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Editorial

Provoking fresh thinking is certainly becoming the prime purpose of International Journal of Multidisciplinary Educational Research (IJMER). The new world era we have entered with enormous contradictions is demanding a unique understanding to face challenges. IJMER's contents are overwhelmingly contributor, distinctive and are creating the right balance for its readers with its varied knowledge.

We are happy to inform you that IJMER got the high Impact Factor 2.735, Index Copernicus Value 5.16 and IJMER is listed and indexed in 34 popular indexed organizations in the world. This academic achievement of IJMER is only author's contribution in the past issues. I hope this journey of IJMER more benefit to future academic world.

In the present issue, we have taken up details of multidisciplinary issues discussed in academic circles. There are well written articles covering a wide range of issues that are thought provoking as well as significant in the contemporary research world.

My thanks to the Members of the Editorial Board, to the readers, and in particular I sincerely recognize the efforts of the subscribers of articles. The journal thus receives its recognition from the rich contribution of assorted research papers presented by the experienced scholars and the implied commitment is generating the vision envisaged and that is spreading knowledge. I am happy to note that the readers are benefited.

My personal thanks to one and all.

(Dr. Victor Babu Koppula)



DEVELOPMENT AND STANDARDIZATION OF *JATARAGNI* IMPAIRMENT CHECKLIST (JIC)

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Introduction

Cancer treatment cause both physical & psychological distress (Haes et al, 1990). Multiple physical distress symptoms are observed in majority of patients during chemotherapy, either alone or cluster of symptoms like nausea & vomiting, loss of appetite, taste alteration etc. (Barsevick et al, 2006). Their intensity varies with type, stage and treatment of the disease. (Rebecca Siegel, et al, 2012) It is observed that, nausea does not occur as a single symptom, but a conglomeration of symptoms like feeling sick, retching, loss of appetite and other abdominal discomfort (GI disturbances) (Dodd et al, 2001, 2004). Also, nausea has been relatively compared to vomiting as an 'urge to vomit'(Trikamji, 1935 Chap 20 Verse 6) Though vomiting is fairly controlled with new antiemetic therapies, delayed nausea still remains the most distressing concern experienced by seventy per cent of the patients undergoing moderately emetogenic chemotherapy. As a result, this subjective symptom is less understood and more so less treated. Although Antiemetic's are used to ease temporary nausea and vomiting, some are known to cause side effects despite their clinical benefits. (Osoba et al, 1997), (Feyer & Jordan, 2011) & (Roila et al, 2005) But use of antiemetic is necessary in CCINV.



Another significant problem is that, substantial gap remains between antiemetic guidelines and practice (Angelis et al, 2003) with majority of patients poorly controlled for Cancer Chemotherapy induced nausea and vomiting –CCINV in developing countries. Conventional antiemetic questionnaires (Functional living Index Emesis and Morrow Assessment of Nausea and Emesis) only measure nausea and emesis and their impact on quality of life(Martin et al, 2003), whereas other accompanying symptoms such as anorexia, abdominal discomfort etc. causing patients' distress are not elicited. Health in Ayurveda is defined in individuals as equilibrium of dosha (three vital Bio energy), Agni (Bio energy), dhatu (Tissue), mala (Waste products), kriya (Physiology) with sound soul, sense and mind (Trikamji, 1935 Chap 1 Verse 53 & 1981 Chap 15 Verse 44).

In order to address the problem in holistic way, we used concept of "Agni" from Ayurveda scriptures to address this cluster of symptoms as a manifestation of "Agni impairment" and that there are thirteen types of Agni governing all cellular metabolic processes such as anabolism and catabolism in all organ systems to bring about a change. (Haridas Samskritha Granthamala 106 Chap 11 Verse 34) & (Trikamji, 1935 Chap 15 Verse 3) Jataragni is the bio energy present in the GI tract. Epicentred in duodenum and regulates the complete digestion and assimilation process including gastric emptying phase of digestion and regulates transit of food through the GI tract facilitating digestion (Akash Kumar et al 2010). The discomforts caused due to chemotherapy are related to formation of "ama" because of sluggish digestion or impaired jataragni (Haridas Samskritha Granthamala 106 Chap 13 Verse 25 & 27) resulting in Vata Pittajachardilakshanas, taken in the present study as CCINV (Trikamji, 1935 Chap 20 Verse 7 & 20). Ayurveda texts prescribe correction of dosha imbalance and Agni ultimately through VayuNiyrantra (directing the energy channels) (Trikamji, 1935 Chap 28 Verse 3 & 4).



So, improving Agni and gastric motility play a vital role in management of CCINV. In this study we attempted to measure the impairment of Jataragni using a checklist that measures symptomatic manifestation of Agni impairment. This was done by collectively using all available information from Ayurveda texts on impairment of Jataragni.

Aim and objective

To develop a comprehensive checklist to evaluate impaired Jataragni level among the CCINV patients, test the measurability of the items in the checklist and examine the reliability and validity of Checklist-JJC

Methods

Checklist development procedure

Comprehensive description of methods and steps are as follows: (Vranda-2009) & (Kiran Rao et al, 1989,)

Phase-1 Pooling of items. Item reduction, Scale construction, consensual validation.

Pooling of items

As a first step identification of the universe of item pool for the checklist (Nunnaly, 1978; Messick1980), the researcher contacted thirty different Ayurveda experts, explained the rationale of the study and documented their views on Agni with respect to its various functionalities and manifestations. In short, experts suggested that the checklist should be based on symptoms of jataragni impairment, as the study covers the role of jataragni in CCINV. A total of about 30 Jataragni impaired symptoms were listed as per the experts' suggestion with references from Charakasamhitha, Sushruta samhitha Madhavanidana, Ashtangahrudaya, Ashtangahsangraha and text book-concept of Jataragni in Ayurveda with special reference to Jataragni bala pariksha by Vd. Bhagwan Dash. Common Chemotherapy side



effects and cancer symptoms were also referred as per CTCAE criteria. The original Sanskrit phrases, their meanings in English were compiled as a checklist. Thus, thirty original sanskrit symptoms on jataragni impairment formed the initial item pool of JIC.

Item reduction

Focus Group Discussion (FGD) I- In order to minimize the number of symptoms in JIC, researcher conducted a group discussion programme-FGD I at Bangalore where a team of 10 Ayurveda experts were present in the focus group discussion for corrections and inclusions based on appropriateness. The researcher posed each of the symptoms to the group of experts. Those items which were completely agreed and voted by five or more judges were retained in the checklist. Overlapping, repeated, irrelevant ambiguous or vague items were eliminated. Thus a total of nineteen symptoms formed the checklist and eleven were eliminated.

Scale construction:

The scale was constructed keeping in mind the criteria for uniformity in scoring using a Likert scale - none, mild, moderate and severe (Likert-Zyzanski et al, 1974). After considering different bias of scale construction, the experts also confirmed that the items of the checklist were linguistically equivalent (Sanskrit terms were translated to English).

FGD II- the researcher posed each of the 19 symptoms to the group comprising five oncologists to conform the appropriateness of items. Those items that received three or more votes were retained in the checklist. They suggested that the symptom checklist be modelled on Common Terminology Criteria for Adverse Events (CTCAE) Version 3.0. Field testing for confirming the measurability of the checklist was carried out among both non cancer patients taking Ayurveda treatment



and those with cancer on chemotherapy. The provisional checklist was customised and prepared accordingly. Field testing 1-was conducted at Ayurveda collage Bangalore on ten patients. Outcome: checklist was able to show the difference in the level of Agni impairment before and after panchakarma treatment. Field testing 2-was conducted on cancer patients at HCG who were undergoing first cycle of chemotherapy. It was observed that the majority of patients had zero score for nausea and vomiting items at baseline before chemotherapy. Verbal consent was first obtained from all subjects prior to their study activities and confidentiality was maintained regarding the information collected for the research. No invasive procedures were used in the study.

Consensual and content validity

FGD III-Consensual and content validation of the JIC was done by convening a expert group of 17 members from Ayurveda, oncology, yoga and clinical psychology. The experts were asked to validate each of the items for, cultural relevance, clarity and ease with comprehension, readability and suitability for a 4-point rating format. Those items which were completely agreed and voted by nine or more judges confirmed validity and were retained in the checklist. The experts accepted the items subject to following conditions:

1. To change the rating of scale from none, mild, moderate and severe to none, asymptomatic but present occasionally or evident on clinical examination, symptomatic and frequent but does not interfere with GI function, Symptomatic but interferes with GI function in lines of CTCAE criteria version 3 for a clear definition of the grade severity (See JIC checklist).
2. To capture symptoms other than Nausea and Vomiting to prove divergent validity.
3. To retain only thirteen symptoms for the checklist (Annexsure-1)



-
4. The patients simultaneously were to complete Visual analogue Scale (Objective assessment).for 2 symptoms- Time interval between each meal and Quantity taken at each meal. The provisional checklist was customised and prepared accordingly Final JIC comprised of 13 symptoms (Annexure-1).

Phase-2 Pilot Study

Patients for pilot study were chosen from a randomised controlled study conducted at Health Care Global (HCG) Bangalore i.e. from first sixty randomized patients, 15 patients were randomly chosen representing all the 3 groups equally- Random 5 from each group. Pilot study was carried out with 13 items of checklist. Sampling procedure was similar to main study. (Usharani et al, 2014)

The aim was to assess the feasibility and comprehensibility of checklist. This self-reported checklist was found to be readable and comprehendible. The checklist was able to capture the difference in the jataragni impairment level before and after chemotherapy. The mean time taken to complete the checklist was found to be 10minutes.

Phase-3

The final 13 items of JIC were tested to examine the measurability of the checklist, to establish the norms for final interpretation of scores and Standardization of Final 13-Items- for Validity and Reliability.

Sampling Procedure:

Study subjects: The study was carried out at Health Care Global (HCG) Bangalore over 16 months period. (Usharani RM, et al)

Sample Size: The sample size was based on the three arm original study to evaluate the effects of yoga intervention to manage CCINV (Usharani et al, 2014).



This study included patients with solid malignancies except those with brain metastases/ brain tumours and GI malignancies.

Ethical issues: The study was approved by institutional ethics committee and written informed consent was taken from all participants prior to their participation in the study.

JIC was administered prior to chemotherapy and post 6 days for 1st, 2nd, 3rd cycles of chemotherapy. Here simultaneously patient completed the Jataragni checklist on par with FLIE quality-of-life (Qol) questionnaire.

Results

The mean age of study sample was 49.3 ± 11.3 years. Data was not normally distributed.

Reliability and validity:

Reliability: The reliability of 13 item JIC was good with Cronbachs alpha=0.74 and inter rater reliability between three raters varied between 0.68 to 0.80

Validity: Good divergent validity of JIC with FLIE indicating that it captured items that were not captured in the FLIE. The kappa values, ranges between 0.01 to 0.09 across four cycles of chemotherapy in the overall study sample, indicating divergent validity. Values within each group also showed similar divergent validity compared to overall study sample indicating that intervention did not influence validity of the scale. This strong validity demonstrates the robustness of the scale to capture Jataragni symptoms independent of FLIE (See table 1&2). The evidence of content validity has already been established in the initial phase.



Table 1: Divergent validity of Jataragni checklist with FLIE

TIME	Agni &		Kappa	p-value
	FLIE	dissimilar		
	similar	No (%)		
D ₀ (n=120)	45 (37.5)	75 (62.5)	-	-
D ₇ (n=112)	57 (50.9)	55 (49.2)	0.064	0.318
C ₂ (n=104)	45 (43.3)	59 (56.7)	0.019	0.769
C ₃ (n=94)	48 (51.1)	46 (48.9)	0.097	0.097

- couldn't calculate Kappa, as FLIE @ D₀ was 0 for all

Symptom severity Symptoms were graded based on their presence (subjective/clinical) and interference with GI function. Anorexia, taste alteration and dry mouth were some of the major symptoms that interfered with GI function. Though most of these symptoms were reported by patients many of them did not interfere with GI function (See Table 2 &3).

Table 2: Severity of symptoms related to agni in Jataragni checklist

Cycle	Mild (1)	Moderate (2)	Severe (3)
	No (%)	No (%)	No (%)
D ₀ (n=120)	45 (37.5)	38 (31.7)	37(30.7)
D ₇ (n=120)	43(35.9)	38 (31.6)	39 (32.5)
C ₂ (n=109)	41 (37.6)	46 (42.2)	22 (20)
C ₃ (n=102)	39 (38.2)	32 (31.3)	31 (30.4)

**Table 3: Severity of individual symptoms in Jataragni checklist**

Symptoms	None 0 No (%)	Mild 1 No (%)	Moderate 2 No (%)	Severe 3 No (%)
Anorexia D5/7	41 (37)	45(40)	22(20)	3 (3)
C2	74 (69.2)	21 (19.6)	10 (9.3)	2 (1.9)
C4	61 (61.0)	25 (25.0)	11 (11.0)	3(3.0)
ConstipationD5/7	75 (68)	28 (25)	7 (6)	1(1)
C2	91 (85.0)	14 (13.1)	2 (1.9)	-
C4	81 (81.0)	16 (16.0)	2 (2.0)	1 (1.0)
Diarrhea D5/7	87(78.4)	19 (17.1)	4 (3.6)	1 (0.9)
C2	100	6 (5.6)	1 (0.9)	-
C4	(93.5)			
C4	90 (90.0)	9 (9.0)	1 (1.0)	-
Distention D5/7	75 (67.6)	29 (26.1)	5 (4.5)	2 (1.8)
C2	96 (89.7)	9 (8.4)	2 (1.9)	-
C4	80 (80.8)	14 (14.1)	4 (4.0)	1 (1.0)
Drymouth D5/7	48 (43.2)	51(45.9)	11(9.9)	1(0.9)
C2	63 (58.9)	31 (29.0)	12 (11.2)	1 (0.9)
C4	56 (56.0)	38 (38.0)	5 (5.0)	1 (1.0)
Flatulence D5/7	79 (71.2)	23 (20.7)	8 (7.2)	1 (0.9)
C2	89 (84.0)	11 (10.4)	6 (5.7)	-
C4	72 (72.0)	24 (24.0)	4 (4.0)	-
Heartburn D5/7	71 (64.0)	31 (27.9)	7 (6.3)	2((1.8)
C2	93 (86.9)	10 (9.3)	4 (3.7)	-
C4	78 (78.8)	17 (17.2)	4 (4.0)	-
Taste alteration D5/7	40 (36.0)	46 (41.4)	24 (21.6)	1 (0.9)
C2	55 (51.4)	39 (36.4)	13 (12.1)	-
C4	37 (37.0)	37 (37.0)	25 (25.0)	1 (1.0)
Heaviness D5/7	75 (67.6)	28 (25.2)	8 (7.2)	-
C2	93 (86.9)	10 (9.3)	3 (2.8)	1 (0.9)
C4	80 (80.0)	17 (17.0)	3 (3.0)	-
Gurgling D5/7	81 (73.0)	28 (25.2)	2 (1.8)	-
C2	96 (90.6)	9 (8.5)	1 (0.9)	-
C4	81 (81.0)	17 (17.0)	2 (2.0)	-
Eruption D5/7	74 (66.7)	31 (27.9)	5 (4.5)	1 (0.9)



C2	88 (83.0)	17 (16.0)	1 (0.9)	-
C4	82 (82.0)	14 (14.0)	4 (4.0)	-
Excess salivation	92 (82.9)	16 (14.4)	2 (1.8)	1 (0.9)
D5/7				
C2	101 (94.4)	5 (4.7)	1 (0.9)	-
C4	84 (84.0)	13 (13.0)	3 (3.0)	-
Quantity at each meal D5/7	35 (31.5)	37 (33.3)	23 (20.7)	16 (14.4)
C2	51 (47.7)	36 (33.6)	16 (15.0)	4 (3.7)
C4	39 (39.0)	38 (38.0)	15 (15.0)	8 (8.0)

Cut off scores

The 33rd percentile cut off scores was 2 (mean across all chemo cycles) and 66th percentile cut off was 6 (mean across all chemo cycles) in this study for Jataragni impairment checklist.

Convergent Validity

Quantity of meal is an extrapolation of Agni quality as per ancient texts (Trikamji, 1935 Chap 12 Verse 11). We compared the convergent validity of all items on JIC with quantity of meal at chemotherapy cycle. There was a strong correlation on Spearmans rank correlation at different chemotherapy cycles of total Agni of JIC with quantity of each meal (All p's=0.001).



4: Spearman's rank correlation between total agni with quantity of each meal at different chemotherapy cycles.

Quantity of each meal at various chemotherapy cycles	TOTALA GNI C1	TOTALAG NID5/7	TOTALA GNIC2	TOTALAG NIC4
Quantity At Each Meal{C1}, N=116		.619**		
Quantity At Each Meal{D5/D7}, N=111			.674**	
Quantity At Each meal{C2}, N=107				.673**
Quantity At Each Meal{C4}, N=100				.641**

**p<0.01, using Spearman's rank correlation

Findings:

There was strong reliability for JIC to measure impairment in Agni. There was a poor agreement between FLIE and Agni scores indicating strong discriminant validity and suggesting that JIC measures a construct different from that of FLIE. However this Checklist measures only impairment of Agni and is more suited to chemotherapy setting as it's known to measure some acute effects. The results suggest that this questionnaire captures subtleties of symptoms that need not individually impair GI function but can collectively increase distress. These symptoms so mentioned are subjective and similar to concept of symptom clusters proposed by Dodd et al, 2001 and 2004.

Secondly, this did show divergent validity with FLIE, but does not mean that these symptoms had no impact on quality of life as FLIE



measured only the impact of nausea or emesis on their respective quality of life domains and not a collective or global quality of life. Third, being subjective checklist the ensuing psychologic distress could have increased the symptomatology in these patients confounding the effects. However despite these limitations these subjective symptoms still elucidate impairment in jataragni. Ayurvedic texts also describe that psychological distress is known to affect Agni imbalance, therefore the presence of these symptoms and distress give more credence to studying agni in this current context.

As per ancient texts Jataragni is a physiological entity which converts the substance from biological level to physiological level. It is subtle and its presence can only be felt and observed but not seen. JIC assessment helps in clinical evaluation of the diseased- in predicting severity of the adverse effects, planning management (dietary and pharmacological,) and in prognosis. But it is a self-reported measure to capture distress and not a diagnostic tool. It measures only presence or absence of symptoms and its severity, if present. Thus a comprehensive tool to evaluate and asses the whole aspects of GI disturbances in its literal sense, as Western point of view is not contributing much in understanding the complex mechanism and subtler aspect of patient's problems at a time because Chemotherapy further simulates these symptoms, leading to hypo or hyper functioning of JatarJataragni affecting Pachaka Pitta) (Trikamji, 1935 Chap 8 Verse 20) .Vitiated Jataragni ,situated as pachaka pitta influences and have a cascading effect on other Jataragnis, and further aggravates pranadivayus resulting in Nausea and Vomiting.

Suggestions:

There is a need to validate if this checklist can be used in other chronic illnesses as well. Future studies should look at a larger population and to develop ideal subscales using factor analysis.



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**CHECKLIST FOR EVALUATING STATE OF AGNI WITH SPECIAL REFERENCE TO
 JATARAGNI - JIC**

Symptom	0	1	2	3
1. Anorexia	none	Loss of appetite without alteration in eating habits	Oral intake altered without significant weight loss or malnutrition, oral nutritional supplements indicated	Associated with significant weight loss or malnutrition, IV fluids, tube feeding or TPN indicated
2. Constipation	none	Occasional or intermittent symptoms, occasional use of stool softeners, laxatives, dietary modification or enema	Persistent symptoms with regular use of laxatives or enema indicated	Symptoms interfering with ADL, obstipation with manual evacuation indicated
3. Diarrhea	none	Increase of <4stools /day over baseline,	Increase of 4-6 stools/day over baseline, IV fluids indicated <24hrs,	Increase of $>_7$ stools/day over baseline, incontinence, IV fluids $>_24$ hrs hospitalization,
4. Distension/bloating,	none	Asymptomatic but evident on clinical	Symptomatic but not interfering with	Symptomatic, interfering with GI function



abdominal examination		GI function	
5. Dry mouth	none	Symptomatic(dry or thick saliva) without significant dietary alteration,	Symptomatic and significant oral intake alteration, Symptoms leading to inability to adequately aliment orally, IV fluids, tube feedings or TPN indicated,
6. Flatulence	none	Asymptomatic but evident on clinical examination	Symptomatic but not interfering with GI function Symptomatic, interfering with GI function ----
7. Heart burn/Dyspepsia	none	Asymptomatic but evident on clinical examination	Symptomatic but not interfering with GI function Symptomatic, interfering with GI function
8. Taste alteration	none	Altered taste but no change in diet	Altered taste with change in diet, noxious or unpleasant taste, loss of taste. ----
9. Gastro-intestinal-others a) Heaviness of abdomen	none	Asymptomatic but evident on clinical examination	Symptomatic but not interfering with GI function Symptomatic, interfering with GI function



b) Gurgling sound in the intestine	none	Asymptomatic but evident on clinical examination	Symptomatic but not interfering with GI function	Symptomatic, interfering with GI function
c) Eructations	none	Asymptomatic or very occasional	Symptomatic and frequent but not interfering with GI function	Symptomatic, interfering with GI function
d) Excessive salivation	none	Asymptomatic or very occasional	Symptomatic and frequent but not interfering with GI function	Symptomatic, interfering with GI function

Note: The symptoms mentioned as 9a, b, c, d categorized under gastrointestinal-others is graded depending on the patient's response (Subjective response)



Reference: The grading of symptoms mentioned in the above checklist is customized for this study based on Common Terminology Criteria for Adverse Events (CTCAE) Version 3.0 published by U.S. Department of health and human services, National Institutes of Health and National Cancer Institute



JOB SATISFACTION OF WORKERS WORKING IN CEMENT INDUSTRIES OF ODISHA

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Introduction

Job satisfaction of workers is an integral component of organizational climate. It is an important cognitive-conative dynamics that determine the destiny of HRM in an organization. It has some degree of correlation with physical health of individual employees. Higher degree of job satisfaction of employees leads to better performance resulting in reduction of employees turnover, absenteeism and eliminating workplace violence. (Dubey, Uppal, Verma and Dwivedi, 1983)

Cement Industry in Odisha is one of the largest and oldest manufacturing industries of the State both in terms of units and employment potential. It contribute substantially towards the total value of production, makes maximum use of locally available inputs and meets the demand of the state as well as of the nation. Odisha accounts for 11.85% of total cement production in India and claims the second largest cement producing state next to Madhya Pradesh.

Job satisfaction of workers is a major challenge before the HR manager. (Benjamin and Rover, 1975) Wage, job security, welfare facility, proper working conditions, living conditions, job contents, safety in the workplace, quality supervision, inter personal relationship between the workers, promotion avenues, harmony in the workplace, and HR policy are some of the determinants of job satisfaction.(Bhol and Pani, 2014)

Measurement of job satisfaction at organizational level provides premise to HR manager to frame appropriate and need based HR policy for the organization. (Johannesson, 1971)



The study will provide some operational solutions to many HR issues in cement industries of Odisha.

Objectives of the study

The study pursues the following objectives:

- 1) To find out the degree of job satisfaction of employees working in cement industries of Odisha.
- 2) To investigate the degree of job satisfaction with respect to age, length of service, skill, education, wage level, marital status and number of dependents of workers.
- 3) To find out the relationship between job satisfaction and age, length of service, skill, education, wage level, marital status and number of dependents of workers.

Hypotheses

In view of the above objectives of the study the following empirical expectations are to be examined:

H01: There is no relationship between age of the workers and degree of job satisfaction.

H1A₁: There is relationship between age of the workers and degree of job satisfaction.

H02: The experience of the workers and degree of job satisfaction are independent.

H2A₁: There is relationship between the experience of the workers and degree of job satisfaction.

H03: There is no relationship between the level of skills of the workers and degree of job satisfaction.

H3A₁: There is relationship between the level of skills of the workers and degree of job satisfaction.



H04: The degree of job satisfaction of employees is independent of levels of education of employees.

H4A₁: There is relationship between the degree of job satisfaction and levels of education.

H05: There is no relationship between the degree of job satisfaction and wages of workers.

H5A₁: There is relationship between the degree of job satisfaction and wages of workers.

H06: The degree of job satisfaction and marital status of workers are independent.

H6A₁: There is relationship between the degree of job satisfaction and marital status of workers.

H07: The number of dependents on workers and degree of job satisfaction are independent.

H7A₁: There is relationship between the number of dependents on workers and degree of job satisfaction.

Methods

Both documentary and field research methods were followed in course of the study. Analytic survey method was used in this study.

Universe

The study was restricted to the cement industries of Odisha. The cement industry has been selected for the purpose of the study for the following reasons:

- 1) The cement industry is one of the oldest and major manufacturing sectors of the state both in terms of units and employment.



- 2) It contributes substantially towards the total value of industrial production, makes maximum use of the locally available inputs and caters the demand not only of the state but also the economy and international requirement.

In view of the place of industry in the national economy, the workers and management personnel working in the cement industry constitute the universe of the study.

Sample

Keeping in view the vital role of the industry its efficiency, functioning and their role in national economy following units were chosen for the purpose of study. The sample size is 250 workers as described below.

Table No.- 1

Table Showing the Sample Drawn from Workers Working in the Cement Industries of Odisha

S.I.N o	Name of Organisation	Sample Taken
1	OCL India Ltd., Rajgangpur	120
2	ACC Cement, Bargarh Cement Works	80
3	Ultratech Cement, Jharsuguda	50

Questionnaire-Development and Administration

The primary data have been collected from the workers which constitute the major source of data for the study. For this purpose a comprehensive questionnaire was prepared for workers. The questionnaire was pre-tested with workers. Revision was undertaken in the questionnaire to make it structured, appropriate and relevant.



Being an instrument of the study, questionnaire helped in keeping the frame of the study intact for achieving qualitative and quantitative interpretation of data.

Analysis and Interpretation

Table No.-2

Index Showing the Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Degree of job satisfaction	Number of workers	Percent
High	63	25.2
Medium	85	34.0
Low	102	40.8
Total	250	100

After the analysis on workers orientation on various aspects of the job, an attempt is made to present the picture of overall job satisfaction of workers. For this purpose, the data obtained from sample organisation on all aspects of the job discussed in the preceding pages are pooled together to compute the overall index of job satisfaction of workers.

A perusal of information contained in the table no.-2 reflects that the about 40.8 percent of the workers shows a lower degree of job satisfaction. In comparison, a less percent (34 percent) is moderately satisfied and still lesser percent (25.2 percent) is highly satisfied with their job. This finding of the study appears to be reasonably valid in view of the deplorable socio-economic condition of the workers and other factors influencing job satisfaction.

Table No.-3

Age and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Age group (in years)	Degree of job satisfaction			
	High	Medium	Low	Total
Below 25	36 (34.29)	31 (29.52)	38 (36.19)	105 (100.00)
25-35	7 (13.46)	20 (38.46)	25 (48.08)	52 (100.00)
35-45	6 (13.33)	14 (31.11)	25 (55.56)	45 (100.00)
45 and above	14 (29.17)	20 (41.67)	14 (29.16)	48 (100.00)
Total	63 (25.20)	85 (34.00)	102 (40.80)	250 (100.00)

$$\chi^2 = 16.162 \text{ } df = 6$$

Results within the bracket represent percent.

The degree of job satisfaction bears some relation to the workers age and total work experience. Young workers with comparatively less experience are filled with high hope of learning and a better career at the beginning of their career. Generally, they are significantly satisfied with their job. As the worker advances in age and experience the frustration overtakes him due to the successive competition and aspirations. As a result, older workers with relatively more experience express their dissatisfaction on the job. The worker with longer experience approaching retirement who works as a matter of routine are again satisfied with their job than those who are in the middle of their tenure.

The table no.-3 shows that out of the young and old age group of workers, the majority was either highly or moderately satisfied with



their job. A majority (48.08 percent and 55.56 percent) of the middle age group express lower degree of job satisfaction. The table no.-3 shows that the calculated chi-square value came out to be 16.162. The calculated chi-square value was found significant at .05 level of confidence. Hence the null hypothesis H01 is rejected at .01 level and alternative hypothesis (H1A₁) namely, 'there is relationship between age of the workers and degree of job satisfaction' is accepted. It indicates that there is evidence of relationship between the age of workers and the degree of job satisfaction. In other words, the age of workers is not independent of the degree of job satisfaction of workers.

Table No.-4

Experience in Service and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Experience (in years)	Degree of job satisfaction			
	High	Medium	Low	Total
Below – 10	39 (27.65)	52 (36.87)	50 (35.46)	141 (100)
10-20	6 (14.28)	12 (28.57)	24 (57.14)	42 (100)
20-30	5 (16.66)	7 (23.33)	18 (60.00)	30 (100)
30 and above	10 (27.02)	15 (40.54)	12 (32.43)	37 (100)
Total	60 (24.00)	86 (34.40)	104 (41.6)	250 (100)

$$\chi^2 = 12.300 \ df = 6$$

Results within the bracket represent percent.

The association between the experience and the degree of job satisfaction is presented in the table no.-4. It also reveals that a high percent (57.14 percent and 60.00 percent) of workers in the experience group ranging from 10-20 years and 20-30 years shows a very low



degree of job satisfaction as compared with the group at two extremes of work experience. The table 4 shows that the calculated chi-square value came out to be 12.300. The chi-square value was not found significant even at .05 level of confidence. Hence the null hypothesis (H_02) namely, 'the experience of the workers and degree of job satisfaction are independent' is accepted. It means that there is no evidence of relationship between experience and degree of job satisfaction.

Table No.-5

Skill and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Level of skill	Degree of job satisfaction			
	High	Medium	Low	Total
Skilled	25(31.25)	31(38.75)	24(30.00)	80(100)
Semi-skilled	30(26.79)	36(32.14)	46(41.07)	112(100)
Unskilled	6(10.34)	17(29.31)	35(60.34)	58(100)
Total	61(24.40)	84(33.60)	105(42.00)	250(100)

$$\chi^2 = 13.844 \ df = 4$$

Results within the bracket represent percent.

The table no.-5 depicts that a majority of skilled workers are highly (31.25 percent) or moderately (38.75 percent) satisfied with their job. A lower degree of job satisfaction has been expressed by semi skilled (41.07) and unskilled (60.34) workers. The table no.-5 shows that the calculated chi-square value came out to be 13.844. The calculated chi-square value was found significant at .01 level of confidence. Hence the null hypothesis H_03 is rejected at .01 level and alternative



hypothesis ($H3A_1$) namely, 'there is relationship between the level of skill of the workers and degree of job satisfaction' is accepted. It indicates that there is evidence of relationship between the skill of workers and job satisfaction.

Table No.-6

**Education and Degree of Job Satisfaction of Workers in
Cement Industries of Odisha**

Level of education	Degree of job satisfaction			
	High	Medium	Low	Total
Up to 10 years of schooling	30(24.59)	36(29.50)	56(45.90)	122(100)
Up to 12 years of schooling	26(23.64)	43(39.09)	41(37.27)	110(100)
More than 12 years of schooling	6(33.33)	5(27.77)	7(38.88)	18(100)
Total	62(24.80)	84(33.60)	104(41.60)	250(100)

$$\chi^2 = 3.438 \ df = 4$$

Results within the bracket represent percent.

The table no.-6 clearly reveals that in case of employees having education up to 10 years exhibited higher percent of lower level of job satisfaction (45.90 percent), in case of employees having education up to twelve years of schooling exhibited higher percent of moderate level of job satisfaction (39.09 percent) and that of comparatively highly educated workers show a higher degree of job satisfaction (33.33 percent). The table 6 shows that the calculated chi-square value came out to be 3.438. The calculated chi-square value was not found significant even at .05 level of confidence. Hence the null hypothesis ($H04$) namely, 'The degree of job satisfaction of employees is



independent of levels of education of employees.' is accepted. It means that there is no evidence of relationship between the level of education and job satisfaction. In other words the degree of job satisfaction is independent of level of education. The reason seems that education generates greater expectancy of workers from their job. Some earlier studies on the subject do not find any relationship between the level of education and level of job satisfaction.

Table – 7

Wage Level and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Wage level (inRs.)	Degree of job satisfaction			
	High	Medium	Low	Total
Below Rs.1080	6 (13.95)	12 (27.90)	25 (58.13)	43 (100)
From Rs.1080 to Rs.1605	36 (24.48)	57(38.77)	54 (36.73)	147 (100)
From Rs.1605 and above	22 (36.67)	19 (31.67)	19 (31.67)	60 (100)
Total	64 (25.60)	88 (35.20)	98 (39.20)	250 (100)

$$\chi^2 = 11.639 \ df = 4$$

Results within the bracket represent percent.

Income from the wages is a very important variable which influences job satisfaction. In other words, higher the pay of the workers more is the degree of job satisfaction. The same is true in case of the cement workers of Odisha. The findings in the context are reported in the table no.-7.



It is evident from the table no.-7 that majority of the workers in the lower wage group express a lower level of satisfaction with their jobs. Among those highly dissatisfied, the higher percent (36.73 percent) also belongs to the middle wage group. Comparatively, in the higher job satisfaction category, about 36.67 percent of workers was highly paid. The table 7 shows that the calculated chi-square value came out to be 11.639. The calculated chi-square value was found significant at .05 level of confidence. Hence the null hypothesis H05 is rejected at .05 level of confidence and alternative hypothesis (H5A₁), namely, 'there is relationship between degree of job satisfaction and wages of workers' accepted. It indicates that there is evidence of association between the wages of workers and degree of job satisfaction. In other words the wage level of workers is not independent of degree of job satisfaction of workers.

Table No.-8

Marital Status and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Marital Status	Degree of job satisfaction			
	High	Medium	Low	Total
Married	38(23.45)	58(35.80)	66(40.74)	162(100)
Unmarried	24(27.27)	26(29.54)	38(43.18)	88(100)
Total	62(24.80)	84(33.60)	104(41.60)	250(100)

$$\chi^2 = 1.083 \ df = 2$$



Results within the bracket represent percent.

The marital status and the number of dependents influence the workers responsibility towards their families. The higher the responsibility of a worker, higher may be the desire to get more and more from his job. When the income from the job fails to meet the responsibility of the worker, it causes dissatisfaction on the job. Assuming this it is expected that a lower degree of job satisfaction among the workers who are married and having a large size family.

A majority of the cement workers under study were found married who usually having the bulk of responsibility of their families. The table no.-8 reveals that a majority of about 40.74 percent of married workers are dissatisfied with their jobs. The table no.-8 shows that the calculated chi-square value came out to be 1.083. The calculated chi-square value was not found significant even at .05 level of confidence. Hence the null hypothesis (H06) namely, 'the degree of job satisfaction and marital status of workers are independent' is accepted. It means that there is no evidence of relationship between the marital status and degree of job satisfaction.

Table No.-9

Number of Dependents and Degree of Job Satisfaction of Workers in Cement Industries of Odisha

Number of Dependents	Degree of job satisfaction			
	High	Medium	Low	Total
Below two	38(35.18)	36(33.33)	34(31.48)	108(100)
Two and more	28(19.71)	48(33.80)	66(46.47)	142(100)
Total	66(26.40)	84(33.60)	100(40.00)	250(100)

$$\chi^2 = 9.010 \ df = 2$$



Results within the bracket represent percent.

With a view to assess that whether the burden of dependents makes any difference in the degree of job satisfaction of workers or not, the relevant data have been provided in the table no.-9.

The higher the number of dependents, lower is the degree of job satisfaction holds true in the case of present study. The table shows a significant relationship between the burden of dependents and the degree of job satisfaction. The table 9 shows that the calculated chi-square value came out to be 9.010. The calculated chi-square value was found significant at .05 level of confidence. Hence the null hypothesis H₀₇ is rejected at the .05 level of confidence and alternative hypothesis (H_{7A₁}) namely, 'there is relationship between the degree of job satisfaction and number of dependents on workers' is accepted. It indicates that there is evidence of relationship between the number of dependents and the degree of job satisfaction. In other words, the numbers of dependents of workers are not independent of degree of job satisfaction. A further explanation of the data reveals that a higher portion of workers having three or more dependents to support (46.48 percent) are highly dissatisfied with their job as compared to those with few dependents.

Findings and Recommendation

The workers working in cement industries of Odisha register their degree of job satisfaction as high, medium and low. The number of workers having medium and low degree of job satisfaction is more as compared to the workers having high degree of job satisfaction.

The forgoing study analyzed the degree of job satisfaction taking the age of the works, years of work experience, level of education and skill of the workers, wages earned by the worker, marital status and dependents of the worker into account.



Precisely, the study revealed the following:-

- There is relationship between the age of the workers and degree of job satisfaction.
- There is no relationship between experience of workers and degree of job satisfaction.
- There is relationship between the skill of the workers and degree of job satisfaction.
- The level of education workers is independent of degree of job satisfaction.
- There is relationship between the wage level and job satisfaction.
- There is no relationship between the marital status of workers and degree of job satisfaction.
- The workers having comparatively less dependents have registered higher degree of job satisfaction than the workers having comparatively more dependents.

In this context, it is recommended to consider the determinants of job satisfaction namely wages, job contents, job security, welfare amenities, proper working conditions, living conditions, safety in the workplace, quality supervision, interpersonal relationship promotional avenues, harmony in the workplace, quality governance, efficient grievance rendering machinery and sound HR policy as a HR strategy to register higher degree of job satisfaction in cement industries of Odisha.

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TEACHERS' JOB PERFORMANCE AND ORGANIZATIONAL CLIMATE IN MAHABOONAGAR DISTRICT

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Introduction

Development of nation is primarily dependent on the education system available in the country. Education is nowhere without teacher's playing a pivotal role in ensuring achievement in a educational institution. Teacher's job performance plays a crucial role in student's learning process. It is known to be related to teacher's effectiveness (Medly and Shannon, 1994). Teachers play a basic and dynamic role in the educational system. It is said that good performance of students depends upon effective teaching of their teachers. As professionals, teachers need to be appropriate role models and exhibit to their students a commitment to scholarly values and to life-long learning (Medly and Shannon, 1994). One factor that might influence teacher's job performance is organizational climate. The organizational climate dimensions were measured based on principal's leadership behavior and teacher's behavior. Principals can encourage effective performance of their teachers by identifying their needs and try to meet them (Adeyemi, 2010). This encouragement is very much dependent on various aspects of the principal's leadership behavior. Teacher's behavior too plays a role in the teacher's job performance. Both principals' behavior and teachers' behavior are part of organizational climate which influence the teacher's job performance.



Teachers are arguably the most important group of professionals for our nation's future. Without teacher, the education system will be crippled. The increased importance in teacher's job performance has made it extremely important to identify the factors that influence teacher's job performance. In recent years, effects of organizational climate on teacher's performance have become topic of concerns for researchers and education officers. Although numerous studies have been conducted on teacher's job performance, past research has been constrained by the shortage of studies on the influence of organizational climate on teacher's job performance. Number of reports has shown that teacher's job performance is deteriorating around the world in general, and also Malaysia in particular. This seems to be affecting the teaching and learning process as well other instructional activities at school. As a result, students are the most affected individuals. Hence, it is crucial to determine the factor that has influence in teacher's job performance.

Job performance referred to an act of accomplishing or executing a given task (Lindsay, 1995; Griffin, 2012). Teacher job performance defined as duties performed by a teacher at a particular period in the school system in achieving organizational goals (Obilade, 1999). Teachers' job performance could be measured through teacher's job satisfaction and job attitudes such as job commitment, feelings of job challenge, job meaningfulness and job responsibility (Cheng, 2002). When an individual is satisfied, their job performance might increase. They tend to be more committed to their work. Job performance is important to ensure the quality of instruction taking place at school. There are a few reasons contributing to low level of teachers' job performance such as inadequate pay, poor career structure, lack of promotion opportunities, poor school facilities, inadequate school disciplinary policy, principal's leadership behavior and students' poor



work attitudes and teachers' behavior (George, Louw and Badenhost, 2008). However, this study focus on organizational climate as one of the factors that influence teachers' job performance.

Generally, there is various definition of organizational climate. According to Thompson (2005), organizational climate can be defined as an approach in which organizational members observe and characterize their surrounding and environment in an attitudinal and value-based manner.

In educational setting, organizational climate is also referred to as the mixture of interpersonal interaction among the stakeholders of the institutions which include teachers, parents, students and others

The way principal's act as an icon for some types of behaviour expected to be demonstrated by the school community is known as thrust. This kind of principals' behaviour normally encourage the subordinates to achieve and maintain the school standard by setting rules and guidelines pertaining to school standards.

Another aspect of organizational climate is teacher's behavior (Raza, 2010). Teacher's behaviour could determine a positive school climate because the way teachers perceive their work, relationship with principals and other teachers determine the school climate. Halpin (1967) has underlined four dimensions of teacher's behaviour are disengagement, hindrance, esprit, and intimacy.

Research questions

- 1.What are the levels of job performance among secondary school teachers in Mahaboobnagar district?
- 2.What is perceived organizational climate among secondary school teachers in Mahaboobnagar district?



