 1998) power flow through transmission lines and transformers exceeds the power transfer capability of transmission lines, congestion takes place that may lead to line outage and blackout. It also weakens power system's security as well as reliability. Consequently electricity prices increase in electricity markets (Papalexopoulos, 1997).

(a) Reasons for Congestion

Congestion in transmission lines occurs due to ever increasing power demand and different types of loads may be clubbed under the following reasons:

(i) Generator outages.

(ii) Transmission line outages.

(iii) Changes in energy demand above the specified limit.

(iv) Uncoordinated transactions

(v) Infeasibility in existing and new contracts

(b) The Congestion may lead to some of following problems:-

(i) The market efficiency is reduced.

(ii) The consumers are forced to reduce the consumption of power, as the electricity prices increase.

(iii) Security concern of the system may get affected.

(iv) The system is forced to operate at lower stability margins.

(v) The system may collapse due to initiation of cascade tripping.

(vi) Congestion holds the operator of the systems from transmitting further power from a particular generator.

(vii) The surplus power transmission charges increase.

(c) Congestion Management

With proper congestion management techniques, the system can be made more efficient by reducing or completely eliminating the overloading of transmission line. Congestion management can be done by three approaches. The first approach is based on centralized optimization. In this type, system operators control the congestion either directly or indirectly by controlling the power flow in the system. The second way is based on price signals forecast for congestion by controlling the generator output prior to real time operation. In the third approach, congestion is controlled by permitting or prohibiting the bilateral power flow in transmission line. It basically depends upon the commitment between consumer and producer. Congestion is an unavoidable phenomenon and it must be corrected in real time by centralized control (Androcec, 2009). Congestion management can be classified as:-

(i) **Cost free method -** Cost free methods include tap changing in transformers and phase shifter operation, FACTs devices and modification in network topologies. They are called cost free because the cost involved is nominal.

(ii) **Non cost free method-** The non-cost free methods include load reduction and generation rescheduling. The conventional congestion management includes price control theme, fuzzy logic, genetic algorithm (GA), nodal pricing method, voltage stability, use of FACTS devices to reduce line loading and market-based analogy (Galiana and Ilic, 1998). Cost free methods have the merits over non cost free method because it does not affect the economy of the system as well as it concerns system security.

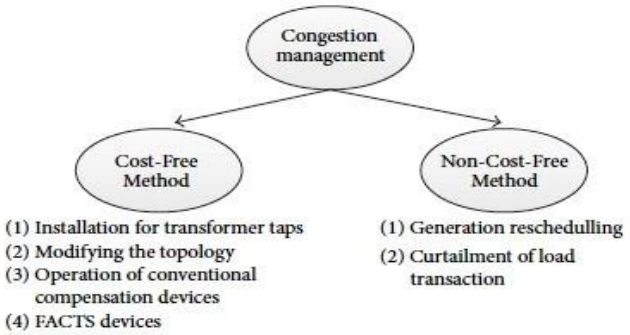

Fig. 1. Methods of congestion management (Gupta, et. al., 2017).

Reactive power is one of the key factors for managing congestion in transmission lines. It is mainly provided by regulating tap positions of transformers, shunt capacitors and generators excitation. Flexible AC transmission system (FACTS) devices are another effective means of controlling reactive power flow in transmission lines by changing the reactance across the transmission line by using fast acting power electronic switches along with inductors and capacitors. Congestion can also be managed in the existing system by Load Shedding (Singh, et. al., 1998) (NERC, 1996).

This paper presents the detailed overview on congestion and its management by optimal placement of FACTS devices by using optimization techniques. The paper is structured as follows: Section II - Literature review, Section III- Methods of congestion management and Section IV - Optimum placement of facts devices.

II. LITERATURE REVIEW

In 1980s, rapid changes have been undergoing in electric supply industry in which independent entrepreneurs are allowed for competition to supply power to the utility due to which efficiency of the electric supply industry increases. This competitive market makes the significant changes among electric supply industry for reducing the energy production and distribution cost such as manpower shedding, eliminates certain system inefficiencies and increase in customer preferences. Later in 1990's, worldwide, many electric sector, industries and companies were forced to deregulation because of various factors such as ever increasing power demand, high tariffs rate, political reforms, global economic crisis and managerial insufficiency. The only goal behind the deregulation is to enhance the completion among the electric supply industries. This will bring various choices and economical tariff rates or benefits to consumers.

Restructuring and deregulation of electric power industries promote open access. The open access means that the opportunity to use the transmission system must be equally available to all buyers and sellers. As a result, competitive environment for electric supply companies increases. But managing dispatch is a new challenge faced by transmission system operators.

The fair implementation of electricity restructuring is one of the major concerns for electric power companies. Transmission networks is one of the key factors affecting it because power transmission network has some limitations in terms of environment and economy. The other constraints that limit the power transfer between the two transmission networks are power system security and stability. The power flows through transmission line and transformers should be under the power transmission capability limit to avoids any network collapse due to voltage instability, angular instability or any line outages.

When the power flows through transmission lines and transformers above the physical limit of transmission lines, then transmission congestion occurs due to which existence of new contracts is restricted, line outages increase, system security and reliability degrade as well as the electricity prices increase (Papalexopoulos, 1997. Androcec, 2009. Gupta, et. al., 2017. Galiana and Ilic, 1998). Generally congestion occurs in both bundled and unbundled system but the congestion management is much simpler in case of bundled system. It is because a single utility manages generation, transmission as well as distribution system in some cases. In the competitive electricity markets, independent system operator (ISO) performs the important task of congestion management and pricing for its smooth functioning (NERC, 1996). ISO takes actions and remedial measures to manage congestion in transmission network.

In real time system, following measures are adopted for congestion management:

(a) Operation of FACTs devices for controlling power flow.

(b) Rescheduling of generation based on economical bidding.

(c) Timely collect the transmission line data and find out the probability of any line congestion. Consequently provide the incentives to the congested line so that system remains under constraints limit.

(d) Curtailment of loads.

Mostly System Operators (SO) uses the top two methods for congestion management. Load curtailment is always the last choice for it.

Real power transfer between transmission systems mainly depend upon the reactive power and voltages (Miller, 1982). For maintaining secure voltage profile, the sufficient amount of reactive power support is necessary at correct location. The importance of reactive power dispatch in an open access system is more important because the power transfer in an open access systems increases and the voltages associated with it prevents the system from further increase in power transfer (Mamadur & Chenoweth, 1981). The generators in the system provide the additional reactive power support whether they are involved in real power transfer or not (Dai and Ni, et. al., 2001). Mostly reactive power is provided by tap changing transformers, switching shunt reactors and capacitors, by controlling generators excitation.

England and Wales (E&W) market consists of only one zone, hence no constrained interfaces are considered for the market dispatch. The generator's offers decided the zonal pricing (Wolak and Patrick, 1997). In congestion management, ISO commanded the operation of generators and each bus is considered as a zone and all constraints are taken. The selection of generators for transmission congestion management is based on their bidding prices. Loads do not take part in congestion management. ISO incurred the additional charges on consumer as uplift. The uplift is a part of total price which is not directly related to energy production cost. It is the cost consisting of ancillary services and losses in the system.

In Pennsylvania–Jersey–Maryland (PJM), the ISO performs a centralized market dispatch for each time period in the scheduling horizon. State estimator data is used to compute the nodal price. Generally nodal prices can be determined as dual variables in an optimization framework corresponding to specific constraints (Interconnection, 1997). Each member is charged and paid according to its consumption and production based on its nodal price. Hence there may be a difference in nodal price between any bus pair. This difference in nodal price becomes the transmission usage charges for the power flow over the grid. Hence each node is considered as a zone with its own zonal price. Each line connected in a zone is an inter-zonal interface.

In California, ISO divided the grid into number of predefined zones (California ISO, 1998). In this market dispatch strategy, zonal prices are set up on hourly basis for the next day market. In bilateral markets, scheduling coordinators provide the dispatch schedules based on auction results. If any congestion takes place due to market dispatch solution then re-dispatch with zonal portioning is applied for its elimination. The transmission usage price and zonal prices are getting from this process and they are considered as dual variables. Hence, members are charged and paid according to zonal prices set up during the re-dispatch duration. One of the key features of this type of market is that ISO maintains the difference between different scheduling coordinators portfolios. Hence, ISO maintains a fair market for all and does not promote any implicit trade between them (Gribik, et. al., 1999).

In Nord Pool, two methods are used for congestion management. The first one is counter purchases for intra- zonal congestion and the second one is zonal pricing for inter-zonal. In counter purchasing method for congestion management, some generators are forced off at congestion location and forced on at better area. While in zonal pricing method, the system is divided into different price zones (Kumar, 2005).

In recent years, various articles are published on congestion management in electricity market (EM). In deregulated EM, three types of congestion

management have been adopted. They are centralized optimization, price signaling and bilateral transmission. In the first method, SO executes the centralized optimization program for optimal power flow for congestion relief. Second method is based on price signals forecast for congestion by controlling the generator output prior to real time operation. In the third approach, congestion is controlled by permitting or prohibiting the bilateral power flow in transmission line between a producer and a consumer (Christie, et. al., 2000)

Madhvi Gupta et al. proposed an approach for mitigating congestion using the minimum total modification to the desired transactions (Gupta, et. al., 2017). A weighting scheme having least modifications approach is highlighted (Fang and David, 1999). In this approach, surcharges in the form of weights are being paid for the transmission usage under congestion relieved network. In (Glavisch and Alvarado, 1998), congestion management is done by using marginal cost signals of generators. Transmission congestion distribution factors (TCDFs) based on Jacobian sensitivity on AC power flow has been proposed in (Kumar, et. al., 2004) R. S. Fang et.al suggested a willingness to pay premium approach for avoiding curtailment of the transactions (Fang and David, 1999). In (Hogan, 1992), Hogan proposed nodal pricing and contract path approach using spot pricing theory for pool type market. (Sood, et. al., 2002) proposed the hybrid model for congestion management with real and reactive power transaction. Later in 2005, H. Iranmanesh et al. proposed an intelligent real genetic algorithm based technique for coordination between two different FACTS devices. In this approach, the power transfer capability of the system is increased (Iranmanesh, et. al., 2005). This approach is very effective for solving congestion in highly meshed transmission network. Alvarado used MATLAB based codes for congestion management (Alvarado, 1999). Congestion management in transmission system by determining the optical location for placing FACTS devices in deregulated power systems is proposed in (Taher and Besharat, 2008). TCSC based FACTS device is used for determining total reduction in reactive power loss and real power performance. P.N. Biskas et al. achieved decentralized or multi-area congestion management of interconnected power systems through cross border coordinated re-dispatching (Biskas and Bakirtzis, 2002). Lagrangian relaxation based pricing mechanism is used to performed coordination.

(Singh and David, 2000) proposed a simple and efficient method for finding out the optimal location for installing FACTS devices for congestion management by controlling their parameters. In this paper, congestion management by using TCSC and TCPAR devices is explained by two steps. In first step the optimal location of these devices in the network is obtained by one of the loss sensitivity indices from available three loss sensitivity indices which are known as total system loss sensitivity indices, line loss sensitivity indices and real power flow performance index sensitivity indices. In the second step, the optimal location for installing FACTS devices on the most sensitive line is carried out. After that, sensitive indices for both the devices are computed. The line having the largest absolute values of the sensitivity factor is placed by TCPAR and the line having the most negative sensitivity index is placed by TCSC. Huang and Yan in (Huang and Yan, 2002) examined the impact on congestion management by improving the total transfer capability (TTC) of the transmission lines and reducing transaction curtailment by the use of FACTS devices.