3.What is the relationship of organizational climate and teachers' performance among secondary school teachers in Mahaboobnagar district?

Methodology

In selecting a method to conduct descriptive study, a survey method is chosen to collect data from respondents. In this study, a survey method was used to obtain teachers' perception on organizational climate and job performance.

Sample

In this study, a simple random sampling was employed to determine the secondary school teachers that will be involved in the study. From the selection technique, 37 respondents were selected to fulfil the objectives of this study.

Tool

The questionnaire was adopted as the main research instrument to assess the level of teachers' job performance and the relationship between organizational climate and teachers' job performance. The questionnaire was adopted and adapted from Raza (2010) and employed seven point Likert scale to indicate respondents response on each item.

ANALYSIS OF THE DATA

For the data analysis, the responses to the questionnaires were analysed using the Statistical Package for Social Sciences (SPSS) version 17 for Windows. With the aid of the SPSS, the data collected from the questionnaire were tabulated and converted into frequency and percentages to describe the demographic profiles and the levels of teachers' job performance. A further analysis is conducted by using descriptive analysis to examine mean and standard deviation scores for



perceived organizational climate. Other than that, Pearson's Correlation Moment Coefficient was used to examine the relationship between organizational climate and teachers' performance among secondary school teachers in Mahaboobnagardistrict.

Level	Frequency (n=37)	Percentage
Low	34	91.9
Moderate	3	8.1
High	0	0
Total	37	10

Level indicator: 1.00 - 2.99 (Low), 3.00 – 4.99 (Moderate) and 5.00 – 7.00 (High)

Table 1. The Levels of Teachers' Job Performance.

Table 2 displays the levels of job performance among secondary school teachers in Mahaboobnagardistrict. The findings revealed that majority of them, 91.9% (34) demonstrated low level of job performance and 8.1% (3) of total respondents showed moderate level of job performance. Surprisingly, none showed high level of job performance. In the analysis, it was found that the level of teachers' job performance was low. Thus, it could be inferred that secondary school teachers in the Mahaboobnagardistrict were less likely to carry out the given tasks (Griffin, 2012) such as lesson preparation, teaching and extracurricular activities (Adeyemi, 2008).

Variables	Organizational Climate	Teachers 'Job Performance
Organizational Climate	1	
Teachers' Job Performance	0.367**	1

** Correlation is significant at the 0.05 level (2-tailed)

Cronbach Alpha, p<0.005



Table 2. The Relationship of Perceived Organizational Climate and Teachers' Job Performance

Table 2 shows the relationship of organizational climate and teachers' job performance. Based on the findings, organizational climate and teachers' job performance demonstrated moderate and positive linear relationship. According to Davis (1971), the r value of +0.30 to +0.49 was considered positive and moderate linear relationship.

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E-RESOURCE IN ENGINEERING COLLEGE LIBRARIES: CHALLENGES AND RESPONSIBILITY FOR LIBRARIAN

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1. Introduction:-

Present time is an information era and libraries are undergoing change. The responsibility and challenge of a library and information professional are increasing in 21th century. The quality and training will be main activating using machine readable resource in the future. In the internet era user have no more time for spent in libraries when various needful matter we can access online anywhere and anytime. But the role of library and librarian not hidden with the batter use of library. It is the only library professionals who have to make the required information available to the users without wasting his/her time. This is possible only when the librarian acquires stores, locates and disseminates the necessary information for the users.

The engineering education, an education where the training is give with practical tools. The users of engineering college libraries are technical students. So they are expectation to the libraries to deliver high quality, comprehensive, user friendly new generation services. As the world advances the library must also evolve and redesign their activities in order to higher quality, need based and value added services. According engineering college library is to assist the professionals in upgrading their knowledge and provide information, views, theories and latest technology engineering and research. So librarian should have following skills-

1. Knowledge and skills-librarian need to known understand the knowledge of resources, technical facilities and resources, financial resources and human resource management.



2. Competencies - Competencies that required to posses in library and information science professional need to acceptance of change and knowledge of user interaction with knowledge resources. He should provide quality of service in library and be adoptive, flexible and resistant. Librarians to be knowledge of possess excellent communication skills, constantly update personal knowledge with latest development. Librarian also has capability of awareness among their users and also be an information management strategist.
3. Technical knowledge required –Librarians need to knowledge of latest ict like operating system, windows, UNIX, Linux, word processing, graphics, spread sheet and presentation. He also have knowledge of data base management system in including the skills in bibliographic data base management system and general purpose programming networking . the urgent need of digital library tools are needful for making digital library for library and information professionals.

To the expectation of today's engineering college library users, the concept of libraries has been described by several different terms such as automated library, computerized library, e-library, digital library, virtual library etc. The libraries are not only store house of books but also a growing organism through which services are provided to users. In the Information Technology era libraries are playing key roles as a information center in engineering colleges.

4. Engineering education:-

In India engineering educational system covers various courses in technical technology management, architecture , pharmacy, textile, automobile etc. the all india council of technical education take care the quality in engineering education in india with ministry of human resources development .the program of under graduates, post graduates, research and Ph D



level are running in the approval of AICTE. Beside this IITS, IIMS, IISC, IIITM, IIITDM, NITS are also provide and promote research in engineering and technical education to improve quality in education.

5. **What are e-resources**—electronics resources or product that delivers a collection of data, it may be text referring to full text database, electronics journals image, collection and other multimedia called e-resources.
6. **Type of e-resources**----presently in libraries has two types of e-resources. First offline e-resources and second one is online e-resources which are available through internet. Generally in library following e-resources available in mostly libraries.
7. **Why e-resources in libraries**--present era of the information era and mostly information available in digital form. In the area of globalization, industrialization world has become a global village. Every users including engineering stream want to access information by sitting in the corner of his house through internet. The users wants to books and journal in electronics form instead of hard copies and libraries are also providing information through electronics sources.
8. **Advantage of e-resources**--the information resources offers enormous benefits.
 - 1) E-resources are updated and upgraded.
 - 2) E-resources provide users faster, more convenets and any time access from home, office or campus library.
 - 3) These resources take up less space.
 - 4) E-resources save the time of the users.
 - 5) E-information can provide a number of advantages over traditional print based sources.
 - 6) These resources cheaper instead to print.
 - 7) No need to binding, solving and easy of presentation.
 - 8) These resources are instant access, easy updates and less bulky.



9. Limitation of e-resources-

- 1) For use of e-resources compulsory need for hardware and software in library.
- 2) The resources are available in variety of forms like "PDF" for adobe acrobat, text formats, HTML, so everyone has not familiar with the latest technology.
- 3) For provide online access to information need of LAN/WAN and other networks.
- 4) Various e-resources are very costly, so not possible to subscribe in library budget.
- 5) Subscribed e-resources can access up to subscription period only.
- 6) Regular need of growth of online and computer system and application to update for access of e-resources.

10. Role of librarian in e-resources-

In the e-environment the librarian has become very challenging. The present day librarian can designate as a system librarian or information scientist. The modern libraries need to be replaced by the terms information center or knowledge centre. The new librarian has take responsibility as a system analyst, system designer, information manager, data base manager, network manager, knowledge manager etc.

The ready availability of information on the internet and its widespread use, really promotes librarians with an opportunities, not a threat librarian presently face difficulties and complicity, challenges due to new trends in information access. In the present internet technological era the professionals have to change themselves as the information professions is being changed.

Today, there is a need of skilled library professionals who will be familiar with a wide range of communication activities knowledge of indexing policies and procedure etc. in the near



future the role of librarian will be vital in design and development of the efficient user friendly information systems expert system on library and information retrieval activities, library network etc.

11. Conclusion and suggestion---the modern era of digital information era and role of library and information professionals has changed. The digital era has brought remarkable change in the way of information is stored and accessed. This has brought change in the concept of librarian and the role of librarian has changed in digital era, with the development of the information technology it is important on the part of librarian to acquire information skills in order to empower library and provides services expected from the user in the new environment the empowerment of library and information professionals with it skills is aimed at providing services that are expected of form the clientele in the new environment. Engineering librarians have to be serious in developing their own proficiency as well as must find out to develop the professional competency in general. Since the users are more prone to online and electronically delivered services the growing role of the librarian in engineering college would lie in information consulting, training, advising users on services and information products appropriate to their needs and how best to use them,

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NETWORK SECURITY AND CRYPTOGRAPHY

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Introduction:

For the first few decades of their existence, computer networks were primarily used by university researchers for sending e-mail and by corporate employees for sharing printers. Under these conditions, security did not get a lot of attention. But now, as millions of ordinary citizens are using networks for banking, shopping, and filing their tax returns, network security is looming on the horizon as a potentially massive problem.

The requirements of information security within an organization have undergone two major changes in the last several decades. Before the widespread use of data processing equipment ,the security of information felt to be valuable to an organization was provided primarily by physical and administrative means .

.with the introduction of computer the need for automated tools for protecting files and other information stored on the computer became an evident .this is especially the case for a shared system such as time sharing system and the need is even more acute for systems that can be accessed for a public telephone or a data network. The generic name for



the collection of tools to protect data and to thwart hackers is "computer security".

Network security:

Security is a broad topic and covers a multitude of sins. In its simplest form, it is concerned with making sure that nosy people cannot read, or worse yet, secretly modify messages intended for other recipients. It is concerned with people trying to access remote services that they are not authorized to use. Most security problems are intentionally caused by malicious people trying to gain some benefit, get attention, or to harm someone. Network security problems can be divided roughly into four closely intertwined areas: secrecy, authentication, nonrepudiation, and integrity control. Secrecy, also called confidentiality, has to do with keeping information out of the hands of unauthorized users. This is what usually comes to mind when people think about network security. Authentication deals with determining whom you are talking to before revealing sensitive information or entering into a business deal. Nonrepudiation deals with signatures.

Secrecy:

Only the sender and intended receiver should be able to understand the contents of the transmitted message. Because eavesdroppers may intercept the message, this necessarily requires that the message be somehow encrypted (disguise data) so that an intercepted message cannot be decrypted (understood) by an interceptor. This aspect of secrecy is probably the most commonly perceived meaning of the term "secure communication." Note, however, that this is not only a restricted definition of secure communication, but a rather restricted definition of secrecy as well.



Authentication :

Both the sender and receiver need to confirm the identity of other party involved in the communication - to confirm that the other party is indeed who or what they claim to be. Face-to-face human communication solves this problem easily by visual recognition. When communicating entities exchange messages over a medium where they cannot "see" the other party, authentication is not so simple. Why, for instance, should you believe that a received email containing a text string saying that the email came from a friend of yours indeed came from that friend? If someone calls on the phone claiming to be your bank and asking for your account number, secret PIN, and account balances for verification purposes, would you give that information out over the phone? Hopefully not.

Message Integrity:

Even if the sender and receiver are able to authenticate each other, they also want to insure that the content of their communication is not altered, either maliciously or by accident, in transmission. Extensions to the checksumming techniques that we encountered in reliable transport and data link protocols.

Nonrepudiation:

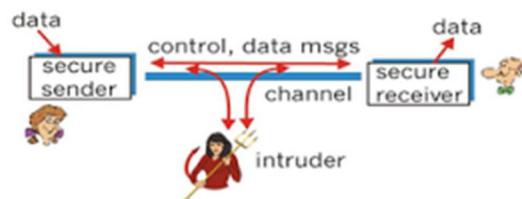
Nonrepudiation deals with signatures Having established what we mean by secure communication, let us next consider exactly what is meant by an "insecure channel." What information does an intruder have access to, and what actions can be taken on the transmitted data?

Figure illustrates the scenario

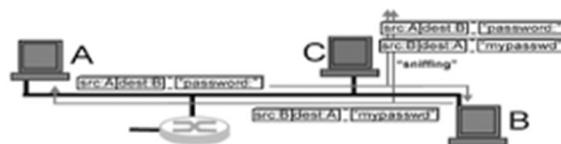
Alice, the sender, wants to send data to Bob, the receiver. In order to securely exchange data, while meeting the requirements of secrecy, authentication, and message integrity, Alice and Bob will exchange both control message and data messages (in much the same way that



TCP senders and receivers exchange both control segments and datasegments). All, or some of this message will typically be encrypted. A passive intruder can listen to and record thecontrol and data messages on the channel; an active intruder can remove messages from the channel and/or itself add messages into the channel.



Network Security Considerations in the Internet :- Before delving into the technical aspects of network security in the following sections, let's conclude our introduction by relating our fictitious characters - Alice, Bob, and Trudy - to "real world" scenarios in today's Internet



. Let's begin with Trudy, the network intruder. Can a "real world" network intruder really listen to and record passively receives all data-link-layer frames passing by the device's network interface. In a broadcast environmentsuch as an Ethernet LAN, this means that the packet sniffer receives all frames being transmitted from or to all hostson the local area network. Any host with an Ethernet card can



easily serve as a packet sniffer, as the Ethernet interface card needs only be set to "promiscuous mode" to receive all passing Ethernet frames. These frames can then be passed on to application programs that extract application-level data. For example, in the telnet scenario , the login password prompt sent from A to B, as well as the password entered at B are "sniffed" at host C. Packet sniffing is a double-edged sword - it can be invaluable to a network administrator for network monitoring and management but also used by the unethical hacker. Packet-sniffing software is freely available at various WWW sites, and as commercial products.

Cryptography:- Cryptography comes from the Greek words for "secret writing." It has a long and colorful history going back thousands of years. Professionals make a distinction between ciphers and codes. A cipher is a character-for-character or bit-for-bit transformation, without regard to the linguistic structure of the message. In contrast, a code replaces one word with another word or symbol. Codes are not used any more, although they have a glorious history

The messages to be encrypted, known as the plaintext, are transformed by a function that is parameterized by a key. The output of the encryption process, known as the ciphertext, is then transmitted, often by messenger or radio. We assume that the enemy, or intruder, hears and accurately copies down the complete ciphertext. However, unlike the intended recipient, he does not know what the decryption key is and so cannot decrypt the ciphertext easily. Sometimes the intruder can not only listen to the communication channel (passive intruder) but can also record messages and play them back later, inject his own messages, or modify legitimate messages before they get to the receiver (active intruder). The art of breaking ciphers, called cryptanalysis, and the art devising them (cryptography) is collectively known as cryptology.



It will often be useful to have a notation for relating plaintext, ciphertext, and keys. We will use $C = EK(P)$ to mean that the encryption of the plaintext P using key K gives the ciphertext C . Similarly, $P = DK(C)$ represents the decryption of C to get the plaintext again.

Two Fundamental Cryptographic Principles:

Redundancy

The first principle is that all encrypted messages must contain some redundancy, that is, information not needed to understand the message.

Cryptographic principle 1: Messages must contain some redundancy

Freshness

Cryptographic principle 2: Some method is needed to foil replay attacks

One such measure is including in every message a timestamp valid only for, say, 10 seconds. The receiver can then just keep messages around for 10 seconds, to compare newly arrived messages to previous ones to filter out duplicates. Messages older than 10 seconds can be thrown out, since any replays sent more than 10 seconds later will be rejected as too old.

Symmetric key Encryption model:

Beyond that, the security of conventional encryption depends on the secrecy of the key, not the secrecy of the algorithm. We do not need to keep the algorithm secret; we need to keep only the secret key.

The fact that the algorithm need not be kept secret means that manufacturers can and have developed low cost chip implementations of data encryption algorithms. These chips are widely available and incorporated in to a number of products.



Substitution Ciphers

In a substitution cipher each letter or group of letters is replaced by another letter or group of letters to disguise it. One of the oldest known ciphers is the Caesar cipher, attributed to Julius Caesar. In this method, a becomes D, b becomes E, c becomes F, ..., and z becomes C. For example, attack becomes DWWDFN. The next improvement is to have each of the symbols in the plaintext, say, the 26 letters for simplicity, map onto some other letter. For example, plaintext: a b c d e f g h i j k l m n o p q r s t u v w x y z

ciphertext: Q W E R T Y U I O P A S D F G H J K L Z X C V B N M

Transposition Ciphers: Substitution ciphers preserve the order of the plaintext symbols but disguise them. Transposition ciphers, in contrast, reorder the letters but do not disguise them depicts a common transposition cipher, the columnar transposition.

M E G A B U C K
7 4 5 1 2 8 3 6

W E L C O M E T PLAIN TEXT: WELCOME TO SAfire-
2K8,CHIRALA,
O S A f i r e 2 PRAKASAM, AP.
K 8 C H I R A L CIPHER
TEXT: CfHAOiiKEeASES8PALACRPT2LA
A P R A K A S A WOKAMMRRA
M A P



The cipher is keyed by a word or phrase not containing any repeated letters. In this example, MEGABUCK is the key. The purpose of the key is to number the columns, column 1 being under the key letter closest to the start of the alphabet, and so on. The plaintext is written horizontally, in rows, padded to fill the matrix if need be. The ciphertext is read out by columns, starting with the column whose key letter is the lowest.

Public key algorithm:

While there may be many algorithms and keys that have this property, the RSA algorithm (named after its founders, Ron Rivest, Adi Shamir, and Leonard Adleman) has become almost synonymous with public key cryptography.

In order to choose the public and private keys, one must do the following:

Choose two large prime numbers, p and q. How large should p and q be? The larger the values, the more difficult it is to break RSA but the longer it takes to perform the encoding and decoding. RSALaboratories recommends that the product of p and q be on the order of 768 bits for personal use and 1024 bits for corporate use. Compute $n = pq$ and $z = (p-1)(q-1)$. Choose a number, e, less than n, which has no common factors (other than 1) with z. (In this case, e and z are said to be relatively prime). The letter 'e' is used since this value will be used in encryption. Find a number, d, such that $ed - 1$ is exactly divisible (i.e., with no remainder) by z. The letter 'd' is used because this value will be used in decryption. Put another way, given e, we choose d such that the integer remainder when ed is divided by z is 1. (The integer remainder when an integer x is divided by the integer n, is denoted $x \bmod n$).

The public key that Bob makes available to the world is the pair of numbers (n, e) ; his private key is the pair of numbers (n, d) . Key



distribution: For symmetric key cryptographhy, the trusted intermediary is called a Key Distribution Center (KDC), which is a single, trusted network entity with whom one has established a shared secret key. We will see that one can use the KDC to obtain the shared keys needed to communicate securely with all other network entities. For public key cryptography, the trusted intermediary is called a Certification Authority (CA). A certification authority certifies that a public key belongs to a particular entity (a person or a network entity). For a certified public key, if one can safely trust the CA that the certified the key, then one can be sure about to whom the public key belongs. Once a public key is certified, then it can be distributed from just about anywhere, including a public key server, a personal Web page or a diskette.

Security in the layers:

Before getting into the solutions themselves, it is worth spending a few moments considering where in the protocol stack network security belongs. There is probably no one single place. Every layer has something to contribute.

Physical layer: In the physical layer wiretapping can be foiled by enclosing transmission lines in sealed tubes containing gas at high pressure. Any attempt to drill into a tube will release some gas, reducing the pressure and triggering an alarm. Some military systems use this technique.

Data link layer: In this layer, packets on a point-to-point line can be encrypted as they leave one machine and decrypted as they enter another. All the details can be handled in the data link layer, with higher layers oblivious to what is going on. This solution breaks down when packets have to traverse multiple routers, however, because packets have to be decrypted at each router, leaving them vulnerable to attacks from within the router.

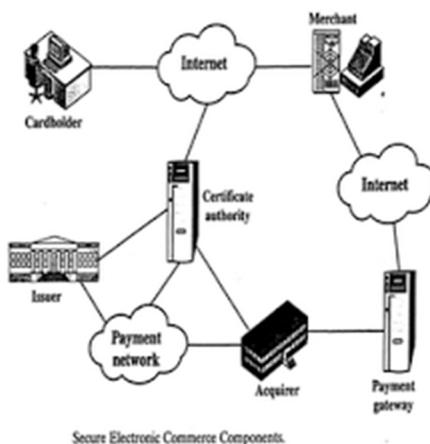
Network layer: In this layer, firewalls can be installed to keep good packets and bad packets out. IP security also functions in this layer.

In the transport layer, entire connections can be encrypted, end to end, that is, process to process. For maximum security, end-to-end security is required . Finally, issues such as user authentication and nonrepudiation can only be handled in the application layer.

Since security does not fit neatly into any layer

Secure Internet Commerce:

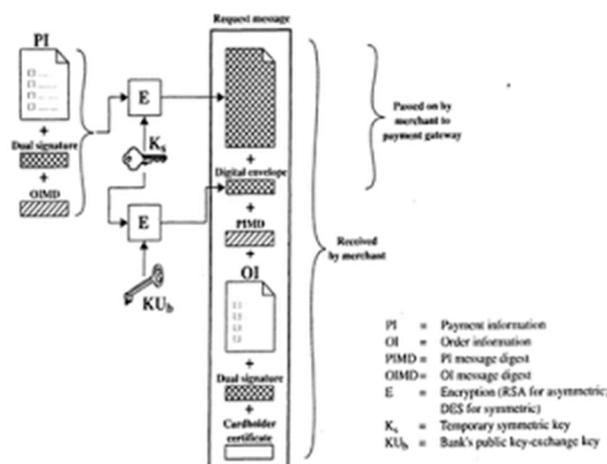
SET (Secure Electronic Transactions) is a protocol specifically designed to secure payment-card transactions over the Internet. It was originally developed by Visa International and MasterCard International in February 1996 with participation from leading technology companies around the world .SET Secure Electronic Transaction LLC (commonly referred to as SET Co) was established in December 1997 as a legal entity to manage and promote the global adoption of SET



Secure Electronic Commerce Components.



1. Bob indicates to Alice that he is interested in making a credit card purchase.
2. Alice sends the customer an invoice and a unique transaction identifier.
3. Alice sends Bob the merchant's certificate which includes the merchant's public key. Alice also sends the certificate for her bank, which includes the bank's public key. Both of these certificates are encrypted with the private key of a certifying authority.
4. Bob uses the certifying authority's public key to decrypt the two certificates. Bob now has Alice's public key and the bank's public key.
5. Bob generates two packages of information: the order information (OI) package and the purchase instructions (PI) package. The OI, destined for Alice, contains the transaction identifier and brand of card being used; it does not include Bob's card number. The PI, destined for Alice's bank, contains the transaction identifier, the card number and the purchase amount agreed to Bob. The OI and PI are dual encrypted: the OI is encrypted with Alice's public key; the PI is encrypted with Alice's bank's public key. (We are bending the truth here in order to see the big picture. In reality, the OI and PI are encrypted with a customer-merchant session key and a customer-bank session key.) Bob sends the OI and the PI to Alice.



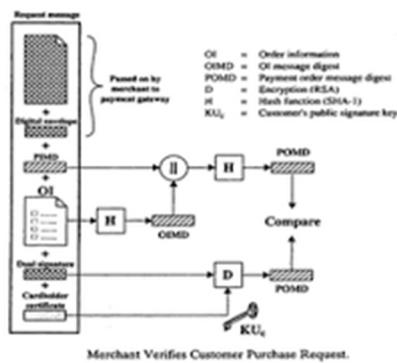
Cardholder Sends Purchase Request.

6. Alice generates an authorization request for the card payment request, which includes the transaction identifier.

7. Alice sends to her bank a message encrypted with the bank's public key. (Actually, a session key is used.) This message includes the authorization request, the PI package received from Bob, and Alice's certificate.

8. Alice's bank receives the message and unravels it. The bank checks for tampering. It also makesure that the transaction identifier in the authorization request matches the one in Bob's PI package.

9. Alice's bank then sends a request for payment authorization to Bob's payment-card bank through traditional bank-card channels -- just as Alice's bank would request authorization for any normal payment-card transaction.



One of the key features of SET is the non-exposure of the credit number to the merchant. This feature is provided in Step 5, in which the customer encrypts the credit card number with the bank's key.

Encrypting the number with the bank's key prevents the merchant from seeing the credit card. Note that the SET protocol closely parallels the steps taken in a standard payment-card transaction. To handle all the SET tasks, the customer will have a so-called digital wallet that runs the client-side of the SET protocol and stores customer payment-card information (card number, expiration date, etc.).

Conclusion:

All the three techniques discussed in this presentation i.e. network security; cryptography and firewalls are most widely used and implemented networks security tools. Each of them had its own significance in its own mode. For example, a single organization or establishment to maintain privacy of information within itself can use cryptography. These methods are being used to provide confidentiality required by the network. There is a lot of scope for the development in this field. Digital signatures are one of the latest developments in the field of cryptography. With the increase in number of computers, and the usage of computers worldwide the demand for network security is



increasing exponentially. This has led to the development of major companies like Symantec Corporation, MacAfee etc. So this field is putting up a big employment potential for the young generation of today. And not to forget, there is no end to the complexity of this subject, which means that any amount of research will not go futile for the world of computers.

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<http://www.jjtc.com/stegdoc/>



FPGA BASED RETINAL BLOOD OXYGEN SATURATION MAPPING USING MULTI SPECRAL IMAGES

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INTRODUCTION

If a blood vessel is occluded and the blood stream is obstructed, the oxygen supply for cells will be insufficient. This leads to disorders such as the malfunction of cells or generation of the vulnerable neovascularity. Even an advanced retinal disease symptoms may be treated by a laser treatment, however, early stage detection of the vascular malfunction is important for preventing alteration in visual acuity or the loss of the eyesight. The retinal vessels are only the blood vessels inside the human body that can be seen directly from outside. If one has retinal disorders, it is suspicious than he or she has blood stream disorders in the whole system such as a hypertension. Actually, it is reported that rates of brain and cardiac infarctions are greatly correlated with the retinal malfunctions. Therefore the reliable measurement of the retinal functions such as the oxygen supply has been expected to be effective in the prevention or the early treatment for the retinopathy and the complication of the hypertension.

Oxygen in the blood stream is transported by haemoglobin contained in a red blood cell. A haemoglobin molecule consists of four units, and each unit has a heme that can be bound to oxygen. Haemoglobin is bound to oxygen in high oxygen partial pressure, while it releases oxygen in low oxygen partial pressure. Then oxygen is transported to whole body. The content of haemoglobin that binds to oxygen is represented as the degree of the oxygen saturation; 100% of the oxygen saturation represents that all haemoglobin molecules bind to the maximum oxygen. To measure the oxygen saturation in blood



stream, spectroscopy is useful. Most pulse oximeters that are commonly used in medical agencies utilize the difference of oxy- and deoxyhemoglobin absorptions at two wavelengths; red and near-infrared. We expect that oxygen saturation levels at retinal vessels can be measured in the same manner as the pulseoximetry though the retinal spectroscopy should be the reflectance measurement unlike the pulseoximetry that measures the transmittance of the light passed through a tip of a finger.

Measuring the oxygen saturation at retinal blood stream based on the spectroscopy has long been developed since the late 1980s. Delori reported in 1988 the measurement of oxygen saturation using three wavelengths. Smith et all reported in 1998 on the oxygen measurement experiment using a laser at two wavelengths. in 1999 the experiment employed four wavelengths and the calibration model was proposed. Heaton et al. reported the originally designed handheld oximeter employing four wavelengths.

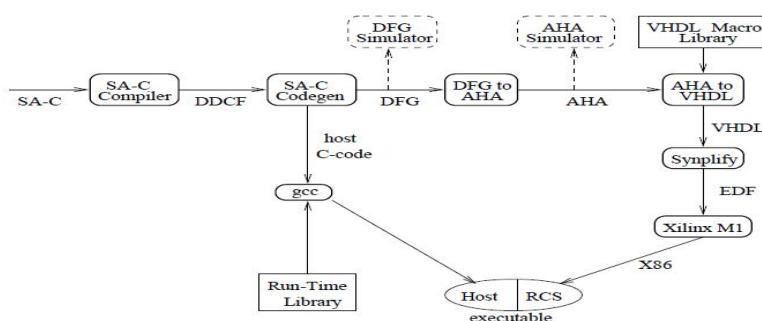
In spite of these vigorous researches, the reliable measurement technique has not yet been established. This may be because following problems are still unsolved. First of all, the Spectroscopic retinal oximetry requires the high wavelength resolution because the absorption spectrum of haemoglobin in the wavelength ranging from 500 to 600 nm has a fine structure compared to the longer wavelength range such as the range around 800 nm utilized in the pulseoximetry. However increasing the wavelength resolution is not easy because of the limitation of the light intensity to illuminate a fundus and the requirement of the short exposure time to prevent a blur caused by flick motion of an eye. Hence this results in lack of spectral information to retrieve oxygen saturation. Second, it is difficult to determine the light path length inside the retinal tissue in the reflectance measurement. Even if the absorption coefficients of oxy- and deoxyhemoglobin are known in advance, oxygen saturation can not be



estimated without a knowledge of the light path length based on the Lambert-Beer law. Inaccurate assumption of the light path length will lead to incorrect estimations depending on the thickness of the blood vessels or the scattering coefficient.

From these background, this paper reports on the preliminary experiment employing both hardware-based and software-based improvements; the measurement setup introduces a high sensitive CCD camera and a tunable spectral filter to ensure the high spectral resolution. The data processing techniques such as the morphological structure analysis and the multivariate regression enable the improvement of the accuracy of the estimated result preventing the distortion caused by the scattering effect.

The biggest obstacle to the more widespread use of reconfigurable computing systems lies in the difficulty of developing application programs for them. FPGAs are typically programmed using hardware description languages such as VHDL. Application programmers are typically not trained in these hardware description languages and usually prefer a higher level, algorithmic programming language to express their applications. Turning a computation into a circuit, rather than into a sequence of CPU instructions, may seem to offer obvious performance benefits, but an effective code generation strategy requires an understanding of the fundamental differences between conventional CPUs and FPGAs.





The SA-C Language

The design goals of SA-C are to have a language that can express image processing (IP) applications elegantly, and to allow seamless compilation to reconfigurable hardware. IP applications are supported by data parallel loops with structured access to rectangular multidimensional arrays. Reconfigurable computing requires fine grain expression level parallelism, which is easily extracted from a SA-C program because of its Single Assignment semantics. Variables in SA-C are associated with wires, not with memory locations. Data types in SA-C include signed and unsigned integers and fixed point numbers, with user specified bit widths. The extents of SA-C arrays can be determined either dynamically or statically. The type declaration `int14 M` for example, is a declaration of a matrix `M` of 14-bit signed integers. The left dimension will be determined dynamically; the right dimension has been specified.

Lower Level Code Generation

A dataflow graph (DFG) is a low-level, non-hierarchical and asynchronous program representation. DFGs can be viewed as abstract hardware circuit diagrams without timing or resource contention taken into account. Nodes are operators and edges are data paths. DFGs have token driven semantics. The SA-C compiler attempts to translate every innermost loop to a DFG. The innermost loops the compiler finds, may not be the innermost loops of the original program, as loops may have been fully unrolled or strip-mined.

Intel Image Processing Library

When comparing simple IP operators one might write corresponding SA-C and C codes and compare them on the Starfire and Pentium II. However, neither the Microsoft nor the Gnu C++ compilers exploit the Pentium's MMX technology. Instead, we compare



SA-C codes to corresponding operators from the Intel Image Processing Library (IPL). The Intel IPL library consists of a large number of low-level Image Processing operations. Many of these are simple point-(pixel-) wise operations such as square, add, etc. These operations have been coded by Intel for highly efficient MMX execution. Comparing these on a 450 MHz Pentium II (with MMX) to SA-C on the Star Fire, the Star Fire is 1.2 to six times slower than the Pentium. This result is not surprising. Although the FPGA has the ability to exploit fine grain parallelism, it operates at a much slower clock rate than the Pentium. These simple programs are all I/O bound, and the slower clock of the FPGA is a major limitation when it comes to fetching data from memory. However, the Prewitt edge detector written in C using IPL calls and running on the 450 MHz Pentium II, takes 53 milliseconds as compared to 17 milliseconds when running the equivalent SA-C code on the StarFire. Thus, non I/O bound SA-C programs running on the StarFire board are competitive with their hand optimized IPL counterparts.

EXPERIMENT

In this experiment, the optical system that has the basic function of a commonly used fundus camera is built on an optical table to keep enough space for a high intensity light source and the tunable spectral filter. The optical setup is shown in Fig.1. A photographic-type fundus camera needs a mechanism in an illumination system to prevent the specular reflection from the surface of the cornea; a ring-shaped aperture is illuminated from its back and focused onto the surface of the cornea. In addition, a beamsplitter or a perforated mirror is necessary to split the illumination light and the reflected light from the retina because both lights share the optical path just before the eye. In our optical setup, the perforated mirror with the 10 mm-circular aperture is located with an angle of 45 degrees to the optical path. The focusing lens between the ring slit and the perforated mirror has a

black circular mask at its center to prevent the specular reflection at the surface of the lens. The image of the retina acquired by the CCD camera is degraded without this mask.

Next, brief explanations about the light source, the imaging CCD camera, and the tunable spectral filter are given as follows. The light source is a 300 W xenon lamp. Emitted light passes through the IR blocking filter and the diffusion

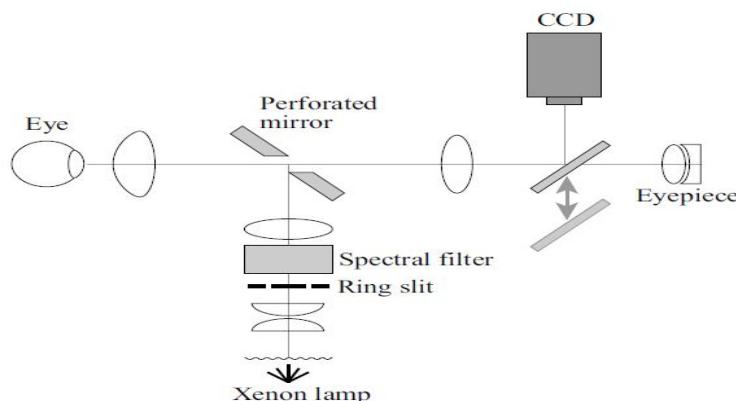


Fig. Optical setup for acquiring multispectral retinal images. Emitted light from the 300 W-xenon lamps is filtered by the IR blocking filter and passes through the diffusing filter for the uniform intensity distribution. Then the diffusing filter plane is focused on the ring slit with the diameter of about 10 mm, and is focused again on the cornea of the subject's eye. The planer mirror before the eyepiece moves according to the visual check and the image acquisition by the CCD camera. Filter to cut-off the IR light and to make uniform distribution. Note that the halogen lamp is generally thought to be better for the spectroscopic purpose because it has no line spectra; however, the xenon lamp was employed in our experiment for stronger emission intensity. The tuneable filter we used (VariSpec VIS; CRI Inc., USA) is known as the Lyot filter that allows to tune the transmission wavelength with the combination of a birefringent plate and a rotating polarizer. The



tunable wavelength range is from 400 to 720 nm with the full width at half the maximum of 7 nm. The centre wavelength of the transmitted light can be selected arbitrarily, and the response time to change the center wavelength was approximately 65 ms by actual measurement. The imaging device is a high sensitive EM-CCD (Electron Multiplying-CCD) camera (ADT-100; Flovel, Japan) with 1000x1000 pixels, 10 bit, and 30 fps transmission rate. The exposure time was set to 1/60s in this experiment. The spectral filter and the CCD camera are synchronized by a PC control. The data acquisition time for a frame including the data transfer and the wavelength switch is about 150 ms.

The measurement experiment was performed with a subject of a healthy male in his 30s after the instillation of the mydriatic drops. The multispectral images were acquired in the wavelength range from 500 to 650 nm with the interval of 5 nm. The acquired region is near the optic nerve head (ONH) with the viewing angle of about 20 degrees. Six examples of images are shown in Fig.2. Note that the images were compensated with regard to the spectral transmittance and the sensitivity through the entire system. Hence the images are proportional to the reflectance at each wavelength. The reflectance of ONH is much higher than that of other area. The dynamic range was optimized to the blood vessels because we will extract only the blood vessel area in the data processing step. It is seen that the reflectance, especially artery, increases as wavelength reflecting the absorption spectrum of hemoglobin. The background reflection seen at the long wavelength is from the choroid; the light passes through the pigment epithelial layer because of the small absorption in the long wavelength range.

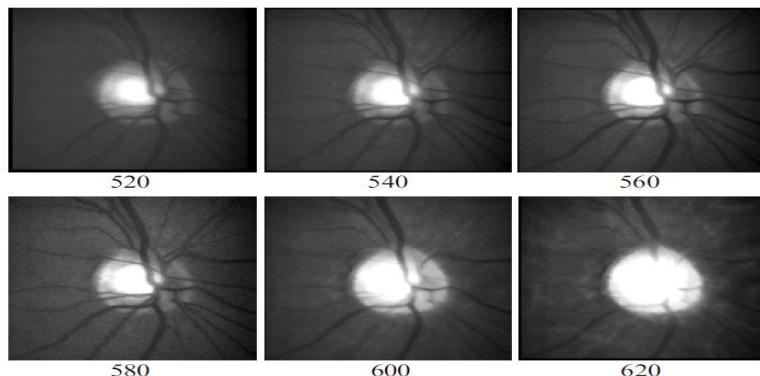


Fig. Six examples of acquired multispectral images. The maximum of the sensitivity including the transmittance of the spectral filter and the sensitivity of the CCD camera is around 640 nm. Brightness level of these figures was modified for better visualization.

DATA PROCESSING

We process the measured multispectral images in three steps for estimating the oxygen saturation levels across the retinal vessels. The first step is a technique similar to the fluorescence angiography (FA) that extracts blood vessels structure from the background image. This step is performed by the digital image processing based on the morphology. The second step is compensating the small involuntary eye movement. Even very small gaps among all the images will result in the inaccurate spectra. The last step is estimating the oxygen saturation levels at all the points extracted in the first step employing the multivariate regression analysis.

Morphological angiography

Morphology is one of the digital image processing techniques based on the firm mathematical foundation, defined as set operations between a subject pattern and an elemental structure. Originally,



morphology was developed in the late 1960s for analysing microscope images. Recently morphology has been extended to the wide variety of fields. The morphological image processing is typified by opening and closing; enable to delete unnecessary small patterns and to clarify the desired subject. They are implemented by combining dilation and erosion, defined mathematically as Minkowski addition and subtraction.

Since the blood vessels have clear edges and their structural feature is apparently different from other area in the multispectral images, it is expected that the FA-like effect can be implemented by applying morphological image processing. The images created by this method will be used as the mask filter that is overlapped on the predicted 2-D oxygen saturation distribution for eliminating retinal tissue areas.

The mask filter is created based on the bottom-hat filtering method; bottom-hat filtering is defined as subtracting the result image of performing a closing operation on the original image from the original image itself. In the obtained multispectral images, the reflectance of ONH is much higher than that of surrounding areas. Thus the algorithm adopted to our purpose need to be robust to the large change of the intensity distribution. The bottom-hat filtering is one of the adequate technique for this purpose. However, we should consider the boundaries between thick main vessels and thin capillaries. This time, we focused on extracting comparatively thick main vessels. For extracting thick vessels near and within ONH area, we adopted the combination method of bottomhat and top-hat filtering; subtracting the top-hat result from the bottom-hat result. Top-hat filtering is a subtraction of the closing-operated image from the original image. As a result, thick vessels can be extracted clearly from the measured multispectral image. Results of both the gray scale and

binary operations were shown in Figs.3 (a) and (b). The original image is the observed data at the wavelength of 580 nm.

B Compensation of eye movement

An oculus constantly takes slight movement owing to our cognition system that recognizes an image by changing light intensity carried to the optic nerve. Therefore the acquired retinal image moves slightly within the measurement time of even a few seconds, and all the images have to be adjusted to the same position in order to obtain the correct spectrum.

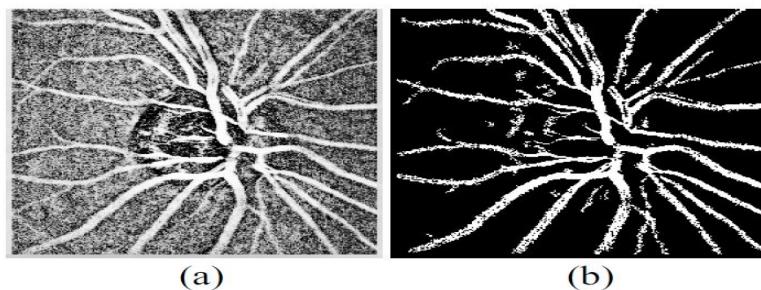


Fig. 3. Mask filters created by the morphological operation. (a) Gray scaled filter and (b) binary filter. For being robust to the large intensity change especially around ONH and for separating thick main vessels from thin capillaries, the algorithm combined with bottom-hat and top-hat operations Were adopted. The mask filter was calculated by subtracting the top-hat result from the bottom-hat result.

An oculus movement is, in general, not only translation but rotation. However, images acquired in this experiment seemed not to contain rotation, thus only the translation compensation was implemented. The alignment algorithm is based on pattern matching. For accurate alignment, linear subpixel interpolation was adopted. Obtained accuracy was within 0.5 pixel.



The ONH area was excluded from the matching calculation because the large intensity change among different wavelengths causes the large error. It was found that using the area including many vessels was effective for the accurate alignment.

C. Oxygen saturation mapping

To build a regression model for the oxygen saturation and to obtain the 2-D oxygen distribution at retinal blood stream, PLS (Partial Least Squares) regression method was employed. PLS regression is one of the multivariate analyses; an objective variable is predicted using a regression model that consists of multiple explanation variables like the multiple regression analysis. PLS regression is, however, more useful especially for spectroscopic chemical analyses because it is applicable to a sample set having correlation among the explanation variables. In addition, PLS regression can be adopted in the case that the number of the explanation variables is larger than the sample numbers, in which the multiple regression can not be solved. First, 20 sample points were selected; 10 points each from artery and vein. In this experiment, we have no knowledge in advance of the actual oxygen saturation values. Thus we will predict the similarity of the spectrum to artery and vein instead of actual oxygen saturation values. In Fig.4, typical spectra of selected points for artery and vein are plotted. In the wavelength range from 500 to 580 nm, no significant difference between arterious and venous spectra is seen, and both lines show that the absorption is higher than that in the longer wavelength range. From wavelength of 580 nm, the

reflectances suddenly increase. However, unlike in the short wavelength range, difference between arterious and venous reflectances are large because the absorptions of oxy- and deoxyhemoglobin reflect on the arterious and venous spectra.

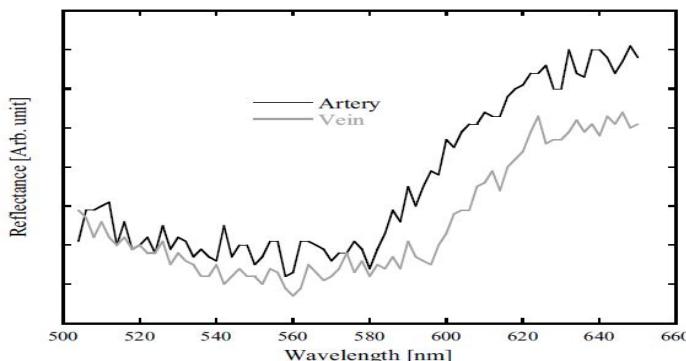


Fig. Typical examples of reflectance spectra from artery and vein. Short wavelength range shows no significant difference between the arterious and venous spectra while the long wavelength range represents the spectral features of oxy- and deoxyhemoglobin.

Next, the PLS regression model was built using selected 20 spectra. As mentioned above, the actual oxygen saturation values are unknown, thus the objective variables of 1 and 0 were given for arterious and venous spectra, respectively. Full cross validation method was performed for evaluate the regression model. The regression model was built by using four PLS factors because the minimum residual was given by the fourth PLS factors. The regression coefficients were multiplied to corresponding images, then the 2-D distribution of the predicted oxygen saturation was obtained by summing up all the weighted images. Finally, the obtained image was overlapped with the mask filters that were created by the morphological technique.

RESULTS AND DISCUSSIONS

Obtained 2-D distributions of the predicted oxygen saturation were shown in Figs.5 (a) and (b); their difference is only the filter mask that was overlapped in the final step. The oxygen saturation level is represented by the gray scale. White represents high value. Thick veins that run upward and downward from ONH show low values while thin



artery show relatively high values. This means the oxygen saturation level was retrieved almost correctly. The area within ONH shows very high value, and blood vessels within the ONH area show higher value than the outer area. This is because the regression results were influenced by the original intensity values; the reflectance of ONH is much higher than blood vessels and other retinal tissue areas. Hence it follows that these high values seen around ONH have not retrieved correctly.

The predicted oxygen saturation is represented by relative values because the actual oxygen saturation values were unknown in this experiment. Generally, the oxygen saturations of blood in main artery and vein are, respectively, about 75 and more than 95%. If the oxygen exchange is not happened in the blood vessels upper than ONH, retrieving the absolute value of oxygen saturation may be possible. Concerning the spectrum measurement, higher wavelength resolution is desirable. In this experiment, fine spectral structure in the range from 500 to 600 nm that should be useful for estimating the oxygen saturation could not be detected due to lack of the wavelength resolution. In future work, introducing some optical improvement such as a confocal imaging system will be necessary for determining optical path length. It is difficult to evaluate the effectiveness of software-based scattering correction that we employed in this research.

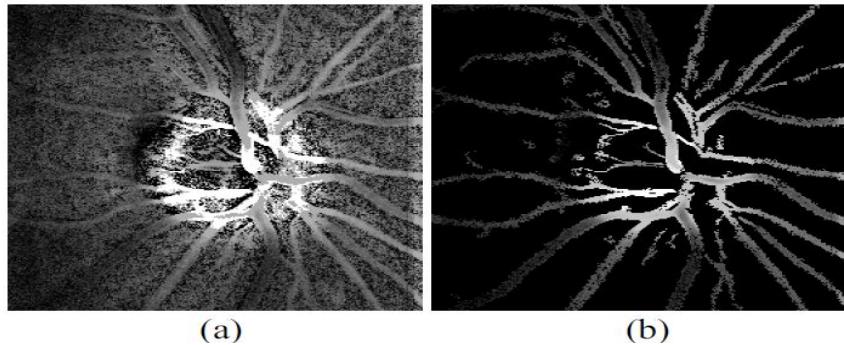


Fig. Retrieved 2-D oxygen saturation levels. (a) Result with the gray scaled mask filter and (b) with the binary filter. High predicted values around ONH are caused due to the extremely high reflectance of ONH. Thin vessels seen in the original multispectral images were vanished by the mask filters.

CONCLUSION

We reported on the preliminary experiment for measuring the blood oxygen saturation at the retina. The multispectral images were acquired in the wavelength range from 500 to 650 nm with the wavelength resolution of 7 nm. The measured images were pre-processed by the morphological blood vessel extraction and the alignment processing. Finally, the two-dimensional distribution of oxygen saturation across the retina was calculated by the PLS regression method. The result showed clearly the difference of the oxygen saturation levels in the retinal blood stream.

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STRENGTH AND DURABILITY CHARACTERISTICS OF GEOPOLYMER CONCRETE USING GGBS AND RHA

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INTRODUCTION

Concrete is the second most used material in the world after water. Ordinary Portland cement has been used traditionally as a binding material for preparation of concrete. One tonne of carbon dioxide is estimated to be released to the atmosphere when one ton of ordinary Portland cement is manufactured. Also the emission by cement manufacturing process contributes 7% to the global carbon dioxide emission. It is important to find an alternate binder which has less CO₂ emission than cement. Geopolymer is an excellent alternative which transforms industrial waste products like flyash, GGBS and rice husk ash into binder for concrete. Al-Si materials which are used as source materials undergoes dissolution, gel formation, setting and hardening stages to form geopolymers. There are two main constituents of geopolymers, namely the source materials and the alkaline liquids. The source materials for geo-polymers based on alumina-silicate should be rich in silicon (Si) and aluminium (Al). These could be natural minerals such as kaolinite, clays, etc. Alternatively, by-product materials such as fly ash, silica fume, slag, rice-husk ash, red mud, etc could be used as source materials. The choice of the source materials for making geopolymers depends on factors such as availability, cost, type of application, and specific demand of the end users. The alkaline liquids



are from soluble alkali metals that are usually sodium or potassium based. The most common alkaline liquids used in geo-polymerization are a combination of sodium hydroxide (NaOH) or potassium hydroxide (KOH) and sodium silicate (Na_2SiO_3) or potassium silicate (K_2SiO_3).

The alumino silicate material which is to be used in this study is a combination of Rice husk ash and ground granulated blast furnace slag (GGBS). RHA is either white or black in color. If the rice husk is burnt in controlled temperature and duration, it will result the ash in white color. This type of RHA has high percentage of silica content. The ease availability of RHA is black in color due to uncontrolled burning temperature and duration in various rice mills, so the black color rice husk ash is called as black rice husk ash (BRHA). The RHA used in this study was black rice husk ash. This study aims to synthesize geopolymers concrete using combination of GGBS and BRHA. In this study GGBS used as a base material for geopolymers concrete. GGBS is replaced up to 30% by BRHA to understand the strength and durability characteristics.

MATERIALS

The materials used for making GGBS based geopolymers concrete specimens are GGBS, Rice Husk Ash, aggregates, alkaline liquids, water and super plasticizer. Ground Granulated Blast furnace Slag was procured from JSW cements in Bellari, Karnataka. Black Rice Husk Ash was obtained from a Rice mill near Karaikudi and then it was finely grounded. The properties of GGBS and BRHA are given in Table I.



TABLE I. PROPERTIES OF GGBS AND RHA

Property	GGBS	BRHA
SiO ₂	31.25 %	93.96 %
Al ₂ O ₃	14.06 %	0.56 %
Fe ₂ O ₃	2.80 %	0.43 %
CaO	33.75 %	0.55 %
MgO	7.03 %	0.4 %
Specific gravity	2.61	2.11

Aggregates

Coarse aggregate passing through 20mm sieve and fine aggregate of river sand from a local supplier were used for the present study and their properties are given in Table II.

TABLE III. PROPERTIES OF AGGREGATES

Property	Coarse Aggregate	Fine Aggregate
Specific gravity	2.73	2.60
Fineness modulus	7.36	2.63
Bulk density	1533 kg/m ³	1254 kg/m ³

B. Alkaline solution

A mixture of Sodium hydroxide and Sodium Silicate was used as the alkaline solution in the present study. Commercial grade Sodium



Hydroxide in pellets form (97%-100% purity) and Sodium silicate solution having 7.5%-8.5% of Na₂O and 25% -28% and water of 67.5%-63.5% were used in the present study. The ratio of Sodium Silicate to Sodium Hydroxide was kept as 2.5. In this study the compressive strength of geo-polymer concrete is examined for the mix of 8M of NaOH solution. The molecular weight of NaOH is 40. For example to prepare 8M of NaOH solution 320g of NaOH flakes are weighed and they can be dissolved in distilled water to form 1 litre solution. For this, volumetric flask of 1 litre capacity is taken, NaOH flakes are added slowly to distilled water to prepare 1 litre solution.

In order to improve the workability of fresh concrete, high-range water-reducing naphthalene based super plasticizer was used. Extra water nearly 15% of binder is added to increase the workability of the concrete.

METHODOLOGY

C. Mixing, Casting and Curing

The mix proportions were taken as given in Table. III. As there are no code provisions for the mix design of geopolymers concrete, the density of geo-polymer concrete was assumed as 2400 Kg/m³ and other calculations were done based on the density of concrete [4]. The combined total volume occupied by the coarse and fine aggregates was assumed to be 77%. The alkaline liquid to binder ratio was taken as 0.40. GGBS was kept as the primary binder in which BRHA was replaced in 0, 10, 20 and 30% by weight. The normal mixing procedure was adopted. First, the fine aggregate, coarse aggregate and GGBS & BRHA were mixed in dry condition for 3-4 minutes and then the alkaline solution which is a combination of Sodium hydroxide and Sodium silicate solution with super-plasticizer was added to the dry mix. Then some extra water about 15% by weight of the binder was added to improve the workability. The mixing was continued for about



6-8 minutes. After the mixing, the concrete was placed in cube moulds of size 150mm X 150mm X 150mm by giving proper compaction. The GPC specimens were then placed in a hot air oven at a temperature of 60°C for 48 hours and then the specimens were taken out and cured under room temperature till the time of testing. The cubes were then tested at 3, 7 and 28 days from the day of casting.

TABLE IIII. MIX PROPORTIONS OF GEOPOLYMER CONCRETE

Materials	Mass(Kg/m ³)			
	Mix1 (0% RHA)	Mix2 (10% RHA)	Mix3 (20% RHA)	Mix4 (30% RHA)
GGBS	394	355	315	276
RHA	0	39	79	118
Coarse Aggregate	647	647	647	647
Fine Aggregate	1201	1201	1201	1201
Sodium Hydroxide	45	45	45	45
Sodium Silicate	113	113	113	113
Super Plasticizer	8	8	8	8
Extra Water (15%)	59	59	59	59

RESULTS AND DISCUSSION

The cubes were tested in the compressive testing machine to determine their compressive strength at the age of 3, 7 and 28 days from the day of casting. The Table IV and figure 1 shows the compressive strength variation with percentage replacement of BRHA. The table4 shows that



GGBS based geopolymer concrete attained compressive strength of 69 MPa. 10 % replacement of GGBS by RHA gives compressive strength of 58 MPa.

The figure1 shows that there is an increase in compressive strength if the curing time increases. The percentage of increase in strength is approximately 16 to 20 for the curing time of 3days to 28days. The percentage increase in strength from 3 to 28 days curing time is approximately 24% for mix1. The graph shows that the replacement of BRHA in GGBS based geopolymer concrete decreases the compressive strength. Because of the unburnt carbon content present in BRHA, decreases the compressive strength. The average 28 days compressive strength of mix2 and mix3 is decreases by 20% and 46% compared to mix1.

TABLE IVV. COMPRESSIVE STRENGTH TEST RESULTS

Mix	Compressive strength at 3 rd day(MPa)	Compressive strength at 7 th day(MPa)	Compressive strength at 28 th day(MPa)
Mix 1 (100% GGBS, 0% RHA)	55.9	60.5	69.2
Mix 2 (90% GGBS, 10% RHA)	48.6	54.3	57.46
Mix 3 (80% GGBS, 20% RHA)	40.75	44.72	47.36
Mix 4 (70% GGBS, 30% RHA)	20.8	23.54	27.36

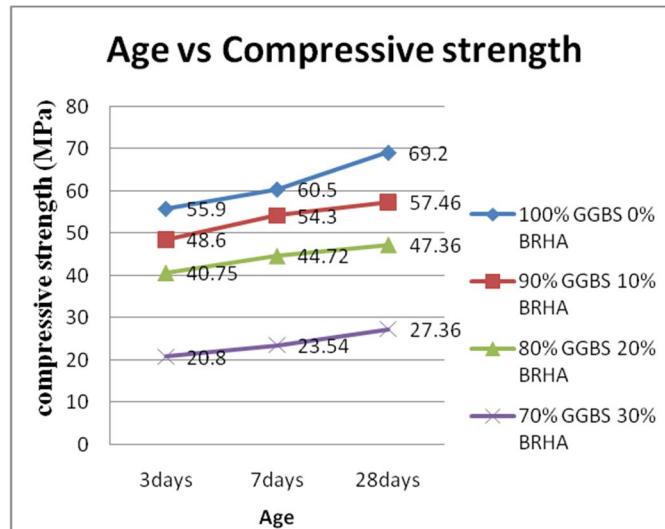


Fig.1 Variation of compressive strength at 3rd, 7th and 28th days with replacement of BRHA

Conclusions

From the limited experimental study conducted on the geopolymer concrete made with GGBS and BRHA, the following conclusions are made.

1. The GGBS based geopolymerconcrte gives higher strength.
2. The replacement of GGBS by BRHA decreases the compressive strength because of the unburnt carbon content.
3. The percentage replacement of BRHA in GGBS based geo-polymer concrete is significant only in 10%.
4. Due to the presence of high silica content in BRHA (94%) there is a fast chemical reaction occurred resulting quick setting of geo-polymer concrete.



5. In this study, the Si / Al ratio is not maintained due to low alumina content in the source materials resulting in lesser compressive strength .
6. I feel that GGBS with 10% of RHA will be well and eco friendly when compared with OPC

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VULNERABILITIES IN CREDIT CARD SECURITY

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I. INTRODUCTION

The reach of the Internet throughout the world is growing day by day and this development has led to the launch of a host of online services like Banking, online shopping, e-ticket booking etc. But almost all forms of services have an element of monetary transaction in them. The services which are mostly based on such online monetary transactions are banking and online shopping or e-commerce. These service providers collect and record a lot of information about their customers and clients especially their financial information like credit card number and in some cases Pin number apart from their name address and preferences. Hence it becomes imperative for these service providers to have a foolproof security mechanism to protect their customer data which they store .Failing to do which might expose such sensitive data to hackers and third parties who might misuse them for personal gain which not just affects the customer but may also erode their trust in the integrity of service providers , mostly highly vulnerable sites only have this problem. Hence this paper highlights some of the security loopholes found in payment gateways and securing customer data.

II. VULNERABILITY

A. Storage of customer data:

First, almost all highly vulnerable e-commerce sites collect and store customer information like their name, address, password, preferences, history of purchase and transaction, and in some cases even the credit



card number and its cvv number. They use these data for analyzing customer trends and to customize the online experience of the customer. Hence it becomes imperative for them to either have a foolproof mechanism to protect this data or avoid collecting such sensitive data.

B. Access of customer data:

The customer records and data stored on the website should be accessible by only the authorized personnel of the service provider and system administrator. It should be secured from unauthorized access by third parties or individuals. Above all the database information must be properly encrypted to prevent illegal elements from accessing such data

C. Vulnerability analysis tools:

A lot of open source and free cyber security and penetration testing tools are freely available in the internet. While the purpose of these tools is to detect and expose vulnerabilities and loopholes in the integrity of a system they can also be used by hackers to scan system and websites which are vulnerable and can be easily exploited. Hence service providers and e-commerce companies must periodically test and analyze their websites and systems for security loopholes and find ways to plug it. Such tools can also be used by hackers to perform credit fraud by stealing customer data from websites which they found to be vulnerable in their tests. So either the service provider had to do the integrity test else an hacker will save him the trouble.



D. Authentication mechanisms:

E. The authentication mechanisms employed by e-commerce sites for their customers also have some loopholes which can be exploited by a hacker once he gets access to sensitive customer data of the e-commerce website. Most of the prominent e-commerce sites do not verify whether the shipping and billing address are same when a customer places an order. This gives leeway to a hacker impersonating as a customer to get away with goods purchased with the customers id and credit card. A proper layer of authentication layers would be essential to prevent such frauds apart from securing customer data.

III. EXPLOITING THE VULNERABILITIES

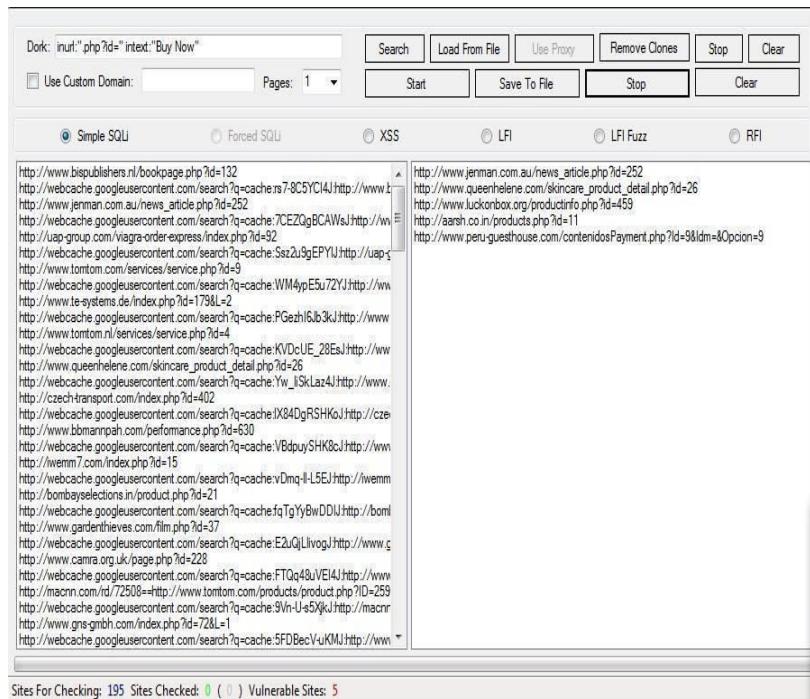
This section will explain how a combined exploitation of the mentioned vulnerabilities can be used to gain access of customer data stored on e-commerce sites and how they can be exploited for the personal gain of the hacker.

F. Scanning for vulnerabilities:

- First a hacker will scan for vulnerable e-commerce sites with a free security tool called ****dork scanner.*This tool is a simple python script which returns websites which include a specified keyword in their url like buy_now, add_to_cart, PayPal etc.
- The hacker enters keywords related to payments like add_to_cart, payment, PayPal, buy_now which are found in the url of payment pages of e-commerce websites as input to Dork scanner.
- The Dork scanner scans the web for websites having the keywords and returns a list of websites having them.
- From the given list of sites the hacker filters a list of sites having a particular kind of vulnerability like SQL injection and XSS



- After selecting a vulnerable site SQL map python tool is used to retrieve tables from the website database which store customer financial data for reference.
- In case of highly vulnerable sites these tables containing keywords like payment are retrieved along with the data stored in them.
- Some of these tables display the last four digits of a credit card and incase of least protected websites they display all the numbers.



How hackers get the info's :

- After scanning the websites , highly vulnerable sites will be targeted . we would need to attack the database of the website using sql injection or XSS ..



- we would need to find the length of the database
- after getting the database , we should find the tables in the database in each table we should scan the columns
- in all shopping websites we can see this example: TOTAL ORDERS, CUST_DETAILS ,CUST PAYMENTS, CUST EMAILS
- if its highly vulnerable we can see the payment methods and we can retrieve all the information's of the credit cards details and the address of the owner
- all these things are applicable only to highly vulnerable shopping sites ..in these days mostly many websites record all info's like CVV and all that ..

So these websites are always vulnerable if we need full cc information we can upload a shell on website and if we get the cpanel full cc info will be there..even many websites directly displaying full cc number..

Encryption is very much essential and sql databases should be tested

<u>id</u>	<u>user_id</u>	<u>date</u>	<u>exp</u>	<u>cc</u>	<u>cc_type</u>	<u>b_addr</u>	<u>s_addr</u>	<u>ip_aut...</u>	<u>cardhol...</u>	<u>ip_ord...</u>	<u>ip_trac...</u>	<u>shippin...</u>
23	10048	108728...	6405	6405	0	Info not...	28701...	00cf5e7...	James L...	0		
25	3577	108736...	02/06	9357	0	Info not...	P O Box...	00d0b6...	Steve L...	0		
28	8449	108745...	11/06	1848	0	Info not...	1884 Gl...	00d1fef...	Brad Sh...	0		
26	10232	108745...	05/06	1006	0	Info not...	rt 2249...	00d1ec...	daniel b...	0		
27	10242	108745...	12/05	1868	0	Info not...	2214 Fl...	00d1f4...	Vincent...	0		
29	10178	108754...	03/06	2994	0	Info not...	12120 ...	00d2e8...	Kevin D ...	22		
30	9624	108762...	07/04	1790	0	Info not...	38 kings...	00d46b...	william r...	0		
31	5958	108771...	02/06	7611	0	Info not...	1138 D...	00d5b4...	Paul Ho...	0		
32	10245	108788...	10/05	1003	0	Info not...	2520 Ea...	00d82e...	John Ta...	0		
33	8440	108700...	11/06	1040	0	Info not...	1004 M...	00d00e...	Danish...	n		

Clear list on get



G. *Exploiting authentication mechanism :*

After obtaining customer financial data including his/her login id and password and credit card number ...the hacker can use it to impersonate the customer and place orders online. Since most of the websites do not check whether the billing and shipping address are the same it forms a loophole for the hacker to exploit ...its applicable to great websites The hacker after extracting the customer data will know where the customer is from and what his preferences are.

- He will then get a VPN connection or remote desktop of that location and then place orders on the website.
- the hacker can match credit card location and vpn location , so that it would easy for him to purchase
- the hacker clear all his cookies and remove all blacklisted ip and so that he can get a fresh vpn so match this
- this methodology is used to bypass any website and many websites cant able to find this

so this illegal access should be fixed

Some Common Loop holes in storing the data :

- Highly secure websites will not store the credit card information of the customer after the transaction but vulnerable sites will store the credit card data even after transaction.
- The stored data in these sites is not secure as most of them are not encrypted.

. Loop holes in payment gateways:

- even good shopping websites cannot find unauthorized transactions ... payment gateways failed to authorize the ip address of the person who is been involved in placing the order



and the location of the credit card. payment gateways not having enough security to verify authorize illegal ip address ..

Loop holes in payment gateway ssl:

- some times hacker's normally use vpn to bypass the website ..many websites are not finding the untrusted connection's , ssl verification is not that much secure so hacker's tend to use vpn to bypass it ..
- all the websites should have good ssl verification to stop illegal ip access and also it should have good certificate verification

IV. PREVENTIVE SECURITY MEASURES

These security loopholes can be plugged by various security mechanisms.

H. Encryption of user records:

The e-commerce websites which store customer data and financial records must encrypt all data in their database to prevent unauthorized use of these sensitive data. Several free and strong open source encryption tools are easily available. Encrypted data is hard to decrypt without proper authentication key and would require huge computing resources. This technique would render the data unusable even after it is retrieved in an unauthorized way.

I. Avoid storing credit card information

The e-commerce websites must avoid retaining sensitive financial information about the customer. ..the website should not save cvv number's and also once they are directed to payment gateways the cvv number should be encrypted even to the website ,and then directed to the bank authentication ..



J. Authentication mechanism to fix loop holes in payment gateways :

The e-commerce websites must have a proper authentication mechanism to make sure whether the order is placed by the original customer and not by an impersonator.

- first it should check whether the billing address matching the credit card address
- if it matches then it should verify its billing phone number with the bank details
- verification of ip should be strong , it should have good ssl certification to check the trusted connection
- after this it should verify the card ip address when it was first accessed and the user ip who is placing the order
- dynamic ip address can be noted and matching of dynamic range is possible to identify illegal access
- suppose if the user is placing an order from some other location , then the website should give the authentication code to user and then the user should contact the bank to process the order
- banking websites should maintain credit card ip's when it was first used
- payment gateways should be built with open source coding like python so that the untrusted and encrypted ip's can be verified..

Basic algorithm :

if user enter's the website and processed for checkout and entering his card information

then



website payment gateway should verify trusted connection to find illegal ip access

if yes

then

website should check credit card first accessed ip location dynamic range of ip address can be possible and it should match the location of the user who is been placing the order (basic authentication)

;\\ if the credit card is from new york , the user ip should be near by to its state location"//

else transaction should declined

if

the user is placing the order from some other country with his own card

then

authentication code from shopping website to the bank is supplied

finding high encrypted vpn or scoks5:

def ipEntered():

global ipEntered

ipEntered = input (" please enter the ip'"):

"""" get the ip address from the user who is been ordering in the website""""""

if



```

ipEntered .match (dynamic.socketsauth())    #“ illegal ip
access”#
then
print “ failed”
else
ip.sucess
if
ipEntered.match
a = s.split(')
match.credit card details
return True
else
payment.failed
its not a brief coding , its a basic authentication for the
payments gateways , if the websites fix some open source coding
to verify untrusted connection and also to match ip ..illegal
access can be reduced
  
```

Comparing with existing payment gateways :

- existing system mainly use php or asp to create payment gateways , mainly php websites are vulnerable to cross site scripting attack and also the server reply is not fully secured
- existing system doesn't have good verification method to find illegal ip's
- existing system using just normal php code to accept the card details



- after accepting , the payment would be fulfilled

New solution:

- every payment gateways should be tested , all anonymous proxy's should be verified
- all ip's should be back listed to avoid illegal access
- all banking websites should maintain the database ,
- the database should contain dynamic matching of ip address of the credit card when it was first accessed
- if the user placing an order from different location then website should provide authentication code to process the order
- tor browser anonymity should be cleared
- mostly all user's use credit card's from own location then this method would be very useful
- authentication code for different location user's should be automated
- python should be integrated with database for easy access
- trusted and secured ssl should be used to avoid man in the middle attack
- all websites payment's and ip address of the order should be verified with database records of the bank
- even if the hacker uses high encrypted vpn the exact location will not acquired , if it also matches then the ip authentication with bank database can find this illegal access
- verifying the ip range with bank database and then websites orders would be fulfilled



Conclusion:

Thus if we maintain good encrypted records and good payment gateway with trusted ssl connection then the illegal access will be stopped

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HEURISTICS TO DETECT AND EXTRACT LICENSE PLATES

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I. INTRODUCTION

A license plate is the unique identification of a vehicle . The basic issues in real-time license plate recognition are the accuracy and the recognition speed. License Plate Recognition (LPR) has been applied in numerous applications such as automatically identifying vehicles in parking slots , access control in a restricted area and detecting and verifying stolen vehicles. Till now, there have been some well-known commercially operational LPR systems around the world. It is assumed that these systems work under some given constraints and the cameras are mounted at fixed locations without mobility. LPR systems consist of three major components: license plate detection, character extraction and character recognition.

License Plate detection is the first important stage of an LPR system. Quality of algorithms used in a license plate detector determines the speed and accuracy of the license plate detection. In this paper the distance between the camera and the car is kept approximately constant. For license plate detection purpose the concept of edge detection [5,9], contour determination and bounding box formation and elimination is used. Selection of license plate areas (LPA) and their elimination to obtain the actual license plate area was



based on various heuristics. This stage is important since improper detection of license plate can lead to misrecognized characters.

Character Extraction or character segmentation is the second component of our LPR system. It takes a properly segmented license plate as an input. Some preprocessing is done on the license plate image for the noise removal. A number of morphological operators are used on the image for this purpose and the noise free output image is sent for character segmentation. Image binarization and image projections are used for character extraction.

The extracted characters are then input to the OCR for recognition.

The rest of the paper is organized as follows. In Section II we briefly describe the Related Works in this field. In Section III we give an overview of our approach followed by some Examples and Testing in Section IV. Results of our experiments along with its discussion are demonstrated in Section V. Finally we conclude this paper in Section VI followed by references in the end.

II. RELATED WORK

Extensive research has been done in the area of License Plate Recognition since its invention in the year 1976 at the Police Scientific Development Branch in the UK. This is an interesting topic in the field of recent research attracting several papers from researchers around the world. Here we mention some of the relevant works in this section.

Some important concepts relevant to the LP detection approaches are mentioned. Processing of boundary lines, from a gradient filter, and an edge image is discussed [10]. This edge image is thresholded and then processed with Hough Transform (HT), to detect lines. Eventually, couples of two parallel lines were considered as plate-candidates. However, boundary line detection is not suitable in the case of not finding horizontal pairs. It may also happen that the image boundary line may be absent or not detected properly due to noise and uneven brightness. In addition to this, HT is inherently a heavy



computation task. The color and textures of the LP have also been used to identify it [11], but they seem to be inefficient, especially when the system has got plates of different colors and sign patterns. Other common approaches involved are Top Hat and Bottom Hat filtering (highlights the black-white transitions) [12] and Binary Morphology algorithm (like Otsu's method) [13]. But all these algorithms rely on color information and special signs.

Many common algorithms for Character Segmentation such as direct segmentation [14], projection and cluster analysis [15] and template matching are present.[16].

III. PROPOSED WORK

We describe here our approach where we take up direct techniques from the essential image processing to obtain the candidate areas and subsequently apply domain heuristics to obtain the LPR. The relevant methods used in our LPR are implemented in OpenCV using some predefined functions which are mentioned in braces.

A. License Plate Detection

In this stage we locate and isolate the license plate region from the given image. Quality of the image plays an important part hence prior to this stage preprocessing of the image is necessary. Preprocessing of the image includes conversion of

erosion and dilation are applied on the LP image. Dilation causes the bright pixels within a region to grow and erosion is the converse operation. Dilation tends to smooth concavities and erosion tends to smooth away protrusions in the image which enhances its quality and makes it noise free. After this step the output image is thresholded to enhance the numerals and characters present in the image, characters are light shaded like white over a darker background like black. Now character segmentation is carried out and the approach used is Vertical Image Projection [6,8]. Boundaries from the noise-free license plate image are removed (im clear border) before applying vertical projection



histogram in order to threshold the histogram bin value to zero. The coordinates where the histogram b in value is zero are stored. The boundary of each character in the license plate image are formed by these co-ordinates. They are cropped subsequently using the concept of ROI (Region of Interest) [2].

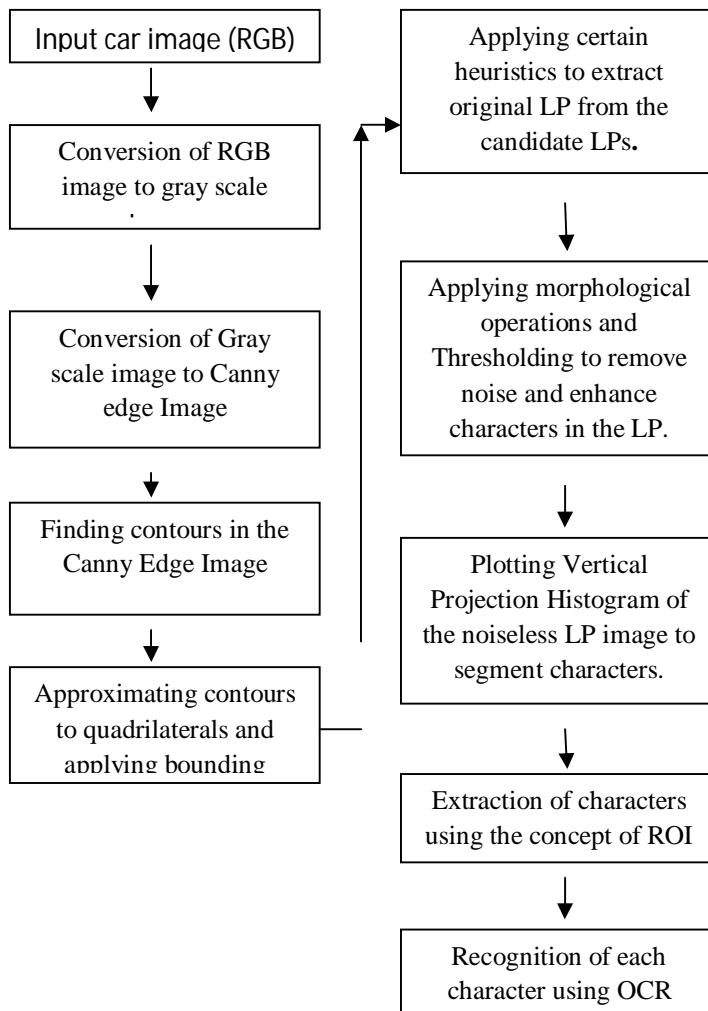


FIGURE 1. BLOCK DIAGRAM OF OUR LPR SYSTEM

IV. EXAMPLES AND TESTING

Experiments were performed to test the accuracy of the proposed heuristic algorithm. In this paper our sample space for experiments included a variety of test images containing license plates made in India, foreign license plates in addition with some of our own snapshots of cars. Our algorithm was converted into a CPP-program which was run on CodeBlocks environment configured with OpenCV. We have shown two examples on the next page. Input image 1 is of an Indian LP taken by our own camera (14 MegaPixel, Sony Cybershot, DSC-H55 Optical zoom m 10x). Input Image 2 is of an international LP taken from the internet.



Figure 2. Input Image 1



Figure 3. Image showing all possible Bounding Boxes

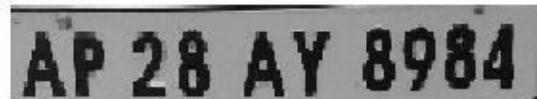


Figure 4. Extracted License Plate

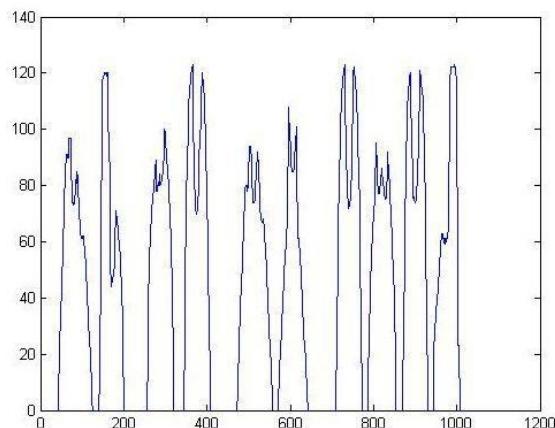


Figure 5. VP Histogram of noiseless LP image



Figure 6. Segment LP showing character boundaries



Figure 7. Extracted Characters



Figure 8. Input Image 2



Figure 9. Image showing all possible Bounding Boxes



Figure 10. Extracted License Plate

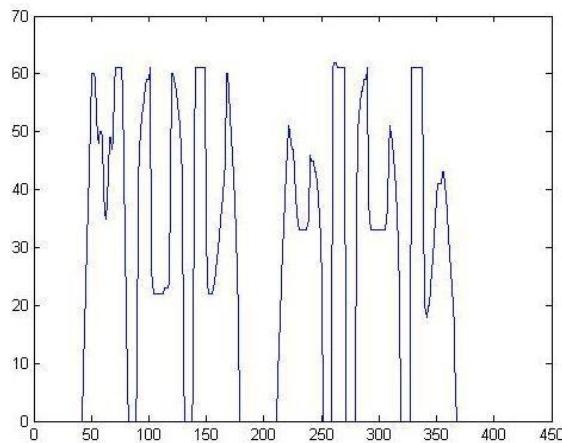


Figure 11. VP Histogram of noiseless LP image



Figure 12. Segmented LP showing character boundaries



Figure 13. Extracted Characters

V. RESULTS AND DISCUSSIONS

After running the program on various test images we obtained properly segmented characters of the LP in 80% cases. The license plate detection approach presented in Section III was used to obtain license plate images. Total 250 different license plate images were included in the experiment. All candidate images are processed in one format, i.e. light colored characters on a darker background. The



binary enhanced license plate character images obtained from our proposed method were sent to the OCR for recognition. It is shown that accuracy is 83% for the extraction of the license plate region, 93% for the segmentation of characters and 90% for OCR. The overall algorithm accuracy combining detection and extraction is 88%.

Type of LP Image	Success Rate in LP extraction	Success Rate in Character segmentation	Success Rate of OCR
Indian LP Images	82	93	90
International LP Images	88	93	92
LP Images taken by own camera	78	91	89

VI. CONCLUSION

In this paper we have proposed a heuristic method to segment a license plate from an image. The algorithm used in this paper not only accelerates the process but also increases the probability of detecting the license plate and extraction of characters, under certain set of constraints. The process is successful through the steps of character width estimation, vertical height estimation, and segmentation of license plate into blocks and identification of these character blocks.

Various well known techniques were used to come out with a final algorithm. The results show high accuracy of non-character area removal and thus better recognition of characters after their segmentation. Finally the percentage accuracy for the entire process came to 88%. Our proposed approach is under improvement and its accuracy will be increased by using more sophisticated approaches.

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A NOVEL SCHEDULING ALGORITHMS FOR MIMO BASED WIRELESS NETWORKS

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1. Introduction

Multi antenna system has been researched intensively in recent years due to their potential, to increase the channel capacity in fading channel. It is shown that MIMO systems can support higher data rates under same transmit power and BER performance requirements. Such system finds wide applications in WLAN networks. The conventional collision avoidance (CSMA/CA) approach described in the 802.11 standard [9] makes use of control messages (RTS/CTS) to mitigate the hidden terminal problem, thus preventing collisions that would result in loss of data and waste of resources. In a MIMO wireless network, however, this is not always the best solution. Specifically, the receiver structure is able to separate incoming PDUs, which would then not result in a collision, but could instead be detected separately. The networking protocols may then choose how many and which channels to estimate, taking into account that the limited receiver capabilities allow locking onto at most N sequences simultaneously. While doing this, trying to detect too many destinations oriented data packets could leave limited resources for interference cancellation, leading to data loss. Even with channel estimation and spatial de-multiplexing, the MIMO receiver itself is still vulnerable to "hidden terminals" in some



sense: if the receiver is not aware of interfering nodes nearby, it cannot estimate their channel and cancel them.

Hence in this paper we propose different scheduling algorithm in which the awareness about interference has been incorporated. The receiver node first schedule all the requests contained in every correctly decoded RTS packet send by many senders for performance improvements. By enabling proper scheduling in the Medium Access Control layer (MAC), the system level performance has been improved by canceling the interference in Priority scheduling which we have proposed in MAC layer. Also we have analyzed the data rates and interference cancellation capability for the different scheduling policy which we have proposed in the MAC layer on RTS/CTS packets.

This paper has been organized as follows:

In the next three sections, the theory about System Model, MAC layer Scheduling, Class and MAC layer policies has been described. The simulation results, using MATLAB, have been included in Section-5. Comparisons of the different MAC layer scheduling using the simulation results, and related discussions have also been included in the same sections.

2. System Model

Traditionally, the growing demand of capacity has been met by increasing the bandwidth and/or by inventing more spectrally efficient communication protocols. However, since the introduction at Bell Labs about 10 years ago, the concept of MIMO (Multiple Input Multiple Output) shown in figure 1 has received an increasing attention. The main observation is that if both the transmitter and the receiver are equipped with n antennas, the capacity (bit rate) can be increased by up to a factor of ' n ', depending on the richness of the wireless channel. In principle, one can form ' n ' parallel channels, which can transmit independently of one another. In general, this is not possible for line-of-



sight (LOS) channels, since the multiple channels cannot be independent and will therefore interfere. However, in a rich scattering environment, the capacity can increase by a factor up to 'n'. The transmission of data in parallel streams is usually referred to as spatial multiplexing.