(Etingov, et. al., 2005) proposed Coordinated emergency control by using load shedding and multiple FACTS devices for overload limitations in a transmission system. The control technique is based on linear optimization technique and sensitivity analysis of the system. In this method TCSC and TCPST are used for coordination with load shedding. Later in 2007, D. Thukaram et al. proposed a new method for the alleviation of congestion management based on relative electrical distance (RED). The RED is the relative location of load buses with respect to generator buses (Yesuratnam and Thukaram, 2007) (Talukdar, et. al., 2005) used the heuristic method for load shedding and generation rescheduling for congestion management. In the proposed method, generators are selected based on the sensitivities of the generation buses to the overloaded lines and costs of generation at those buses.

(Verma, et. al., 2001) and (Liangzhong, et. al., 2005) published the work on the application of SSSC for improving the power transfer capability of transmission lines and congestion management with high penetration of wind power. This approach simultaneously considered voltage, thermal and voltage stability limits. The results obtained by using SSSC for congestion management and enhancing power transfer capability of the system are encouraging. In (Verma, et. al., 2001), published the work on the optimal location of UPFC explaining the static considerations for congestion management. The objectives achieved by using UPFC with controllable components are increase in stability margin, minimal losses, controlled thermal limits and fulfillment of contractual requirement without violating power dispatch limit. The suitable location for the placement of UPFC is found out by using sensitivity based approach.

III. METHODS OF CONGESTION MANAGEMENT

(a) **Congestion-** Transmission congestion is the phenomenon which occurs when the power flow through transmission lines and transformers are scheduled to flow above the

physical limit of transmission lines. Electricity cannot be stored like other commodities. It has to be transferred over transmission lines in a secure manner and without violating power transfer limits. Deregulation of the electric power industry would be much simpler without transmission limits. Hence transmission congestion management is one of the major factors in any type of electricity market for any ISO (Miller, 1982) (Yong-Hua, 2008)

(b) **Congestion Management -** Open access to transmission network for any power industry restructuring is the first major step for proper working of competitive electricity market. Transmission SO faces a new challenge for managing dispatch in an open access environment. The issue of transmission congestion management is especially important. The fair implementation of electricity restructuring faces the difficulties due to transmission networks (Yong-Hua, 2008).

(c) **Causes for Congestion**

The causes for congestion are as follows (Yong-Hua, 2008):

(i) Due to deregulation of the electricity industry, the electricity prices drop down. As a result unexpected large scale transmission of electric power is trade off, which pushes transmission network to their physical limits.

(ii) In deregulated environments, there is a lack of transmission capacity because of lack of investment in electricity networks.

(iii) Due to large-scale integration of continuous and fast changing power flow with the existing grid such as wind and solar power integration, there are difficulties in managing congestion.

(iv) Increase in cross border electricity trade also makes congestion management a bigger challenge.

(d) **General Methodologies for Congestion Management-**There are various methods for congestion management depending upon market structures and market rules. Generally any approach for congestion management should have following features (Yong-Hua, 2008) (Wang, 2008):

(i) **Non - discriminatory**: For all the market members either consumer or producer, the price for any specific entity or place and time should be same. Everybody should be treated equally.

(ii) **Economically efficient**: The systems have to be economically efficient and beneficial for all the consumers, producers and network operators. Incentives have to be given among them for improving the system and reducing congestion scenario.

(iii) **Transparent**: The system should be transparent and well defined for all the members.

(iv) **Feasible**: The operating system should have all the resources i.e. information, computer system, etc. for the faster and efficient operation within the available time frame.

(v) **Compatibility**: The system should be compatible for any type of market such as short-term/long-term bilateral markets, spot market, ancillary services market and real-time balancing market.

The two main purposes for congestion management are as follows:

(vi) For safe and secure operation of power system by adjusting the power flow transactions to keep the system under security limits.

(vii) To compensate the investment on grid by collecting the congestion charges from all the market members and paying to the grid owners.

(e) **Overall Congestion Management Process**

The Figure 2 shows the basic overall transmission congestion management process. It consists of three major steps as shown in the following figure 2 (Wang, 2008):

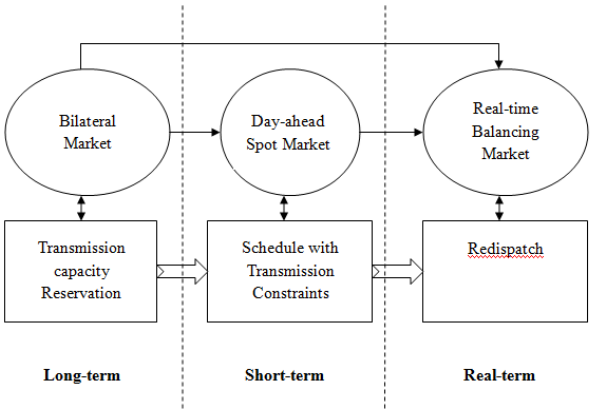

Fig. 2 Overall Congestion Management Process (Wang, 2008)

The first step is Long term transmission capacity reservation. The transmission capacity reservation

can be made daily, weekly or annually. ISO provides the transmission rights to users through a centralized auction or exchange them through a secondary bilateral market. It can be either physical or financial. After getting transmission rights, users or market members create new or revise bilateral transactions.

The second step is short-term scheduling in the day ahead spot market. Transmissions constraints are considered in the day ahead schedules. The main objective of congestion management in short term scheduling is to maintain the physical and operational security and reliability of the system. It also promotes the competitive electricity market. In this step, congestion management has an important impact on the degree of competition, spot price and bidding incentives for energy market participants.

The third step is real-time re-dispatch in the real-time balancing market. In real time operation inspite of first two steps, transmission congestion may still occur because of fluctuating loads and unpredictable events. It is also a market based method. During any emergency, ISO can take any preventive measures to maintain system security.

(f) Congestion Management by using FACTS Devices

In the present deregulated electricity market, transmission congestion is one of the major hindrances for the free competition in electricity trade. Nodal and zonal pricing tools are used for congestion management. But inspite of these methods, congestion still persists in the system. Hence more technological advancement is needed to reduce this concern of transmission network. In this respect, the Flexible AC Transmission system (FACTS) devices can provide a very promising solution (Verma, et. al., 2001).

Deregulation of the electricity industry provides the electricity at competitive rates due to which unexpected large scale transmission of electric power is trade off that pushes transmission network to their physical limits. Moreover for keeping the system secure under such abnormal conditions, expansion of transmission network is needed for increasing the power transfer capability of the existing system. But many factors affect the power transmission network expansion such as environmental, economical, and so on. Hence, the unused potential of transmission system are opened. Flexible AC transmission systems (FACTS) devices offer a solution for better utilization of available power system capacities.

FACTS devices reduce the power flows in heavily loaded lines, as a result system network stability improves, line load ability increases, system losses reduces, Total Transfer Capability (TTC) of transmission line increases, production cost reduces and contractual power requirement fulfils by controlling the power flows in the transmission lines. Phase shifters, variable series capacitors and unified power flow controllers (UPFCs) are used for controlling the power flow through transmission line by changing their parameters [33]. FACTS devices maintain system stability during power flow under steady state as well as dynamic conditions.

The two main reasons for an increased emphasis on FACTS devices are as follows:

(i) Continuous advancement and development in high power electronics components make FACTS devices cost effective.

(ii) Deregulation of electrical power and frequent loading of power systems drive the use of power flow control techniques because these methods are cost effective for dispatching specified power flow.

The placement of these devices at a particular location is an important aspect because of their considerable costs. There are various methods for finding the optimal locations for installation of FACTS devices such TCPAR, TCSC, SVC and many more.

IV. OPTIMUM PLACEMENT OF FACTS DEVICES

Congestion management is a non-linear function. It involves a large no. of variables. It requires optimization algorithms for finding solution. Following are some of the most common optimization techniques for managing congestion in the transmission lines:

(a) **Genetic Algorithm (GA):-** Genetic Algorithm is a very attractive approach for solving a number of non-linear programming problems. In GA, the algorithm continuously iterates each individual solution. This algorithm stochastically picks individuals from the current population and is used to produce next generation. Granelli et al. aim to determine the optimal topological configuration of the transmission system. They use 33-bus CIGRE sample test system and 432-bus EHV Italian network to validate their work. For multi-objective optimization, SPEA inter-zone and for a multi-objective function, there exists no unique solution. So, the objective is determination of all the trade-off solutions (Pillay, et. al., 2015).

(b) **Particle Swarm Optimization (PSO):-** PSO is another effective algorithm for determining the optimal location of installing FACTS devices while minimizing the cost of installation and improving the loadability of the system. It is a computational method for

optimization of a given problem by iteratively working to improve a candidate solution (Saravanan, et. al., 2005) has used PSO to determine the most suitable location of TCSC, SVC, and UPFC. The authors use IEEE 6, 30, 118 bus systems and a Tamil Nadu Electricity Board 69 bus system as a test. After simulation, it is found that the cost of installation of UPFC is much higher than TCSC. Also, it gives better load ability than UPFC. On systems with highest installation cost, UPFC gives maximum system load ability (Zhang and Handschin, 2001).

(c) **Interior point method:-** In the last few decades various optimization techniques have been used for solving optimal power flow (OPF) problems such as, Newton method, gradient method, successive sparse quadratic programming (QP) method, successive non sparse quadratic programming (QP) method and linear programming (LP) method. Each method has its own merits and limitations (Srivastava, 2006). Karmarkar in 1984 published work on interior point method for linear programming.

Optimization techniques are also referred as artificial intelligence approaches because in these techniques numerical algorithms are developed for congestion in power system networks and are solved with the use of computer. Some techniques are reviewed in this section, such as PSO, GA and Interior point method. Besides these methods, there are other methods such as Fuzzy-Logic systems, Simulated Annealing (SA) algorithm, General Algebraic Modelling Systems (GAMS) based optimization, Artificial Bee Colony (ABC) algorithm, Fish School Optimization (FSO) algorithm, Flower Pollination Algorithm (FLA), Strength Pareto Evolutionary Algorithm (SPEA), Multi-objective Evolutionary Algorithm (MOEA) and SFLA which can also be used for congestion management (Yusoff, et. al., 2017).

V. CONCLUSION

This paper presents a brief review on congestion management. With the rapid growth of deregulated power markets, congestion management has become significant for overcoming congestion issues. The loading on transmission network has to be maintained within the specified capacity so that system remains secure and reliable. Transmission line congestion may collapse the system. The application of FACTS device and reactive power rescheduling, lowers the cost of rescheduling and improves the voltage profile. To alleviate congestion, FACTS devices can be effectively used. It can be optimized by optimally selecting the location of installing FACTS devices. Various optimization techniques have been discussed in the paper for selecting the location.

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Corresponding Author

Bharti Sharma*

HOD, Dept. of Electrical, S.V. Polytechnic College, Bhopal (M.P.) India

E-Mail – bharti_5965@rediffmail.com

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Improved Rule Discovery Using FP Growth Algorithm in Educational Data Mining

Rajeev Sharma[1]* Dr. Sitendra Tamrakar[2]

[1]Asst. Prof., Dept of CSE, MIMT, Gwalior (M.P.) India

[2]Dept of CSE, CCET, Durg (C.G.) India

Abstract – In the educational data, the secret information can be extorted from the great quantity of data. This data can be used for the development in the educational system and making it high class education. The methods of data mining are useful for the extraction of the reality of the educational system. FP Growth is a regular unremitting continuous example mining, which produces visit itemset without candidate innovation. It impacts usage of tree based to structure. The learning methodologies of the academic for particular university with their related information are used. Each student's performance is evaluated from the database and it should be that reliable to resist the changes in the academic record. After that we have changed over the general arrangement into a changed relationship for appropriateness of utilizing FP Growth. In this paper, the useful rules are generated for showing the relationship among different number of attributes. FP Growth used in this paper for the appealing rules generation and extort the efficient rules. These rules are helpful to show the achievement of the each and every student. The teaching methodologies are taken into consideration to achieve the better academic of the students and it can be generated by taking different parameters.