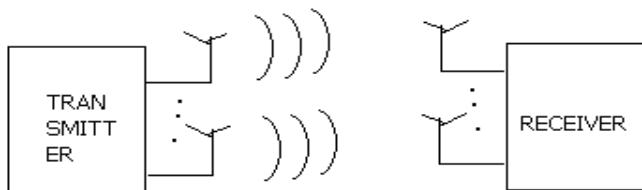


Fig. 1 MIMO SYSTEM

Many detection algorithms have been proposed in order to exploit the high spectral capacity offered by MIMO channels. One of them is the V-BLAST (Vertical Bell-Labs Layered Space-Time) algorithm which uses a layered structure. This algorithm offers highly better error performance than conventional linear receivers and still has low complexity.

2.1. Proposed System Model

In the system being implemented the MAC layer takes decisions based on received power levels. Hence there is a need for scheduling in the MAC layer for performance improvements.

2.1.1. Transmitting Nodes-- Any node splits the transmit data into sub-packets called Packet Data Units or PDUs. We suppose ' u_j ' PDUs are sent through spatial multiplexing i.e., ' u_j ' antennas, one per PDU, where 'j' is the node index. Power of the i^{th} antenna, given that it belongs to user 'j' is given as P_{tot}/u_j , the maximum total power of any node is constrained to P_{tot} .



2.1.2. Receiving Nodes-- Any receiver, say node ' j ', uses all its available antennas N_A . Thus, the received signal can be denoted using the N_A -length column vector

$$\mathbf{r}^{(j)} = \hat{\mathbf{H}}^{(j)} \mathbf{s}' + \mathbf{v}^{(j)}$$

Here $\mathbf{v}^{(j)}$ represents channel noise, and $\hat{\mathbf{H}}^{(j)}$ is the $N_A \times U$ channel gain matrix. Under a Rayleigh fading assumption, $\hat{\mathbf{H}}^{(j)}$, ' m ' is a circularly Gaussian complex random variable, including fading gain and path loss between the m^{th} transmit and the n^{th} receive antenna. We assume that the nodes' channel knowledge is limited, i.e. at most N_{Smax} channels related to as many transmit antennas can be estimated at the beginning of each reception. The set $N^{(j)} = \{n_1, \dots, n_{N_{\text{Smax}}}\}$ contains the indices of such *known antennas* (KAs), for which we assume perfect channel estimation.

2.1.3 The Blast Receiver (Zero Forcing Algorithms with Optimal Ordering) – We take a discrete-time baseband view of the detection process for a single transmitted vector symbol, assuming symbol-synchronous receiver sampling and ideal timing. Letting $\mathbf{a} = (a_1, a_2, \dots, a_M)^T$ denote the vector of transmit symbols, then the corresponding received N vector is

$$\mathbf{r}_1 = \mathbf{H}\mathbf{a} + \mathbf{v} (1)$$

Here \mathbf{v} is a noise vector. One way to perform detection for this system is by using linear combinational nulling. Conceptually, each sub-stream in turn is considered to be the desired signal, and the remaining are considered as "interferers". Nulling is performed by linearly weighting the received signals so as to satisfy some performance-related criterion, such as Zero-Forcing (ZF). When symbol cancellation is used, the order in which the components of \mathbf{a} are detected becomes important to the overall performance of the system. We first discuss the general detection procedure with respect to an arbitrary ordering.



Let the ordered set

$$S \equiv \{k_1, k_2, \dots, k_M\} \quad \dots\dots(1)$$

be a permutation of the integers 1, 2, ..., M specifying the order in which components of the transmitted symbol vector \mathbf{a} are extracted. The detection process proceeds generally as follows:

Step 1: Using nulling vector \mathbf{w}_{k1} , form decision statistic y_{k1} :

$$y_{k1} = \mathbf{w}_{k1}^T \mathbf{r}_1 \quad \dots\dots(2)$$

Step 2: Slice y_{k1} to obtain \hat{a}_{k1} :

$$\hat{a}_{k1} = Q(y_{k1}) \quad \dots\dots(3)$$

Here $Q(\cdot)$ denotes the quantization (slicing) operation appropriate to the constellation in use.

Step 3: Assuming that $\hat{a}_{k1} = a_{k1}$, cancel a_{k1} from the received vector \mathbf{r}_1 , resulting in modified received vector \mathbf{r}_2 :

$$\mathbf{r}_2 = \mathbf{r}_1 - \hat{a}_{k1} (\mathbf{H})_{k1} \quad \dots\dots(4)$$

Here $(\mathbf{H})_{k1}$ denotes the $k1$ -th column of \mathbf{H} .

Steps 1 -3 are then performed for components k_2, \dots, k_M by operating in turn on the progression of modified received vectors $\mathbf{r}_2, \mathbf{r}_3, \dots, \mathbf{r}_M$. The specifics of the detection process depend on the criterion chosen to compute the nulling vectors \mathbf{w}_{ki} , the most common of these being ZF.

The ki^{th} ZF-nulling vector is defined as the unique minimum norm vector satisfying

$$\begin{aligned} \mathbf{W}_k^T \mathbf{i}(\mathbf{H})_{kj} &= 0 \quad j \geq i \\ 1 \quad j = i \end{aligned} \quad \dots\dots(5)$$

Thus, \mathbf{w}_{ki} is orthogonal to the subspace spanned by the contributions to \mathbf{r}_i due to those symbols not yet estimated and



cancelled. It is not difficult to show that the unique vector satisfying (5) is just the k^{th} row of $\mathbf{H}_{ki} - 1$ where the notation \mathbf{H}_{ki} denotes the matrix obtained by zeroing columns k_1, k_2, \dots, k_i of \mathbf{H} and $+^\dagger$ denotes the Moore-Penrose pseudo inverse.

3. MAC Layer Scheduling

A well-designed MAC protocol can offer much help to solve the channel estimation problem. In designing such a protocol, the concurrent channel access typically found in ad hoc networks can be exploited, instead of being suppressed. Collision avoidance schemes, such as 802.11, try to avoid concurrency by blocking the nodes that receive an RTS or CTS. Instead of blocking, simultaneous transmissions have to be encouraged. It is also desirable to make the receivers aware of potential interferers, and to exploit the spatial demultiplexing capabilities of MIMO processing. To this aim, an assessment of the receiver performance when receiving data PDUs and signaling packets has to be done.

Figure 2 shows the MIMO system with scheduler. Here priority based scheduling, Partially Fair Scheduling with and without interference cancellation is proposed. In Priority scheduling, the scheduler receives many RTS packets and schedule according to the priority namely destination oriented (D) packets and non destination oriented (ND) packets. The Performance of all kind of scheduling is analyzed in the section IV.

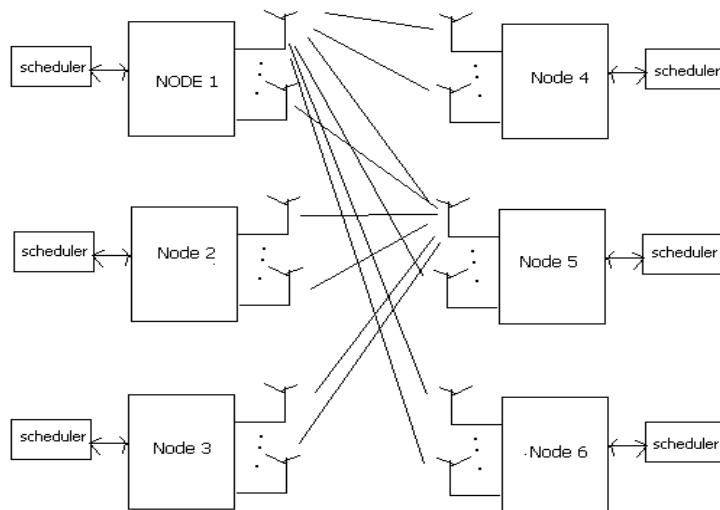


Fig2. MIMO with Scheduler

3.1 MAC Layer Design

We have framed communication structure, with four phases. For this scheme to work correctly, all nodes have to share the same frame synchronization. These phases are designed according to the standard sequence of messages in a collision avoidance mechanism, and are summarized as follows.

3.1.1 RTS phase—In this phase, all senders look into their backlog queue, and if it is not empty they compose transmission requests and pack them into a single RTS message. Each packet in the queue is split into multiple PDUs of fixed length, such that each PDU can be transmitted through one antenna. For this reason, any request has to specify the number of PDUs to be sent simultaneously, in addition to the intended destination node. Any RTS may contain several such requests. Moreover, an RTS is always sent with one antenna and at full power.

3.1.2 CTS phase—During the RTS phase, all nodes that were not transmitters themselves receive multiple simultaneous RTSSs, and apply



the reception algorithm as described in the previous section, to separate and decode them. In the CTS phase, when responding to the correctly received RTSs, nodes have to account for the need to both receive intended traffic (thus increasing throughput) and protect it from interfering PDUs (thus improving reliability). The constraint in this tradeoff is the maximum number of trackable channels, *i.e.*, the maximum number of training sequences a node can lock onto. CTSs are also sent out using one antenna and at full power.

3.1.3 DATA phase—All transmitters receive superimposed CTSs and, after BLAST detection, they follow CTS indications and send their PDUs. Each PDU has a fixed predefined length and is transmitted through one antenna, but a node can send multiple PDUs simultaneously, possibly to different receivers.

3.1.4 ACK phase—After detection, all receivers evaluate which PDUs have been correctly received, compose a cumulative PDU-wise ACK, and send it back to the transmitters. After this last phase, the data handshake exchange is complete, the current frame ends and the next is started. This corresponds to the implementation of a Selective Repeat Automatic Repeat reQuest (SR-ARQ) protocol, where PDUs are individually acknowledged and, if necessary, retransmitted.

Before going more deeply into CTS policy definition, it should be noted that a random back off is needed for nodes that do not receive a CTS, as otherwise persistent attempts may lead the system into deadlock. Here, a standard exponential back off is used. Accordingly, before transmitting, nodes wait for a random number of frames, uniformly distributed in the interval $[1, BW(i)]$, where i tracks the current attempt, and $BW(i) = 2i - 1W$, with W a fixed back off window parameter. An accurate study of the effects of different back off strategies can be found in [12].



4. Class and MAC Layer Policies

Class is a new concept that limits the maximum number of antennas that a transmitter can use while transmitting to a particular receiver. There exists a tight relationship between the number of used antennas (thus, bit rate) and the average received power, thus the maximum coverage distance affordable.

4.1 Class

The maximum number of antennas as related to the distance of a node is called the "class" of the node. For any transmitter, the total power allocated for a single instance of transmission is a constant quantity, say for example 100 W. As the number of transmit antennas increase, this power is divided equally among the same i.e. 2 transmit antennas implies 50 W through each, 4 transmit antennas implies 25 W through each and 10 transmit antennas implies 10 W through each.

Now based on the location of the receiver, it is an obvious conclusion that as the distance between the transmitter and the receiver increases, the power necessary to ensure successful reception with good signal quality, increases and hence the CLASS of the receiver with respect to that particular transmitter decreases. In order to calculate the class of different nodes with respect to each other, assuming free space propagation losses only, the free space path loss model is used to account for the power loss. By setting a minimum threshold of necessary received power for satisfactory signal quality, the maximum number of transmit antennas permissible is calculated.

In simple terms, the maximum number of antennas permissible (I) is inversely proportional to the distance between the transmitter and the receiver. Looking at a multiple receiver context as in MIMO, where the transmitter could send data to many neighbours at once, the concept of class can be a very useful tool to ensure a satisfactory amount of quality along with the maximum data rate. Together with



this concept of class and a modified set of RTS and CTS policies, an increase in performance levels may be made, by making best use of the available spatial diversity due to MIMO.

4.2 MAC Layer Policies

The traditional collision avoidance approach makes use of control signals (RTS/CTS) in order to avoid collisions by ensuring only one transmission at every time slot. But when MIMO is used at the physical layer, multiple transmissions can be supported simultaneously with the use of a modified RTS and CTS policy.

4.2.1 RTS – In this RTS policy, parallelism and allow simultaneous transmissions have been encouraged. Here, RTS/CTS messages are used for traffic load estimation rather than blocking simultaneous transmissions. Since signalling packets are shorter and transmitted with a single antenna at full power, they are expected to be detectable in large quantities without significant errors.

In the modified policy, the concept of class has been integrated along with RTS messages of the traditional 802.11 to create a new RTS policy. The algorithm recursively checks the sender end queue, which holds the receiver ID, the number of PDU's to be transmitted and the class of the receiver with respect to the particular transmitter, for each intended transmission. Based on the class of the receiver, the algorithm successively includes requests to various receivers in the same RTS packet. Each RTS packet includes as many requests for PDU's as the minimum class of those receivers included in that packet.

Two modifications in the RTS packaging that would result in performance improvements are as follows.

1. The queue is scheduled (reordered) with all the requests with higher class at the front end, so the number of simultaneous requests is large. This ensures best utilization of the available



antenna resources. This also implies that the number of RTS packets itself reduce thereby providing further power saving.

2. The FIFO queue that was assumed in the original policy could result in starvation to a particular node, if its distance from the transmitter is particularly large and hence, its class is minimum. Hence priorities may be assigned to all the neighbours of a node and in case of a node being bypassed once, its priority comes into picture and has to be included in the next round of RTS packaging.

4.2.2 CTS – In collision avoidance schemes like 802.11, concurrency is avoided by blocking the nodes other than one sender and transmitter pair. In contrast to this, in the following CTS policy, simultaneous transmissions are encouraged. At the same time, the receivers should also be warned of potential interferers and should be capable of exploiting the spatial de multiplexing capabilities of the MIMO system. A receiver node can receive multiple RTS packets, each of which can contain multiple requests. Each request in turn comprises of the receiver id and the number of PDUs requested to be sent. Against this background, the receiver node first sorts all the requests contained in every correctly decoded RTS packet in the order of decreasing received power, and divides them into two subsets depending on the receiver ID mentioned in the request, namely Destination oriented ‘D’ (containing the requests meant for itself) and non Destination oriented ‘ND’ (containing all remaining requests). If a request by node x implies the transmission of, say, y PDUs, the receiver has to account for channel estimation resources that will be needed for all the y PDU transmissions. Since the maximum number of simultaneous PDUs that can be tracked by a receive antenna is limited to, say, $N_s\max$, each time a transmission is granted, the number of available tracking resources is decreased by y. This is done until there are no more resources left. This process of granting resources involves a tradeoff between the number of simultaneous transmissions that it allows to itself and the amount of



interference from transmission by other nodes that it cancels. There are four different CTS policies here:

- ***Priority Scheduling Without Interference Cancellation (PS-WIC):***

Do the following steps till end of D.

- Read source S_i and number of PDUs P_i for the packet with index i
- Insert grant (S_i, P_i) in the CTS.
- $N_s = N_s - P_i$
- If for any i , $N_s < P_i$, allot $N_s - P_i$ PDUs for the particular request.
- If $N_s = 0$, STOP

- ***Partially Fairness Scheduling(PFS):***

Do the following steps till $N_s = 0$

- $i = D(1)$. (Insert the first request in the destination oriented list in the CTS)
- Read source S_i and number of PDUs P_i for the packet with index i
- Insert grant (S_i, P_i) in the CTS.
- $N_s = N_s - P_i$
- $queue = queue - i$
- Let k be the request with highest power in the queue $\in D \setminus D$
- If $k \in D$ then
 - Insert grant (S_i, P_i) in the CTS.



- Else store in interference cancellation list
- Endif
- Stop
- Using resources allotted accept incoming packets and cancel interference from other exchanges.

- ***Priority Scheduling (PS):***

Do the following steps till $N_s=0$

- Start with request in D
- Read source S_i and number of PDUs P_i for the packet with index i.
- Insert grant (S_i, P_i) in the CTS.
- $N_s = N_s - P_i$
- If for any i , $N_s < P_i$, allot $N_s - P_i$ PDUs for the particular request.
- After all the requests in D are exhausted, if $N_s > 0$, Do the following steps for ND
- Read S_i of the non destination oriented request and the number of PDUs P_i .
- If $P_i < N_s$, add (S_i, P_i) to interference cancellation list
- $N_s = N_s - P_i$
- Stop
- Using resources allotted accept incoming packets and cancel interference from other exchanges

- ***Partially Fairness Scheduling Without Interference Cancellation (PFS-WIC):***

Do the following steps till $N_s=0$



- $i = D(1)$. (Insert the first request in the destination oriented list in the CTS)
- Read source S_i and number of PDUs P_i for the packet with index i
- Insert grant (S_i, P_i) in the CTS.
- $N_s = N_s - P_i$
- $\text{queue} = \text{queue} - i$
- Let k be the request with highest power in the queue $\in D \setminus ND$
- If $k \in D$ then
 - Insert grant (S_i, P_i) in the CTS.
 - Else store in interference cancellation list
 - Endif
- Stop
- Using resources allotted accept incoming packets.

In real time networks, only Partially Fairness Scheduling (PFS) and Priority Scheduling (PS) are practical for use, since the other two do not provide any interference cancellation. Between PFS and PS, choice is made depending on which of the two performance parameters, SNR and throughput, is critical to the network under consideration.

5. Simulation Results and Discussions

In order to evaluate the performance of these RTS/CTS policies specifically designed for MIMO-VBLAST physical layer, 4 nodes, each with 10 antennas, are deployed. The 4 nodes are assigned varying coordinates, thereby simulating a mobile topology. The assumption made is that condition of frame synchronization holds throughout the simulation. Traffic is generated according to a Poisson process at the

rate of Λ packets per second per node. Each generated packet has 'k' 1000-bit long PDUs, where 'k' is a whole number. This specific configuration is tested because; all nodes are within coverage range of each other. This is a demanding scenario in terms of interference, required resources and efficient protocol design. All the simulations have been made using MATLAB codes. Transmissions follow the MAC protocol, as described in the previous section.

5.1 MIMO Performance

A comparison is made between the capacity of a Single Input Single Output and Multiple Input Multiple Output systems for specific Eb/No values. Capacity is measured in bits per second per hertz (bps/Hz) of the given frequency and Eb/No is measured in Decibels (dB). From figure 3, it is observed that the capacity of the MIMO system is higher than the SISO system for every value of Eb/No. Shannon's capacity theorem is used for the capacity calculation. Thus, performance of MIMO is found to be much better than the performance of SISO for every value of Eb/No. In fact, the capacity increases 'N' fold for MIMO, where 'N' is related to the number of transmitting and receiving antenna.

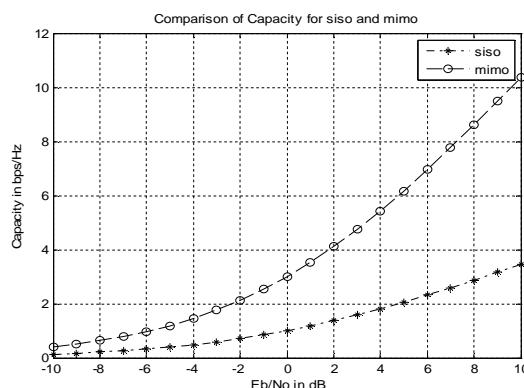


Figure 3: MIMO performance



5.2 V-Blast Performance

To simulate the performance of the BLAST physical layer, V-BLAST algorithm with optimal ordering has been used for a codebook of a specified length. Optimal ordering of received signals in the descending order of power ensures that signal decoding is of better quality. In this paper, the spatial multiplexing technique has been implemented using V-BLAST in the physical layer.

5.2.1 Transmitter Diversity -- Figure 4 shows an insight into the performance of the system. Here, the Bit Error Rate (BER) vs. SNR values has been plotted for a system having 12 receivers and varying number of transmitters. It can be seen that for the same value of SNR, in every case, the system with fewer antennas is found to have a better BER performance i.e. have a lesser Bit Error Rate than systems with more number of transmitters. This is because as the number of transmitters increase, there is more interference caused at the receiver side due to other unwanted transmissions (transmissions not addressed for the receiver). This causes degradation in the performance, as shown in the graph.

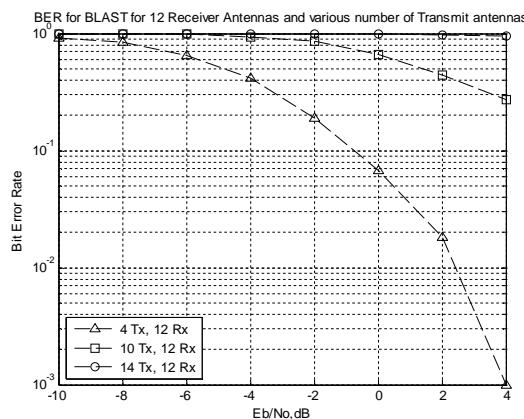


Figure 4: Transmitter diversity



To combat this degradation in performance the concept of CLASS has already been mentioned in this paper. This specifies the optimal number of transmitter antennas to be used for a specific distance between the transmitter and receiver. In mobile wireless networks, where the distances of the nodes keep varying with respect to each other, it is not advisable to use a fixed number of transmitter antennas for all distances. A brief discussion of CLASS follows next.

5.2.2 Class -- To do the classification, a topology consisting of a number of transmitters at varying distances from the receiver has been considered. The graph of figure 5 specifies the maximum number of antennas a transmitter can use when it is at a particular distance from the receiver. This number (number of transmit antennas to be used) classifies the transmitter into its respective CLASS. This classification is based on the power levels of the received packets. When transmit diversity is employed, the total power level at the node is divided equally among all the transmit antennas to be used for the transmission. Thus power of every PDU (each antenna transmits one PDU per transmission) decreases in accordance to this division. The channel employed here is a multipath Rayleigh fading channel. Power allotted to each transmit antenna should be sufficient to withstand the fading caused by the channel. Each receiver has a threshold power level for decoding. If a packet arrives with a power level below the threshold it cannot be detected.

In the figure 5, below, it can be seen that, when the distance is very high the number of transmitter antennas used is very less. This is because the packet has to travel a long distance and thus requires a lot of power to withstand the fading and attenuation losses. For the maximum distance, literally, only one antenna is used. For distances above this maximum distance, multi-hop transmission is employed. The number increases exponentially with decrease in distance and it is

observed that the maximum number of antennas is used for shorter distances.

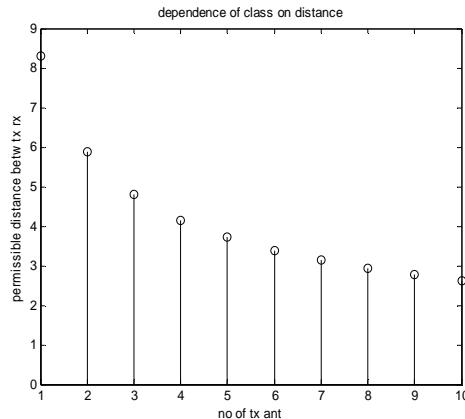


Figure 5: Class vs. Distance

5.2.3 Receiver Diversity – Contrary to the previous case of transmitter diversity, performance increases in the case of receiver diversity. Figure 6 is a clear proof of this statement. Here the cases of 8 transmit antennas for varying number of receiver antennas is compared.

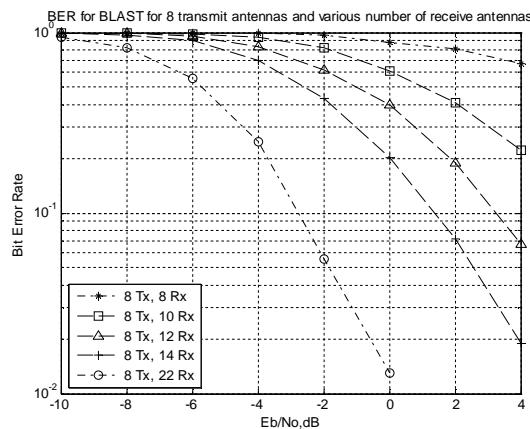


Figure 6: Receiver diversity

It is seen that the best Bit Error Rate performance is for the receiver having 22 antennas. This is because with increase in the number of receivers more paths exist from each transmitter antenna and each path exhibits varied levels of fading. This indicates possibilities of channels with lesser levels of fading. In every case it can be seen BER decreases with increasing values of SNR. However, for each value of SNR the node with 22 antennas has the least value of BER. Thus, robustness increases with receiver diversity.

5.3 Performance Comparisons

The primary comparison among the policies is based on data rates, which in turn is dependent on the number of grants allotted for the wanted PDUs. The packet arrival rate is varied each time, and the corresponding data rate is noted. As seen in figure 7, in every case, i.e. for any packet arrival rate, the data rate of Priority Scheduling (PS) is greater than Partially Fairness Scheduling (PFS). This is because PS prioritizes allotting resources (for the destination oriented packets) to interference cancellation. Thus, data rate is higher in PFS scheme.

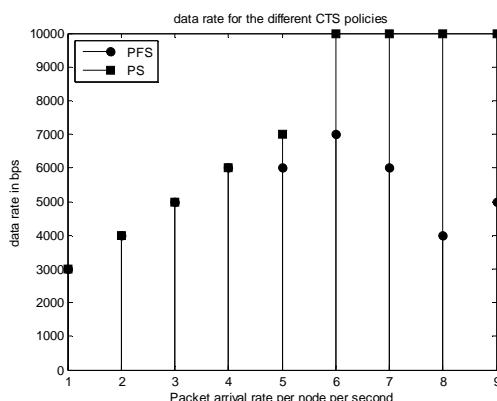


Figure 7: Comparison of Data Rates between PFS and PS

The plot for Priority Scheduling without Interference Cancellation (PS-WIC) and Partially Fairness Scheduling without

Interference Cancellation (PFS-WIC): are not shown here, because their grants are similar to PS and PFS, respectively. Thus, it is sufficient to compare the latter two schemes. The next parameter for comparison is the amount of interference cancelled by the two schemes. From figure 8, it can be seen that PFS outperforms PS for almost every Λ value. This is just the inverse of the previous graph, as the total resources are divided between these two activities of accepting data and cancelling interference from other parallel transmissions. For the initial values, both PFS and PS seem to show the same performance in case of interference cancellation because the number of arriving packets themselves is very less.

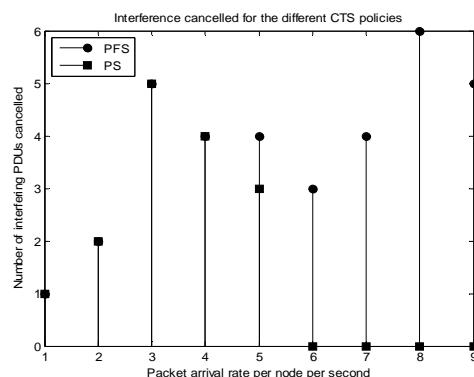


Figure 8: Comparison of interference cancellation for PFS and PS

As the number of packets arriving increases PS has only enough resources to grant for the wanted packets. Thus it can be seen for higher values of Λ interference cancellation for PS is zero.

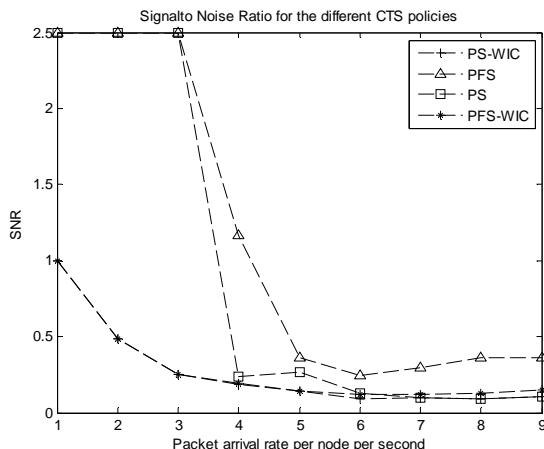


Figure9: SNR for various CTS policies

Another very important way of interpreting the above two graphs is by comparing the SNR performance of the schemes. The interference cancelled and the grants given actually have a direct implication on the SNR at the receiver.

From figure 9, it can be seen that the SNR performance of PFS is the best followed by PS. In PFS, major portion of the resources are allotted for interference cancellation. Hence, noise caused due to other interfering packets is less, and SNR is higher. In PS, the resources are given preferably to the wanted packets. Interference cancellation plays second fiddle here, a direct consequence of which is seen in the graph above. However, as the number of packets arriving increases, there is a decrease in the SNR in both the schemes due to limited availability of resources. In every case, PS-WIC is found to have the least performance. As the arrival rate becomes higher, it can be seen that PFS-WIC performs slightly better than PS. This can be explained as follows: At high arrival rates, PS exhausts all its resources towards allocation to the wanted set and hence may not be left with any resources for interference cancellation. PFS-WIC, too, by itself does not

perform any interference cancellation. However, the above mentioned performance degradation in PS can be attributed to the fact that PS could allocate resources to requests of very low power levels which have low immunity to noise. However PFS-WIC, following PFS, allocates resources only for packets with sufficient power. Thus, SNR performance of PFS-WIC is better than PS at high arrival rates.

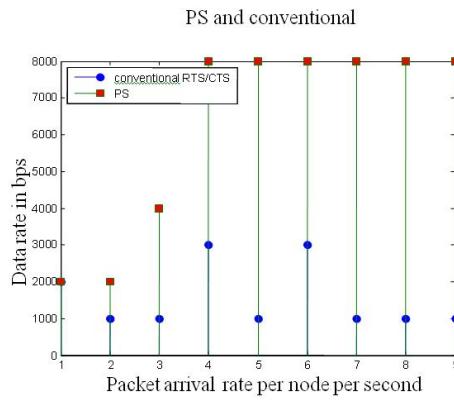


Figure 10: Data rate comparison of conventional and PS

Next, the importance of the RTS/CTS schemes, so far explained, is highlighted. This is done by making a comparison of data rates between our scheme and the conventional 802.11 collision avoidance scheme.

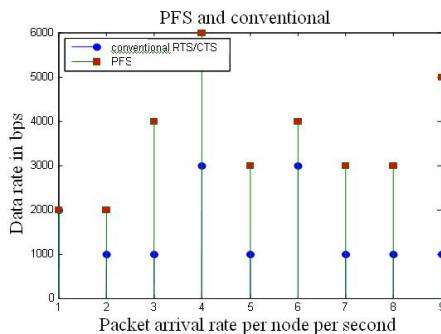


Figure 11: Data rate comparison of conventional and PFS



In the conventional collision avoidance system, simultaneous transmissions are not allowed, and the MIMO wireless channel is reserved for one request at a time. This limits the data rate. However, in the improved RTS/CTS policy, simultaneous transmissions from different senders are encouraged by providing for interference cancellation, thereby improving the data rate per receiver. In both figures 10 and 11, (comparison of PFS and the conventional policy, and comparison of PS and conventional policy), the improved RTS/CTS policy is found to give a better data rate than conventional policies. However the performance improvement in PS is found to be more than in PFS.

6. Conclusions And Future Work

In this work, the advantages of Multiple Input Multiple Output (MIMO) over Single Input Single Output (SISO) have first been addressed. The performance of the V BLAST physical layer (with optimal power ordering) has also been studied. The cross layer policies to drive traffic requests and grants have been considered, with the aim of designing an efficient way to let multiple point-to-point links coexist while keeping interference under control. Simulations of MAC policies in a demanding mobile network scenario with all nodes within the coverage of each other have been carried out. These results have been used to highlight the key features that yield the best performance in terms of throughput and signal to noise ratio.

Future work on this topic includes a study on the impact of channel estimation at the transmitter on the overall performance, and the extension to multihop topologies and routing issues.

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WEB PERSONALIZATION: A GENERAL SURVEY

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I. INTRODUCTION:

WEB PERSONALIZATION:

The web is used for accessing a variety of information stored in various locations in various formats in the whole world. The content in web is rapidly increasing and need for identifying, accessing and retrieving the content based on the needs of the users is required.

When user sends a query to search engine to find specific information, the search engines must be able to retrieve some information according to the user's preferences. But the search engines retrieves the long snippets ranked based on their similarity to the query. Sometimes the retrieved results are not according to the user's interests.

An ultimate need nowadays is that predicting the user requirements in order to improve the usability of the web site. Personalized search is the solution for this problem since different search results based on preferences of users are provided.

In brief, web pages are personalized based on the characteristics of an individual user based on interests, social category, context etc... The Web Personalization is defined as any action that adapts information or services provided by a web site to an individual user or a set of users. Personalization implies that the changes are based on implicit data such as items purchased or pages viewed.

WEB PERSONALIZATION ARCHITECTURE:

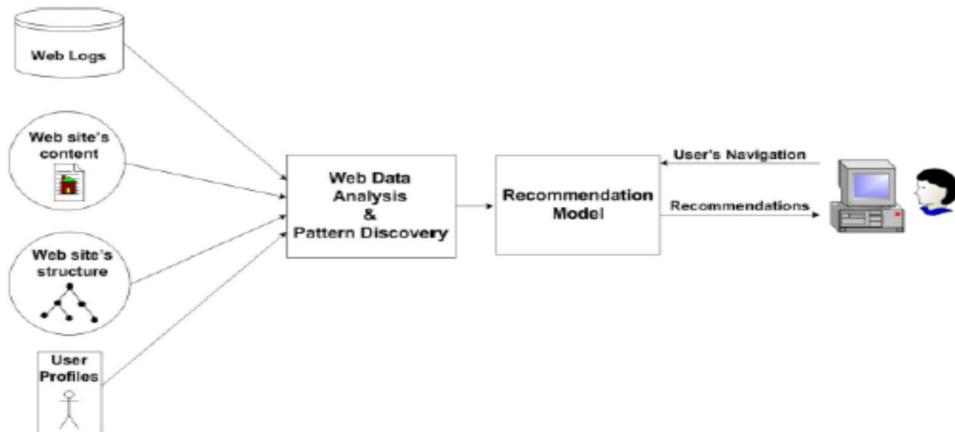


Fig1.1: Web personalization process

The above web personalization process uses the web site's structure, Web logs created by observing the user's navigational behavior and User profiles created according to the user's preferences along with the Web site's content to analyze and extract the information needed for the user to find the pattern expected by the user. This analysis creates a recommendation model which is presented to the user. The recommendation process relies on the existing user transactions or rating data, thus items or pages added to a site recently cannot be recommended.

II. WEB PERSONALIZATION APPROACHES

Web mining is a mining of web data on the World Wide Web. Web mining does the process on personalizing these web data. The web data may be of the following:

1. Content of the web pages(actual web content)
2. Inter page structure
3. Usage data includes how the web pages are accessed by users



-
4. User profile includes information collected about users(cookies/Session data)

With personalization the content of the web pages are modified to better fit for user needs. This may involve actually creating web pages, that are unique per user or using the desires of a user to determine what web documents to retrieve. Personalization can be done to a group of specific interested customers, based on the user visits to a websites. Personalization also includes techniques such as use of cookies, use of databases, and machine learning strategies. Personalization can be viewed as a type of Clustering, Classification, or even Prediction.

USER PROFILES FOR PERSONALIZED INFORMATION ACCESS:

In the modern Web, as the amount of information available causes information overloading, the demand for personalized approaches for information access increases. Personalized systems address the overload problem by building, managing, and representing information customized for individual users. There are a wide variety of applications to which personalization can be applied and a wide variety of different devices available on which to deliver the personalized information.

Profiles that can be modified or augmented are considered *dynamic*, in contrast to *static* profiles that maintain the same information over time. Dynamic profiles that take time into consideration may differentiate between short-term and long-term interests. *Short-term* profiles represent the user's current interests whereas *long-term* profiles indicate interests that are not subject to frequent changes over time.

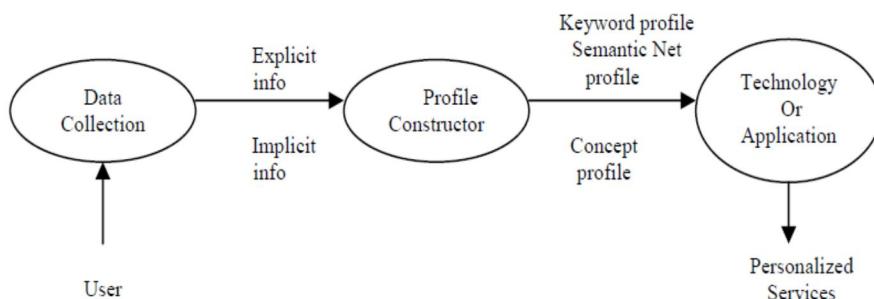


Fig. 2.1. Overview of user-profile-based personalization

As shown in Figure 2.1, the user profiling process generally consists of three main phases. First, an information collection process is used to gather raw information about the user. Depending on the information collection process selected, different types of user data can be extracted. The second phase focuses on user profile construction from the user data. The final phase, in which a technology or application exploits information in the user profile in order to provide personalized services.

TECHNIQUES USING USER PROFILE:

From an architectural and algorithmic point of view personalization systems fall into three basic categories: Rule-based systems, content-filtering systems, and collaborative filtering systems.

Rule-Based Personalization Systems. Rule-based filtering systems rely on manually or automatically generated decision rules that are used to recommend items to users. Many existing e-commerce Web sites that employ personalization or recommendation technologies use manual rule-based systems.

The primary drawbacks of rule-based filtering techniques, in addition to the usual knowledge engineering bottleneck problem, emanate from the methods used for the generation of user profiles. The input is usually the subjective description of users or their interests by



the users themselves, and thus is prone to bias. Furthermore, the profiles are often static, and thus the system performance degrades over time as the profiles age.

Content-Based Filtering Systems. In Content-based filtering systems, user profiles represent the content descriptions of items in which that user has previously expressed interest. The content descriptions of items are represented by a set of features or attributes that characterize that item. The recommendation generation task in such systems usually involves the comparison of extracted features from unseen or unrated items with content descriptions in the user profile. Items that are considered sufficiently similar to the user profile are recommended to the user.

Collaborative Filtering Systems: Collaborative filtering has tried to address some of the shortcomings of other approaches mentioned above. Particularly, in the context of e-commerce, recommender systems based on collaborative filtering have achieved notable successes. These techniques generally involve matching the ratings of a current user for objects (e.g., movies or products) with those of similar users (nearest neighbors) in order to produce recommendations for objects not yet rated or seen by an active user.

III. WEB PERSONALIZATION AND RELATED WORKS

Lot of research had been conducted in Personalized Ontology. Generally, personalization methodologies are divided into two complementary processes which are (1) the user information collection, used to describe the user interests and (2) the inference of the gathered data to predict the closest content to the user expectation. In the first case, user profiles can be used to enrich queries and to sort results at the user interface level. Or, in other techniques, they are used to infer relationships like the social-based filtering and the collaborative filtering. For the second process, extraction of information on users'



navigations from system log files can be used. Some information retrieval techniques are based on user contextual information extraction.

Dai and Mobasher [5] proposed a web personalization framework that characterizes the usage profiles of a collaborative filtering system using ontologies. These profiles are transformed to "domain-level" aggregate profiles by representing each page with a set of related ontology objects. In this work, the mapping of content features to ontology terms is assumed to be performed either manually, or using supervised learning methods. The defined ontology includes classes and their instances therefore the aggregation is performed by grouping together different instances that belong to the same class. The recommendations generated by the proposed collaborative system are in turn derived by binary matching the current user visit expressed as ontology instances to the derived domain-level aggregate profiles, and no semantic relations beyond hyperonymy/hyponymy are employed.

Acharyya and Ghosh [7] also propose a general personalization framework based on the conceptual modeling of the users' navigational behavior. The proposed methodology involves mapping each visited page to a topic or concept, imposing a tree hierarchy (taxonomy) on these topics, and then estimating the parameters of a semi-Markov process defined on this tree based on the observed user paths. In this Markov modelsbased work, the semantic characterization of the context is performed manually. Moreover, no semantic similarity measure is exploited for enhancing the prediction process, except for generalizations/specializations of the ontology terms.

Middleton et.al. [8] explore the use of ontologies in the user profiling process within collaborative filteringsystems. This work focuses on recommending academic research papers to academic staff of a University. The authors represent the acquired user profiles using



terms of a research paper ontology (is-a hierarchy). Research papers are also classified using ontological classes. In this hybrid recommender system which is based on collaborative and content-based recommendation techniques, the content is characterized with ontology terms, using document classifiers (therefore a manual labeling of the training set is needed) and the ontology is again used for making generalizations/specializations of the user profiles.

IV. CONCLUSION

In this paper we surveyed the research in the area of personalization in web search. The study reveals a great diversity in the methods used for personalized search. Although the World Wide Web is the largest source of electronic information, it lacks with effective methods for retrieving, filtering, and displaying the information that is exactly needed by each user. Hence the task of retrieving the only required information keeps becoming more and more difficult and time consuming.

To reduce information overload and create customer loyalty, Web Personalization, a significant tool that provides the users with important competitive advantages is required. A Personalized Information Retrieval approach that is mainly based on the end user modeling increases user satisfaction. Also personalizing web search results has been proved as to greatly improve the search experience. This paper also reviews the various research activities carried out to improve the performance of personalization process and also the Information Retrieval system performance.