Index Terms—Data Mining, ARM, EDM, FP Growth, etc.

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I. INTRODUCTION

Data mining is a technique of extricating interesting taking in or designs from large databases. There are a few procedures that have been utilized to find such sort of knowledge, the vast majority of them coming about because of machine learning and measurements. Despite the fact that this learning might be useless if it doesn't offer some sort of surprisingness to the end user. The assignments achieved in the data mining depend upon what kind of know-how someone needs to mine (Jain, et. al., 2013). The most essential sorts of undertaking done by methods for DM strategies are Classification, Dependence Modeling, Clustering, Regression, Prediction and Association. Clustering task search for the information able of compute the cost of a formerly depicted reason trademark in light of different qualities and is regularly frequently addressed by IF-THEN rules.

II. ASSOCIATION RULE MINING

ARM, a standout among the most basic and pleasantly researched systems of data mining. It centers to isolate intriguing associations, frequent patterns, associations or casual structures among sets of items in the transaction databases or differing data vaults. Let $I=I_1, I_2, \ldots, I_m$ be a course of action of m specific properties, T be transaction that combines a settled of contraptions to such a degree, to the point that $T \subseteq I$, D be a database with particular transaction records. An association rule is a proposal as $X \Rightarrow Y$, where X, $Y \subseteq I$ are sets of items called itemsets, and $X \cap Y = \emptyset$. Here, X is called forerunner while Y is recommended as coming about, the manage strategy X infers Y (Mihir & Dabhi, 2015). To choose interesting statutes from the arrangement of every single conceivable manage, necessities on different measures of essentialness and intrigue can be used. The best-known goals are insignificant edges on support and confidence.

Support (X=Y) = XUY. Count/n

Confidence of an association rule is portrayed as the proportion/fraction of the wide blend of transactions that join XUY to the entire assortment of bits of knowledge that consolidate X, where if the rate outperforms the edge of self belief a stimulating association rule $X \Rightarrow Y$ can be delivered.

Confidence (X=Y) = Support (XUY) /Support (X)

Drawbacks and solutions

In the ARM zone, the vast majority of the examination endeavors went inside the first area to enhancing the algorithmic general execution (Ceglar & Roddick, 2006) and inside the second region into diminishing the output set by techniques for empowering the chance to express essentials on the pined for results. Over the earlier decade spreads of computations that change in accordance with those issues through the refinement of look for methodologies, pruning strategies and data frameworks had been delivered (Goethals, et. al., 2006).

III. EDUCATIONAL DATA MINING

EDM is rising as an examination zone with a suite of computational and mental systems and research approaches for rising how students learn. EDM in data mining recoup secured learning by applying arranged arrangement of data mining like clustering, rule mining, web based mining, test mining, neural network, baysian network, and distinctive others which gives us a last result and in the event that it require some need to changes clearly the raw data if isolated by require (Kumar, 2015).

Goals of EDM: FP Growth (Borgelt, 2003) is another basic frequent pattern basic FPM strategy, which produces visit itemset without candidate age. It uses tree based structure. The issue of Apriori algorithm was overseen, by displaying a novel, minimal data structure, called frequent pattern tree, or FP by then in light of this structure a FP pattern fragment growth technique was made (Borgelt, 2003).

FP tree is worked in two passes:

(i) Pass 1:

Scan data and check support for everything

Discard infrequent items

Sort visit things in diving demand in light of their support.

(ii) Pass 2:

Reads one exchange at any given minute and maps it to the tree.

Fixed organize is utilized with the target that way can be shared

Pointers are kept up between nodes containing same items.

Frequent things are extracted from the rundown It experiences certain.

Advantage: Preference of FP-Growth is that the developing FP Tree has awesome execution of compression, and its strategy of mining can decrease the cost of rescanning data. Also, it applies contingent FP-Tree on abstaining from producing applicant thing and testing analysing process.

Disadvantages:

Fp tree may not fit in vital memory.

Execution time is gigantic as a result of complex reduced data structure (Kulkarni & Khonde, 2017).

IV. LITERATURE SURVEY

Prajakta G. Kulkarni et al. [2017] in this paper a new scheme or algorithm is proposed that will reduce the execution time for the massive database and works efficiently on number of nodes by using Modified Apriori algorithm.

Ying Gao et al. [2017] In this paper, based on the development and application of on-board subsystem test bench for current CTCS-3 system, this paper focuses on the approach of naturally age of test sequence, takes the existing test sequences of ETCS-2 (European Train Control system level 2) as the train set existing relatively mature test sequence as the training set, to execute ARM. The whole data mining process involves data preparation (including data cleaning and data selection) firstly, providing basement for association rule, then establishes FP tree and seeks test cases with frequent pattern through implementing FP growth algorithm for the target database. Comparing the analysis results and experience, it shows that the association rule based on FP tree could play an important role on the efficiency and verification of consequently generation of test sequence.

Jih-Jeng Huang et al. [2017] In this paper, our propose an integrated framework to combine centralized calculations, for example, the FP Growth, Sequential Pattern Discovery using Equivalence classes (SPADE), and rough set algorithms, to mine decision rules in a distributed environment. In addition, our method finds some significant rules that other algorithms cannot. The experiments also demonstrate that the proposed method is well suited to finding association and sequential rules in a distributed environment.

Vaishali Patil et al. [2016] in this case, every site is interested in globally supported association rules without revealing its own local information. To fulfill this goal, we use a secure multi-party algorithm based on secure sum technique to simplify the operation of mining association rule when the database is on a horizontally apportioned among different sites. We are using a Frequent-Pattern (FP) growth algorithm to

find frequent itemsets and try to reduce total computation time.

Wenchuan Yang et al. [2016] this paper proposes an incremental line calculation styles in light of association rules, which is the progressed FP4W-Growth calculation.

Hong-Yi Chang et al. [2016] In this paper, our propose a novel incremental data mining algorithm in light of FP-Growth, the utilization of stack tree to deal with the bother of incremental refreshing of common item sets (Chang, et. al., 2016)

V. PROPOSED METHODOLOGY

The database of each institute contains private and educational information of the students. For performing some operation over that data, we have to collect that data and apply operations on it. Different categories of operations used distinctive data so there are various techniques available to development the data. Initially pre-processing performed on the academic records by taking courses data and some other attributes like Hall Status, Retention, Abandonment and etc are in use for the better mining of the rules.

In the starting level, we performed the processing on the courses of the institution. As distinctive things have been attempted with the student "Data of the branch of Computer Science and Engineering in BUET, we have analyzed all aides inside the curriculum which must be taken to finish the BSc degree. A scholar has to take 68 departmental publications and non-departmental courses in overall. Among them there are 40 theory courses (25 departmental and 15 non-departmental) and 28 sessional distributions (20 departmental and 7 non-departmental). We determine academic performance and impact of other factors on the basis of these course's last grades, indications of attendance, class tests, and term last answer substance add up to marks and so on.

Mainly the database contains personal information of the students and this database is known as universal database. This table also includes the academic record of the student. The particular course contains some grades and the number of attendance to calculate the efficiency of the student. Hall status, Student id, Gender, Grades and attendance are stored in this database. Now the data transformation performed by converting it from continuous to discrete form to increase the reliability of the data. The transformation of CGPA into different classifications such as poor, average, good, very good and excellent. Likewise, all the attributes are converted into discrete form.

Proposed Algorithm:

Start the process

(ii) Open the dataset and taken it as input

(iii) Choose Nominal to Binary from pre-process

(iv) Apply FP Growth in the preprocessed data

(v) Database examine performed to decide the support of each object, discard the rare objects and type the frequent items in lowering order

(vi) Scan the data set one exchange at an opportunity to make the FP-tree. For every transaction:

If it's miles a unique transaction shapes a new path and set the counter for each node to at least one.

If it shares a commonplace prefix itemset then increment the common itemset node counters and create new nodes if wished

(vii) Continue this till every transaction has been mapped unto the tree

(viii) Stop the process

VI. RESULT ANALYSIS

WEKA Explorer has used in this paper for the simulation of the proposed work and performed the implementation of the different number of parameters.

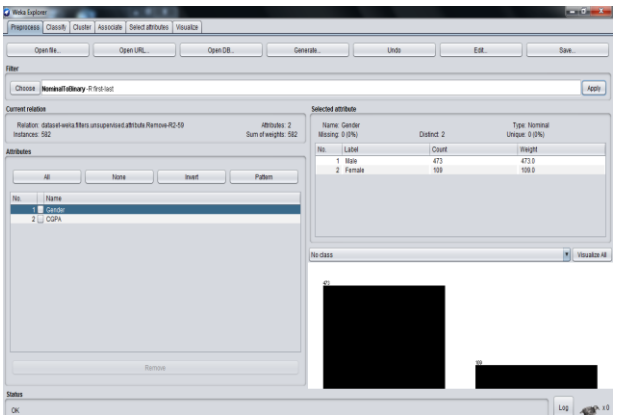

Fig.1 WEKA Explorer for Input File

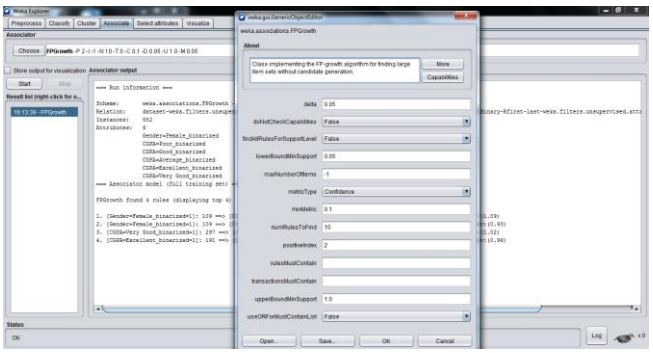

Fig. 2 Associate tab of FP Growth

In the result section, the impact of various parameters is shown with their generated rules. Different rules are generated in this section by considering minimum support and confidence value.

The following impacts are shown below:

Influence of Gender

The influence of gender has been originate in the general academic execution. The country's situations might show the sign of socio economist. Mainly there are male candidates who live in the residence of the university (BUET). There are different elements that influence the educational environment and college student's academic achievement. The female students of the university have high chance of achieving good CGPA which is demonstrated in the table below. The reason behind the good academic records is mostly influenced by usual societal issues of the country. Hence the male candidates are inferior to female candidates in the overall performance of the academic. In the table below, we used "G" for Gender, "M" for Male and "F" for Female.

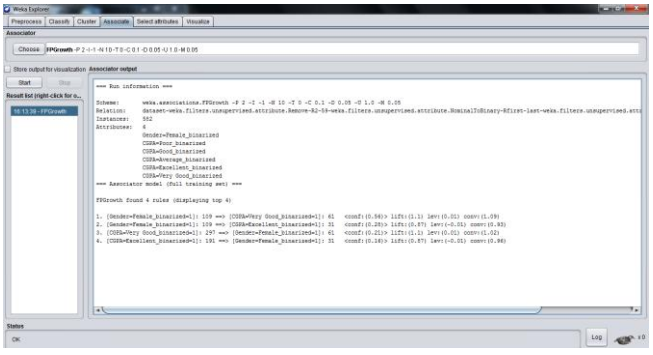

Fig.3 Rules for Gender

S.No.	Useful Rules Produced	Min. Support	Confidence
1.	G=F ==> CGPA=Very Good	5%	56%
2.	G=F ==> CGPA=Excellent	5%	28%
3.	CGPA=Very Good ==> G=F	5%	21%
4.	CGPA=Excellent ==> G=F	5%	16%

(b) Influence of Residence

There are two types of students in the university such as student live at their home and at institution's hall. In the university, large amount of students live in the hall of the institution. Both types at students are taken into consideration for calculating the impact of the residence. From the table below, it can be demonstrated that the non-resident students performed better than resident students. Non-resident student can concentrate more in their academic and get much better CGPA. This can be understood that student can achieve better score to provide the full concentration in their study.

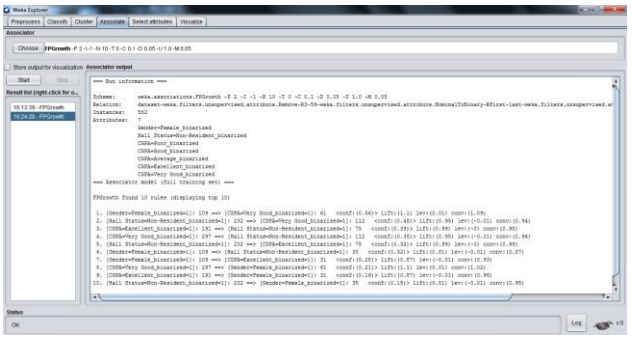

Fig.4 Rules for Residence

S.No.	Useful Rules Produced	Min. Support	Confidence
1.	G=F ==> CGPA=Very Good	5%	56%
2.	Hall Status=Non-Resident ==> CGPA=Very Good	5%	48%
3.	CGPA=Excellent ==> Hall Status=Non-Resident	5%	39%
4.	CGPA=Very Good ==> Hall Status=Non-Resident	5%	38%
5.	Hall Status=Non-Resident ==> CGPA=Excellent	5%	32%
6.	G=F ==> Hall Status=Non-Resident	5%	32%
7.	G=F ==> CGPA=Excellent	5%	28%
8.	CGPA=Very Good ==> G=F	5%	21%
9.	CGPA=Excellent ==> G=F	5%	16%
10.	Hall Status=Non-Resident ==> G=F	5%	15%

(c) Correlation between Courses

From this section, it can be show that the different courses affect the performance of other subjects. From the 1st rule, if student in CSE801 subject get poor grade then also get poor grade in CSE601 subject. From the last rule, if student in CSE701 subject get poor grade then also get poor grade in HUM275 subject.

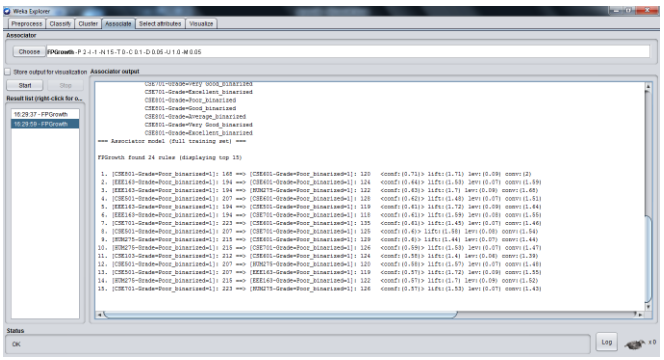

Fig.5 Rules for Courses

S. No.	Useful Rules Produced		Min. Support	Confidence
1.	CSE801-Grade=Poor CSE601-Grade=Poor	==>	5%	71%
2.	EEE163-Grade=Poor CSE601-Grade=Poor	==>	5%	64%
3.	EEE163-Grade=Poor HUM275-Grade=Poor	==>	5%	63%
4.	CSE501-Grade=Poor CSE601-Grade=Poor	==>	5%	62%
5.	EEE163-Grade=Poor CSE501-Grade=Poor	==>	5%	61%
6.	EEE163-Grade=Poor CSE701-Grade=Poor	==>	5%	61%
7.	CSE701-Grade=Poor CSE601-Grade=Poor	==>	5%	61%
8.	CSE501-Grade=Poor CSE701-Grade=Poor	==>	5%	60%
9.	HUM275-Grade=Poor CSE601-Grade=Poor	==>	5%	60%
10.	HUM275-Grade=Poor CSE701-Grade=Poor	==>	5%	59%

(d) Influence on Retention

Retention is the term which is useful to extract the students who is not able to pass the exam and have to attend that course again.

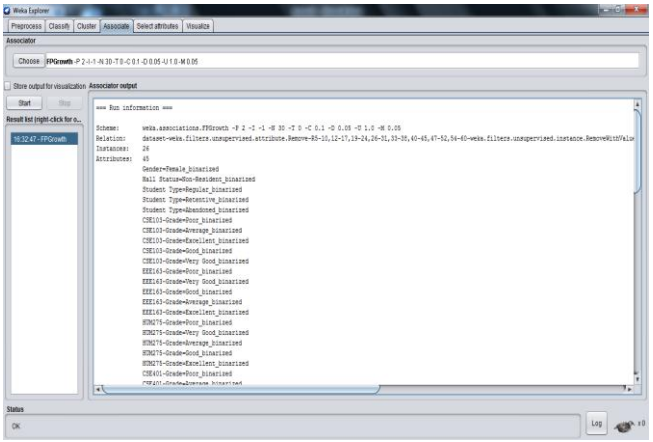

Fig.6 Rules for Retention

From the table below, it can be demonstrate that the retentive students not perform well in the exam and achieve poor grades in the exams. All the rules below show the grades of retentive students with the subjects.

S. No.	Useful Rules Produced		Min. Support	Confidence
1.	HUM275-Grade=Poor Student Type=Retentive	==>	5%	100%
2.	EEE163-Grade=Poor Student Type=Retentive	==>	5%	100%
3.	CSE701-Grade=Poor Student Type=Retentive	==>	5%	100%
4.	CSE601-Grade=Poor Student Type=Retentive	==>	5%	100%
5.	CSE103-Grade=Poor Student Type=Retentive	==>	5%	100%
6.	HUM275-Grade=Poor EEE163-Grade=Poor	==>	5%	100%
7.	EEE163-Grade=Poor HUM275-Grade=Poor	==>	5%	100%
8.	HUM275-Grade=Poor CSE103-Grade=Poor	==>	5%	100%

(e) Influence on Abandonment

Abandoned students are that who does not complete their studies and leave it in the middle of the course is known as abandoned students. From the table below, it can be show that female students are more likely is abandoned. Mainly non-resident students leave their studies without completing their course.

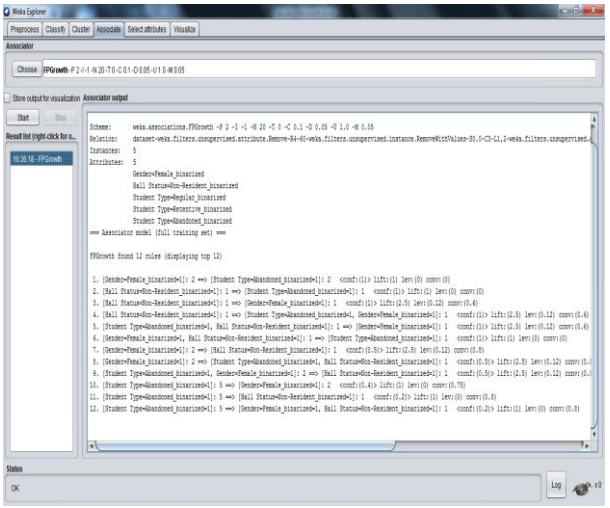

Fig.7 Rules for Abandonment

S. No.	Useful Rules Produced	Min. Support	Confidence
1.	G=F ==> Student Type=Abandoned	5%	100%
2.	Hall Status=Non-Resident ==> Student Type=Abandoned	5%	100%
3.	Hall Status=Non-Resident ==> G=F	5%	100%
4.	Hall Status=Non-Resident ==> Student Type=Abandoned, G=F	5%	100%
5.	Student Type=Abandoned, Hall Status=Non-Resident ==> G=F	5%	100%
6.	G=F, Hall Status=Non-Resident ==> Student Type=Abandoned	5%	100%
7.	G=F ==> Hall Status=Non-Resident	5%	50%
8.	Student Type=Abandoned ==> G=F	5%	40%

(f) Influence of Departmental Courses

In any institution, there are many departmental courses which are responsible for final CGPA. Grade of one subject affects the performance of other subjects. If the grade of one course is good or average then other courses also achieve better grades and vice-versa.

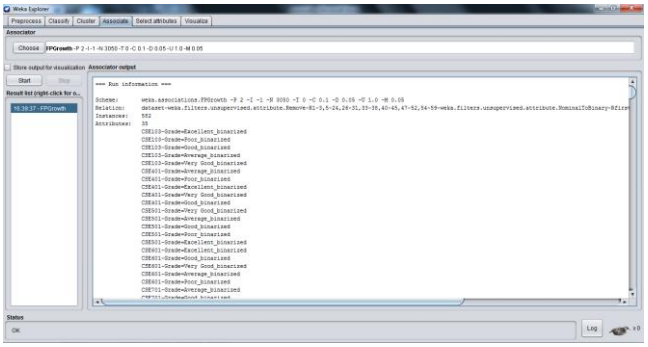

Fig.8 Rules for Departmental Courses

S. No.	Useful Rules Produced	Min. Support	Confidence
1.	CSE801-Grade=Good, CSE501-Grade=Very Good ==> CGPA=Excellent	5%	100%
2.	CSE801-Grade=Good, CSE601-Grade=Excellent ==> CGPA=Excellent	5%	100%
3.	CSE103-Grade=Average, CSE501-Grade=Very Good ==> CGPA=Excellent	5%	97%
4.	CSE501-Grade=Excellent ==> CGPA=Excellent	5%	94%
5.	CSE601-Grade=Very Good ==> CGPA=Excellent	5%	92%
6.	CSE701-Grade=Average, CSE801-Grade=Very Good ==> CGPA=Excellent	5%	90%
7.	CSE103-Grade=Average, CSE801-Grade=Average ==> CGPA=Excellent	5%	88%
8.	CSE401-Grade=Good, CSE701-Grade=Good ==> CGPA=Excellent	5%	85%
9.	CSE401-Grade=Good, CSE103-Grade=Average ==> CGPA=Excellent	5%	81%
10.	CSE501-Grade=Average ==> CGPA=Excellent	5%	75%

(g) Influence of Continuous Assessment

The evaluating of a way relies upon different components together with signs of participation, class test, and two areas of term last examination.

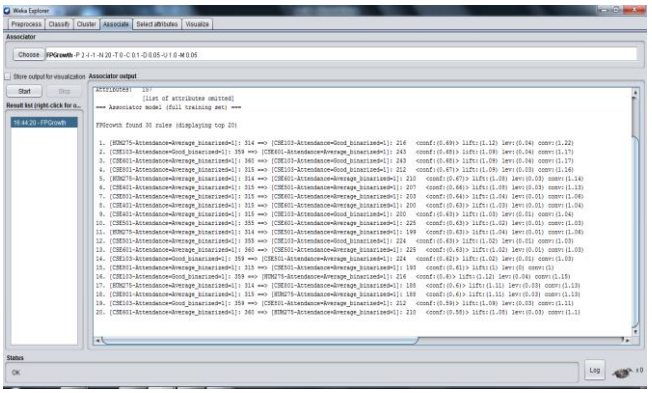

Fig.9 Rules for Continuous Assessment

In the table, there should be good attendance for each subject and if student attend class of one course then there is more chance to attend the class of other courses.