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DYE SENSITIZED SOLAR CELL

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IV year

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Gowtham Raj.S

IV year

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Diwakar.B

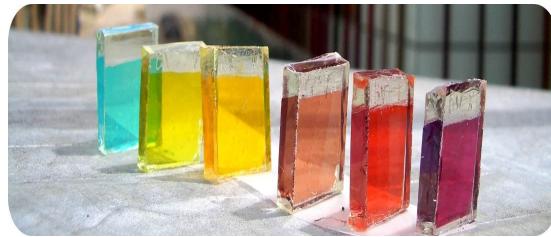
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Dinesh.M.K

IV year

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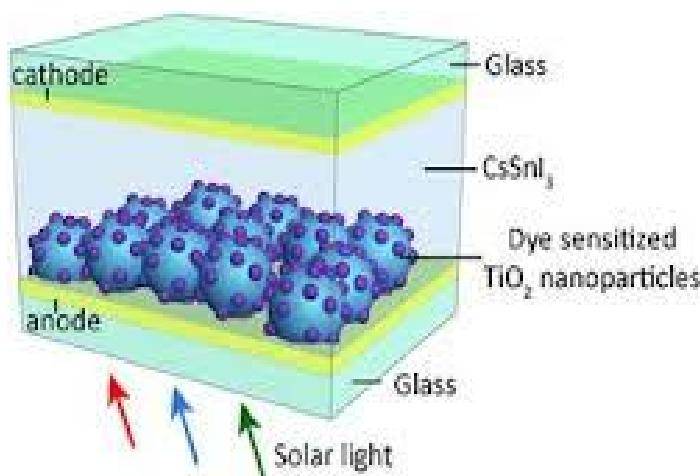
INTRODUCTION:

The prototype of a DSSC was reported in 1991 by M.Gratzel. In **Gratzel Cells** the functions of light absorption and charge-carrier transportation are separated. Although the solar power conversion efficiencies of DSSCs are lower than that of classical crystalline silicon cells. In DSSCs based on liquid electrolytes, a photoelectric conversion efficiency of 11 % has been achieved. However, the potential problems caused by liquid electrolytes, such as the leakage and volatilization of solvents, possible desorption and photo-degradation of the attached dyes, and the corrosion of Platinum counter electrode, are considered as some of the critical factors limiting the long-term performance and practical use of DSSCs. It is believed that quasi-solid-state electrolytes,

especially those utilizing thermosetting gels, are particularly applicable for fabricating high photoelectric performance and long-term stability of DSSC in practical applications.

Here we describe a photo voltaic cell created from low to medium purity materials through low cost processes, which exhibits commercially realistic energy conversion efficiency. The device is based on a $10\mu\text{m}$ thick, optically transparent film of **Titanium dioxide** particles a few nanometers in size, coated with a mono layer of a charge- transfer dye to sensitize the film for a light harvesting. Because of a high surface area of the semiconductor film and the ideal spectral characteristics of the dye, the devise harvests a high proportion of the incident solar energy flux(46%) and shows exceptionally high efficiencies for the conversion of incident photons to electrical current(>80%). The overall light-to-electric energy conversion yield is 7.1-7.9% in simulated solar light and 12% in diffuse daylight. The large current densities ($>12\text{mAcm}^{-2}$) and exceptional stability (sustaining at least 5million turnovers without decomposition), as well as the low cost, make practical applications feasible.

STRUCTURE AND PRINCIPLES OF DSSC:





DSSCs include a substrate of fluorine-doped SnO₂ conducting glass (FTO), a porous nano-crystalline semiconductor oxide (TiO₂) film sensitized by a dye

for absorbing visible light, a redox electrolyte (usually an organic solvent containing a redox system, such as iodide/triiodide couple) layer for deoxidizing oxidized dye, and a platinized cathode to collect electrons and catalyze the redox couple regeneration reaction. The light-to-electricity conversion in a DSSC is based on the injection of electron from the photo excited state of the sensitized dye into the conduction band of TiO₂. The dye is regenerated by electron donation from iodide in the electrolyte. The iodide is restored, in turn, by the reduction of tri-iodide at the cathode, with the circuit being completed via electron migration through the external load.

1. $\text{TiO}_2|\text{S} + h\nu \rightarrow \text{TiO}_2|\text{S}^*$ **Excitation**
2. $\text{TiO}_2|\text{S}^* \rightarrow \text{TiO}_2|\text{S}^+ + \text{e}^-_{(\text{cb})}$ **Injection**
3. $\text{TiO}_2|2\text{S}^+ + 3\text{I}^- \rightarrow \text{TiO}_2|2\text{S} + \text{I}_3^-$ **Regeneration**
4. $\text{I}_3^- + 2\text{e}^-_{(\text{Pt})} \rightarrow 3\text{I}^-$ **Reduction**
5. $\text{I}_3^- + 2\text{e}^-_{(\text{cb})} \rightarrow 3\text{I}^-$ **Recaption**
6. $\text{TiO}_2|\text{S}^+ + \text{e}^-_{(\text{cb})} \rightarrow \text{TiO}_2|\text{S}$ **Recombination**

The electrolytes employed in DSSCs can be classified as liquid, solid-state, or quasi-solid-state.

Several aspects are essential for any electrolytes in a DSSC.

(1) The electrode must be able to transport the charge carrier between photo anodes and counter electrode. After the dye injects electrons into the conduction band of TiO₂, the oxidized dye must be reduced to its



ground state rapidly. Thus, the choice of the electrolyte should take into account the dye redox potential and regeneration of itself.

(2) The electrode must be able to permit the fast diffusion of charge carriers (higher conductivity) and produce good interfacial contact with the porous nano-crystalline layer and the counter electrode.

For liquid electrolytes, it is necessary to prevent the loss of the liquid electrolyte by leakage and/or evaporation of solvent.

(3) The electrolyte must have long-term stability, including chemical, thermal, optical, electrochemical, and interfacial stability, which does not cause the desorption and degradation of the dye from the oxide surface.

(4) The electrolyte should not exhibit a significant absorption in the range of visible light. For the electrolyte containing I^-/I_3^- redox couple, since I_3^- shows color and reduces the visible light absorption by the dye, and I_3^- ions can react with the injected electrons and increase the dark current. Thus, the concentration of I^-/I_3^- must be optimized.

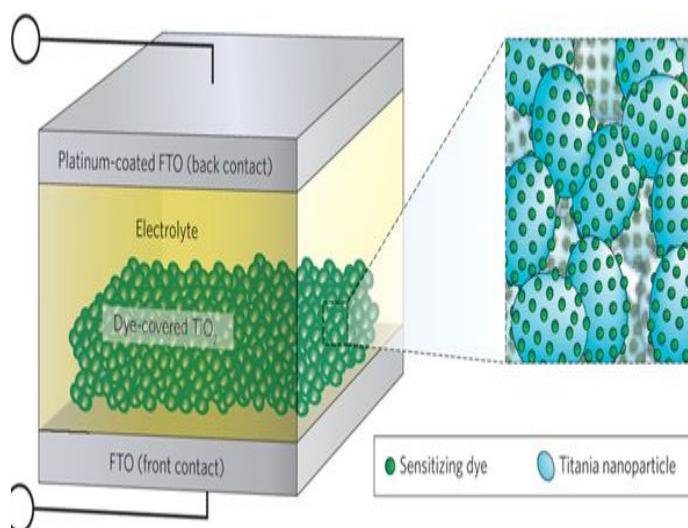
QUASI-SOLID-STATE ELECTROLYTES:

The quasi-solid state, or gel state, is a particular state of matter, neither liquid nor solid, or conversely both liquid and solid. Generally, a quasi-solid-state electrolyte is defined as a system which consists of a polymer network (polymer host) swollen with liquid electrolytes. Owing to its unique hybrid network structure, quasi-solid-state electrolytes always possess, simultaneously, both the cohesive property of a solid and the diffusive transport property of a liquid. Namely, quasi-solid-state electrolytes show better long-term stability than liquid electrolytes do and have the merits of liquid electrolytes including high ionic conductivity and excellent interfacial contact property. These unique characteristics of quasi-solid-state electrolytes have been actively developed as highly conductive electrolyte materials for DSSCs,



lithium secondary batteries, and fuel cells. Quasi-solid-state electrolytes are usually prepared by incorporating a large amount of a liquid electrolyte into organic monomer or polymer matrix, forming a stable gel with a network structure via a physical or chemical method. The quasi-solid-state electrolyte formed via physical cross-linking is called "entanglement network", which is thermo-reversible (thermoplastic). By contrast, chemical or covalent cross-linking leads to the formation of thermo-irreversible (thermosetting) gel electrolyte.

DSSC Based On Colloidal TiO_2 Films:



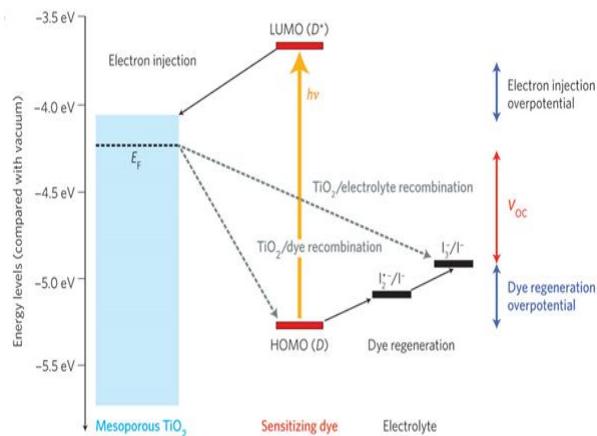
Dye-sensitized cells differ from the conventional semiconductor devices in that separate the function of light absorption from charge carrier transport. In the case of TiO_2 , current is generated when a photon absorbed by a dye molecule gives rise to electron injection into the conduction band of the semiconductor. To complete the circuit the dye must be regenerated by electron transfer from a redox species. The monochromatic current yield

$$\eta_i(\lambda) = \text{LHE}(\lambda) \times \phi_{\text{inj}} \times \eta_e$$



where Light Harvesting Efficiency (LHE) is the fraction of the incident photons that are absorbed by the dye, ϕ_{inj} is the quantum yield for charge injection and η_e is the efficiency of collecting the injected charge at the back contact.

Although attempts to use dye sensitized photoelectrochemical cells in energy conversion have been made before, the efficiency of such devices of such devices have been low. One problem is that o poor light harvesting. On a smooth surface, a monomolecular layer of sensitizer absorbs less than 1% of incident monochromatic light. The remaining option is to increase the roughness of the semiconductor surface so that a larger number of dye molecules can be absorbed directly to the surface and can simultaneously be in direct contact with the redox electrolyte. By using semiconductor films consisting of nanometer sized TiO_2 particles, together with newly developed charge transfer dyes, the efficiency and stability of solar cell has been improved.



High surface area TiO_2 films were deposited on a conducting glass sheet from colloidal solutions. Electronic between the particles was produced by brief sintering at 450 °C. The size of the particles and pores making



up the film is controlled by the size of the particles in the colloidal solution. The internal surface area of the film is determined by the size of the particles and the thickness of the films. These parameters were optimized to obtain efficient light harvesting while maintaining a pore size large enough to allow the redox electrolyte to diffuse easily. Films of 10 μ m thickness consisting of particles with an average size of 15nm gave linear photocurrent response up to full sunlight and were used throughout.

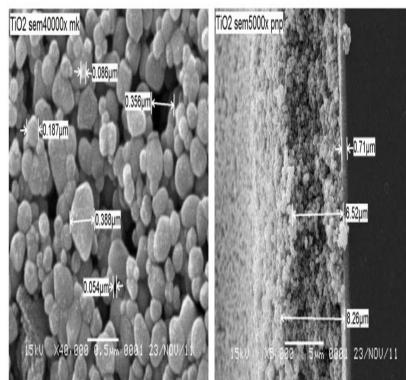
As each dye molecule occupies an area of 1nm², the inner surface of the film is 780cm² for each 1cm² of geometric surface. Thus, the roughness factor is 780, which is smaller than the predicted value of 2000.

The loss mechanisms such as recombination, normally encountered in semiconductor photo conversion, have been minimized. The role of semiconductor in dye-sensitized device is merely to conduct the injected majority charge carriers. There are no minority carriers involved in the photo conversion process. Therefore, surface and bulk recombination losses due to lattice defects, encountered in conventional photovoltaic cells, are not observed in such a device.

The long term stability of cell performance was tested by illuminating the thin TiO₂ film loaded with visible light for 2 months. The change in the photocurrent was less than 10% over this period, during which a charge of 62,000 C cm⁻² was passed through the device, corresponding to a turnover number of 5x10⁶ for the sensitizer. This implies that if any degradation had occurred its quantum yield is less than 2x10⁻⁸. As $\Phi_{dec} = k_{dec}/\Sigma k$, the rate constant, $k_{dec}\text{s}^{-1}$, for excited state decomposition must be at least 10⁻⁸ times smaller than Σk , the sum of rate constants for all channels of dye deactivation. Because charge injection is the predominant channel, this sum is practically equal to the rate constant for charge injection which exceeds 10¹²s⁻¹. Therefore, the upper limit for k_{dec} is 2x10⁴s⁻¹, which agrees with the known photo physics of this class



of transition metal complexes. The very fast electron injection observed with dyes such as, combined with high chemical stability, renders these compounds very attractive for practical development.

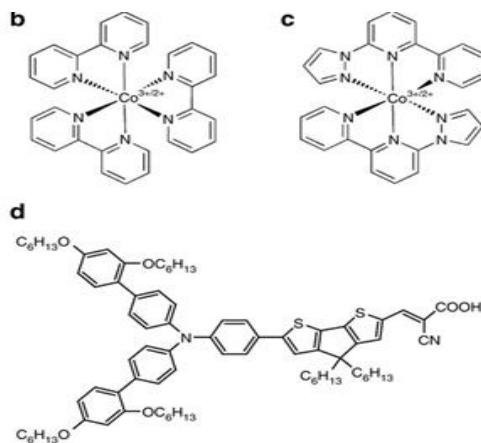


Thermoplastic Gel Electrolytes (TPGEs):

The formation of the TPGE is based on physical cross-linking of gelators to form an “entanglement network” to solidify liquid electrolyte. The main characteristic of this kind of gel electrolyte is the gel-sol-state reversible conversion with the change of temperature, which is a benefit of deep penetration of the electrolyte into mesoporous dye-coated nano-crystalline TiO₂ film. The interfacial contact between the electrolyte layer and nano-crystalline TiO₂ film or counter electrode is one of the most important factors influencing the photovoltaic performance of DSSCs besides the ionic conductivity of the gel electrolyte.

The TPGE contains gelator and liquid electrolyte, the liquid electrolyte consists of organic solvent, Redox couple, additive, or IL electrolyte system. The first thermoplastic polymer gel electrolyte used in DSSCs was reported [89]. The electrolyte was composed of poly (acrylonitrile) (PACN), EC, PC,

AcN and NaI. The light-to-electricity conversion efficiency of this DSSC was lower in comparison with that of the DSSC based on liquid electrolytes, due to the unoptimized components and the difficult penetration of the PAcN network into nano-crystalline TiO₂ film. The high photovoltaic performance and excellent stability of DSSC was obtained by using a TPGE containing poly(vinylidenefluoride-*co*-hexafluoropropylene) (PVDF-HFP) combined with MePN-based liquid electrolyte containing 1,2-dimethyl-3-propyl imidazolium iodide and iodide. The DSSC showed a similar photovoltaic performance as that of an analogous cell containing the same liquid electrolyte, which means that the polymer matrix has no negative effect on the performance of DSSC.



Characteristics of TPGE:

- (1) PEG contains many ether groups and polyhydric side groups, two kinds of groups can keep complexation with alkali metal ions such as potassium ions, sodium ions. Because of the interaction between PEG and PC and alkali metal iodide salts, the iodide anions can be separated from Alkali cations to form free anions
- (2) The large amount of ether groups and polyhydric side groups on the PEG matrix can form a hydrogen bond with PC solvent, which hangs



the molecule of solvent on the "entanglement network" of the polymer chain, and results in the formation of a stable thermo-reversible polymer gel electrolyte.

(3) The TPGE is in a solid state and shows the fluidity with a viscosity of 0.76 Pa s at a temperature higher than 50 °C, which makes for a deep penetration into the mesoporous dye-coated

Nano-crystalline TiO₂ film [102], and forms a sufficient interfacial contact between electrolytes layer and nano-crystalline TiO₂ film and platinum counter electrode. Whereas at a temperature below 20°C, the TPGE is in a gel state with a viscosity of 2.17 Pa s. The reversible thermoplastic behavior of the TPGE is very useful for sealing and assembling DSSCs.

The characteristic of the thermoplastic polymer gel electrolyte markedly depends on temperature.

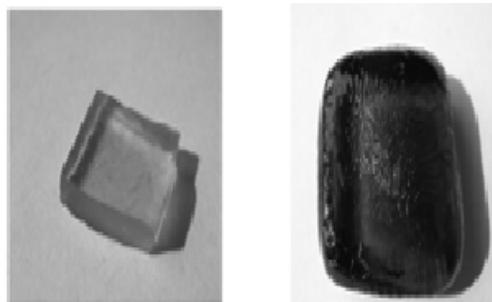
This is due to the fact that the increase of temperature causes a phase transfer from gel state to sol state, and a change of dominate conduction mechanism from Arrhenius type to Vogel-Tamman-Fulcher (VTF), which turns to the change of ionic conductivity of thermoplastic polymer gel electrolyte and photovoltaic performance of DSSC. The photovoltaic performance of DSSCs severely depends on the temperature, which is the typical characteristic of DSSCs based on this kind of polymer gel electrolyte.



Thermosetting Gel Electrolytes (TSGEs):

The TPGE is good for fabricating DSSCs. However, there is also a potential venture for actual application of DSSCs, which is the chemical instability, such as phase-separation, crystallization of iodide salts. Therefore, some more environmentally stable electrolytes are still needed. Among those optional methods, the TSGE is one of the good selections for high photovoltaic performance and good long-term stability of DSSCs. A high stable DSSC based on a TSGE containing ureasil precursors and organic liquid electrolyte containing iodide salts was prepared. The unique structure of this thermosetting

Organic-inorganic hybrid gel electrolyte leads to the high quality of DSSC, which maintains 5–6 % light-to-electricity conversion efficiency even after preserving for several years.





CONCLUSIONS:

In this review, we introduce on Quasi-solid-state electrolytes for DSSCs. Although a light- to-electricity conversion efficiency of 11 % for DSSCs containing liquid electrolytes has been achieved, the potential problems caused by liquid electrolytes, such as leakage and volatilization of organic solvents, are considered as some of the critical factors limiting the long-term performance and practical use of DSSCs. Solid-state electrolytes overcome the disadvantage of fluidity and volatility for liquid electrolytes, however, poor interface contact property and lower conductivity for solid-state electrolytes lead to lower light-to-electricity conversion efficiency for DSSCs. Quasi-solid-state electrolytes, especially TSGEs, possess liquid electrolyte's ionic conductivity and interface contact property and solid-state electrolyte's long-term stability, it is believed to be one kind of the most available electrolytes for fabricating high photoelectric performance and long-term stability of DSSCs in practical applications.

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COMPARATIVE STUDY: MIMO OFDM, CDMA-SDMA COMMUNICATION TECHNIQUES

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I. INTRODUCTION

Novel wireless communication and multimedia services are being introduced almost daily and the spectacular progress is to a great extent due to continuous progress in electronic and micro-electronic technology. Such advances have also been fostered by major theoretical developments. The list of wire-less air interface protocols which follows signifies the most familiar standards in exercise around the world nowadays. The next generation broadband wireless communication system(4G) will be able to provide users with wireless multimedia services of high-speed wireless Internet access, wireless video, and mobile computing, which push communication technologies towards to more high-speed and more reliable [1].

In order to satisfy the future requirements of wireless access systems, Orthogonal Frequency Division Multiplexing (OFDM), and the Multiple Input Multiple Output (MIMO) are the most competitive technologies in future wireless communication systems. Moreover, Practical communications systems have to support a multiplicity of users and hence diverse schemes have been proposed for supporting multiple users, including Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA) , and Space Division Multiple Access (SDMA). However, all the performance gains from these technologies could be achieved only if the channel state information is available at the receive



side [2]. Robust channel estimation and multi-user detections are required. Furthermore, an important problem in the design of digital communication system receivers is the detection of data from noisy measurements of the transmitted signals. Designing a receiver which has the property of minimizing this error probability while being realistic from the computational complexity point of view has thus attracted a lot of attention amongst researchers. Multi-User detection (MUD) refers to the scenario in which a single receiver jointly detects multiple simultaneous transmissions. More generally, multiuser detection techniques apply to the joint detection of different signals transmitted over MIMO channel. One example include channels in which multiple transmitted information streams are multiplexed over multiple transmit antennas. In that scenario, the multiple users refer to the multiple information streams, even though the transmitted signal may originate from a single user [3]. A variety of MUD schemes, such as the Minimum Mean-Square Error (MMSE) detectors, Successive Interference Cancellation (SIC), Parallel Interference Cancellation (PIC), Ordered successive interference cancellation (OSIC) and Maximum Likelihood (ML) Detection schemes may be invoked for the sake of separating the different users at the Base Station (BS).

SDMA techniques have the advantage of improving the capacity of wireless systems, with the expense of requiring robust detection in the receiver. This paper investigates multi-user detection methods and implement these methods for different cases in the capacity of system with noting the tradeoff of computational complexity for these detection techniques. The next section will introduce the MIMO-OFDM technologies. In Section III, we investigate the multi-user detection methods and see what the effect of increasing the number of users in the SDMA-OFDM system.



Capacity of OFDM and CDMA with Multiple Cells

With any cellular system, interference from neighbor cells lowers the overall capacity of each cell. For conventional TDMA and FDMA systems, each cell must have a different operating frequency from its immediate neighbor cells. This is to reduce the amount of interference to an acceptable level. The frequencies are reused in a pattern, with the spacing between cells using the same frequency which is determined by the reuse factor. The required frequency reuse factor depends on the interference tolerance of the transmission system. Analog systems typically require a carrier to interference ratio (C/I) of greater than 18dB [7], which requires reuse factor of 1/7 (see Figure 2 (b)). Most digital systems only require a C/I of 12dB allowing a reuse factor of 1/3-1/4 (see Figure 2 (a)). CDMA uses the same frequency in all cells, and hence ideally allowing a reuse factor of 1 (see Figure 2).

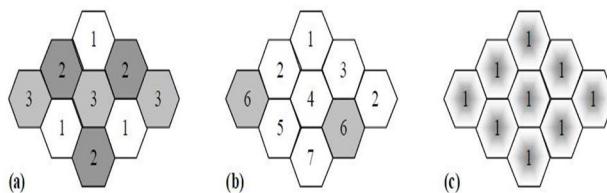


Fig 2: Frequency reuse patterns for (a) 3 frequencies (Digital systems), (b) 7 frequencies (Analog FDMA), (c) CDMA

In practice the frequency reuse efficiency of CDMA is low, as neighbouring cells cause interference, which reduce user capacity of both. The frequency reuse factor for a CDMA system is about 0.65 [8]. Figure 3 shows the interference from neighbouring cells. Most of the neighbouring interference is from the immediate neighbours of the cell

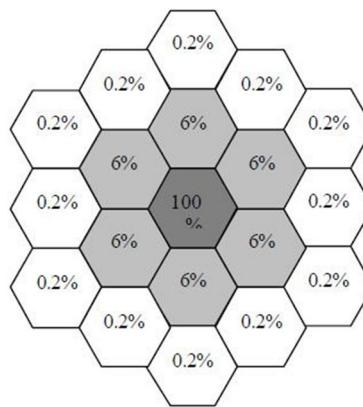


Fig 3: Interference contributions from neighbouring cells in a CDMA system.

The cell capacity for a multi-cellular CDMA system equal to the single cell capacity reduced by the frequency reuse factor. The cell capacity for CDMA is very low if cell sectorization and voice activity detection is used. A straight CDMA system can only have somewhere between 5-11 users/cell/1.25MHz. Using voice activity detection and cell sectorization allow the capacity to be increased by up to 6.4 time, allowing somewhere between 30-70 user/cell/1.25MHz. OFDM require a frequency reuse pattern to be used in a multi-cellular environment to reduce the level of inter-cellular interference. The C/I required must be greater than ~ 12 dB. This could be done with a frequency reuse factor of ~ 3 . This should be easily achieved as cell sectorization could also be used to reduce the level of interference. This would result in the cell capacity for an OFDM system of approximately $128/3 = 42.7$ users/cell/1.25MHz in a multicellular environment

II. MIMO-OFDM TECHNOLOGIES

A. MIMO Assisted OFDM

The MIMO scheme has attracted considerable interest to enhance the data rates capability of system. Moreover, a particularly promising



candidate for next-generation fixed and mobile wireless systems is the combination of MIMO technology with OFDM. MIMO systems can be used for beamforming, diversity combining, or spatial multiplexing. Spatial multiplexing is the transmission of multiple data streams on multiple antennas in parallel, leading to a substantial increase in capacity [2].

MIMO-OFDM system can achieve high data rates while providing better system performance by using both antenna

diversity and frequency diversity, which makes it attractive for high-data-rate wireless applications. Initial field tests of broadband wireless MIMO-OFDM communication systems have shown that an increased capacity, coverage and reliability is achievable with the aid of MIMO techniques.

B. SDMA-based MIMO OFDM Systems

Among the notable applications of MIMO system, is the Space Division Multiple Access (SDMA) techniques. The implementation of SDMA comes in two main scenarios: multi-user access and multiple stream transmission. In the first scenario, multi-users share the up-link and downlink channels for connection to the base station . The second scenario that achieved by the Bell Labs Layered Space Time (BLAST) technology where the multiple sub-streams of a single user's data are transmitted in the same frequency band. SDMA offers high spectrum efficiency and enhance the effective transmission rate, and thus it's one of the most promising techniques aiming at solving the capacity problem of wireless communication systems, where theoretically, SDMA can be incorporated into any existing multiple access standard at the cost of a limited increase in system complexity, while attaining a substantial increase in capacity [4]. More specifically, the exploitation of the spatial dimension, namely the so-called spatial signature, makes it possible to identify the individual users, even when they are in the

same time/frequency/code domains, thus increasing the system's capacity. However, to mitigate the channel impairments, OFDM can be used, which transforms a frequency-selective channel in a set of frequency-flat channels.

Fig. 1 illustrate the concept of SDMA systems, where each user exploiting a single transmitter antenna aided Mobile Station (MS) simultaneously communicates with the BS equipped with an array of receiver antennas. In SDMA-OFDM systems the transmitted signals of L simultaneous uplink mobile users- each equipped with a single transmit antenna are received by the P different receiver antennas of the BS as shown in Fig. 2. At the BS Multi-User Detection (MUD) techniques are invoked for detecting the different users transmitted signals with the aid of their unique, user-specific spatial signature constituted by their Channel Impulse Responses (CIRs).

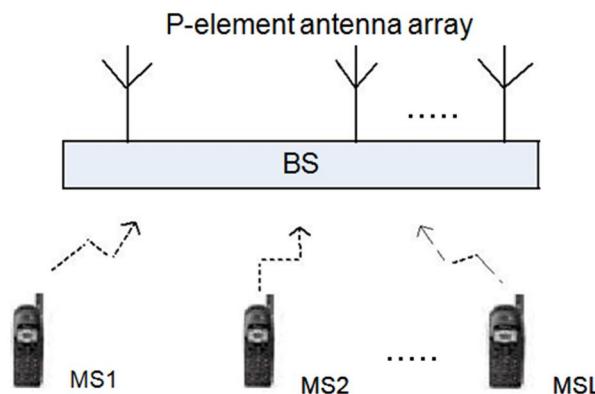


Figure 1. Illustration of the generic SDMA system.

III. JOINT CHANNEL ESTIMATION AND MULTI-USER DETECTION

A. Channel Estimation

The OFDM technique is capable of satisfying the requirements of supporting a high grade of mobility in diverse propagation



environments. This is a benefit of their ability to cope with highly time variant wireless channel characteristics. Also in spite of an immense interest from both the academic and the industrial communities, a practical MIMO transceiver architecture, capable of approaching channel capacity boundaries in realistic channel conditions remains largely an open problem [4]. Thus, the provision of an accurate and robust channel estimation strategy is a crucial factor in achieving a high performance. However, the channel estimation for wireless systems is a challenging problem and the literature treating it is vast, where its simply defined as the process of characterizing the effect of the physical channel on the input sequence. In this work, the channel estimation techniques are assumed to be perfectly done at the BS and it can be used to detect the users data.

B. Multi-User Detection

Robust multi-user detection schemes become necessary in order to using the advantage of SDMA technique to solve the capacity problem in wireless systems, since the increasing number of users will decrease the performance of system particularly when the number of users is more than the number of receive antennas.

Consider the $N_R \times N_T$ MIMO system, and H denote a channel matrix with h_{ij} is the channel gain between the i th transmit antenna and the j th receive antenna, $j=1,2,\dots,N_R$ and $i=1,2,\dots,N_T$. The spatially multiplexed user data and the corresponding received signals are represented by $x = [x_1, x_2, \dots, x_{N_T}]^T$ and $y = [y_1, y_2, \dots, y_{N_R}]^T$, respectively, where x_i and y_j denote the transmit signal from the i th user which have single transmit antenna and the received signal at the j th receive antenna, respectively. Let z_j denote the white Gaussian noise with a variance of σ^2 at the j th receive antenna, and h_i denote the i th column vector of the channel matrix H . Now, the $N_R \times N_T$ MIMO system is represented as

$$y = HX + z = h_1x_1 + h_2x_2 + \dots + h_Nx_N + z \quad (1)$$

Linear signal detection method treats all transmitted signals as interference except for the desired stream from the target transmit antenna. Therefore, interference signals from other transmit antennas are minimized or nullified in the course of detecting the desired signal from the target transmit antenna. These linear methods consider the input-output relation of a MIMO system as an unconstrained linear estimation problem, which can be solved by using Zero-Forcing (ZF) or Minimum Mean Square Error (MMSE) criterion [5].

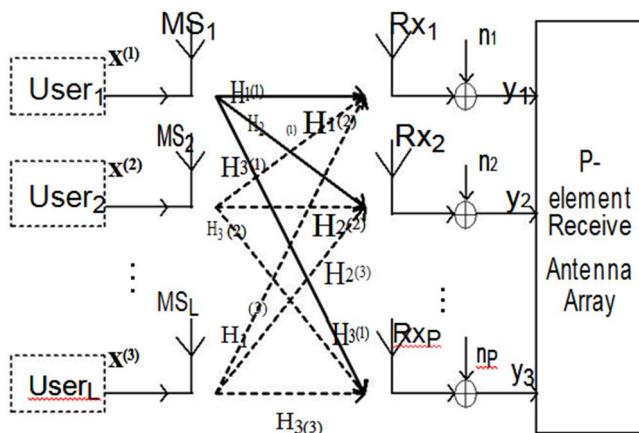


Figure 2. Schematic of the SDMA uplink MIMO channel model .

Instead of forcing interference terms to zero without considering the noise as used in the ZF detection, the MMSE criterion minimizes the overall expected error by taking the presence of the additive noise into account. Linear detection schemes are simple, but unfortunately they do not provide near optimal performance, especially when the channel matrix is near singular. Moreover, based on linear detection methods, the Successive interference cancellation (SIC) is one method, where the key idea of SIC is to successively detect and cancel the streams layer by layer. The algorithm first detects (using ZF or MMSE) an arbitrarily



chosen data symbol, assuming the other symbols to be interference. The detected symbol is then cancelled from the received signal vector and the procedure is repeated until all the symbols are detected. Compared to the linear detection schemes, SIC achieves an increase in diversity order with each iteration. The performance of the linear detection methods is worse than that of other nonlinear receiver techniques. However, linear detection methods require a low complexity of hardware implementation.

One method used to improve the performance without increasing the complexity significantly is the Ordered successive interference cancellation (OSIC) scheme [5]. This method can improve the performance of SIC by selecting the stream with the highest signal-to-noise-plus-interference ratio (SINR) at each detection stage. Fig. 3 illustrates the OSIC signal detection process for $N_T = 4$ [6]. Let $x(i)$ denote the symbol to be detected in the i th order. Let $x'(i)$ denote sliced value of $x(i)$. Suppose that the MMSE method is used, thus the first stream is estimated using the MMSE method, then slicing to produce $x(1)$. The remaining signal in the first stage is formed by subtracting it from the received signal, that is

$$\begin{aligned} y'(1) &= y - h(1)x'(1) \\ &= h(1)(x(1) - x'(1)) + h(2)(x(2) - x'(2)) + \dots \quad (2) \\ &\quad + h(N)(x(N) - x'(N)) + z \end{aligned}$$

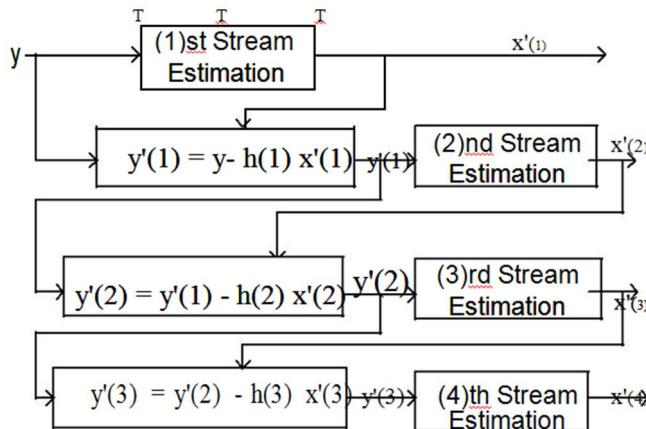


Figure 3. OSIC signal detection for four transmit antennas.

If $x(1) = x'(1)$, then the interference is successfully canceled in the course of estimating $x(2)$; however, if $x(1) \neq x'(1)$, then error propagation is incurred because the MMSE weight that has been designed under the condition of $x(1) = x'(1)$ is used for estimating $x(2)$. Due to the error propagation caused by erroneous decision in the previous stages, the order of detection has significant influence on the overall performance of OSIC detection. There are three different methods of detection ordering. The first method is SINR-Based Ordering which start detect the signals with higher post detection signal-to-interference-plus-noise ratio (SINR). In the course of choosing the second detected symbol, the interference due to the first detected symbol is canceled from the received signals. The second method of OSIC detector is the SNR-Based Ordering which use the ZF weight. The same procedure of detection ordering as in the first method but without interference term. The third method is the Column Norm-Based Ordering which is used to reduce the ordering complexity using the norm of the column vectors in a channel matrix. Consider the representation of the received signal in equation(1) which it can be observed that the received signal strength of the i th transmitted signal

is proportional to the norm of the i th column in the channel matrix. Therefore, the detection of signal it can be done in the order of the norms h_i . In this method, the first is compute N_T norms and then, order them only once. Detection is performed in the decreasing order of norms and the complexity is significantly reduced as compared to the previous methods, since ordering is required only once [6].

Fig. 4 compares the error performance of the OSIC detection for the three ordering methods. (SINR-based ordering, SNR-Based ordering, and Column Norm-Based Ordering). The number of users are 4 transmitting at the same time using SDMA technique each one have single transmit antenna (N_T) and the number of receive antennas (N_R) at the BS is 4 with 16-QAM modulation. It is observed that the detection SINR-based ordering method achieves the best performance among three methods. OSIC receivers reduce the probability of error propagation with the cost of slightly higher computational complexity compared to that of the SIC algorithm.

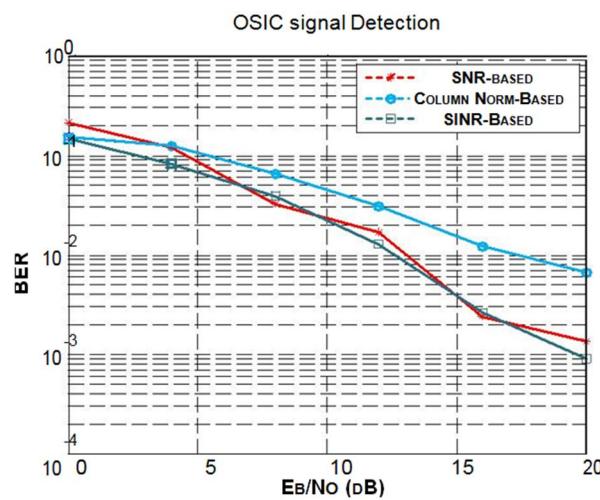


Figure 4. Performance of OSIC methods with different detection ordering.

Among the MUD techniques, is the ML detection scheme achieves the optimal performance as the maximum a posteriori (MAP) detection when all the transmitted vectors are equally likely. The ML method calculates the Euclidean distance between the received signal vectors and the product of all possible transmitted signal vectors with the given channel, and finds the minimum distance [6]. The ML detection determines the estimate of the transmitted signal vector x as

$$x_{ML}^* = \operatorname{argmin}_y \|Hx\|^2 \quad (3)$$

Where $\|y - Hx\|^2$ corresponds to the ML metric.

The number of candidate symbol vectors grows exponentially with N_T and the number of bits per constellation point. Thus, with higher order constellations and with multiple transmit antennas (or number of users in SDMA system), ML detection becomes computationally intensive. Simulation results investigate the performance of ML scheme and compare it to OSIC method.

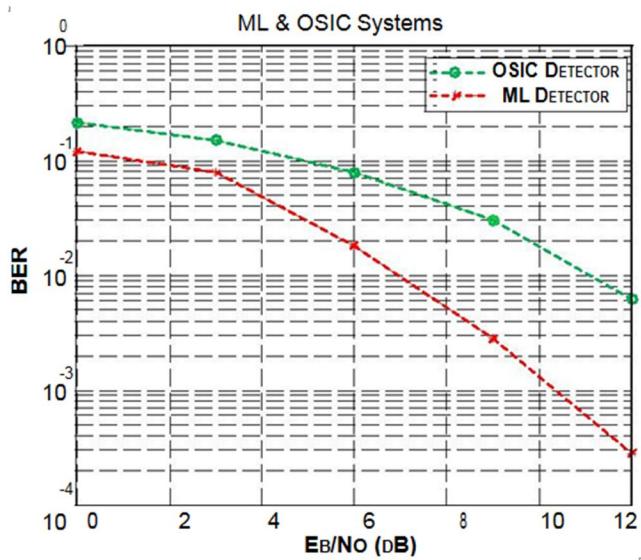


Figure 5. Performance comparison: ML vs. OSIC signal detection methods for $N_T = N_R = 4$.



Fig. 5 shows the performance of ML compared to OSIC method for SDMA system with 4 users each one have single transmit antenna N_T and the number of receive antennas N_R equal to 4 with 16-QAM modulation, where it's obvious that the ML outperforms the OSIC detection. ML achieves the optimal performance and its performance serves as a reference to other detection methods, however its complexity increases exponentially as number of users increases.

The SDMA system solve the capacity problem of the wireless system. However, when the number of users is higher than the number of receive antennas at the receiver, the performance of the system will be decreased and the multi-user detection method should have the ability to improve the performance. ML method will improve the performance in contrast to the other methods at the cost of increasing the computational complexity, especially in the context of a high number of users and higher-order modulation schemes. Fig. 6 shows the improvement of using the ML method in comparison to the OSIC detection when the number of users increased to 6 and number of receivers is 4. It shows that ML method has the ability to maintain low bit error rate even if the number of users higher than the number of receive antennas at the BS.

In order to reduce the computational complexity of ML algorithm, a QR decomposition associated M-algorithm was proposed, named QRM-ML algorithm. It performs signal detection sequentially in N_T stages after QR decomposition. By appropriately choosing the parameter M the QRM-ML algorithm can achieve similar performance as that of the ML algorithm with significantly reduced computational complexity. Assuming that the number of users(or transmit antennas N_T) and number of receiver antennas are equal, the QRM-ML detection method can be investigated for different cases.

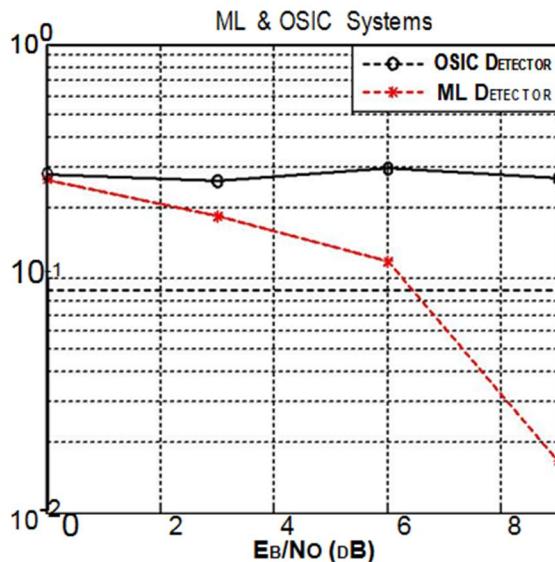


Figure 6. Performance comparison: ML vs. OSIC detection methods when number of users equal to 6 and $N_R=4$.