S. No.	Useful Rules Produced	Min. Support	Confidence
1.	HUM275-Attendance=Average ==> CSE103-Attendance=Good	5%	69%
2.	CSE103-Attendance=Good ==> CSE601-Attendance=Average	5%	68%
3.	CSE601-Attendance=Average ==> CSE103-Attendance=Good	5%	68%
4.	CSE801-Attendance=Average ==> CSE103-Attendance=Good	5%	67%
5.	HUM275-Attendance=Average ==> CSE601-Attendance=Average	5%	67%
6.	CSE401-Attendance=Average ==> CSE501-Attendance=Average	5%	66%
7.	CSE801-Attendance=Average ==> CSE601-Attendance=Average	5%	64%
8.	CSE401-Attendance=Average ==> CSE601-Attendance=Average	5%	63%
9.	CSE401-Attendance=Average ==> CSE103-Attendance=Good	5%	63%
10.	CSE601-Attendance=Average ==> CSE501-Attendance=Average	5%	63%

(h) Influence of Non-Departmental Courses

The generated rules are considered for showing the influence of non-departmental courses with their corresponding grades. The concluding result of particular session is based on the accomplishment of the non-departmental courses. But these courses have less influence on the last result and provide the option to improve the achievement of the academic

record. From the generated rules, it can be shown that these subjects have less influence over the final grades. Rule 1 demonstrates that subject EEE163 has average grade and final CGPA is also very good. But from rule 8, it can be shown that subject HUM275 has poor grade instead of this the final CGPA is also very good.

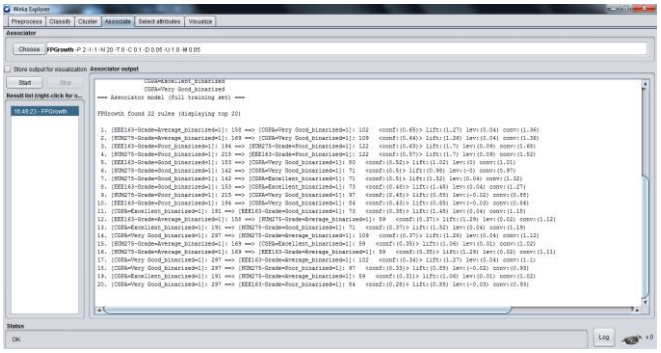

Fig.10 Rules for Non-Departmental Courses

S. No.	Useful Rules Produced	Min. Support	Confidence
1.	EEE163-Grade=Average ==> CGPA=Very Good	5%	65%
2.	HUM275-Grade=Average ==> CGPA=Very Good	5%	64%
3.	EEE163-Grade=Poor ==> HUM275-Grade=Poor	5%	63%
4.	HUM275-Grade=Poor ==> EEE163-Grade=Poor	5%	57%
5.	EEE163-Grade=Good ==> CGPA=Very Good	5%	52%
6.	HUM275-Grade=Good ==> CGPA=Very Good	5%	50%
7.	EEE163-Grade=Good ==> CGPA=Excellent	5%	48%
8.	HUM275-Grade=Poor ==> CGPA=Very Good	5%	45%
9.	EEE163-Grade=Poor ==> CGPA=Very Good	5%	43%
10.	CGPA=Excellent ==> EEE163-Grade=Good	5%	38%

CONCLUSION

The academic achievement of particular student is very vital for each institution to improve the record of their institution. In general manner it can be shown that the database should be used accurately to perform the detailed study. The brightest students can also reduce the performance and the reason can be detected from the academic record. Retention and abandonment are two main causes for the performance of the students. So the data mining techniques are used to mined the useful data and generate the most influential rules to detect the main causes. FP Growth is used in this paper for the generation of rules over the pre-processed data and makes it more useful for the institution.

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Corresponding Author

Rajeev Sharma*

Asst. Prof., Dept of CSE, MIMT, Gwalior (M.P.) India.

E-Mail – sharmaraj2007@gmail.com

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Optimization and Implementation of Solar PV System to Using Boost Inverter with MPP Tracking for Electrification

Bikash Chandra Saha[1]* Dr. S. R. Awasthi[2]

[1]Asst. Prof., Cambridge Institute of Technology, Ranchi (Jharkhand) India

[2]Professor & Dean of Electrical Engineering Dept., RNTU, Bhopal (M.P.) India

Abstract – In 21 century, the utilization of renewable sources of energy has been increased rapidly. Nowadays, Solar energy is emerged as a vital renewable or non-conventional energy sources. The main advantages associated with the Solar energy is it's clean, pollution free and in exhaustible nature. This Paper involves integration of Solar panel to an array of three 24V batteries via boost converter. Boost converter maintains the desired potential of 72V (24V each battery) for charging from solar panel. The output of battery was further boosted using simple boost circuitry to 230V and converted to 230 V AC supplies of 50Hz using PWM VSI inverter. Boost inverter consisted of simple boost circuitry and a PWM VSI inverter. Other inverter configuration was also tried out to get better waveforms such as multistep inverter and for 3 phase applications 3 –phase VSI. In this paper solar Photovoltaic panel (SPV), Boost transformer used to step up DC-DC with Maximum Power Point Tracking (MPPT). The hole system to be optimized to increase the efficiency. Finally, most economical solution of boost inverter is in favour with PWM VSI. It is suggested for lesser economical expense and satisfactory performance for domestic electrification. Best result was obtained in case of multistep inverter configuration having Low THD.

Keywords: - MPPT, boost converter, PMW VSI, Inverter, Battery

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I. INTRODUCTION

The plenty of energy is necessity for the sustainable development of industrial and economic growth. The limited availability of popular conventional energy resources like coal, crude oil, natural gas, etc., there is a strong need of an alternative renewable and clean source of energy. Now, the solar energy is one the most versatile and widely used renewable source of energy. Recently, several research works have been accomplished in this field. Most of the daily natural life's in the earth are completely depending on the daily flow of solar energy. Recent trends show, that the utilization of energy resources in India increases day by day and with the limitation in conventional energy resources, there is a strong need of non-conventional energy sources in the future. The Solar energy utilizes the heat energy of the sun by converting heat energy into electrical energy by using solar photovoltaic cells. In recent days, the research and development increased in the field of Solar photovoltaic (SPV) for increasing the efficiency of solar photo voltaic as well as the improvements of latest technology of solar panels. The Solar photovoltaic cells can used in a stand-alone off-grid as well as on grid mode. The tracking of solar energy plays an important role in the efficiency of solar panel. This phenomenon is known as maximum power point tracking (MPPT). The output of solar system depends on irradiance, temperature and the load. The boost converter used to increase or improving the output power of solar panel.

The efficient conversion of solar energy is possible with using optimizing methods to obtain Maximum Power Point Tracking (MPPT) algorithm. Solar panel depends on atmosphere condition; the output power of a solar Photo Voltaic panel depends on the output voltage of the SPV system. The output voltage of the solar Photo Voltaic system has maximized using DC-DC boost converter. Boost Converter used to maximum demand from non-conventional energy sources and conventional energy sources.

II. SYSTEM CONFIGURATION

The system consists of solar photo voltaic panel, Boost converter (DC-DC step-up), Boost inverter and Battery Bank. All parts explained in the system configuration.

(a) Solar PV Panels- The Solar Photo Voltaic panels generate electricity and phenomenon is called as "Photo-voltaic Effect". In the Photovoltaic effect, when the solar lights fall on the solar cells, then electron-hole pairs are generated and which causes the electric current to flow. The electric current is the difference between the solar light generated current and diode current.

Mathematically,

$I = I_L - I_D$

$I = I_L - I_0 [\exp (eV_j/K_cT) -1]$

where, I = Saturation current

I_L = Light Generated current

I_D= Diode Current

e = charge of Electron

V_j = junction Voltage

K_c = Boltzmann's constant

T = temperature

This phenomenon is known as the photovoltaic effect.

The flowing electrons light generated current that is directed out of the solar panel to load. Thus, the photovoltaic effect converts heat energy into the Electric energy in useful form of power, electricity.

(b) Boost Converter- A DC – DC power electronics converter used to step –up or increase the voltage from its input to output voltage of solar photovoltaic system. It containing at least semiconductor device as like a diode and a transistor. The boost converter also contains one energy storage element i.e. Inductance, a capacitor. The capacitor reduces ripple voltage and filters.

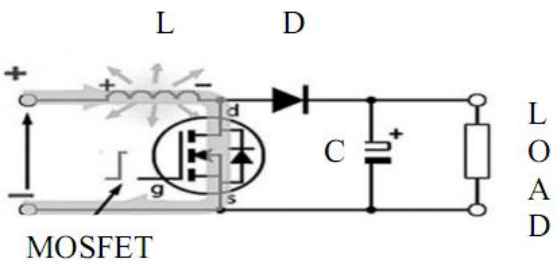


Fig. 1 Boost Converter

(c) Boost Inverter- Boost DC-AC inverter generally generates in a single stage an ac voltage whose maximum value can be minimum or higher than the DC input voltage. In this work input of array of three 24V batteries is boosted to 230V AC supply of 50 Hz for purpose direct use under domestic electrification. Operation boost circuitry in boost inverter is same as that of boost circuit connected between battery and solar panel. Only thing in addition is an inverter is further added to convert 230V DC output to AC using PWM VSI or multistep inverter or if desired to have 3 phase VSI output using 3 phase output.

III. MAXIMUM POWER POINT TRACKING

It is tried to use maximum power from solar energy system. This technology is known as maximum power point tracking (MPPT).A Maximum power point tracking system tracks the Maximum power Point under atmospheric conditions. It is improving and implements using different optimisitation algorithm to obtain Maximum power point. The power converter used to increase the solar output power. To measure output current and output voltage after tracking of solar panel to obtain power output of solar photovoltaic. The power converter made to the convert the power low voltage to high voltage. It controlled by change in the duty cycle controlling the converter. The change of duty cycle changes the output voltage. The power converter not connected to solar photovoltaic panel. The characteristics of a solar Photovoltaic panel coupled with this effect are allowing Maximum Power Point Tracking to occur. There are many optimization methods to obtain Maximum power point.