In Direct Sequence Code Division Multiple Access (DS-CDMA) systems [1], various versions of the so-called Gaussian approximation are widely used for modeling the distribution of the Multiple Access Interference (MAI). A few examples are the Standard Gaussian Approximation (SGA) [2]–[15], the Improved Gaussian Approximation (IGA) [2], [6], [9], [10], [12], [13], [15]–[17], the Simplified IGA (SIGA) [2], [6], [9], [11], [13], [15], and the Improved Holtzman Gaussian Approximation (IHGA) [11]. However, the accuracy of the various Gaussian approximation techniques depends on the specific configuration of the system. It is well known that the Gaussian approximation techniques become less accurate, when a low number of users is supported or when there is a dominant interferer [12].

Therefore the accurate BER analysis dispensing with the previous assumptions on the MAI distribution is desirable. Hence a number of accurate techniques have been developed, such as the series expansion



[12], [13], [18]–[20], the Fourier [2], [3], [11], [15], [18] and Laplace [21] transform based methods. The latter two lead to the Characteristic Function (CF) and Moment Generating Function (MGF) based approaches and have been prevalent in the accurate BER analysis of communication systems.

The BER performance of DS-CDMA systems communicating over Additive White Gaussian Noise (AWGN) channels has been extensively studied [5]–[10], [12], [13], [15], [16].

However, to the authors' best knowledge, the accurate BER analysis of asynchronous Ricean-faded DS-CDMA systems using random spreading [2]–[17], [19], [20] sequences is still an open problem. There are many propagation environments, such as microcellular urban and suburban land mobile, as well as picocellular indoor and factory scenarios, where there exist Line-Of-Sight (LOS) propagation paths between the transmitter and the receiver [27]. In the presence of a LOS component, the Ricean distribution, also known as the Nakagami- n distribution [28], [29], is a better model of the fading channel. The Ricean distribution becomes the Rayleigh distribution, when the energy of the LOS component becomes zero [27], [30]. The novel contribution of this paper is that we provide an accurate BER expression for asynchronous DS-CDMA systems in a Ricean fading environment, which requires only a single numerical integration, when using the hypergeometric functions of two variables [31]–[33].

The organization of this paper is as follows. In Section II an asynchronous DS-CDMA system using BPSK modulation is considered in the context of a Ricean fading channel. Then in Section III an accurate BER expression based on the characteristic function approach is derived for the BER calculation of the system using random spreading sequences.

[18]–[20], [22]–[26], and there are numerous studies also for

transmission over both Rayleigh [2], [12] and Nakagami- m [3], [4], [11], [17], [21] channels. Geraniotis and Pursley [18] were the first authors, who investigated the accurate BER calculation of asynchronous DS-CDMA systems over AWGN channels using the CF approach. Then Cheng and Beaulieu extended the results to both Rayleigh [2] and Nakagami- m [3] channels.

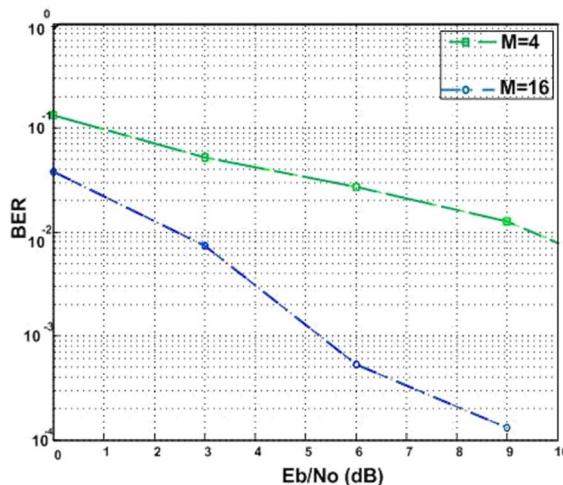


Figure 7. The performance of QRM-ML signal detection using $N_T = N_R = 4$ with 16-QAM modulation.

Consider QR decomposition of the channel matrix, that is $H = QR$. Then, the ML metric in equation(3) can be equivalently expressed as

$$\begin{aligned}
 \|y - Hx\| &= \|y - QRx\| \\
 &= \|Q^H(y - QRx)\| \\
 &= \|y' - Rx\|
 \end{aligned} \tag{4}$$

The performance of QRM-ML depends on the parameter M , where, it equal to the number of users and number of receive antennas N_R . As M increases, its performance approaches ML performance at the



sacrifice of the complexity [6]. Fig. 7 shows the performance of QRM-ML for $M = 4$ and 16. The QRM-ML performance degrades when $M = 4$ at the benefit of the reduced complexity.

IV. SIMULATION RESULTS

In this section, we present and discuss the numerical results of the BER performance of an asynchronous DS-CDMA system over a frequency-selective multipath Rayleigh fading channel. The numerical results are based on the standard Gaussian approximation (SGA) for the multipath and multiple access interference (MAI) (eq. (11)) with perfect power control. Each cell is equipped with a conventional correlation receiver. The received power of the desired signal is normalized to 1.

Fig. 2 shows the BER performance over a frequency selective multipath Rayleigh fading channel with perfect power control, as a function of the number of interfering cells M_c . In this simulation, the number of multipaths is set to $L_k =$

5, the signal-to-noise ratio (SNR) $\frac{E_b}{N_0} = 20$, the process gain

$$N_o$$

$N = 84$, and $\beta_4 = 1$. As illustrated in Fig. 2, we observed that the BER increases when the number of interfering cells is less. It is evident that the performance of the DS-CDMA system depends on the number of interfering cells.

Fig. 3 shows the BER performance over a frequency selective multipath Rayleigh fading channel with perfect power control, as a function of the number of the multipath components ($L_k = 3, 5$, and 10). The number of interfering cells is set to $M_c = 4$, the SNR = 20, the process gain $N = 84$, and $\beta_4 = 1$. From the figures, it is clear that varying the multipath components, L_k , has a significant influence on the BER performance using the SGA approximation.

Fig. 4 shows the BER performance over a frequency selective multipath Rayleigh fading channel with perfect power control, as a function of the process gain ($N = 32, 84$, and

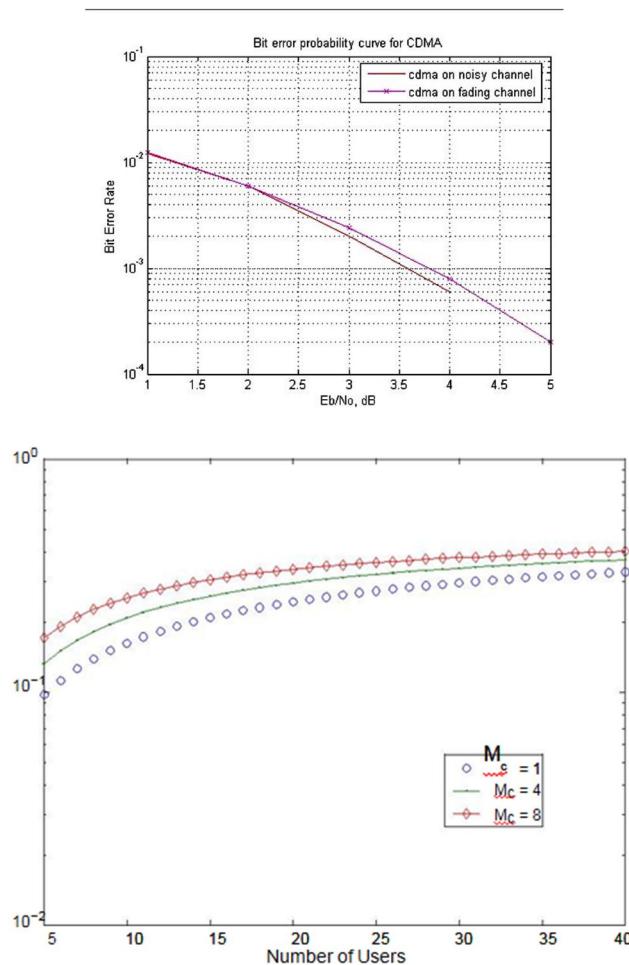


Fig. 2. BER performance over a frequency selective multipath Rayleigh fading channel with perfect power control, as a function of the number of interfering cells with $L_k = 5$, the process gain $N = 84$, and SNR = 20.



The number of interfering cells is set to $M_c = 4$, the SNR = 20, the number of multipath components is set to $L_k = 4$, and $\beta = 1$. From the figures, it is clear that varying the process gain, N , has a significant influence on the BER performance using the SGA approximation.

Fig. 4 shows the average BER performance obtained by simulation over a frequency selective multipath Rayleigh fading and AWGN channel. From the simulation, we find that averaging over more experiments and using a larger symbol size will produce results closer to the theoretical results. The symbol size used in this simulation is 10,000.

IV.CONCLUSION

In this paper, we assume an OFDM/SDMA/CDMA approach that couples the capabilities of these techniques. OFDM helps to enhance the system performance, while SDMA increases the spectral efficiency, where CDMA uses high rate signature pulses to enhance the signal bandwidth far beyond what is necessary for a given data rate. Performance of various multi-user detection schemes based on OFDM/SDMA/CDMA are investigated for different scenarios. Results show the importance of robust detection methods in improving the performance of the system, particularly when the SDMA technique is used to achieve the higher spectral efficiency. It is found that CDMA only performs well in a multi-cellular environment where a single frequency is used in all cells. This increases the comparative performance against other systems that require a cellular pattern of frequencies to reduce inter-cellular interference. ML is the optimal multi-user detection scheme where it gives high performance in comparison to the OSIC method even if the number of users is higher than the number of receive antennas. Thus the ML method can support the SDMA technique, however this technique is associated with large computational requirements. Long time is usually needed for running



the algorithm which does not allow real time implementation. One major area, which hasn't been investigated, is the problems that may be encountered when OFDM is used in a multiuser environment. One possible problem is that the receiver may require a very large dynamic range in order to handle the large signal strength variation between users . Hardware implementation of the algorithm can help reduce the running time considerably. Success in real time implementation of optimization technique for SDMA can play a major role in next generation communication systems.

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STUDENTS ATTITUDE TOWARDS ADVERTISING: AN EMPIRICAL STUDY

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1. Introduction:

Worldwide Advertising Industry is experiencing tremendous changes. Munusamy and Wong (2007) opined that advertising has become one of the important elements in modern life. Advertising as a major social event expresses key changes in values, beliefs, behavior and buying pattern of the people which influences the life style of people (Polly and Mittal, 1993). Government interventions in advertising industry have regulated the content of the advertisements message, and subsequently this created certain impacts on the formulation of consumer's attitude towards advertising (Calfee & Ringold). Attitude towards advertising is an important concept as it is one of the determinants of attitude towards specific advertisements (Lutz, 1985) and can influence the way a consumer will respond to any particular advertising (Mehta, 2000). Munusamy et al (2007) cited that enormous research has been done at macro level at two classical dimensions; social and economic effect of advertising, whereas Polly and Mittal (1993) represent product information, social role, and hedonism as personal dimensions of attitude towards advertising at micro level.

India is considered as an emerging market; due to the trends of globalization, establishment of multi-national companies; advertisements undergone drastic changes in the recent years which has great impact on the attitudes and beliefs of the consumer. In the present study Macro level factor Good for Economy and Micro level



factors; product information, hedonism are considered to evaluate the effect of advertising on consumer attitude.

2. Literature Review

Consumer Attitude towards Advertising

Fishbein (1967) defined Attitude as "a learned predisposition of human beings". Kotler (2000) further elaborated attitude as an individual personal evaluations, emotional feeling and attached and action tendency towards some objects or ideas. Aaker et al (1986) defined attitude as an intellectual way an individual can use to organize the way they see their environment and guide them to respond that environment. Bauer and Greyser (1968) considered attitude towards advertising as the audience behavior towards the advertising. MacKenzie and Lutz (1989) Opine that audience behavior towards advertising can be indicated through consumer's favorable or unfavorable response towards particular advertising. According to the Mehta (2000), consumer attitude towards advertising is one of the influential indicator of advertising effectiveness because consumer's cognitive ability towards the advertising are reflected in their thoughts and feelings and consequently will influence their attitude towards advertising.

In a comprehensive review of American and British research on attitude towards advertising, O'Donohoe (1995) concluded that in spite of different dimensions being identified or different terms used to describe attitude towards advertising, there appeared to consensus that attitude towards advertising comprised two levels of beliefs; personal experience dimension of advertising and generalized or Macro level belief.

Table 1: Summary of the key determinants of consumer's attitude towards advertising

Author	Key Dimensions
KwekChoon Ling et al (2010)	Four factors: Credibility, Informative, Hedonism, Good for Economy
MahammadUsman et al (2010)	Three factors: Product Information, Social Integration, Hedonism
SooJiuan Tan and Lily Chia (2009)	Six factors: Materialism, Good for Economy, Product Information, Hedonic, Falsity/no sense, Social Image
Wang, Sun, Lei, and Toncar (2009)	Five factors: entertainment, information, credibility, economy, value corruption.
Petrovici, Marinova, Marinov, and Lee (2007)	Seven factors: product information, social integration/ image, hedonic/ pleasure, good for economy, promotes undesirable values, alienation/ value incongruence, falsity/ misleading.
HumayunkabirChowdury (2006)	Four factors: Entertainment, Informativeness, Irritation, Credibility
Ashill and Yava (2005)	Three factors: control, believability, economic.
D'Souza and Taghian(2005)	Five factors: favorable, pleasant, convincing, believable, good.
Petrovici and Marinov (2005)	Six factors: General attitude, Attitude institution, Attitude instrument, Product Information, Social Image/ role,



	Hedonic/Pleasure
Tsang, Ho, and Liang (2004)	Five factors: Entertainment, Informative, Irritation, Credibility, Relevant demographic variables
Barrio and Luque (2003)	Six factors: Product Knowledge, Message Involvement, Attention, Comparative advertising intensity, claim believability, Advertisement cognition
Korgaonker, Silverblan and O'Leary (2001)	Seven factors: Product Information, Social role and Image, Hedonic/Pleasure, Value corruption, Falsity/no sense, Good for the economy, Materialism

Source: Developed for the study

3. Hypothesis

Advertising plays an important role and legitimate role in delivering information (Rotzoll, Haefner and Sandage, (1989), Rubin (2002) states that one of the most vital functions of advertising is to provide information. According to Varshney (2003) information is considered as a very valuable incentive in marketing because recipients respond positively to the advertisements that transfer incentives. Studies such as Ramprasad and Thurwanger (1998); Haghrian and Madlberger (2005); and Ducoffe (1996), support that there is a strong and positive relationship between informative and consumer's attitude towards advertising. Thus it is hypothesized that:

H_1 : Product Information of an advertising message is positively related to consumer's attitude.



Ramprasad and Thurwanger (1998), Munusamy and Wong (2007), Polly and Mittal (1993), Petrovici et al (2007) argue that Hedonic/Pleasure is positively related to consumer's attitude towards advertising. Bauer and Greyser's argues that consumer's response to the advertisements are provisioned by their hedonic value. Alwitt and Prabhaker (1992) and Pollay and Mittal (1993) found that consumer's like and prefer to see advertisement that have more entertainment and pleasurable elements. Researchers also concluded that hedonic factor will create significant favorable attitude towards advertising. In other words it can be concluded that the more positive the belief in hedonic/pleasure is the more positive is the audience attitude towards advertising. Thus it is hypothesized that:

H_2 : Hedonic/Pleasure of an advertising message is positively related to consumer's attitude advertising.

The economics of information theory as cited in Stingler and Telser (1964) propose that advertising can provide information and reduce cost of searching. This argument is supported by eminent researchers (Nelson, 1974; Eskin & Baron, 1977; Chiplin and Sturgess, 1981). Therefore Good for Economy addresses the concrete effects of advertising for consumers. The economic benefit of advertising is the advertising to provide accurate and reliable information about their products to the audience (Petrovici et al, 2007). Munuswamy and Wong (2007), Tan and Chia (2007), Wang et al (2009) conclude that good for economy is positively related to consumer's attitude towards advertising. Thus it is hypothesized that:

H_3 : Good for Economy of an advertising message is positively related to consumer's attitude towards advertising.

4. Methodology

The present study is considered to be descriptive in nature. The basic research method used in this study is a self administered questionnaire



survey. The items of three independent variable 'Informative', 'Hedonic/Pleasure', 'Good for Economy' and the items of independent variable 'attitude towards advertising' were adopted from Ramprasad and Thurwanger (1998) with the original Cronbach alpha 0.772, 0.759, 0.658, 0.807 respectively. A point Likert scale ranging from '1= Strongly Disagree to 5=Strongly Agree' was adopted as the attitude measurement for the independent and dependent variable. Hypothesis is tested by collecting data through a survey of 125 Postgraduate students in Sri PadmavathiMahilaVisvaVidyalayam, Women University, Tirupati using Convenience sampling method.

5. Results and Discussion

Multiple regression analysis is carried out to test the hypotheses and the results are presented in Table 2.

Table: 2 Results of Multiple Linear Regression Analysis for this Research

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	.294	.300		.978 .330
	Product Information	.377	.064	.395	5.875 .000
	Hedonic/Pleasure	.364	.065	.364	5.641 .000
	Good for Economy	.217	.062	.233	3.521 .001

Dependent Variable: Attitude towards Advertising

Independent Variable: Product Information, Hedonic/Pleasure, and Good for Economy



$R=76.3$, $R\text{ Square}= 58.3$, $\text{Adjusted R Square}= 57.2$, $F=56.346$,
 $P=0.000$ ($p < 0.01$)

Based on the Table 2, product information of an advertisement message has ($\beta=.377$, $p < 0.05$) significant positive impact on consumer's attitude towards advertising. According to Muhammad Usman (2010), Haghrian and Madlberger (2005), Ramaprasad Thurwanger (2005), Ducoffe (1996), product information of an advertising message has a positive influence on consumer's attitude towards advertising. Thus the finding supports the previous literature.

Hedonic/pleasure of an advertising message has ($\beta=.364$, $p < 0.05$) significant positive impact on consumer's attitude towards advertising. Studies conducted by Munusamy and Wong (2007), Petrovici, Marinova, Marinova and Lee (2007) also suggests that hedonic/pleasure of an advertising message affect consumer's attitude towards advertising.

Finally, good for economy of an advertisement message has ($\beta=.217$, $p < 0.05$) significant positive impact on consumer's attitude towards advertising. Previous studies conducted by Munuswamy Wong (2007), Tan and Chia (2007), Wang (2009) suggested that good for economy of an advertising has significant positive effect on consumer's attitude towards advertisements which is supported in the present study.

6. Conclusion

In the present study researcher examine the consumer's attitude towards advertising. The empirical data shows the consumer's positive attitude towards advertisements. The independent variables ranged from weakest relation good for economy to the strongest relation product information. Therefore this suggests that product information of an advertisement message is the most important antecedent in effecting consumer's attitude towards advertising. Hedonic/pleasure



and good for economy are ranked the second and third important antecedents.

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CLOUD COMPUTING AND SECURITY CHALLENGES

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1. Introduction

Cloud computing increases financial and outfitted benefits, which allows organizations to understand significant cost savings and speed up deploying new applications. Though, business benefits cannot be obtained from an organization without using latest data security tests created by cloud computing.

Because of unidentified, multi-inhabitant nature of cloud computing, there are chances of attacking confidential information and vital resources. But unauthorized rendering leads to theft of information. Even though, the user leaves the cloud space, his data continue if the cloud vendor does not reprocess the storage securely. In this paper, part 2 focuses on cloud computing, part 3 focuses on security threats of cloud computing, part 4 focuses on the actions of those threats and part 5 is the concluding part of the paper.

2. Cloud computing

According to the definition of NIST, "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly



provisioned and released with minimal management effort or service provider interaction."

"Reuse of IT resources" is the basic idea to build cloud computing. The distinction observed when cloud computing is evaluated with conventional methods like grid computing, distributed computing, utility computing is to enlargethe possibilities from corner to corner in an organization.

2.1 Attributes of Cloud Computing

2.1.1. Use on request: A person at any time and from any place can use the resources via worldwide network. These resources can be accessed without the need for human intrusion.

2.1.2. Resource allocation: Large number of simultaneous users are allocated with resources into such a way that the system dynamically deal out according to customer requirements. No control is given to the users over the physical parameters, but cloud solutions can choose where the data is stored.

2.1.3. Network accesses: Users can access the network through different devices like smart phones, mobile device, computers, etc.

2.1.4. Quantifiable service and transparency:These can mechanically control the resources depending on users' criteria. It provides transparency to both users and vendors by observing, controlling and reporting the resource usage.

2.1.5. Scalability, Elasticity, and Flexibility of the cloud: Cloud has the biggest advantage of having these three properties. It has the capability in allocating the resources dynamically whenever it is necessary to guarantee a smooth flow of operation. The extra resources can be purchased by the user at any period in any extent.

2.2 Models of cloud computing:

2.2.1 SaaS: SaaS is referred as Software as a Service, where the software and its related data are hosted in the cloud and these are accessed by users using a thin client, like using a web browser. New releases are hosted without requiring user to install new software physically. SaaS has a single configuration, which makes development testing faster. It is a model of "Software delivery".

2.2.2 PaaS: PaaS refers to Platform as a Service. PaaS serves to develop, test, deploy, host and maintain applications in the same integrated developing environment. It provides computing platform and solution stack. It manages the necessary hardware and software. It deploys the application without any cost and complexity. It supports teamwork.

2.2.3 IaaS: IaaS refers to Infrastructure as a Service. Rather than from a local computer, the user can access the logical computational resources via a computer network. Users can store and access files such as pictures, videos, music, etc on a remote server. This stage can be described as hypervisor.

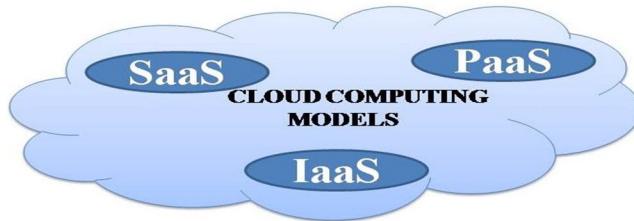


Fig: Cloud Computing Models

2.3 Deployment models:

2.3.1. Public cloud: Public cloud is accessible to everyone. In this, same infrastructure is shared by all the customers, where they are managed and maintained by the cloud provider.



2.3.2. Private cloud: Private clouds are building up for a particular organization containing of multiple users. These have more security and privacy. It requires capital investment and experts to build and maintain.

2.3.3. Hybrid Cloud: Combination of both public cloud and private cloud is hybrid cloud. Computing flexibility is increased. Maximum of workload is deployed on the private cloud. Resources available in public cloud can be used when there is overflow of resources in a private cloud.

3. Security risks

In this paper we come across four types of security risks. They are

- 1) Data related security
- 2) Application related security
- 3) Network level attacks.

3.1Data related security:

Cloud computing is reliant on internet technology. This can be considered as a major disadvantage of cloud computing because one can access the cloud only by internet connection. So we need to consider secure data transfer on a secure data channel.

- 1) Data Infringement
- 2) Data Location
- 3) Data recovery.

3.1.1 Data Infringement: Data infringement refers as data breach which refers as an occurrence of unauthorized access or viewing or reclaim of data by an individual or application. We can describe it as making the data public in an unsecured or unauthorized location.

We can reduce this by small techniques in the business world.



Most of the companies allow the employees to use their own electronics in the office and work with them on company projects and they are able to access the Internet through office WiFi. This may infect the intranet as if any, personal device infected with viruses or malware. A good solution to this is, office need to provide electronic devices to do their job.

Requires all employees to use strong password protection, it becomes difficult for a hacker to crack a device.

Encryption needed to be installed on all devices used to send or receive sensitive data.

3.1.2 Data Location: We do not know precisely where the data is hosted, when we use cloud. Actually, we might not know in which country it is stored. We need to ask providers to store and process data indefinite authority and need to have a commitment to act upon local confidential requirements as Gartner advises. This issue concern can also be worked out by creating protected SaaS model which provides consistency in the area of the data stored to the customer.

3.1.3 Data recovery: Data recovery refers to the process of data backup and allowing systems to recover data due to loss of data. It involves copying and documenting computer data, in order that it can access, if data corrupted or deleted. Data recovery is a part of disaster recovery.

There may be a chance that server breaks down and it damages the customer's data. Data need to be backed up to avoid this by allowing users to synchronize their local documents with cloud account, so that they can be recovered in the future.

3.2 Application related security issues: In this sector, we come across the cloud malware injection attack, cookie poisoning, backdoor and debug option related issues.



3.2.1 Cloud malware injection attack: This attack is executed by developing malicious software and adding to the cloud system. Once it is added, attacker shows it as a valid occurrence to the cloud system. On success, user requests its service and it is executed. There are chances of hardware damage, if the cloud accepts the virus instance.

In order to avoid it reliable checks need to be performed on requests. We can create a hash value for storing original source; thereby attacker needs to create valid hash value to add up malicious software in the cloud system.

3.2.2 Cookie poisoning: Cookie poisoning is an unauthorized access of data in a cookie and retrieves some information. Concentrating on cookies to hack the data is referred as cookie poisoning. We need to clean up the cookie or encrypt data to avoid cookie poisoning.

3.2.3 Backdoor and debug option: Debug option is generally used by the developers when they make website public. These sometimes act as a backdoor for the hackers and change the website, if the options are enabled unseen. Therefore, developer needs to disable the debug option to avoid this attack.

3.3 Network level attacks: The network level security enables data availability, integrity and confidentiality when data moves from or to an organization in public cloud architecture.

3.3.1 Replay attack: Replay attack is a network attack, which involves transmission of valid data repeatedly for a service and gain access to unauthorized resources. We can easily detect this attack on web as payload information is available. We can detect the patterns more easily with the usage of right tools.

3.3.2 IP spoofing: IP spoofing is making the IP address look like authentic by masking it. It is a process of taking control through a fake IP



address. In order to prevent this, we need to organize firewall rules to monitor and filter out harmful traffic.

3.3.3 DNS attacks: In DNS attack, attacker prevents the authorized user from accessing the service. In general, user knows domain name rather than IP address, because of this reason; he may route to some other cloudin preference he asked.

Other attacks

ATTACK	PREVENTION
Sniffer attack	<ul style="list-style-type: none">➤ Implement Internet Protocol Security (IPSec) to encrypt network traffic➤ using one time password
Virtual Server	<ul style="list-style-type: none">➤ We need to follow operational security procedures
SQL injection	<ul style="list-style-type: none">➤ Avoid dynamic generated SQL
DOS attack	<ul style="list-style-type: none">➤ Proper configuration of firewalls➤ Using strong password policies

Security requirements in cloud computing:

In order to develop secure cloud system, we need to have these security requirements.

Confidentiality: The avoidance of unauthorized access of information from harmful gatecrasher and allowing access to sensitive data for authorized users refers to confidentiality.

Integrity: Integrity refers to safeguard the data from unauthorized user alteration. In cloud, integrity refers to avoiding modifications from an unauthorized users and avoiding modification of unauthorized data by authorized user.



Availability: This ensures that the cloud services, Cloud data, computing resources are enable and manage when needed.

Authentication: The process of ensuring and confirming a user's identity is referred as authentication. In cloud, we ensure authenticated user by the process of testing the user's identity.

Non repudiation: The process of using digital signature between the parties assuring the message transmission. The key should not be public knowingly or unknowingly.

Challenges in Cloud Computing

The world steps towards changeover to the cloud by increasing the value of business. This even changeover involves the benefits as well as challenges. The cloud computing is not open from issues like any new technology. Some of the important challenges are as follows.

Security: Cloud computing also faces some security challenges in terms of data segregation, multi tenancy issue, authentication, sensitive data access, etc. Security also a challenge for the startup companies due to shortage of resources. Some of the solutions include cryptography, secure interfaces and legal support. Therefore, one needs to understand the challenges in cloud system and develop solutions for the success of the budding model.

Service level agreement: Service level agreement is a contract for new services and associations in the cloud system between cloud provider and customer. It is a relationship in measurable term. The challenge lies in the violation of agreement. Providers deals with melancholic customers, when it occurs. On breaking the agreement, the cost would intimidate company's profits.

Performance: Cloud system must provide enhanced performance and the performance is evaluated by the applications ability in the cloud system. Users normally prefer to use more than one cloud. The data



concerted applications challenges to provide suitable resources. Performance may result poor due to lack of good resources which may lead to poor service delivery.

Interoperability: It refers to the property of uncontrolled distribution of resources between different resources. Cloud users have an ability to use the application across various cloud platforms. Lack of open standards and interfaces becomes a challenge for interoperability.

Resource management: Resource management describes the efficient usage of resources. Different resource allocation approaches need to be followed in cloud system because it is a collaboration of different technologies. Different scheduling algorithms need to follow for resource selection, resource allocation and resource release. If this is not properly done, it leads to performance degrade and wastage of resources.

Conclusion

One of the revolution in the world of computers is could computing. Cloud computing is expected to transform the landscape of IT industry. It has bright prospects in future, but it needs to address the certain issues like security, interoperability, performance, scalability, reliability, etc. In this paper, we discussed about attributes, service models and deployment models of cloud computing, security risks, security requirements and challenges of cloud computing. Data related security is the major issue and the paper also addressed the other issues like application related, network related, etc and solutions to prevent the attacks. Customers often concern about security in adoption of cloud. Cloud vendors need to inform to their customers about the security levels, they provide to cloud systems. It is required to develop new security techniques to work with cloud architecture along with improvements of old techniques. The further research work



includes the design challenging issues in the architecture of cloud system.

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ECO FRIENDLY CONSTRUCTION METHODS AND MATERIALS

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INTRODUCTION :

In today's world of climate change and high energy prices, it is critical that buildings use as few fossil fuels as possible to "future proof" the home against unpredictable and rapidly rising prices. There are many definitions of what a green building is or does. Definitions may range from a building that is "not as bad" as the average building in terms of its impact on the environment or one that is "notably better" than the average building, to one that may even represent a regenerative process where there is actually an improvement and restoration of the site and its surrounding environment. The ideal "green" project preserves and restores habitat that is vital for sustaining life and becomes a net producer and exporter of resources, materials, energy and water rather than being a net consumer. A green building is one whose construction and lifetime of operation assure the healthiest possible environment while representing the most efficient and least disruptive use of land water, energy and resources.

SETTING GREEN GOALS AND OBJECTIVES...

Once the decision to build green has been made, one of the first steps in the green design process is to establish firm environmental goals for the project. This is often done during what is called a goal setting or targeting session. During this session, it is important to set specific measurable goals for things like energy efficiency, water conservation, on-site treatment of rain water and storm water,



material and resource management, construction waste management, and to assign responsibility for meeting these goals to specific members of the design team. Each goal needs a champion who will see that objective through to the end.

GREEN BUILDING ...

The 'Green Building' concept is gaining importance in various countries, including India. These are buildings that ensure that waste is minimized at every stage during the construction and operation of the building, resulting in low costs, according to experts in the technology. A green building is a structure that is environmentally responsible and resource efficient throughout its life-cycle. Expand and complement the classical building design, concerns of economy, utility, durability and comfort.

COMPACTED FLY ASH BLOCKS...

A mixture of lime, fly ash and stone crusher dust can be compacted into a high-density block. Lime reacts with fly ash minerals forming water insoluble bonds imparting strength . Some advantages of the technology are:

- (a) decentralized production in tiny scale industries,
- (b) utilization of industrial waste products and
- (c) energy efficient and environment friendly.

STABILIZED MUD BLOCK FOR MASONARY-

Stabilized mud blocks (SMB) are energy efficient eco-friendly alternatives to burnt clay bricks. These are solid blocks manufactured by compacting a mixture of soil, sand, stabilizer (cement/lime) and water. After 28 days curing, these blocks are used for wall construction. Compressive strength of the block greatly depends upon



the soil composition, density of the block and percentage of stabilizer (cement/lime).

Major advantages of SMB are:

- (a) energy efficient, do not require burning, 60–70% energy saving when compared with burnt clay bricks,
- (b) decentralized production, production on site is possible,
- (c) utilization of other industrial solid wastes like stone quarry dust, fly ash etc. and
- (d) easy to adjust the block strength by adjusting stabilizer content.

BLENDED CEMENT-

These are cements containing a high volume of one or more complementary cementing materials (CCM), such as coal fly ash , granulated slag, silica fume and reactive rice-husk ash. A large volume of CO₂ is directly emitted during the cement manufacturing process (0.9 tonnes/tone of clinker). Reduction in the quantity of clinker by substituting

with CCM results in lesser CO₂ emissions.

GREEN TECHNOLOGY FOR ROAD CONSTRUCTION

Lime reacts with fly ash minerals forming water insoluble road construction technology needs changes to minimize dam bonds imparting strength to the block. Some advantages of the technology are:

- (a) decentralized production in tiny scale indususage to the environment of the earth. Aggregates are heated to tries,
- (b) utilization of industrial waste products and
- (c) energy temperatures between 1500C and 1800C for drying, proper efficient and



environment friendly coating and mixing with bitumen. Mixing temperature of bituminous mixes can be lowered by using foamed bitumen, tumen emulsion and some chemicals which reduce the viscosity of bitumen so that less fuel is used with consequent reduction of green house gases. Use of recycled plastic, recycled aggregates and municipal wastes will slow down the degradation of the earth. pavement can be designed to help charging of groundwater. Municipal wastes consist of considerable amount of waste materials such as plaster, bricks bats, demolished concrete. They can easily be used as materials for widening of roads as well as new road construction. Some of the waste product from coal mining is highly variable and sometimes may get ignited due to presence of pyrites. If they are used deep in embankment, there is little risk of combustion due to too low air content to allow combustion All footpaths, parking yards, roads of residential area. Fly ash Block slow volume roads can be made permeable so that rain water

GREEN TECHNOLOGY FOR ECO- FRIENDLY HOUSE

Buildings are one of the major consumers of energy and are the third largest consumers of energy, after industry and agriculture. Buildings annually consume more than 20% of electricity used in India. The awareness about the impact of depletion of fossil fuels and global warming phenomena has led to renewed interest in the green technologies. Eco-friendly house uses the naturally available resources. The house can be built in such a way that it can use the naturally available light and ventilation. The openings can be provided in south-west side which will provide better ventilation. Windows can be placed considering cross ventilation concept. Wind breakers can be provided for west side windows which will guide more air in the house. Higher ceiling height can be provided than the conventional one which will give relatively cool air at the leaving area. If the built up area is less then more space will be available around the building for air



circulation. Solar panels can be installed which will reduce the burden on the electricity consumption. Solar system can be used for the cooking of food as well as water heating. This will reduce the consumption of electricity or LPG. Implementation of rain water harvesting system can be beneficial in many ways. Few of them are

- i) Independent and ample supply of water in the dwelling.
- ii) Water received is free of costs. Use of this water significantly reduces water bills for purchased water from municipal supply.
- iii) Costs incurred for purifying the water for potable use are nominal.
- iv) For users located in the rural areas, an independent supply of water avoids the cost of installing a public water supply system.
- v) Rainwater harvesting lessens local soil erosion and flooding caused by rapid runoff of water from impervious cover such as pavements and roofs.

WOOL BRICKS

The objective was to produce bricks reinforced with wool and to obtain a composite that was more sustainable , non-toxic, using abundant local materials, and would mechanically improve the brick's strength Amazingly, with the added wool and alginate (a natural polymer found in seaweed) the researchers' mechanical tests discovered that this new brick was 37% stronger than regular unfired, stabilized earth bricks.These fibres improve the strength of compressed bricks reduce the formation of fissures and deformities as a result of contraction,reduce drying time and increases the bricks resistance to flexion.

SOLAR TILES - It exist only to protect the building . They spend large portion of day by absorbing energy from the sun.



PAPER INSULATION – Made from recycled newspaper and cardboard. Then mixed with Chemical form. They are insect resistant and fire retardant .

TRIPLE GLAZED WINDOW- Super-efficient windows. Stops heat to enter the building & from direct sun

ECO-FRIENDLY – Using of bamboo stick instead instead of steel bars

SOCIAL BENIFITS:

- Enhance occupant comfort and health
- Heighten aesthetic qualities
- Minimize strain on local infrastructure
- Improve overall quality of life

ENVIRONMENTAL BENEFITS:

- Enhance and protect biodiversity and ecosystems
- Improve air and water quality
- Reduce waste streams
- Conserve and restore natural resources

ECONOMICAL BENEFITS :

- Reduce operating costs
- Create, expand, and shape markets for green product and services
- Improve occupant productivity
- Optimize life-cycle economic performance

MERITS OF GREENBUILDING :

- Efficient Technologies
- Easier Maintenance
- Return On Investment
- Improved Indoor Air Quality
- Energy Efficiency
- Waste Reduction
- Temperature Moderation
- Water Conservation
- Economical Construction For Poor
- Healthier Lifestyles and Recreation



- Improved Health

DEMERITS OF GREEN BUILDING :

- Initial Cost Is High
- Availability Of Materials
- Need More Time To Construct
- Need Skiled Worker

CONCLUSION

Nowadays, we should make a way to maximize our natural resources and also help our mother earth to get some relief since pollution is everywhere plus the global warming that we are all experiencing. Non-renewable energy is expensive and unsafe but did you know that through green building we can save a lot of energy. Before that, let's define first the meaning of *green building* (know also as green construction is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and deconstruction. The importance of this is it lessen the consume of energy and the pollution as well because the more we use nonrenewable energy the higher the risk of pollution.

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EXPERIMENTAL STUDY ON PROPERTIES OF TERNARY BLENDED FIBRE REINFORCED SELF COMPACTING CONCRETE

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I. INTRODUCTION

Concrete is the age old building material which is abundantly used in construction, and it is most likely that it will continue to have the same influence in future. However, these construction and engineering materials must meet new and higher demands. One direction in this evolution is towards self-compaction concrete (SCC) modified product that, without additional compaction energy, flows and consolidation under the influence of its own weight. The use of SCC offers a more industrial production. Not only will it reduce the risky tasks for labours, it can also reduce the in situ cast concrete constructions, due to fast construction quality, durability, surface finish and reliability of concrete structures.

Generally SCC requires a large content of binder and chemical admixtures compared to ordinary concrete; its material cost is generally 20-50% higher, which has been a major hindrance to a wider implementation of its use. There is growing evidence that incorporating high volumes of mineral admixtures and micro fillers as partial replacement for Portland cement in SCC can make it cost effective. However, the strength and durability of such SCC needs to be proven. Compared to normally vibrated concrete, self-compacting concrete possesses enhanced qualities and improves productivity and working conditions due to elimination of compaction. SCC generally has higher powder content than Normally Vibrated Concrete (NVC) and thus it is



necessary to replace some of the cement by additions to achieve an economical and durable concrete.

SCC is a complex mix, strongly dependent upon the composition and the characteristics of its ingredients. It has to possess the incompatible properties of high flowability to gather with high segregation resistance. These properties can be achieved by considering high fine particle content as additional filler material or by using the dispersing effect of high range water reducing agents or in combination of both.

The method for achieving self-compactability involves not only high deformability of paste or mortar, but also resistance to segregation between coarse aggregate and zone of reinforcing bars (Okamura and Ozawa). Homogeneity of SCC is its ability to remain unsegregated during transport and placing. The methods adopted by Okamura and Ozawa to achieve self-compactability are Limited aggregate content, Low water-powder ratio, Use of super plasticizer.

Fly ash is finely divided residue that results from the combustion of coal and transported by flue gas. India is a resourceful country for fly ash generation with an annual output of over 110 million tones, but utilization is still below 20% in spite of quantum jump in last three to four years. Rice husk ash is obtained by burning rice husk in a controlled manner without causing environmental pollution. When it is properly burnt it has high SiO₂ content and can be used as a concrete admixture. Rice husk ash exhibits high Pozzolanic characteristics and contributes to high strength and high impermeability of concrete.

The objective of the present work is to study the influence of rice husk ash along with fly ash as partial replacement of cement on properties of ternary blended self-compacting concrete. To study the



influence of steel fibers in various percentages on the properties of ternary blended self-compacting concrete.

II. LITERATURE REVIEW

EFNARC(2002)[1] investigated that the SCC flows alone under its dead weight upto leveling, airs out and consolidates itself thereby without any entry of additional compaction energy and without a nameable segregation. Due to the high content of powder, SCC may show more plastic shrinkage or creep than ordinary concrete mixes. These aspects should therefore be considered during designing and specifying SCC. Current knowledge these aspects are limited and this is an area requiring further research.

B. Krishna Rao, Prof. V. Ravindra[11] (2010) investigation was performed to compare the properties of plain normal compacting concrete (NCC) and SCC with steel fiber. Ten SCC mixtures and one NCC were investigated in this study. The content of the cementitious materials was maintained constant (600 kg/m³), while the water / cementitious material ratio is kept constant 0.31. The self-compacting mixtures had a cement replacement of 35% by weight of Class F fly ash. The variables in this study were aspect ratio (0, 15, 25 and 35) and percentage of volume fraction (0, 0.5, 1.0 and 1.5) of steel fibers. Compressive strength, splitting tensile strength and flexural strength of the concrete were determined for the hardened properties. A marginal improvement in the ultimate strength was observed. The addition of fiber enhanced the ductility significantly. The results indicated that high-volume of fly ash can be used to produce Steel fiber reinforced self- compacting concrete, even though there is some increase in the concrete strength because of the use of steel fiber and high-volume of flyash.