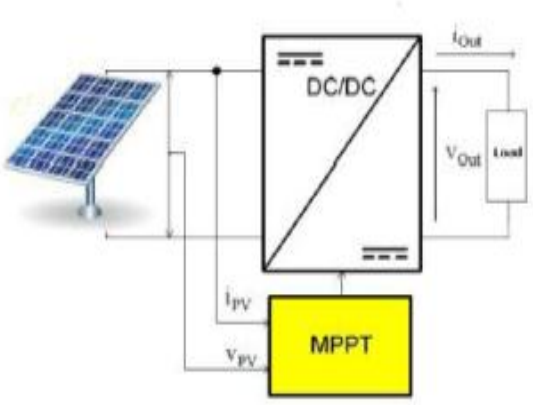


Fig. 2 Implementation of MPPT

IV. Matlab Simulation Circuit Diagram

(a) Simulation Model of Boost Converter

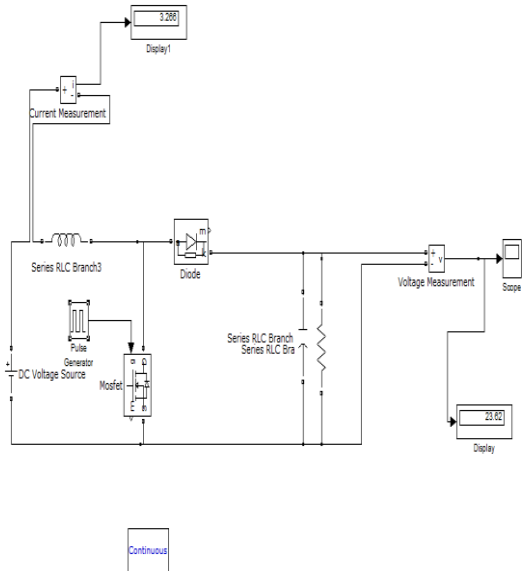


Fig. 3 Simulation Model

(b) Matlab Simulation Main System

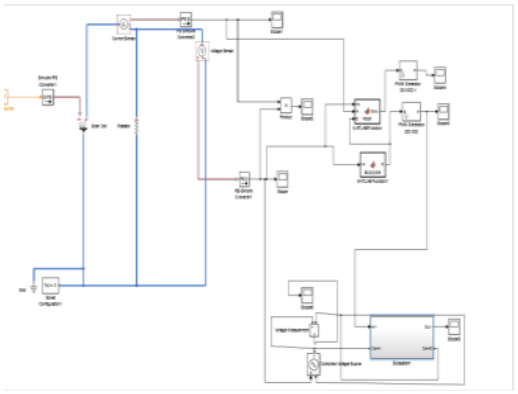
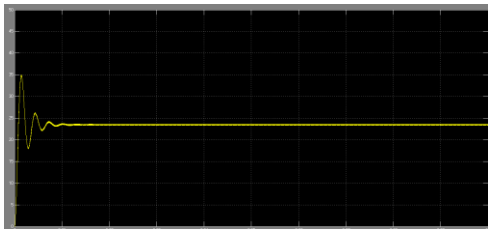


Fig. 4 Simulation Model

(a) Simulation Result

Simulation Output of Boost Converter



Time in sec

Fig. 5 Output of Boost Converter

(b) Output of Main System

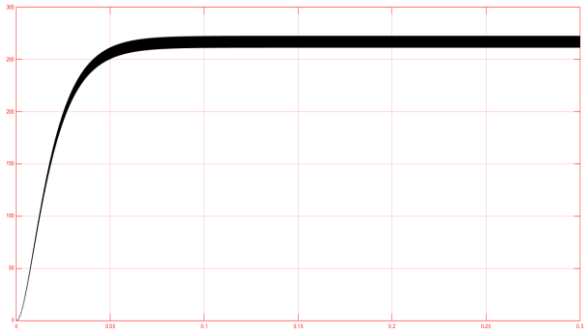


Fig. 6 Output of Main System

V. CONCLUSION

In research work is going on extracting power from the solar Pv System in many directions, one direction being the capture the maximum power point of the solar Photovoltaic system under given environmental conditions.Integration of Solar panel to an array of three 24V batteries via boost converter. Boost converter maintains the desired potential of 72V (24V each battery) for charging from solar panel. The output of battery was further boosted using simple boost circuitry to 230V and converted to 230 V AC supplies of 50Hz using PWM VSI inverter. Boost inverter consisted of simple boost circuitry and a PWM VSI inverter. MPPT can be extended from the DC-DC converter to form a system, by connecting an inverter at the output terminals of the DC-DC converter.

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Corresponding Author

Bikash Chandra Saha*

Asst. Prof., Cambridge Institute of Technology, Ranchi (Jharkhand) India

E-Mail – bcsaha1012@gmail.com

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Low Cost Maintenance Strategy for Road by Spraying Emulsion and Sprinkling Sand – A Case Study

Ghanshyam Patel[1]* Dr. Rajiv Khatri[2] Dr. Shalini Yadav[3] Awanti Lodhi[4]

[1]Dept Civil Engineering, RNTU, Bhopal (M.P.) India

[2]Director, Global Nature Care Sangathan's Group of Institutions, Jabalpur (M.P.) India

[3]Dept Civil Engineering, RNTU, Bhopal (M.P.) India

[4]GGITS, Jabalpur (M.P.) India

Abstract – Road network created in our country has resulted in increased social and economic benefits all around. However, these benefits would be reduced due to poor maintenance of these created assets. Thus, in order to reap the benefits of created assets it is essential to maintain the Road network in India. This study highlights some basic issues for low cost maintenance of roads. This Study is of the Road where Semi Dense Bituminous Concrete (SDBC) ,Mix Seal Surface(MSS), Seal Coat (SC) is done and when road have hungry surface there is no need of Black topping the Surface one can only Spray the Emulsion and Sprinkle Sand and leave it to traffic which increases, the life of Road. It is expected that the finding of this study will be useful to preserve the benefits of huge rural road assets created recently in India includingNagar Nigam Roads and Colony's roads.

Keywords:- SDBC - Semi Dense Bituminous Concrete, MSS - Mix Seal Surface, SC - Seal Coat,MORTH – Ministry of Road Transport and Highways, CAGR- Compound Annual Growth Rate, NHs - National Highways, SHs - State Highways, OPWD – Other Public Work Department, MPSEB – Madhya Pradesh State Electricity Board

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I. INTRODUCTION

For a rapid Economic, Industrial and Cultural growth of any country a good system of transportation is very much essential. It plays an important role for the development of a country. There are three basis modes of transport - land, water and air. However, road is the first mode which lead us to the origin points of other transports viz. railway station, harbor or airport. Hence it can be said that out of all the types of transport systems road is the most essential transport system needed for us. Transportation by road is the only mode which could give maximum services to one and all. The road network is needed not only to serve as feeder system for other modes of transportation but also to provide independent facility for road travel by a well-planned network of road throughout the country.

A robust road network is a key element of inclusive growth and socio-economic development. Road networks provide the crucial link between products and markets and ensure access to employment, health, education and other services.

India has one of the largest road networks in the world of over 5.4 million km as of Financial Year 2015. The country's road network consists of national highways, state highways, major and other district roads and village and rural roads. Over the years, there has been consistent improvement in accessibility and mobility through the construction of new roads and the upgradation of the existing roads.

In recent years, transportation by roads has scored over other modes of transport because of easy accessibility, flexibility of operations, door-to-door service and reliability. Consequently, the share of road in freight and passenger movement has been increasing vis-a-vis other transport modes.

II. OVERVIEW OF ROAD NETWORK IN INDIA

As per the "Basic Road Statistics of India 2013-14 and 2014-15" of MORTH, New Delhi the total road length of our country increased significantly from 3.99 lakh km in 1951 to 54.02 lakhs km in 2014 and further

to 54.72 lakh km in 2015, growing at a Compound Annual Growth Rate (CAGR) of 4.2% up to 2015 from 1951. The break-up of road length as on 31st March 2014 and 2015 are given in Table 1.1 below:

Table 1.1:

Break-up of Road length in India

Category of Road	As on 31st March 2014		As on 31st March 2015	
	Length of Road (km)	Share in total Road Length (%)	Length of Road (km)	Share in total Road Length (%)
National Highways(NHs)	91,287	1.69	97,991	1.79
State Highways(SHs)	1,70,818	3.16	1,67,109	3.05
Other PWD(OPWD) Roads	10,82,267	20.03	11,01,178	20.12
Rural Roads	33,04,328	61.16	33,37,255	61.00
Urban Roads	4,57,467	8.47	4,67,106	8.54
Project Roads	2,96,319	5.49	3,01,505	5.50
Total	54,02,486	100.00	54,72,144	100.00

The largest share in the road network as on 31st March 2014 and as on 31st March 2015 was that of rural roads (61%). Other PWD Roads accounted for the second highest share (20.12%), followed by Urban Roads by (8.4%), Project Roads (5.5%), SHs (3.05%) and NHs (1.79%).

As on 31stMarch 2015, India's road density at1.66 kms/sq.km of area was higher than that of Japan (0.91 km/ sqkm), USA (0.67 km/ sqkm), China (0.46 km/ sq. km), Brazil (0.18 km/sq.km) and Russian Federation (0.08 km/ sqkm). The surfaced road length in India was 61.05 per cent of the total road length which was much lower as compared to United Kingdom (100.00), Korea (82.51) Russia (70.54) and China (67.89). NHs in India, which accounted for 1.79 % of the total length as on 31st March, 2015 was much lower than that of some of the developed countries of the world such as Japan, Korea Republic, Russian Federation, UK and Brazil.

Road network is vital for sustained and inclusive growth of the economy. It facilitates the movement of passengers and freight across the country. It promotes efficiency in the economy by minimizing total transportation cost in terms of economies of production, distribution and consumption. The role of road transport among the different modes of transport is dominant because of its last mile connectivity or feeder service. In comparison to other modes of transport, the movement of passenger and freight in India over the years has increasingly shifted towards road transport sector.

The road network of our country consists of National Highways (NH), State Highways (SH), Other Public Works Departments (OPWD) Roads, Rural Roads, Urban Roads and Project Roads. Table 1.2 shows the progress of road length under different categories during the period 31st March, 1951 to 31st March, 2014 and 31st March, 2015.

Table 1.2:

Road Network by Categories (in kilometers) – 1950-51 to 2013-14 and 2014-2015

Road Category	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2013-14	2014-15
National Highways	19,811 4.95 %	23,798 4.54 %	23,838 2.61 %	31,671 2.13 %	33,650 1.45 %	57,737 1.71 %	70,934 1.52 %	91,287 1.69 %	97,991 1.79 %
State Highways	0 0	0 0	56,765 6.20 %	94,359 6.35 %	1,27,311 5.47 %	1,32,100 3.92 %	1,63,898 3.50 %	1,70,818 3.16 %	1,67,109 3.05 %
OPWD Roads	1,73,723 43.44 %	257,125 49.02 %	2,76,833 30.26 %	4,21,895 28.40 %	5,09,435 21.89 %	7,36,001 21.82 %	9,98,895 21.36 %	10,82,267 20.03 %	11,01,178 20.12 %
Rural Roads	2,06,408 51.61 %	197,194 37.60 %	3,54,530 38.75 %	6,28,865 42.34 %	12,60,430 54.15 %	19,72,016 58.46 %	27,49,804 58.80 %	33,04,328 61.16 %	33,37,255 61.00 %
Urban Roads	0 0	46,361 8.84 %	72,120 7.88 %	123,120 8.29 %	1,86,799 8.03 %	2,52,001 7.47 %	4,11,679 8.80 %	4,57,467 8.47 %	4,67,106 8.54 %
Project Roads	0 0	0 0	1,30,893 14.31 %	1,85,511 12.49 %	2,09,737 9.01 %	2,23,665 6.63 %	2,81,628 6.02 %	2,96,319 5.49 %	3,01,505 5.50 %
Total	3,99,942	5,24,478	9,14,979	14,85,421	23,27,362	33,73,520	46,76,838	54,02,486	54,72,144

Table 1.2 shows that from year 1950 to 2015 Rural roads has increased from 2 lacs to 33 lacs i.e. 61% of total roads in our country.Rural Roads consist of (1) Road constructed under PanchayatiRaj (ZillaParishad roads, Village Panchayat roads and Community Development/Panchayat Samiti roads) (2) Roads constructed under JawaharRozgarYojana (JRY) and (3) Roads constructed under Pradhan Mantri Gram SadakYojana(PMGSY).The total length of Rural Roads is shown in Table 1.2. –Length of PanchyatiRaj Roads were 18,31043 kms- Length of PMGSY Roads were 6,06,212 kms and the remaining length of 9 lakhs kms of roads were constructed under JawaharRozgarYojana (JRY).