M Chandrasekhar, , M V Seshagiri Rao, Maganti Janardhana[14] (2011) have investigated the behavior of standard



grade hybrid fiber reinforced self-compacting concrete which is made with a combination of steel and glass fibers in suitable proportion. It is observed that the confinement of the concrete has increased the 28 days strength from 12.39% to 28.2% for different percentages of confinements and It peak stress and corresponding strain at peak stress increases with increase in

percentage confinements. An empirical equation is proposed between E and fck, in the form of $E=5700\sqrt{f_{ck}}$. Out of the two analytical models were proposed for the stress-strain behavior of HFRSCC under different confinements it is observed that the model based on Seanz equation is closely agreeing with experimental results.

Nitish Chahotra[15] (2011) investigated the properties of SCC containing flyash and Silica Fume and concluded that for 35% replacement of flyash, the fresh properties were good as compared to 15% to 25%.

Tarun R. Naik[16] (2004) found that the replacement level of cement with Fly ash increased from 0% to 20%, 35%, 45%, and 55%, the 3-day compressive strength of SCC decreased. The decrease in strength was probably due to longer initial-setting time and final-setting time of SCC containing a considerable amount of Fly ash. However, with the increase in age, concrete with a replacement of cement with fly ash gained considerable strength. The strength of mix made with 20% replacement of cement with

fly ash, was somewhat higher than that of mix with 0% replacement of cement at 7 days, and considerably higher strength than that of Control Mixture at 28 days. SCC mixtures made with 35% replacement of cement with Class C fly ash showed almost equivalent 7- day strength compared with mix of 0% replacement of cement and higher 28-day strength compared with Control Mixture. SCC mixtures made with 45% and 55% replacements of cement with fly ash showed very low 3-day



strength, and the mixture made with 55% replacement of cement showed low 7-day strength. However, the 28-day strength of the SCC mixtures with 45% fly ash was equivalent to that of Control Mixture. Mix with 55% fly ash showed a considerable strength gain after the age of 7 days, and its 28-day strength was nearly equivalent to that of Control Mixture.

Sahmaran et al. [17] (2009) studied the tensile strength of self-compacting concrete using Fly ash. Split tensile strength tests were carried out at 28, 90 and 180 days respectively. The split tensile strength ranges from 3.21 to 5.07 MPa, 3.64 to 5.14 MPa and 4.19 to 5.64 MPa at 28, 90 and 180 days, respectively. The split tensile strength of all SCC mixtures increased with age. The results showed that, an increase in the Flyash content decreased the split tensile strength of the SCC especially at 28 days. 33 SCC mixtures containing 30–50% Flyash replacement showed higher split tensile strength than SCC mixtures containing 60–70% Flyash replacement. The mixtures containing 60–70% Flyash showed lower tensile strength probably due to the weaker bond between the matrix and the aggregates.

III. EXPERIMENTAL INVESTIGATION

A. Materials

Cement: Ordinary Portland cement (Ultra tech cement) of 53 grade confirming to IS: 12269- 1987 was used. It was tested for its physical properties as per IS 4031 (part II)-1988 and chemical properties as per IS: 12269.

Aggregate: The size, shape and gradation of the aggregate play an important role in achieving a proper concrete. The flaky and elongated particles will lead to blocking problems in confined zones. The sizes of aggregates will depend upon the size of rebar spacing.



The coarse aggregate chosen for Ternary Blended Concrete is typically angular in shape, is well graded, and smaller in maximum size that suited for SCC. It should have a maximum aggregate size of 20mm. Gradation is an important factor in choosing a coarse aggregate, especially in typical uses of ternary blended concrete. Gap-graded coarse aggregate promotes segregation to a greater degree than the well graded coarse aggregate.

Fine Aggregate: The locally available sand is used as fine aggregate in the present investigation. The sand is free from clayey matter, salt and organic impurities. The sand is tested for various properties like specific gravity, sieve analysis, bulk density etc., and in accordance with IS 2386-1963. The fine aggregate is conforming to standard specifications

Coarse Aggregate: Machine crushed angular granite of 16mm nominal size from the local source is used as coarse aggregate. It is free from impurities such as dust, clay particles and organic matter etc. The physical properties of coarse aggregate were investigated in accordance with IS 2386 -1963

Fly Ash: The fly ash obtained from Hyderabad Industries, Andhra Pradesh is used in the present experimental work.

Rice Husk Ash: SILPOZZ Rice husk ash obtained from Orissa is used. The specific gravity of rice husk ash is 2.4. The rice husk ash is in conformity with the general requirement of Pozzolona.

Fibers: Dramix steel fibers with aspect ratio 80/60 were used.

Water: Locally available water used for mixing and curing which is potable and is free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete or steel.



Super Plasticizer: Sika Viscocrete-10 R2 high performance superplasticiser obtained from Sika Chemicals Pvt. Ltd. is used to improve fluidity of concrete and produce SCC with high levels of workability without segregation.

Viscosity modifying agent (VMA):

Sika stabilizer obtained from Sika Chemicals Pvt. Ltd. is used as VMA to produce robust concrete.

B. Mixes:

In the present investigation M30 mix design is considered as reference concrete (SCC) for obtaining the optimum mix proportion. Keeping optimum mix proportion as reference ternary blended SCC is produced by using Fly Ash and Rice Husk Ash. Based on the literature review, Fly Ash content was fixed at 30% and Rice Husk Ash was varied (4%, 6%, 8%, 10%, 12%). The optimum ternary mix proportion was kept as reference and fibers were incorporated in varying percentages (0, 0.5%, 1%, 1.5%, 2%) .

C. Mixing, Casting, Curing and Testing:

All the triple blended composites were mixed in the pan mixer. Required number of specimens for various combinations were cast. Continuous curing was maintained upto the age of 3, 7 & 28 days. Mixing, casting, curing and testing were carried out as per the standard specifications. The maximum percentage of fibers for compressive, tensile and flexure strength were noted.

IV. RESULTS AND DISCUSSIONS

Results obtained from experimental investigation to study the properties of ternary blended FRSCC are discussed in detail as given below.



Based on the present investigation, the studies of strength behavior of the Steel Fiber Reinforced Self Compacting Concrete, and the following observations have been made.

1) From Table 1 with a constant rate of 30% Fly Ash, the Rice Husk Ash is added up to 12% starting from 4% with an increase of 2% in each case. The obtained mix has satisfied the EFNARC specifications.

Table No: 1 Workability parameters of Ternary Blended SCC against EFNARC values.

Test Method	Property	Unit	Min	Max	% of RHA (30% FA)					
					0%	4%	6%	8%	10%	12%
Slump flow	Filling ability	mm	650	800	710	695	698	680	675	675
T50 slump flow		sec	2	5	3.3	4.0	4.5	5.0	5.1	5.4
V-funnel	Filling ability	sec	6	12	7.3	7.6	7.8	8.0	8.7	9.8
L-Box	Passing ability	%	0.8	1.0	0.82	0.85	0.88	0.86	0.9	0.92

2) Dramix fibers of aspect ratio 80/60 are added up to 2% with an increase of 0.5%. From Table 2 the SFRSCC have satisfied the EFNARC specifications up to 2% by volume of concrete. Beyond 2% EFNARC specifications are not satisfied.



Table No: 2 Workability parameters of SFRSCC (FA30 RHA6) against EFNARC values (Aspect ratio = 80/60).

Test Method	Property	Unit	Min	Max	% of fibers				
					0%	0.5%	1.0%	1.5%	2.0%
Slump flow	Filling ability	mm	650	800	698	685	680	660	640
T50 slump flow		sec	2	5	4.5	4.5	5.2	5.0	5.5
V-funnel	Filling ability	sec	6	12	7.8	7.4	7.8	9.8	10.0
L-Box	Passing ability	%	0.8	1.0	0.88	0.92	0.94	0.9	0.92

3) From Table 3 Ternary blended SCC has improved the compressive strength with age. The maximum value being 26.06 MPa and 39.59 MPa for 7 and 28 days respectively.

The optimum percentage value of Rice Husk Ash may be taken as 6%.

4) From Table 4 the SFRSCC has improved the compressive strength with age irrespective of amount of fibers added to the concrete. The SFRSCC has improved the compressive strength as % of fibers in concrete increased. The optimum value of fibers may be taken as 1.5% by volume of concrete.

5) From Table 5 the flexural strength of SFRSCC has been increasing with respect to the increased amount of steel fibers. Though it may be affected by aspect ratio. There was about 21.5% increase in flexural strength when compared to plain SCC.

6) From Table 6 the SFRSCC has shown an improvement in split tensile strength with respect to the increase in the amount of Dramix steel fibers. There was about 12.2% increase in split tensile strength when compared to plain SCC.

7) From Table 6.7 there was not much significant reduction in cost from SCC to Ternary Blended SCC. However the cost depends on the availability of material. Since in this project Rice Husk Ash is bought from Orissa, the cost was somewhat more.

Table No.3 Compressive Strength of Ternary Blended SCC.

Sl.No	Specimen	Strength in N/mm ²		Avg.Strength in N/mm ²	
		7 days	28 days	7 days	28 days
1	F0 RHA0	29.55	35.19	28.4	32.9
2		28	32.7		
3		28.8	34		
1	F30 RHA4	25.33	38.0	25.25	37.96
2		25.11	37.77		
3		25.33	38.13		
1	F30 RHA6	26.66	39.02	26.06	39.59
2		25.77	40.0		
3		25.77	39.77		
1	F30 RHA8	25.55	39.55	25.47	39.24
2		25.33	38.22		
3		25.55	39.55		
1	F30 RHA10	24.44	38.22	24.74	38.14
2		25.34	37.77		
3		24.44	38.45		
1	F30 RHA12	24.22	37.77	24.52	36.29
2		24.89	35.55		
3		24.45	35.55		

Table No.4 Compressive Strength of Fiber Reinforced SCC

Sl.No	Specimen	% of fibers	Strength in N/mm ²		Avg.Strength in N/mm ²	
			7 days	28 days	7 days	28 days
1	F0 RHA0	0	26.66	39.02	26.06	39.59
2			25.77	40.0		
3			25.77	39.77		
1	F30 RHA4	0.5	30.02	41011	29.64	40.66
2			28.88	40		
3			30.02	40.88		
1	F30 RHA6	1	30	40	30	39.84
2			30.02	39.77		
3			30	39.77		
1	F30 RHA8	1.5	31.11	42.22	34.74	42.22
2			30.66	42.66		
3			31.11	42		
1	F30 RHA10	2	30.66	42	30.51	41.66
2			30.44	41.7		
3			30.44	42		

Table No.5 Flexural Strength of ternary blended FRSCC Mixtures at 28 days curing

Sl.N o	Specimen	% of fibers	Flexure Strength (MPa)
1	PSCC	0	7.34
2	F30 RHA6	0	6.91
3	F30 RHA6	0.5	8.65
4	F30 RHA6	1	8.93
5	F30 RHA6	1.5	8.96
6	F30 RHA6	2	8.93

Table 6 Split Tensile Strength of ternary blended FRSCC Mixtures at 28 days curing

Sl.No	Specimen	% of fibers	Split Tensile Strength (MPa)
1	PSCC	0	4.57
2	F30 RHA6	0	4.25
3	F30 RHA6	0.5	4.02
4	F30 RHA6	1	4.58
5	F30 RHA6	1.5	5.13
6	F30 RHA6	2	4.98

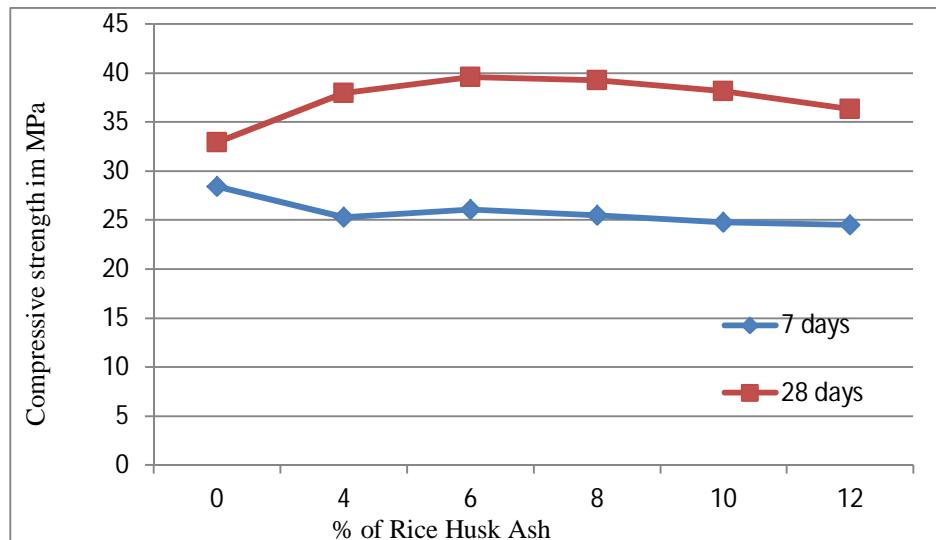
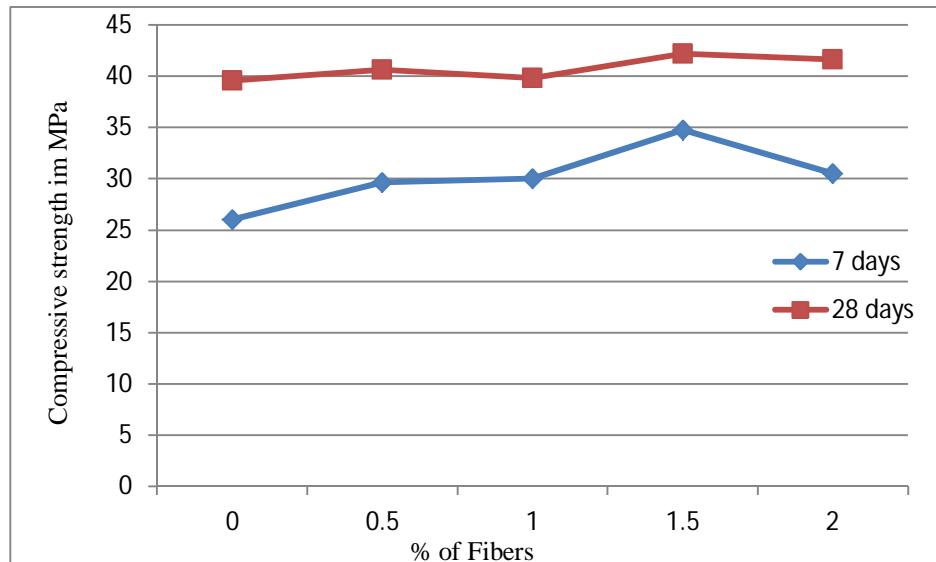
**Figure 1 Compressive Strength of % of Rice Husk Ash****Figure 2 Compressive Strength of % of fibers**

Figure 3 Flexural strength Vs % of Fibers

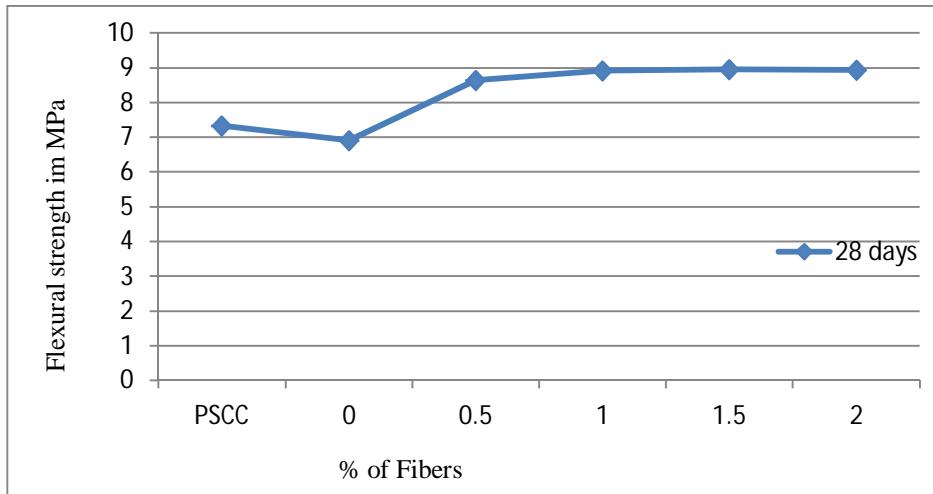
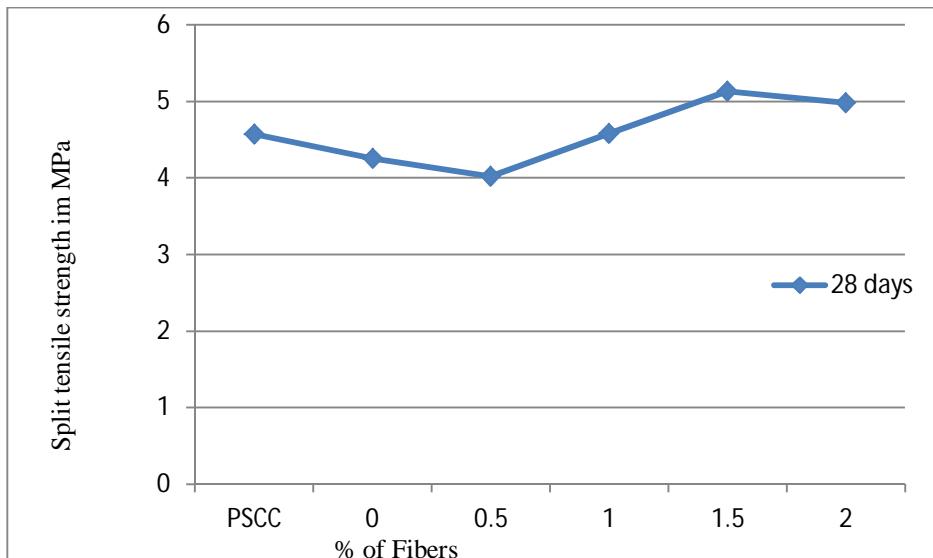


Figure 4 Split tensile strength Vs % of Fibers





V. CONCLUSIONS

This study shows that Rice Husk Ash can be used as replacement to cement in SCC.

1. By using RHA heat of hydration is reduced and also cost analysis shows not much variation in cost, though it is economic than ordinary concrete.
2. Optimum percentage of SCC mix containing RHA and Fly Ash as partial replacement of cement was found to be 6% and 30%.
3. Ternary mix exhibited better consistency in compressive strength development, which indicates a synergy of inert particle interaction between Ordinary Portland Cement, Rice Husk Ash and Fly Ash which enhanced compressive strength property.
4. The SCC developed compressive strength ranging from 24.00 MPa to 29 MPa and from 33.00 MPa to 40 MPa at 7 and 28 days respectively.
5. The Dramix steel fibers are suitable for SCC up to 2% by volume of concrete.
6. The Dramix steel fibers of aspect ratio 80/60 have shown overall improvements of all the properties.
7. The SFRSCC developed compressive strength ranging from 26.00 MPa to 35.00 MPa and from 39.00 MPa to 42 MPa at 7 and 28 days respectively.
8. The SCC developed split tensile strengths ranging from 3.25 to 5.13 Mpa at 28days.
9. The SCC developed flexural strengths ranging from 4.69 to 6.62Mpa at 28 days.



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10. This study has shown that FRSCC can also be applied locally for construction of concrete pavements, base slabs which require not much higher strength.

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AUTOMATED BUS MONITORING AND TICKETING SYSTEM USING RF TRANSCEIVER AND RFID

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I. INTRODUCTION

The automated bus monitoring system using RF transceiver proposed in this paper is designed to track the government buses (especially MTC buses). The purpose of tracking the government bus is to create an advanced bus transport system which helps the people to know about the arrival, departure and current status of the buses to people all around the city. This reduces the traffic, the congestion in bus stops, waiting time of the commuters in the bus stop and unawareness about the arriving and departed buses.

The automated bus ticketing system using RFID proposed in this paper is designed to pay the exact bus fare instantly and automatically. This system is also useful to pay the bus fare without giving away the money during the journey which resolve the problem of giving and collecting exact change. The RFID enabled smart card is used to pay the ticket fare. The purpose of making automated ticketing system is: to reduce the conflict between commuters and conductors regarding the issue of wrong tickets with improper change; to reduce the culprits; to find the culprits and to reduce the usage of papers in the form of tickets.

The RF Transceiver uses RF modules for high speed data transmission. The microelectronic circuit in the digital-RF architecture



works at speed up to 100 GHz. The RF transceivers are available in various ranges at various costs suitable for the user. RFID refers to Radio Frequency Identification that uses three parts namely the reader, antenna and the tag. RFID is classified into two such as active RFID and passive RFID. The tag is nothing but a small chip which consists of a unique id which is burnt at the time of manufacture. The data can be stored in the tag and the amount of data is based on the capacity of the tag. The reader reads the tag when it comes within its range. GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile), is a standard to describe protocols for second generation (2G) digital cellular networks used by mobile phones. Zigbee is a protocol that is used to transfer data wirelessly to a greater distance than Bluetooth in a minimum power usage.

II. NECESSITY OF TECHNOLOGY

The Metropolitan Transport Corporation (MTC) runs an extensive city bus system consisting of 3280 buses on 643 routes, and moves an estimated 5.52 million passengers each day. Chennai's transportation infrastructure provides coverage and connectivity, but growing use has caused traffic congestion. The government has tried to address these problems by constructing grade separators and flyovers at major intersections. But this alone doesn't favor to reduce traffic. Not only the government but also the people get affected more due to the congestion and traffic near the bus stop (fig.1). Infrequent commuters are unaware of the bus schedule for which they are waiting. Actually, in general each and every commuter is unaware of the arriving and departed buses. This in turn paves way for the major congestions near the bus stops and traffic in the city.



Fig.1 Crowded Bus Stop

In order to overcome this hitch the technology comes into play through the system called Automated Bus Monitoring System (ABMS) which is to intimate the people about the current status of the buses i.e., arriving or departed, through the display board and a mobile application flawlessly using RF transceiver and a GSM module. The government also can make a record of the timings of the buses and can check whether the buses are functioning as per the schedule.

The ticketing in Government buses is being carried out manually since several decades. Few years back the MTC introduced ETM (Electronic Ticketing Machine) which found to be useless within a short period of usage. The major issues in these practice is that the manual work of the conductors made to delay the issue of tickets with improper change. Also in many situations especially during the peak hours the buses are made to halt in between the bus stops by the conductor to issue the tickets and collect fare which became a big hindrance to the commuters now-a-days. In addition the buses are being halted by the ticket checking inspectors even during peak hours, creating one more trouble to the people. The checking for tickets despite of peak hours also mean that there are many commuters travelling without tickets.



Therefore to overcome these hitch faced by both government and the commuters the technology comes into play through the system called Automated Bus Ticketing System (ABTS) in which the passenger pay the fare through a smart card and a virtual ticket is generated. This results in a cashless; paperless; less or no ticket checker bus transport system.

III. SYSTEM OVERVIEW

A. Automated Bus Monitoring System

1)System's Description: The ABMS consists of RF transceivers, GSM modem, display boards and a microcontroller. In real time according to ABMS both the bus and bus stop is equipped with RF transceiver, microcontroller and display boards but additionally a GSM modem is installed in the bus stop. As explained above a RF transceiver and a display board will be installed inside the bus along with a microcontroller to control the entire system while the bus stop will be installed with a RF transceiver, a GSM module and a display board along with a microcontroller. If necessary a Zigbee can be installed in the bus stop to extend the range of the RF transceiver.

When the bus, say Bus1, nears the bus stop, say Bus Stop A, the RF transceivers both in the bus and the bus stop will start communicating each other. These transceivers send their corresponding information to each other. The microcontroller processes this information; send the respective information to the display board and the GSM module. The display board in the bus stopA displays the details of the bus 1 that has just arrived the stop. The details may contain the name, number, type, source to destination and the time of arrival of the bus 1. Then this detail is sent to the two successive bus stops, say B and C respectively using the GSM. The stops B and C displays the current status of the bus 1 that it has arrived the stop A and it is yet to arrive in some particular time as calculated(approx.). Meanwhile the RF transceiver in

bus stop A transmits the name of the bus stop which is then displayed in the display board inside the bus; this helps the commuters inside the bus to know the stop they have arrived. If the bus starts moving from stop A then the bus gets out of range of the RF transceiver in the stop which then makes the microcontroller of stop A to change the information such as the bus moves from A to B in the display board where as the GSM makes the corresponding changes to stop B and C. If the bus reaches B then the same procedure follows as proceeded in A and so on.

2) Enhancement of the System: Even though this system helps the commuters, it only focuses on the commuters waiting in the bus stop. In order to make use of the details available in the bus stop by the people all over the city a mobile application is developed in such a way that the user gets the necessary information about the current status of all the buses at the door step. The entire system's layout is shown in figure (fig.2).

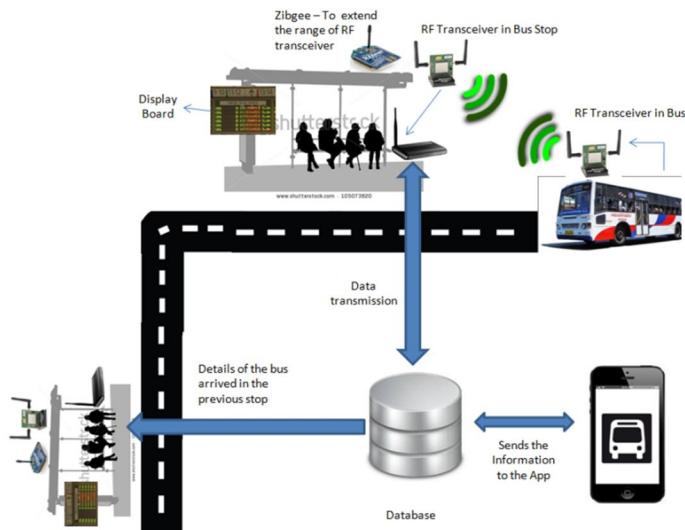


Fig.2 Layout of ABTS



Fig.3 App Sample

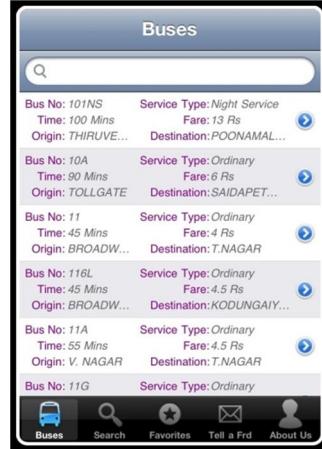


Fig.4 App Sample

The application should be developed in such a manner that the current status of all the buses to be available in one tab and in another tab a search should be made available in order to search the required bus's status. There are many apps available with the entire database of the cities. For example: An iOS mobile app named ChennaiBus is available in apple's app store which has the entire database of Chennai's metropolitan buses.

B. Automated Bus Ticketing System

The ABTS comprises of a smart card and two devices namely Human Detecting Sensor (HDS) and Integrated Ticketing Machine (ITM) (fig.5 & fig.6) which integrates RFID reader, NFC reader, led indicators, a keypad and a small display board. Smartcards are typically the size of a credit card, and contain a microchip (in this case RFID tag) that stores and transmits data using radio frequency identification (RFID), enabling it to communicate with a device within eight centimeters of the card without physical contact. Smartcards are able to store enough information to process monetary transactions and profile a card holder's details for security purpose. Thus each smartcard corresponds to a unique account of the user that holds the money for the

transaction. The user is supposed to recharge the smart card with a minimum balance.



Fig. 5 Sample ITM position



Fig. 6 Sample ITM

1) *Integrated Ticketing Machine*: This seems to be heart of the system. Two ITMs (one for each entrance) are required for each bus. On entering the bus, commuters show their smart card to one of the ITMs then the RFID reader in the ITM will detect the presence of the card; checks for minimum balance; records the card number along with boarding point of that particular commuter into a log such as entry log and then initially debits the ticket fare for the distance from boarding point of the commuter to destination point of the bus.

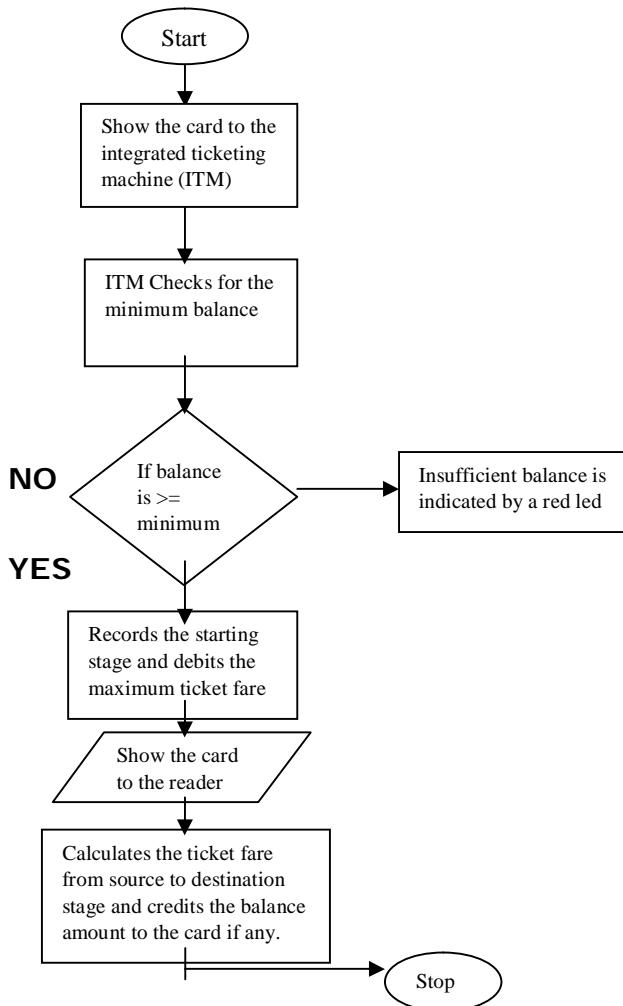


Fig.7 ITM flowchart

The commuter on reaching his destination point is supposed to show the card once again to any one of the ITMs so that the machine detects the card; checks for the card number inside the entry log by which it retrieves the boarding point and now stores the destination point into another log such as exit log; calculates the ticket fare for the distance travelled by the commuter and finally credits the remaining amount



from initially debited amount. The working procedure of the ITM is described as a flow chart in fig.7

2) Human Detecting Sensor: The human detecting sensor is mounted at the top of entrance and exit of the bus in a convenient manner (fig.8). This sensor is capable of differentiating the commuter's movement i.e., entering and existing (fig.9). This paves the way for calculating the number of passengers inside the bus and keeping track of number of commuters entered a particular bus stop. It is used to check whether the commuters are paying the fare correctly. Once the bus has halts in a bus stop the HDS starts counting and storing the number of commuters entering and exiting the bus in its own entry log and exit log respectively.



Fig.8 HDS at the entrance of a bus

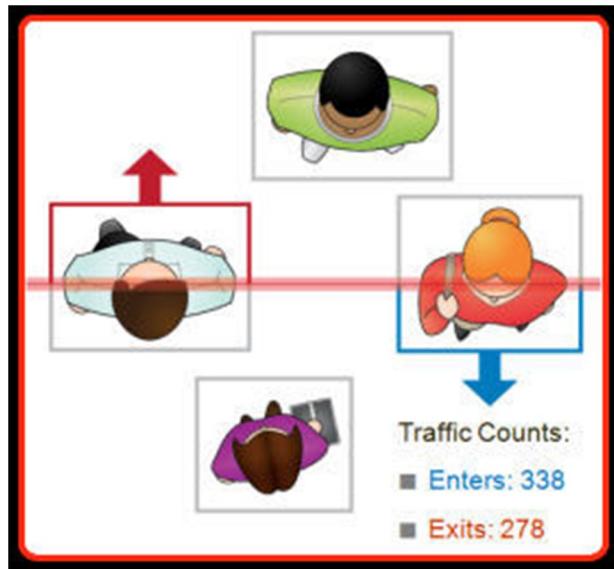


Fig.9 Counting people in HDS

As soon as the door closes, the HDS checks the number of passengers entered and allots an Average Ticketing Time (ATT). Average Ticketing Time is the average time limit within which the passengers are supposed to pay the bus fare. After the ATT expires the HDS compares its entry log with that of the ITM's entry log and if any mismatch occurs it indicates the numbers of commuters who haven't paid the bus fare yet. Then it compares its exit log with that of the ITM's exit log so that and if any mismatch occurs it indicates the number of culprits inside the bus. The working procedure of the HDS is described as a flow chart in fig.10

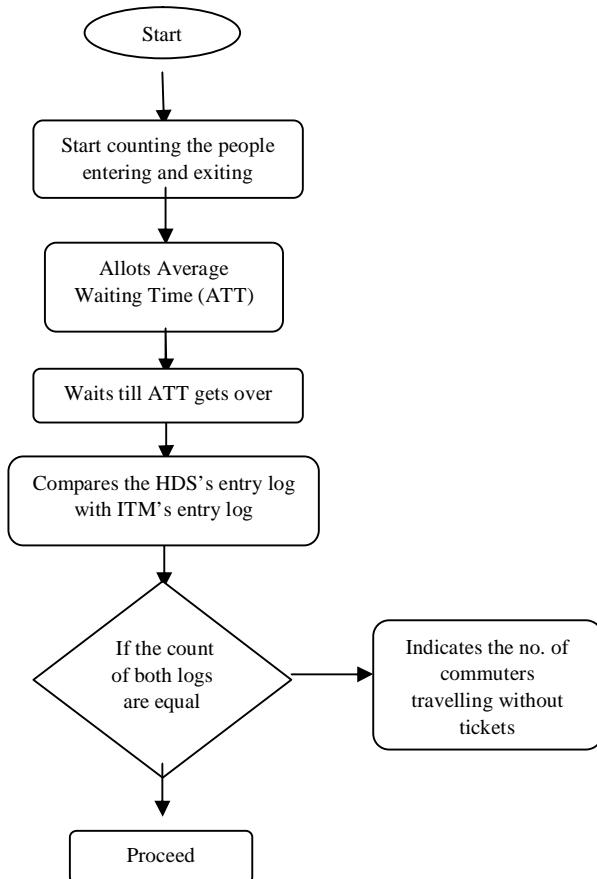


Fig.10 HDS flow chart

NOTE: The HDS is the general term whereas specifically it is known as people counter.

IV. PROTOTYPE EXPERIMENTS AND RESULTS

As substantiation for the ABMS a prototype has been developed using RF transceiver, GSM module, PIC microcontroller 16f887 and 16f883. The prototype is developed as two kits (fig.11) where one is the bus (fig.12) and the other the bus stop (fig13). Three bus stops and three buses have been used in this module. Switches are used to indicate the movement of the buses. We make use of a GSM module (SIM 900) installed with a sim card to retrieve the current status of each bus. A LCD (20X2) is used as a display board that displays the status of the each bus.

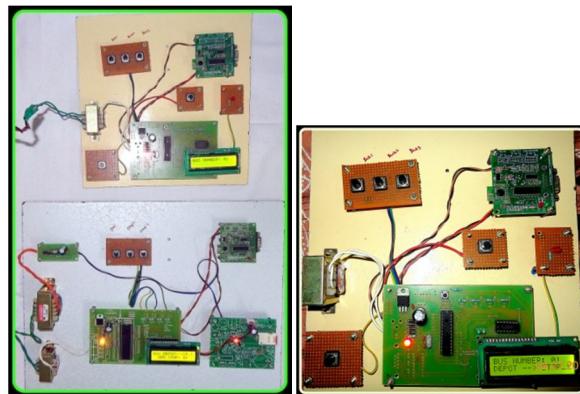


Fig.11 Project Prototype

Fig.12 Bus Kit

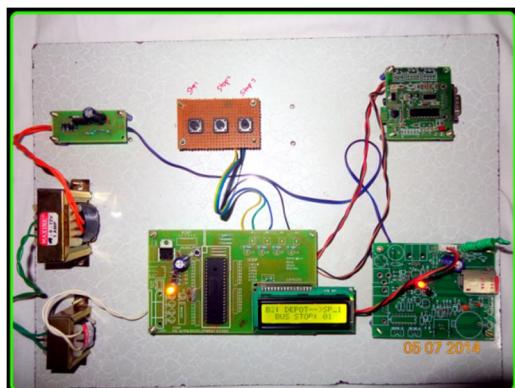


Fig.13 Bus Stop Kit



Thus with the help of a prototype it has been clearly proved that the bus monitoring system can be easily implemented in real time as exactly stated in this paper. The automated bus ticketing system can also be easily implied in real time due to the usage of very common components and an already existing technology.

V. Merits and Demerits:

Result/Outcome of Automated Bus ticketing System

	Traditional ticketing system	Electronic ticketing system	ABTS
Self help/computerized	✗	✗	✓
Involuntary and Spontaneous	✗	✗	✓
Paperless ticketing	✗	✗	✓
Eco friendly	✗	✗	✓
User Friendly	✓	✓	✓
Less time consuming	✓	✗	✓
Issuing Appropriate tickets always	✗	✗	✓
Issuing exact number of tickets always	✗	✗	✓
Avoids misunderstanding	✗	✗	✓
Determines the culprit	✗	✗	✓
Omits ticket inspector	✗	✗	✓
Economical	✓	✓	✗
Not necessary of carrying smartcards	✓	✓	✗
Requires money only for the distance to be travelled	✓	✓	✗

TABLE 1: Merits and Demerits



VI. CONCLUSION

It is believed that by the implementation of this system, problems such as underutilization of buses fleet and long waiting time at the bus station will be reduced. So, both passenger and bus station administrators will benefit from the system as real time information are provided. Resources should be integrated and coordinated based on the RFID, RF transceiver, GSM in the transportation medium which can easily meet the requirement of the public and can meet their emergency & requirement. Thus by implementing this entire system, advanced bus transportation can be achieved which brings the people of the city to a comfort zone. This system can be easily implemented in real time efficiently.

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PSYCHOLOGICAL WELL-BEING, EMOTIONAL INTELLIGENCE AND JOB SATISFACTION

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Introduction

Job satisfaction has been defined in several different ways in the literature. Job satisfaction refers to how content or pleased or happy an individual is with his or her job. Spector (1997) considers job satisfaction as constellation of attitudes comprising about various aspects or facets of the job or as a global feeling about the job. Job satisfaction is generally defined as an employee's affective reactions to a job based on a comparison of desired outcomes and actual outcomes (Cranny, Smith, & Stone;1992). Job satisfaction is the degree to which people like their jobs (Spector, 1997). Job satisfaction leads to employee behaviors that affect organizational functioning and performance (Rowden, 2002). Locke (1969) defined job satisfaction and dissatisfaction as complex emotional reactions to the job (p. 314) Smith, Kendall, and Hulin (1969) conceptualized job satisfaction as "feeling or affective responses to facets of the situation"(p. 6). Grandey(2000) considers job satisfaction as a proxy for an employee's well being at work. Job satisfaction has been one of the important constructs in psychology (Cooper-Hakim and Viswesvaran, 2005; Maertz, Griffeth, Campbell, and Allen, 2007) Psychological well-being and emotional intelligence have recently emerged as two important constructs under positive psychology. The present study attempts to investigate how these two variables have an influence on the job satisfaction of the employees.



Psychological Well-Being

The concept of well-being has recently emerged as an important area of research in positive psychology. Ryan and Deci (2000) describe well-being as a combination of experience and optimal functioning of the individual. In the literature the concept of well-being has been studied from two different approaches, hedonic (subjective well-being) approach and eudemonic (psychological well-being) approach. Subjective well-being is explained as sum total of three components namely life satisfaction, presence of positive affect, and absence of negative affect, while eudemonic approach describes psychological well-being as engagement with existential challenges of life (Keyes, Shmotkin, & Ryff, 2002). Research on hedonic well-being (subjective well-being) gained prominence, while research on eudemonic remained unexplored in the literature (Singh, Kaur, & Singh, 2014). The present research study focuses on the eudemonic approach and attempts to examine how psychological well-being of executives has an influence on their job satisfaction

According to Wright and Cropanzano (2004), psychological well-being may be defined as the overall effectiveness of an individual's psychological functioning. Edwards (2005) defined Psychological well-being as positive mental health. According to Ryff and Keyes (1995) psychological well-being is the positive psychological functioning of individuals. She defined Psychological Well-Being as a state in which an individual can function psychologically well enough to realize his/her true potential. Ryff& Keyes (1995) proposed a model of psychological well-being consisting of six key facets. These facets are: (1) autonomy: refers to a sense of self-determination and personal authority, (2) environmental mastery: indicates to shape one's environment so as to meet personal needs and desires, (3) personal growth: it denotes a sense of continued growth and development as a person, (4) positive relations with others: it indicates to develop and maintain warm and trusting



interpersonal relationships, (5) purpose in life: it refers to the feeling that one's life is purposeful and meaningful, and (6) self-acceptance: this denotes an attempt to feel good about oneself even while aware of one's own limitations. The model proposed by Ryff and Keyes (1995) has emerged as the most researched and accepted conceptualization of psychological well-being in the literature.