III. ROAD MAINTENANCE – A KEY ISSUE

Maintenance has always been a most important factor for any structure so as to have its prolonged serviceability and also to prevent its deterioration which shorten its service life. In reality, however, maintenance works are not given the prime attention due to prior budget allocated for maintenance work.

Structures, as stated, not only include buildings, but also include other structures such as bridges, roads, harbours, drainages and any other kind of engineering structures. Maintenance on these structures may differ in various ways, but all of it must be carried out in a strategic and systematic way. In the case of roads the funds for new road construction are easier to mobilize while funds for road maintenance have to compete with number of other priorities. Lack of understanding regarding the economic consequences of poor maintenance further complicates the efforts to raise sufficient maintenance funds. As a "Thumb-Rule", 2 to 3 percent of cost of construction or up gradation is required for routine and periodic maintenance. Due to negligence or

insufficient maintenance, there could be a minimum erosion of 5 percent in asset base of rural roads. Studies have shown that one million rupees spent in routine maintenance saves two million rupees in periodic maintenance. Two million rupees spent in periodic maintenance saves four million rupees in rehabilitation, besides causing avoidable carbon footprint by way of burden on extraction of aggregates from quarries and their transportation over long distances. It would, therefore, make good economic sense, for state governments to invest in maintenance of roads.

According to "An analysis of road transport: Budget 2017-18" allocations in Union Budget 2017-18, the total budged expenditure on the Ministry of Road Transport and Highways for 2017-18 is Rs 64,900 crore and out of which Rs 3,108 crore (nearly 5%) has been allocated for Maintenance of Roads and Highways.

IV. OBJECTIVES OF THE STUDY

The rural roads which have the largest length amongst the roads in India are one of the important road network connecting billions of people. Poor condition of these roads not only obliviates feature of the serviceability of the road network but also results in increase in cost of road transportation. Presently strong need is, therefore, been felt to develop and put in practice the appropriate Maintenance Strategies for Maintenance of Roads.

The government spends lot of money to maintain and repair the roads. In 2017-18 the Ministry of Road Transport and Highways has allocated Rs 3,108 crore towards maintenance of roads and highways. So, from the present study about road maintenance management system, it will help the government as to how to reduce the cost for maintenance and also to make sure the road in maintained good condition with minimum maintenance cost.

V. MAINTENANCE STRATEGIES

(a) Preventive - Planned strategy to extend the life of the pavement(b) Preserves the system, retards deterioration, and maintains or improves the functional condition of the system (without increasing structural capacity)

(b) Rehabilitation - renews the life of the pavement (b) work undertaken to restore serviceability and improve an existing pavement to a condition of structural or functional adequacy.

(c) Reconstruction - removal and replacement of the existing pavement structure.

(d) Holding - strategy that prolongs the life of an asset (for a planned period of time). Strategy employed to maintain acceptable levels of functionality or safety (b) until full rehabilitation or reconstruction can be completed.

Preventive Strategies are as follows –

(1) Crack sealing (2) Slurry Seal (3) Micro surfacing (4) Warm Mix Asphalt / Stone Matrix Asphalt (5) Thin surfacing (6) Hot mix patching / Single lift mill and pave (7) Hot In-place Recycling (8) Crack sealing

VI. CASE STUDY

In this Study we have taken the Preventive Strategies strategy to extend the life of the pavement. This is for the Road Portion or reach where Sub grade, Sub base & Base Course is firm and only top BT surface is damaged.

In the old surface if it is damage the potholes & ruts are repaired and total surface is sprayed by Emulsion & fine sand is sprinkled and leave to traffic it fills the hungry Surface and top surface becomes smooth.

For the ease of work and Judgement the nearby road is selected for the case study.

(a) The Road is situated from MPSEB Barrier to Tee junction Near Jal Pari via Shakti Bhawan Jabalpur (MP) for about 2km in length for the subject case study. It ranged from Latitude N23^{0}8'32.9674" Longitude E79^{0}54'57.7901" to Latitude N23^{0}8'3.7726" Longitude E79^{0}54'46.6279".

(b) Initially the Road was constructed by Contractor M/s Gammon India (1984); both Rigid and flexible Pavement are there and are, in general, in good condition.

(c) It required Periodic Maintenance for repairing of pot holes in flexible pavement parts, for which Overlay has been done by another Contractor in the year 2011and later on in the year 2013, also. The rigid pavement part has been in good condition and no needs of even preventive measures were required.

(d) After inspecting the condition of the road in the year 2014, wherein some portion the top surface was damaged due to traffic and hungry spot appears; on Sample basis the low cost Maintenance Strategy work i.e. spraying Emulsion and sprinkling of sand has been done and studied for a period of 3 years i.e. up to 2017. The details of conditions of roads and other observations are depicted

through the photographs as in Plate 1, as under –

PLATE 1 :Roadfrom MPEB Barrier to Tee Near Jal Pari via Shakti Bhawan Jabalpur (MP)

Image No 1 : Emulsion& Sand Sprinkling

Image No 2 : After 3 years it is observed that the portion where Emulsion is sprayed is well good and on the other side where it is not done (at that time it was in good condition) is damaged which require maintenance (overlay).

Image No 3 : In Dec 2014 Patch repair is being required & done in middle portion at portion where preventive measures has not done.
Latitude 23.135624 Longitude 79.912663.

Image No 4 : In Dec 2014 Patch repair is being required & done.
Latitude 23.138357 Longitude 79.912673.

Image No 5 : Emulsion Sprayed portion is Safe and firm.

Image No 6 : Emulsion Sprayed portion is Safe and firm.

Image No 7 : Patch repairing work done in Right Sideportion where preventive measures has not done.

Image No 8 : Overlay in PQC (Damaged)

Image No 9 : In this portion Emulsion is not Sprayed Properly so, that portion is also damaged.

Image No 10 : Patch work done in portion where preventive measures has not done.

VII. ANALYSIS, DISCUSSIONS AND FINDINGS

The following findings have been made from the road –

(a) For the ease of work and Judgement the nearby road is selected.

(b) With the verbal permission of Civil Wing of Madhya Pradesh State Electricity Board the some hungry portion of the road is been sprayed by Emulsion and sand is sprayed so as to make the surface smooth.

(c) After one year it is observed that in the portion where preventive strategies of low cost maintenance with spraying emulsion and sprinkling sand is being done that portion is stiff and smooth and other portion is damaged and required patch work which is shown in Images in Plate 1

(d) In Image No 6 where Emulsion roles down that portion is also firm.

(e) In third and fourth year also it is observed that in the portion where emulsion is sprayed and sand being sprinkled is smooth and firm.

(f) The remaining portion of roads shows pot holes at many place which if not maintained in time results into large size and thus becomes more prone to accidents.

VIII. CONCLUSION

The important conclusions drawn from the present study can be summarized as follows:

(a) Where Sub grade, Sub base & Base Course is firm no need to Overlay or over top the Surface.

(b) It is clear that in Rural Roads, Nagar Nigam Roads and Colony's roads where traffic is not more this is very cheap process to maintain the road by doing preventive strategies.

(c) This study identifies some strategies for sustainable preventive measures of maintenance rural roads, Nagar Nigam roads, Colony's roadsin India to provide huge level of funding for maintenance in future. Absence of timely maintenance results in severe damages.

IX. FUTURE SCOPE OF WORK

(a) The above work can be further verified experimentally for NHs and SHs and strategies be planned accordingly.

(b) Other Preventive Strategies such as (1) Slurry Seal (2) Micro surfacing can also be verified and maintenance strategies be planned accordingly.

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Corresponding Author

Ghanshyam Patel*

Dept Civil Engineering, RNTU, Bhopal (M.P.) India

E-Mail – thegpatel1968@gmail.com

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Queuing System with Encouraged Arrivals, Impatient Customers and Retention of Impatient Customers for Designing Effective Business Strategies

Bhupender Kumar Som[1]* Sunny Seth[2]

[1]Associate Professor, JIMS Rohini (New Delhi) India

[2]Assistant Professor, JIMS Rohini (New Delhi) India

Abstract – In todays' scenario of uncertain business environment and fierce competition, organisations don't leave any stone unturned to stay ahead of others. They often introduce lucrative offers and discounts to attract customers. These encouraged customers at times result is heavy rush and waiting time of customers at the service facility increases. Long waiting time results in customer impatience and customers after waiting for more than their threshold waiting time limit abandon the facility and renege. Reneging is a loss to business and it is very important for an organisation to design strategies in advance to retain the reneging customers. It can be done effectively if the performance of the system can be measured in advance with some probabilities. In this paper a single-server queuing model is developed to analyse the system encountering above mentioned challenges. The model is then solved iteratively and various performance measures are derived. Numerical illustrations and economic analysis are presented. Sensitivity analysis of the model is also performed to study the impact of various parameters on cost model functions.

Key words: Queuing Theory, Customer Impatience, Reneging, Encouraged Arrivals, Retention

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I. INTRODUCTION AND LITERATURE SURVEY

Managing business in today's volatile and uncertain environment is a challenging task. Organisations are facing fierce competition from not only domestic but also from international markets. Any product from any corner of the world is available at the fingertips of the customers because of technological advancements. In order to fight this tough competition and stay ahead organisations introduce various lucrative deals and discounts to attract customers. These attracted customers are termed as encouraged arrivals (Som and Seth, 2017) (Som and Seth, 2017) developed queuing model with encouraged arrivals and impatient customers for managing the business effectively under uncertain business environment. And presented its economic analysis as well. This paper is a further extension where retention of impatient customers in case of encouraged arrivals is presented. The phenomenon of encouraged arrivals can also be understood as contrary to discouraged arrivals discussed (Kumar and Sharma, 2014). They mentioned that customers get discouraged to join once they look in to large system size (Reynolds, 1968) presented multi-server queuing model with discouragement (Natvig, 1975). studied single server queuing model with discouraged arrivals with state dependent parameters. As encouraged arrivals results in large customer base, due to limited service rate waiting time of the customers in the system increases and as a result length of the queue increases. Due to longer queues many customers standing in the queues may get impatient and start leaving the queue without completion of their service. This is termed as reneging in queuing literature.The concept of reneging appears in queuing theory in the work of (Barrer, 1957) (Haight, 1959) and (Ancker and Gafarian, 1963) (Ancker and Gafarian, 1963) After that numbers of authors have studied the concept of reneging. (Wang, et. al., 2010) presented an extensive review on queuing systems with impatient customers. Reneging is a loss to business and it hampers the goodwill of the organisation. Hence there is a need to design strategies in advance to retain customers leaving the system without completion of service. The concept of retention was introduced (Kumar and Sharma, 2012) and (Kumar and Sharma, 2013). They studied retention of

impatient customers in single server as well as multi-server case.

In this paper we develop a single-server Markovian queuing system with customer impatience and retention of impatient customers. The paper is organized as per following details. Mathematical model formulation is presented in section 2 while section 3 presents steady-state solution of the model. Section 4 deals with measures of performances. Numerical illustration is presented in section 5. Section 6 deals with economic analysis and sensitivity analysis of the model. Conclusion and future scope are given in section 7.

II. MATHEMATICAL MODEL FORMULATION

A single-server queuing model is formulated under following assumptions:

(i) The arrivals occur one by one in accordance to Poisson process with parameter $\lambda(1+\eta)$, where 'η' represents the percentage increase in number of customers calculated from past or observed data.

(ii) Service times are exponentially distributed with parameter μ.

(iii) Customers are serviced in the order of their arrival i.e. first come first served.

(iv) Service is provided through a single channel.

(v) The capacity of the system is finite say, N.

(vi) Reneging times are exponentially distributed with parameter ξ.

(vii) The probability of retention of a reneged customer is q and the probability that customer is not retained is p = 1−q.

In steady state, equations governing the model are given by:

$$0 = -\lambda(1+\eta)P_0 + \mu P_1 (1)$$

$$0 = \lambda(1+\eta)P_{n-1} + \{-\lambda(1+\eta) - \mu - (n-1)\xi p\}P_n + (\mu + n\xi p)P_{n+1} \quad (2)$$

$$0 = \lambda(1+\eta)P_{N-1} - \{\mu + (N-1)\xi p\}P_N \quad (3)$$

III. STEADY-STATE SOLUTION

On solving (1) - (3) iteratively we get;

$$P_n = \Pr\{\text{'n' customers in the system} = \prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0,\ 1 \le n \le N-1 \quad (4)$$

And the probability that system is full is given by:

$$P_N = \Pr\{\text{sytem is full}\} = \prod_{i=0}^{N-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0 \quad (5)$$

Using condition of normality $\sum_{n=0}^{N} P_n = 1$

$$P_0 = \Pr\{\text{system is empty}\} = \left\{1 + \sum_{n=1}^{N}\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}\right\}^{-1} \quad (6)$$

IV. MEASURES OF PERFORMANCE

1. Expected System Size (L_s)

$$L_s = \sum_{n=0}^{N} nP_n = \sum_{n=0}^{N} n\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} (7)$$

2. Expected queue length (L_q)

$$L_q = \sum_{n=0}^{N}(n-1)P_n = \sum_{n=0}^{N}(n-1)\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} (8)$$

3. Average rate of reneging (R_r)

$$R_r = \sum_{n=1}^{N}(n-1)\xi p P_n = \sum_{n=1}^{N}(n-1)\xi p\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} (9)$$

4. Average rate of retention (R_R)

$$R_r = \sum_{n=1}^{N}(n-1)\xi q P_n = \sum_{n=1}^{N}(n-1)\xi q\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} (10)$$

V. NUMERICAL ILLUSTRATION

In this section we present numerical illustration of the above model.

Variation in L_s, L_q, R_r and R_R with respect to λ

We take, $N = 10, \mu = 3, \xi = 0.2, p = 0.4,\ \eta = 0.5$

Table -1

Average rate of arrival (λ)	Expected System Size (Ls)	Expected Queue Length (L_q)	Average rate of Renegin g (R_r)	Average rate of Retentio n (R_R)
2	4.004591	3.12906	0.250325	0.375487
2.2	4.850677	3.93233	0.314586	0.471880
2.4	5.637055	4.688786	0.375103	0.562654
2.6	6.321101	5.353144	0.428252	0.642377
2.8	6.889811	5.909442	0.472755	0.709133
3	7.350464	6.362471	0.508998	0.763497
3.2	7.719431	6.726812	0.538145	0.807217
3.4	8.014679	7.019259	0.561541	0.842311
3.6	8.252229	7.255106	0.580408	0.870613
3.8	8.445101	7.446932	0.595755	0.893632
4	8.603399	7.604582	0.608367	0.912550
4.2	8.734808	7.735583	0.618847	0.928270
4.4	8.845127	7.845641	0.627651	0.941477
4.6	8.938737	7.939084	0.635127	0.952690
4.8	9.018968	8.019204	0.641536	0.962304
5	9.088368	8.088531	0.647083	0.970624
5.2	9.148909	8.149023	0.651922	0.977883

It can be observed that with increase in arrival rate the expected length of the system increases and so as expected queue length, while increase in reneging rate means that with increase in number of customers waiting time increases and customers leave the system and increase in rate of retention also shows that by employing retention strategies many customers can be retained. Similarly by varying service rate, the numerical results are obtained below:

Table -2

Variation in L_s, L_q, R_r and R_R with respect to μ

We take, $N = 10, \lambda = 3, \xi = 0.2, p = 0.4\ \eta = 0.5$

Average rate of service (μ)	Expected System Size (Ls)	Expected Queue Length (L_q)	Average rate of Renegin g (R_r)	Average rate of Retentio n (R_R)
3	7.350464	6.362471	0.508998	0.763497
3.1	7.16726	6.182199	0.494576	0.741864
3.2	6.976688	5.995061	0.479605	0.719407
3.3	6.779503	5.801846	0.464148	0.696222
3.4	6.576605	5.603487	0.448279	0.672418
3.5	6.369025	5.401036	0.432083	0.648124
3.6	6.157896	5.195639	0.415651	0.623477
3.7	5.944422	4.988502	0.39908	0.598620
3.8	5.729844	4.780859	0.382469	0.573703
3.9	5.515401	4.573936	0.365915	0.548872
4	5.302303	4.368914	0.349513	0.524270
4.1	5.091692	4.166902	0.333352	0.500028
4.2	4.884622	3.968913	0.317513	0.476270
4.3	4.682034	3.775842	0.302067	0.453101
4.4	4.484744	3.588456	0.287077	0.430615
4.5	4.293436	3.407388	0.272591	0.408887
4.6	4.108659	3.233133	0.258651	0.387976

It can be observed that with increase in service rate the expected length of the system decreases and so as expected queue length, and due to less waiting time with fast service, reneging rate also decreases and hence rate of retention also decreases.

VI. ECONOMIC ANALYSIS

In this section economic analysis of the modelis performed by developing the functions of total expected cost (TEC), total expected revenue (TER) and total expected profit (TEP).

Total expected cost (TEC) is given by:

$$TEC = C_s\mu + C_h \sum_{n=0}^{N} n\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} + C_r \sum_{n=1}^{N}(n-1)\xi p\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} + C_R \sum_{n=1}^{N}(n-1)\xi q\left\{\prod_{i=0}^{n-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0\right\} + C_L\lambda\prod_{i=0}^{N-1}\frac{\lambda(1+\eta)}{\mu+i\xi p}P_0$$

Total expected revenue (TER) is given by:

$$TER = R \times \mu \times (1 - P_0)$$

$$TER = R \times \mu \times \left[1 - \left\{1 + \sum_{n=1}^{N} \prod_{i=0}^{n-1} \frac{\lambda(1+\eta)}{\mu + i\xi p}\right\}^{-1}\right]$$

Total expected profit (TEP) is given by:

$$TEP = TER - TEC$$

Where, C_s= Service cost per unit time, C_h= holding cost per unit per unit, C_r= Cost per reneging unit per unit time, C_L= Cost per lost unit per unit time, R= Revenue earned per unit per unit time

The cost model formulated above if translated in MS EXCEL and sensitivity analysis is performed for varying rates of arrival and service.

Table -3

Variation in $TEC, TER \text{ and } TEP$ with respect to λ

Taking,

$N = 10, \mu = 3, p = 0.4, \xi = 0.2, \eta = 0.5, C_s = 10, C_L = 15, C_h = 2, C_r = 2, R = 200$

Average rate of arrival (λ)	Total Expected Cost (TEC)	Total Expected Revenue (TER)	Total Expected Profit (TEP)
2	39.74067	525.3182	485.5775
2.2	42.63425	551.0083	508.374
2.4	45.82523	568.9611	523.1358
2.6	49.17749	580.7739	531.5964
2.8	52.58652	588.2211	535.6346
3	55.98916	592.7958	536.8066
3.2	59.35513	595.5715	536.2164
3.4	62.67443	597.252	534.5775
3.6	65.94749	598.274	532.3265
3.8	69.17911	598.9011	529.722
4	72.37535	599.2904	526.915
4.2	75.54208	599.5352	523.9931
4.4	78.68448	599.6912	521.0067
4.6	81.80686	599.792	517.9852
4.8	84.91274	599.8581	514.9453
5	88.00498	599.9019	511.897
5.2	91.08587	599.9314	508.8455

It can be observed that the total expected profit increases with increase in average rate of arrival, but starts falling down after reaching a maximum value. It is due to the fact that with fixed service rate, after certain level with increasing load on service, cost increases rapidly than revenue, owing to longer queues and increasing reneging.

Table -4

Variation in $TEC, TER \text{ and } TEP$ with respect to μ

We take, $N = 10, \lambda = 3, \xi = 0.2, \eta = 0.5, p = 0.4, C_s = 10, C_L = 15, C_h = 2, C_r = 2, R = 200$

Average rate of service (μ)	Total Expected Cost (TEC)	Total Expected Revenue (TER)	Total Expected Profit (TEP)
3	55.98916	592.7958	536.8066
3.1	55.84102	610.7378	554.8967
3.2	55.70445	628.2417	572.5373
3.3	55.58315	645.2534	589.6703
3.4	55.48097	661.7202	606.2392
3.5	55.40176	677.5925	622.1907
3.6	55.3493	692.8256	637.4763
3.7	55.32715	707.3811	652.054
3.8	55.33854	721.2278	665.8893
3.9	55.38634	734.3428	678.9564
4	55.47293	746.7115	691.2386
4.1	55.60015	758.3283	702.7282
4.2	55.76934	769.196	713.4266
4.3	55.98128	779.325	723.3437
4.4	56.23623	788.7328	732.4966
4.5	56.53399	797.4431	740.9091
4.6	56.8739	805.4843	748.6104

It can be observed that the firms profit keeps on increasing with an increasing rate of service due to reducing reneging rate.

Table -5

Variation in $^{TEC, TER \text{ and } TEP}$ with respect to ^{q}, the probability of retaining a customer.

We take,

$$N = 10, \lambda = 2, \mu = 3, \eta = 0.5, \xi = 0.4, C_s = 10, C_L = 15, C_h = 2, C_r = 2, R = 200$$

Probability of retaining a customer (q)	Total Expected Cost (TEC)	Total Expected Revenue (TER)	Total Expected Profit (TEP)
0.1	36.1774	479.4618	443.2844
0.15	36.28892	481.8394	445.5505
0.2	36.4114	484.317	447.9056
0.25	36.54641	486.9021	450.3557
0.3	36.69579	489.6031	452.9073
0.35	36.86174	492.429	455.5672
0.4	37.04684	495.3896	458.3428
0.45	37.25418	498.4957	461.2415
0.5	37.48741	501.7586	464.2712
0.55	37.75089	505.1904	467.4395
0.6	38.04979	508.8037	470.7539
0.65	38.39027	512.6112	474.2209
0.7	38.77961	516.6254	477.8458
0.75	39.2264	520.858	481.6316
0.8	39.74067	525.3182	485.5775
0.85	40.33403	530.012	489.6779
0.9	41.01964	534.9397	493.9201

It can be observed that with increase in the probability of retaining a customer which can be done by employing effective retention strategies, profit of the firm keeps on increasing as customer choose to wait and complete their service than leaving the system without completion of service.

VIII. CONCLUSION AND FUTURE SCOPE

The results of the paper could be of immense use for any organization encountering the phenomenon of encouraged arrivals, customers getting impatient and leaving the system and where organisation needs to design retention strategies to retain/ renege customers. By knowing the measures of performance in advance, effective strategies could be designed for smooth administration. By adopting and implementing this model the financial aspects of the system could also be examined.

Further, model could be studied with infinite capacity system and multi-server model could be developed. Model could also be studied in transient state and optimization of service rate and arrival rate in the model could be achieved.

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Corresponding Author

Bhupender Kumar Som*

Associate Professor, JIMS Rohini (New Delhi) India

E-Mail – bksoam@live.com