Much of the research on psychological well-being and job satisfaction has been carried out in the North American and European context. Very little research has been carried out in the Indian context. The present study attempts to investigate the relationship between psychological well-being and job satisfaction of executives working in Indian organizations.

Emotional Intelligence

Emotional intelligence has recently emerged as one of the most important constructs in the organizational behavior research (Prati, Douglas, Ferris, Ammeter, & Buckley 2003). The importance of emotional intelligence is also being recognized in the area of education, social work and other social science disciplines. Emotional intelligence is observed as an important and necessary individual competency essential for organizational performance (Cherniss, 2001). There is a popular opinion and belief among organizational theorist that emotional intelligence increases performance and productivity in an organization (Lam and Kirby, 2002), and growing evidence indicates that emotional intelligence competency has the potential to improve performance on both personal and organizational levels. However Carmeli (2003) points that research on emotional intelligence is still in the initial phase of understanding the extent to which members with high emotional intelligence would be more valued assets than less emotionally intelligent members of their organization. An article written by Zeidner, Matthews, and Roberts (2004) observed that



emotional intelligence literature has over-relied on expert opinion, anecdotes, beliefs and unpublished surveys, and that scant, empirical evidence exist to support the importance of emotional intelligence in the workplace and recommended that scientific studies be carried out in organizations to examine its importance. Further, Dulewicz and Higgs (2000) indicate that "little research has been conducted in an organizational context" and "there is a need for rigorous research to underpin the assertion in an organizational setting" (p. 341 and p. 351). The present study gains importance in this context and attempts to narrow this gap by empirically testing the degree to which emotional intelligence influences the job satisfaction of executives

Theoretical Framework

In the contemporary world of work, to compete effectively, companies not only must recruit the top talent, but must also inspire and enable employees to apply their full capabilities to their work (Bakker, Albrecht, & Leiter, 2011). Organizations need employees who are not only proactive but are willing to exert and work beyond their job description (Podsakoff & Mackenzie, 1994). They need employees who feel energetic, and are committed to high quality performance standards (Bakker & Leiter, 2010). Emotionally intelligent employees are more likely to engage in favorable outcomes at the work place. Employees with positive feelings react more favorably to others, and have positive emotional reactions to the job, and thus are more likely to have job satisfaction. Research studies done in the area of emotional intelligence indicates that it has a significant relationship with job satisfaction and work attitudes including organizational citizenship behaviour (Busso, 2004; Carson & Carson, 1998; Day & Carroll, 2004; Carmeli & Josman, 2006). Thus based on the review of literature, and the conceptual relationship that exists between emotional intelligence and job satisfaction it can be hypothesized that there will be positive



relationship between emotional intelligence and job satisfaction of executives.

Employee health and well-being has recently gained increased attention in management research. Several researchers have suggested that organizations should adopt healthy workplace practices that focus not only on profitability and productivity of the organization but also contribute to enhance the health and psychological well-being of its employees (Grawitch, Gottschalk, & Munz, 2006; Grawitch, Trares, & Kohler, 2007; Russell, 2008; Wright & Cropanzano, 2004). Research has demonstrated that psychological well-being is related to a variety of organizational outcomes, such as enhanced job performance, job satisfaction and work involvement, increased profitability and competitiveness of the organization, and reduced employee turnover (Grawitch, Gottschalk, & Munz, 2006; Keyes, Hysom, & Lupo, 2000; Russell, 2008; Spector, 1997; Warr, 2005; Wright & Bonnet, 2007). Hence it can be hypothesized that: Psychological well-being will be positively related to the job satisfaction of executives.

Method

Research Design

The present research study is designed on a quantitative research framework which utilized a descriptive research perspective. This study was a non experimental research study in nature and adopted a survey research methodology in which psychometrically sound instruments-questionnaires were used to collect primary data from the executives working in different organizations.

Sample

The sample for the present study comprised of 250 executives drawn from different organizations. Their age range was from 33 to 51 years. Most of the executives were holding middle level managerial position.



Measures

Emotional Intelligence Scale: For measuring emotional intelligence the scale developed by Schutte, Malouff, Hall, Haggerty, Cooper, Golden, and Dornheim (1998) was used. This scale was selected for measuring emotional intelligence, and was preferred over other scales as this scale is based on the framework of emotional intelligence developed by Salovey and Mayer, (1989,1990) and also Mayer and Salovey(1997). This scale comprises of 33 items, having a response format ranging from 1 = strongly disagree to 5 = strongly agree, thus the possible score on this scale range from 33 to 165. High scores on this scale indicate high emotional intelligence. The cronbach's alpha for this scale in the present study was found to be 0.78. This scale has demonstrated adequate internal consistency and construct validity(Ciarrochi, Chan, & Caputi, 2000; Ciarrochi, Chan, & Bajgar, 2001)

Psychological well-being: Psychological well-being scale developed by Carol Ryff (1989) was used in the study. This scale comprises of 54 items having a Likert type response format ranging from strongly disagree (1) to strongly agree (6). This scale is further divided into six dimensions, namely: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. The scores on this scale range from 54 to 324. High score on this scale indicate higher psychological well-being, and low scores indicate low on psychological well-being. This scale is found to be reliable and valid in the literature

Job Satisfaction Scale: For measuring job satisfaction the job satisfaction survey developed by Spector (1997) was used in the study. This scale is a 36 item scale, having a response format ranging from 1 = strongly disagree to 5 = strongly agree. The minimum and maximum possible scores on this scale range from 36 to 180. High scores on this



scale indicate high job satisfaction, and low scores on this scale indicate low job satisfaction. This scale measures job satisfaction on nine different facets, however for the purpose of the present study, the total score on all the 36 items was taken as the measure of job satisfaction. Several studies have employed this job satisfaction scale and have obtained satisfactory internal consistency-reliability coefficients. This scale has also demonstrated construct validity and reliability (Spector, 1985, 1997).

Procedure

All the three questionnaires along with the covering letter were bound in form of a booklet. Initial rapport was established with the executives and later they were briefly explained about the manner of responding to the items on the questionnaires. Executives were encouraged to give frank and honest responses to the items on questionnaires. They were also assured of the confidentiality of their responses. It was also communicated to them that their individual data will not be communicated to the organization.

Results and Discussion

To examine the relationships of emotional intelligence and psychological well-being with job satisfaction the product moment correlation coefficients were computed and presented in table 1.

Table 1
Correlation Coefficients of Emotional intelligence and Psychological Well-being with Job satisfaction

Variable	Correlation Coefficient
Emotional intelligence	0.378**
Psychological Well-Being	0.325**

**p<0.001



From table 1 it can be observed that the correlation coefficient computed between emotional intelligence and job satisfaction, and psychological well-being and job satisfaction is positive and found to be significant ($p < 0.001$). This indicates that there is significant positive relationship between emotional intelligence and job satisfaction; and psychological well-being and job satisfaction. To further examine whether emotional intelligence and psychological well-being scores of executives would predict their job satisfaction scores, the data was subjected to multiple linear regression analysis. Job satisfaction scores were treated as criterion variable and emotional intelligence, and psychological well-being scores were treated as predictor variable. The result thus obtained is presented in table 2.

Table 2
Results of Regression Analysis with Emotional intelligence, and Psychological Well-being predicting job satisfaction of executives

Model	F	df	Adj. R ²	β
Dependent Variable: Job satisfaction	27.705**	2,247	0.189	0.312** 0.587**
Emotional intelligence				
Psychological well-being				

****p<0.001**

It can be observed from table 2 that the F value is significant ($p < 0.001$), this indicates that there exists a linear relationship between emotional intelligence, psychological well-being and job satisfaction, and the model of regression is found to be appropriate. Approximately nineteenpercent ($\text{Adjusted } R^2 = 0.189$) of the variation in the job satisfaction scores of executives can be explained by the changes in the emotional intelligence, and psychological well-being scores of the executives. The last column in table 2 indicates both the standardised



regression coefficients (β) to be significant ($p<0.001$), this indicates that there is a significant influence and impact of emotional intelligence, and psychological well-being on job satisfaction of executives

The significant and positive correlation found between emotional intelligence and job satisfaction; and between psychological well-being and job satisfaction; and the emergence of Emotional intelligence and Psychological well-being as significant predictors of Job satisfaction indicates that emotional intelligence, and psychological well-being of executives influences and predicts their job satisfactions. This result confirms and proves both the hypotheses formulated in the study.

Conclusion

Organization comprises of knowledge workers, proper management of these knowledge workers becomes pertinent in these days of increased global competitiveness among industries. Organizations invest substantially on their employees in the form of training, development and other work related aspects. Job satisfaction of employees contributes significantly to the productivity of the organization. Retaining and managing competent workforce in the organization and expecting them to indulge in extra role behaviours becomes a challenge. The results of the present study suggest that Emotional intelligence and Psychological well-being are significant predictors of job satisfaction of executives. This demonstrates the importance of emotional intelligence, and psychological well-being for enhancing job satisfaction among the executives. This suggests the need for Emotional intelligence, and Psychological well-being training of executives. Basic training in emotional intelligence, and psychological well-being would enable employees to develop their psychological capacities and would result in increased job satisfaction. Human resource managers may also assess the emotional intelligence and



psychological well-being and may include it as selection strategy of employees during the selection process of the personnel. Further studies may be carried out by conducting an intervention, to enhance the emotional intelligence, and psychological well-being of executives. Longitudinal studies may also be carried out to examine how emotional intelligence and psychological well-being would have an influence on job satisfaction of executives over a period of time.

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A BIRDS EYE VIEW ON EUTHANASIA

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"The illiterate of the 21st Century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn"

-Alvin Toffler

Introduction:

Constitution of India has bestowed Fundamental Rights to every Citizen of India. Article 21 deals with one of the Fundamental Rights guaranteed by the Constitution of India. The Right to protection of Life and Personal Liberty is the main object of Article 21. No person shall be deprived of his life or personal liberty except according to the procedure established by law. In the case Law of Maneka Gandhi V. Union of India, AIR 1978 Supreme Court 597, it was held that the Procedure must not only be established by law but, it must be just, fair and reasonable. In the recent past, a fresh debate has been going on the subject of '**Euthanasia**'. **Like his right to life and liberty, does a man has a right to death also?** For generations, people, Governments and Legal luminaries across the world have been debating on the most sensitive and controversial subject, 'Euthanasia'.

Supporters of 'Euthanasia' believe that allowing people to die with dignity is kinder than forcing them to continue their lives with suffering. But the religious minded people on the other hand believe that God created man and only He has the right to take away life in his own good time. *Raisend'retrea* handful of countries have legalized euthanasia makes it all the more thought provoking. Thus there are counter and encounter arguments, are going on Euthanasia across the



world. Against this backdrop, an exertion has been made by focusing a bird's eye view on the origin and growth, verdicts delivered by various judicatures , for and against arguments present stage of the issue in and across the world followed by certain suggestions and logical conclusion.

Meaning and Definition of Euthanasia:-

The New Oxford Dictionary of English defines '*euthanasia*' as ' the painless killing of a patient suffering from an incurable and painful disease or in an irreversible coma'. '*Euthanasia*' comes from two Greek Words, 'eu-', a prefix meaning 'good' or 'well', and '*thanatos*', meaning 'death'. Literally speaking, when someone undergoes euthanasia, their death is good. Normally, for death to be good, living would need to be worse than death. Incurable, Painful disease and irreversible coma are two ways in which living can be worse than dying. In these cases, we might say life is not worth living. In simple parlance the word 'Euthanasia' means mercy killing. There are broadly two types of euthanasia.

1. Passive euthanasia:-In this, life support can be pulled out in case of persons permanently vegetative state. It is nothing but withdrawal of medical treatment with an intention of causing and terminally ill patients death.

2. Active euthanasia:-In this, administering lethal medicine to cause death in case of patients who are terminally ill but not on life support. It is deliberately causing the patients death by injecting poison or giving an over dose of sleeping pills and other lethal medicines.

Origin and Growth:-

Right from the Mahabharatha regime itself, 'self end of life' instances are there. Handing over the rule of the Kingdom to the legal heirs, going to Mahaprasthanam by the Pandavas accompanied by Droupadi,



going to Kasi Pilgrimage and Bhismasself end of life during the Kurukshethrabattle are a few among them. Furthermore '**Sallekhanam**' is also one kind of self end of life during Chandra Guptasmourya's regime in the annals of History. During 1920's and 1930's, certain NGO's have been established and propagating in favour of euthanasia at England in the name and style of '**Dignity in Dying**' with a slogan that 'man should have the right to die with dignity besides free and peace'. In the year 1940 at Germany, it was formed in the name and style of 'Action T4'programme, by the Nazi's meant for eradication of the lives not able to lead. Hitler himself bestowed a dictum to do so. In the first instance, they shed their light against the children, who are suffering from autism, Physically handicappedness and such other syndromes. Subsequently, they focused their attention against the people, who are suffering from Chronical diseases. Consequently by 1945, approximately 3 lakhs Germans were died due to this type of brutal activities in the form of euthanasia. In India preferably at Southern Districts of Tamil Nadu State in the guise of '**Tallaikuthal**', there is a barbaric custom to kill the age old people with an ulterior motive to seize their properties and acquire powers secretly. This brutal incident come to lime light in one case during the year 2010 and a result of the same the Government of Tamil Nadu appointed a Task Force to eradicate this type of unwanted events.

Unique Case Laws and Instances in connection with Euthanasia:

1. P.Rathinam Vs Governement of India, 1994:

In this case, it was held by the Hon'ble Supreme Court that Section 306 of IPC,1860 i.e., 'Committing Suicide is a Crime' which is against to the constitution of India. Albeit in 1996, Full Bench of Supreme Court



annulled this verdict and held that 'right to die' is not at all part and parcel in 'right to live'.

2. A Teacher Vs Govt. of Kerala, 1997:-

A retired teacher filed a Writ petition in the High Court of Kerala for 'Euthanasia'. After 4 years, the Court set aside the W.P. Subsequently by viewing that it is better to die rather than leading with chronic terminal diseases, he committed suicide at the age of 86.

3. ArunaRamachandranbaug Case,2011:-

In 1973, while working at a Junior nurse at King Edward Memorial Hospital, Mumbai, ArunaShanbaug was sexually assaulted by a ward boy, walmiki and has been in a vegetative state ever since. After she had been in this state for 37 years, the Supreme Court responded to the PIL filed by PinkiVeerani, a social activist for euthanasia and delivered its land mark judgment on 7th March,2011 with 110 pages by setting aside the PIL and allowed for passive euthanasia. But the order could not be implemented as the entire staff and the medical fraternity who were looking after her strongly protected against euthanasia. Albeit it is heartening that after 7 years of Rigorous imprisonment, the culprit was released and leading life flamboyantly.

4. In the recent issue of LaxmiSeghal, freedom fighter and Netaji's Associate:-

As she was critically ill and there was no ray of hope of revival, her daughter,Subhashini Ali gave her consent to remove the life support of her mother. With doctors under Hippocratic Oath to save human lives and the Governemt under social and legal obligations on right to life, it is a difficult issue for the judiciary to give a judgment that will satisfy all.



5. A Plea submitted recently by Abhiramasundari to the Chief Minister of Tamil Nadu, Jayalaitha:-

The Women in question filed a petition to the Chief Minister of Tamil Nadu stating that her husband Senthil Kumar committed suicide in 2002 due to severe debts. She is having 2 daughters Nila and Ramya. She is not able to nursingand look after them by doing cooly. Ramya is suffering from Physically and mentally handicappedness and no hope for survival. Hence plead for euthanasia.

6. PIL filed by Common Cause, A Non -Governmental Organization (NGO) before theHon'ble Supreme Court of India:-

In response to the Plea for constitutional validity for euthanasia by the said NGO, a constitutional Bench comprising C.J. RM Lodha and Justices J.S. Khehar, J. Chalameswar, A.K.Sikri and RohintonNariman on 16.07.2014, issued notices to all the states and Union Territories seeking their response to decide an important Question : '**Whether the right to die with dignity was part of the right to live with dignity under Article 21 of the Constitution (right to life and liberty)**' after hearing counsel, PrashantBhushan and Attorney General,MukulRohatgi considering the important questions of law to be decided, senior advocate, TR Andhyarujina was appointed as *amicus curiae* to assist the court.

Present Stage and for and against arguments in respect of implementation of euthanasia in Abroad and India:-

A. In Abroad:-

Only three Countries – Belgium, Columbia and Lexembourg have legalised euthanasia in totality. India, Ireland, Mexico, Netharlands and a few states in the USA like Oregon, Washington, New Mexico, Montana and Vermont have legalised



only passive euthanasia. Briton, Japan, Esrail, Newzeland, Narway, Tarkey and Philippines, vehemently interdicted to implement euthanasia in their Countries. There was no constitutional validity for passive euthanasia at France. However during the election campaign in 2013, the then president of France, Waholand supported for passive euthanasia. In a survey conducted in 2010, 57% of the people supported for passive euthanasia subject to the condition if the doctor co operated on the plea of the patient. Consequent on repeated pleas made by the kins, the doctor who co-operated for another's euthanasia he was punished by the Government of Netharlands in 1973. But the same country in 2002 legalized the euthanasia.

B. In India:-

A debate has been initiated on euthanasia during 1996. Subsequently a marathon Seminar has been held in 2005 on '*the end of life*' issue. Consequently, the then Law Minister, HR. Bharadwaj agreed for passive euthanasia and opined that there should be guidelines to implement the same. In order to study and suggest in this regard, a Law Commission was appointed. In 2006 April, the 17th Law Commission under the Chairmanship of Justice JagannadhaRao recommended for certain guidelines for euthanasia. Subsequently the 19th Law Commission under the Chairmanship of Justice Jeevanreddy in 2012, Aug 12, submitted a report on euthanasia to the Government of India. According to which, euthanasia can be enacted subject to certain guidelines and conditions. By and large they are favourable for the implementation of Passive euthanasia subject to approval from the High Court, consent from the kins of the patient and advice of the Group of Medical Experts. Medical



Council of India(MCI) has also suggested certain guidelines in this regard.

Reflections from the Legal Experts:-

Justice Prashant Bhushan:-

He contended that persons with Chronic Terminal diseases and likely to go into a permanent vegetative state must have the right to execute a "*living will*" to refuse treatment and die. Heed that when a medical expert opined that the person with the terminal diseases had reached a point of no return, then he or she should be given the right to refuse being put on a life support system.

Mukul Rohatgi, Attorney-General of India:-

He advocated that passive euthanasia was a form of suicide which could not be allowed as it was amount to an offence. The issue pertained not only to the Constitution but also involves Morality, Religion and Medical Science and Social issues. He added that the right to die merely because of pain and suffering would not be in the interest of society and was against public policy. Only parliament could make any change in the Law. The ruling in the Aruna Shanbaug Case, upholding the validity of passive euthanasia, was wrong. If legalised, euthanasia would be misused in the Country. Further, when to stop medical treatment was not something easily decided. The legislature had to debate and decide the matter.

Anand Grover, Senior Advocate, Supreme Court of India:-

In an interview with Teena Thacker and Ridhima Malhotra, he opined that he supports passive euthanasia because it allows a person to die with dignity, which is a part of right to live with dignity both of which are embraced by article 21 of the Constitution of India. The right to die with dignity where misuse is eliminated is an ideal state.



Suggestions and Conclusion:-

Beyond any scepticism that euthanasia is a most sensitive and highly debatable one. It is a very difficult issue for the judiciary to give a judgment that will satisfy all. The Chief Justice of India, RM Lodha also drew the attention of counsel to the fact that what was the least painful way to bring life to an end was debatable. Many discussions had been held, but no unanimous finding was reached. The right to die with dignity where misuse is eliminated is an ideal state. By and large, active euthanasia is not at all advisable. Albeit passive euthanasia can be supportive with proper safeguards. Misuse can be curbed if the person can give advance cues when he/she is conscious. To minimise the risk of misuse, there is a need to have a process where one is allowed to give a "*living will*". In cases where the person can't give a living will or the person is in a vegetative state, the family should have the right to approach the court. The court can then appoint a Medical Team and come to its own assessment. This is called a '*three-layered process*', where the family, a medical team and the Court involved. The same was set out in ArunaShanbaug's case. This also happens in cases in Europe and the US resulting in minimising the risk of misuse. We must respect the autonomy of the patient in giving a will. We should not reckon any age limit in respect of the patient for passive euthanasia. We should not think that euthanasia is a modern mentality rather it is about doing things rationally. Lord Falconer's while presenting the **right to die bill** in the Lords, has aptly suggested that there should be two doctors acting independently must confirm a patient is likely to die within 6 months. Further it is not an out of place to mention here that '**Archbishop Tute's eloquent abhorrence at Nelson Mandela's last days offers a perfect example of, why dignity in death is an essential part of a good life**'. Therefore, before going to enact on passive euthanasia, the Government of India and the Apex Court should reckon the majority



opinion of the states and Union Territories, outcome of the marathon discussions of the legal experts, guidelines of Medical Council of India(MCI) and various Law Commissions sans detriment to the social and religious customs, morality, medical science with broad mind and sense in the greater interest of humanity and with the milk of human kindness. Eventually we can positively speculate that some concrete suggestions will emerge to resolve humanitarian problem by the Supreme Court's latest initiative. Thus we can make epilogue to this topic with an euphoria that "**Whatever action a great man performs, Common man follow. Whatever standards he set by exemplary acts, all the world pursue**"- Bhagavathgeetha.

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PASSENGERS' SATISFACTION TOWARDS INDIAN RAILWAY OFF - BOARD AMENITIES

(A Comparative Study of Three Divisions in the State of
Andhra Pradesh, India)

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Introduction

Indian transport industry has been organized with a mixed pattern of public and private sector ownership. The evident economic growth in India over the last two decades has increased the demand for all transport services, particularly land transport through road and rail. The development of railways is one of the landmarks in the progression of human civilization. Indian Railways, a historical legacy, is a vital force in Indian economy. India is a country with the largest railway network in Asia. Railways are the most convenient mode of transport for large scale of goods as well as for long distance travel. Indian service sector has witnessed a major boon and is one of the major contributors to both employment and national income in recent times. The weight age of service sector is an indication that in near future, India's GDP growth will be influenced considerably by the service sector. Thus, an effective transport system is a pre-requisite for economic development of a country. Indian Railways owned a total route length of 65,000 (as on 17th June 2013) Kilometres, 2,16,717 wagons, 39,263 coaches, 7,739 locomotives and runs about a total of 12,000 passenger trains and 7,000 freight trains daily. It carries nearly 23 million passengers every day and transports over 2.65 million tonnes of freight daily. The Head Quarters of the Indian Railways is in New Delhi. Indian Railways is



controlled by the Government of India through the Ministry of Railways. At present, there are 17 zones and 68 divisions in the Indian Railways. Indian Railways has identified model stations for the provision of upgraded passenger amenities.

Customers' Satisfaction about Railway Services

In the competitive scenario, transport plays a vital role in catering to the needs of the people. Among the various modes of transport, the railways hold the credit of providing more advantages to the passengers. The ultimate success of railways depends upon the satisfaction of the passengers. It becomes inevitable to obtain the patronage from its passengers to raise its image in the Indian economy. The level of satisfaction of the railway passengers largely depends on the extent to which needs and expectations are being fulfilled. It is necessary for the railways to assess the level of satisfaction of its passengers in order to keep up its name and fame. Moreover, the railways can ameliorate its revenue by enticing more number of passengers, along with provision of satisfied services. By considering these aspects, this is a modest attempt to measure the level of satisfaction of the passengers about the railway services offered by the Indian Railways.

Review of literature:

Vishnuvarthan and Selvaraj, (2012)¹ investigated on the Railways as the most convenient mode of transport for large scale goods movement as well as for long distance travel. Indian Railways has envisaged provision of various automated facilities oriented towards interfacing and guiding passengers to comfortably board trains and for providing enquiry facilities at all stations. Provision of ticketing machines, water vending machines, platform shelters at stations, pay and use toilets, provision of improved cost effective lighting, good retiring rooms with modern furniture, coach indication boards, signage, security and



enquiry counters are also provided to fulfill the needs of the railway passengers. The Indian Railways can perform well when the passengers are satisfied with the attainable services only. Gupta and Datta, (2012)² stated the objective to measure the quality of services provided at Indian railway stations. The purpose of the paper is to propose a method which indicates the level of importance and satisfaction. The other familiar methods of service quality assessment do not vividly provide.

Geetika et al., (2010)³ Service quality has been viewed as a determinant of customer satisfaction. Different dimensions of service quality have been considered by various researchers. This study identifies components of service quality of Indian Railways at railway platforms. Laura and Gabriella, (2009)⁴ studied on index based customer perspective which is proposed for evaluating transit service quality. The index, named Heterogeneous Customer Satisfaction Index is inspired by the traditional Customer Satisfaction Index, but takes into account the heterogeneity among the user judgments about the different service aspects.

Need for the Study:

Globalisation has resulted in the increased floating population in developing countries. More and more number of people are using the transport services particularly the road transport service. Railway transport is cheaper and convenient having comfortable journey especially for long distance journeys. Though a number of services are provided by the railways, many passengers do not know about these services. Hence an attempt is made to make a study on the railway services in three major divisions of Andhra Pradesh. The main objective of my research is to identify the attributes of passengers off - board amenities, analysing the service quality of Indian railways and passenger's satisfaction. It is to be evaluated by collecting the data from



the passengers of Indian Railways in Andhra Pradesh. The present investigation has been concentrated on Secunderabad, Vijayawada and Waltair Divisions which are major railway junctions and well connected to other cities of the state as well as the country. The principal purpose of this study is to suggest better ways of providing good amenities to the passengers as majority of the Indians and also the foreigners who are visiting India and staying in India for various reasons use this mode of transport both for personal travel and goods transportation.

Objectives of study

1. To examine the importance of the Indian Railways in Indian Economy.
2. To decipher the Passenger Amenities in 3 Divisions of Indian Railways
3. To assess the level of satisfaction of Passengers on Indian Railway off - Amenities
4. To give the appropriate suggestions for the amelioration of Passenger off - Amenities.

Methodology:

The process of gathering reliable and meaningful information is a requisite step for the entire research design. For attaining the objectives of the present study, the required data is collected from both the primary and secondary sources. The primary data is collected by way of scrutiny observation, interviews and through circulating a questionnaire to the passengers in order to elicit the information on various passenger amenities provided by Indian Railways. A structured questionnaire is prepared for eliciting the perceptions of Passenger amenities for off – board facilities provide by Indian railways. The questionnaire covered in the opinion survey of rail passenger off – board amenities at station like waiting halls, retiring rooms and



dormitories, Bathing, urinal and latrines, water, lighting, fans and tubs, catering, medical, reservation, security etc., are also covered. The opinions were collected from 900 passengers at random covering all sections of people. The opinions survey was carried out on rail passengers while passengers are off – board the train. All the questions were framed to reflect the research problem and to obtain the perceived outcomes of the Railway passengers. The secondary data is drawn from research reports, published books, journals, bulletins, magazines, newsletters, newspapers, annual reports & manuals of the organizations and the internet. The Chi-square is used to determine the association between the variables. It tests whether two or more variables are independent or homogeneous. This test for independence examines whether knowing the value of one variable helps to estimate the value of another variable. The chi-square test for homogeneity examines whether two populations have the same proportion of observations with a common characteristic. ANOVA stands for analysis-of-variance, a statistical model meant to analyze data.

Data Analysis:

Passenger satisfaction towards Indian Railway Facilities at Station

Facilities	Very poor	Poor	Neutral	Good	Very Good
Waiting Halls	8.3	16.3	25.2	39.3	10.8
Retiring rooms & dormitories	11.1	20.6	29.6	29.6	9.6
Platforms	7.9	18.2	36.2	28.1	9.6
Bathing & urinal and latrines	14.1	23.9	28.4	24.3	9.2



Water	8.8	21.4	29.8	29.3	10.7
Lighting, fans, tubs at station	5.4	16.2	29.2	39.7	9.4
Catering	11.6	23.6	27.3	27.7	9.9
Medical	15.9	29.3	25.2	20.1	9.4
Reservation	8.0	14.2	30.0	37.8	10.0
security	13.8	22.2	29.6	26.9	7.6

The above table designates the opinion of passengers regarding the facilities of the Indian Railways in Andhra Pradesh. From that it is distinct that maximum of 24.6 per cent passengers felt that waiting halls are poor and 50.1 per cent passengers felt good. Similarly 25.6per cent of the passengers opined that waiting halls were neutral. Likewise maximum of 31.7 per cent passengers opined poor about the retiring rooms and dormitories, maximum of 39.2per cent passengers opined good and nearly 29.6per cent passengers opined neutral.

Passengers regarding the platforms opined that maximum 16.1 per cent as good and 37.7per cent as poor. Nearly 36.2 per cent passengers opined neutral about the platforms in Andhra Pradesh. Thus according to the survey outcome it is deciphered that there are enough number of platforms in Andhra Pradesh. Also nearly 38 per cent passengers opined that the bathrooms, urinals and latrines are poor and 33.5 per cent passengers felt good. As well 28.4per cent passengers expressed neutral. According the analysis it can be concluded that bathrooms, urinals and latrines in Railway stations are poor. It is on account of the reason that many divisions in A.P are A1 grade stations with more traffic. Therefore, bathrooms, urinals and



latrines should be cleaned time to time; this process subjugates the spread of diseases.

The survey designates that the Railway authorities' maintenance was good with respect to lighting, fans and tubes at stations and rendering optimum services to their passengers. The passenger's opinion on the catering facilities was also good. Railways owing to give catering facilities to the private people, attention should be given in providing quality food. Similarly passengers opined good about the reservation facilities. It is due to the care taken by Railways to reduce the involvement of agents in reservation process as far as possible. The survey observed that nearly 45.2 per cent passengers were dissatisfied with medical facilities and 25.2 per cent passengers expressed as neutral. It is for the reason that many passengers were unaware of the medical facilities provided in the railway stations. So in every platform, for the knowledge of passengers, where the medical facilities are provided should be given through root maps and sign boards. In case of emergency doctor phone number must also be displayed.

Shows ANOVA Test Results towards the facilities of Indian Railways

Division	n	Mean	S.D	F- value	P-value	Decision
Waltair	300	.1280	.63742	2.442	.088	Not Significant
Vijayawada	300	.0873	.59195			
Secunderabad	300	.0213	.55796			



The average opinion score of the Waltair division is more when compare with the remaining two division which results that facilities provided in Waltair division is good when compare with the remaining two division but the difference is not statistically significant at 5 per cent level of significance. The same is mentioned below as a box plot

Passenger satisfaction towards the Charges of retiring Rooms

Charges of Retairing Rooms	Division			Total
	Waltair	Vijayawada	Secunderabad	
Below Normal	37(12.3)	23(7.7)	36(12.0)	96(10.7)
Normal	116(38.7)	97(32.3)	69(23.0)	282(31.3)
Above Normal	78(26.0)	123(41.0)	137(45.7)	338(37.6)
Don't Know	69(23.0)	57(19.0)	58(19.3)	184(20.4)
Total	300	300	300	900

Chi – square: 34.022P – Value: 0.000

The above table highlights that 37.6per cent of passengers opined that the charges levied for the retiring room is above normal. Whereas maximum 45.7 per cent and 41.0 per cent of passengers from Secunderabad and Vijayawada divisions respectively feel that the charges levied for the retiring rooms are above normal and 38.7 per cent of passengers from Waltair division felt that the charges levied for the retiring room are normal. In the three divisions – Waltair, Vijayawada and Secunderabad the rent for retiring room is vary at



different regions. Due to more rents retiring rooms are not at reach for most of the passengers in these divisions.

Passenger satisfaction towards availability of Lighting at Stations

Electrical	Division			Total
	Waltair	Vijayawada	Secunderabad	
Very poor	44(14.7)	14(4.7)	19(6.3)	77(8.6)
Poor	62(20.7)	48(16.0)	47(15.7)	157(17.4)
Satisfactory	74(24.7)	80(26.7)	74(24.7)	228(25.3)
Good	86(28.7)	109(36.3)	104(34.7)	299(33.2)
Excellent	34(11.3)	49(16.3)	56(18.7)	139(15.4)
Total	300	300	300	900

Chi – square: 31.523 P – Value: 0.000

Table explains that maximum 33.2 per cent of respondents opined that there is good illumination and electrification in all the railway divisions Andhra Pradesh; for the safety and security of the railway passenger's sufficient good illumination should be there on the platforms of railway stations and in trains. Sufficient illumination can reduce thefts, provides safety and security for female passenger. Out of the total responded passengers 36.3 per cent passengers opined good in Vijayawada division, 34.7per cent in Secunderabad division and 28.7 per cent in Waltair division.



Passenger satisfaction towards Booking Offices and Reservation Systems

Reservation quota system WL/RAC	Division			Total
	Waltair	Vijayawada	Secunderabad	
Very poor	32(10.7)	23(7.7)	39(13.0)	94(10.4)
Poor	63(21.0)	54(18.0)	61(20.3)	178(19.8)
Satisfactory	95(31.7)	87(29.0)	67(22.3)	249(27.7)
Good	79(26.3)	105(35.0)	92(30.7)	276(30.7)
Excellent	31(10.3)	31(10.3)	41(13.7)	103(11.4)
Total	300	300	300	900

Chi – square: 15.487 P – Value: 0.05

The above Table infers the passengers' opinion on the existing reservation quota system for stations and waiting list / RAC for berths. Out of the responded passengers maximum 35.0 per cent passengers in Vijayawada Division, 30.7 per cent of passengers in Secunderabad division express their opinion as good and 31.7 per cent of passengers in Waltair division expressed satisfactory. When the figure of Andhra Pradesh is taken maximum 30.7 per cent of passengers expressed good.

Passenger satisfaction towards Telephonic Enquiry Systems

Telephone enquiry	Division			Total
	Waltair	Vijayawada	Secunderabad	
Very poor	36(12.0)	42(14.0)	49(16.3)	127(14.1)
Poor	53(17.7)	62(20.7)	58(19.3)	173(19.2)
Satisfactory	81(27.0)	70(23.3)	80(26.7)	231(25.7)
Good	97(32.3)	100(33.3)	97(32.3)	294(32.7)
Excellent	33(11.0)	26(8.7)	16(5.3)	75(8.3)
Total	300	300	300	900

Chi – square: 9.567P – Value: 0.297



The table emphasizes the opinion of passengers on the telephonic enquiry and the responses given by staff to the passengers through telephone. In this table it is noticeable that 32.7 per cent of passengers in Andhra Pradesh felt good. The response from each division of Andhra Pradesh is also same; out of total respondents 33.3 per cent in Vijayawada division, 32.3 per cent in Secunderabad division and 32.3 per cent in Waltair division felt good about the railways telephonic enquiry system. The announcement of information like train timing, train name, train number, platform number in three languages i.e. regional language, Hindi and English is a great deal of Railways in making foreign, illiterate and blind passengers to know the train information and catch the train in time without ambiguity. From the table it is distinct that first good, Satisfactory stood in the second position with 25.7 per cent, poor in the third position with 19.2 per cent, very poor stood in the fourth place with 14.1 per cent and excellent occupies the last place.

Passengers satisfaction towards the Public Address Systems

Public address system	Division			Total
	Waltair	Vijayawada	Secunderabad	
Very poor	13(4.3)	13(4.3)	12(4.0)	38(4.2)
Poor	61(20.3)	50(16.7)	66 (22.0)	177(19.7)
Satisfactory	130(43.3)	69(23.0)	102(34.0)	301(33.4)
Good	77(25.7)	133(44.3)	99(33.0)	309(34.3)
Excellent	19(6.3)	35(11.7)	21(7.0)	75(8.3)
Total	300	300	300	900

Chi – square: 42.445P – Value: 0.358



Public address system in railway stations play a vital role in communicating the passengers about the train numbers, name of the train, arrival time of the trains and platform number of the train etc., illiterates gain more advantage with this system. In table, the opinion survey of the passengers show that maximum 34.0 per cent and 43.3 per cent of passenger from Secunderabad division and Waltair division respectively were satisfied, where in Vijayawada division 44.3 per cent passengers felt good. Out of total respondents 34.3 per cent of passengers felt good, 33.4 per cent were satisfied, 19.7 per cent felt as poor, 8.3 per cent felt as excellent and 4.2 per cent felt as very poor. It indicates that railways maintaining good quality of public address system. But, more efforts are required to improve for excellence.

Shows the ANOVA Analysis towards Public Address System

Division	n	Mean	S.D	F- value	P-value	Decision
Waltair	300	.1756	.63242	.791	.454	Not Significant
Vijayawada	300	.1611	.59304			
Secunderabad	300	.1172	.54665			

The average opinion scores of all the three divisions are very close to each other which results that ANOVA test value and its corresponding P-value shows an insignificant difference among the three divisions respondents opinion on "Passenger Guidance & Help Systems". But the average score of Waltair division respondents are little over than the remaining two divisions but the difference is not statistically significant at 5 per cent level.



Suggestions and Conclusion

On the basis of the findings of the present study, the following suggestions have been made to improve the services of the Indian Railways. Entertainment with a closed circuit TV or music system has to be provided in waiting hall and compartments for recreation of passengers at Waltair, Vijayawada and Secunderabad Stations. Good numbers of benches or suitable seating arrangements have to be made on platforms. The benches or such seating arrangements have to be densely located on the platforms where the passengers aboard the train frequently. Electronic display of Train compartments number should be arranged on platforms and the authorities have to see that the train exactly stops as per the number boards. Separate reservation counter exclusively for ladies should be provided. Electronic display boards for arrivals departures and platform information should be provided at big stations. Smaller electronic display boards should be provided at the general booking counters to indicate arrival and departure timings to the trains at Waltair, Vijayawada and Secundrabad station. Sign boards should be fixed on platforms giving direction to passengers who get down from the trains. The boards may give directions to main gate or the exit point, enquiry counters, booking counters, reservation counters, luggage booking, medical etc. CC Cameras should be kept in each platform to identify all illegal issues, thefts in the train. The railway authorities have to negotiate with banks and make arrangements to provide ATM counters and currency exchange counters at stations. This helps passengers to carry very less amount of cash while on travel and thereby can have safe and peaceful journey.



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NOVEL DESIGN AND IMPLEMENTATION OF THE PERSONALIZED SEARCH ENGINE IN CONTEXT WITH USER KEYWORDS PROFILE AND KEYWORDS OPTIMIZATION TECHNIQUE

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INTRODUCTION

With the fast development of Internet technology, SE has been widely used .Now a day's Internet is in its 4th generation. Due to the large scale use of Internet, SE becomes an important technology. With the rapid development of SE the personalized service has become an active research area. Although personalization and keyword optimization in the search engine reduces the problem of getting irrelevant search results, but it was not completely overcome. To solve this problem a new model of personalized search engine is propose.

According to the literature review, The most common personalization approaches reported till date were namely user behavior, ontology, user interest mining, users' access interest and user profile. In order to get possible alternative to the above mainsation problem a PSE based on user keyword profile and long tail keyword optimization technique is suggested. Keyword optimization is one of the foundations of Search Engine Optimization this technique greatly improves the conversion rate for retrieved results. Keyword optimization (also known as keyword research) is the act of researching, analyzing and selecting the best keywords to target the result. Keyword search optimization is a critical step in initial stages of search engine. In the present study author proposes to design a personalized search engine model that is based on user keyword profile



and long tail keywords optimization technique. Long tail keywords are a type of keyword phrase that has at least three, and some times as many as five words in the phrase these keywords are highly specific. Choosing the right long tail keyword combinations involves careful research around a particular topic. Testing the search results will be done by the method of simulation to verify the effectiveness of proposed model. The propose work will have different functional module including User interface, Keywords profile constructor along with keywords database, Query Engine, SE, Page repository and Keywords match algorithm. In the user interface login form is provided for identification of users.

The propose work is aimed to improve the accuracy and relevancy of search result that will be obtained by personalized search engine user.

REVIEW OF LITERATURE

The literature survey for the personalized search engines is done rigorously, the literature surveyed for the last 20 years shows that lot of research work has been done on PSE, but there was no evidence of the use of keyword profile with long tail keyword optimization technique. Li Yong et al [1] design and implement personalized search engine base on shared knowledge base and mining of the users' interest from database. Ontology was use effectively to improve the recall and precision ratios. LiuZhongbao [2] personalized search engine model was based on user interest mining. Xiang-dongChen *et al* [3] first time introduces users' access interests into the design of PSE with web mining technology. In his model firstly, the users' access interest transactions were gained by interest algorithm via mining the users' logs. Secondly, it presents a method to compute session similarity of transactional unit and sets up an interest similarity matrix for clustering by setting the suitable threshold value. Clustering along with page rank algorithm is used to get accuracy. HaoChen *et al* [4]

suggested a new personalized information retrieval model which is based on imported user interest that provides fast and accurate information to the user. XueLi *et al* [5] gives a realistic, user-based personalized searching system that provides the general framework and implementation of system functions. Lai, J. *et al* [6] used a method base on similarity score in his model of SE to derive users' documents profile.

METHODOLOGY

After the rigorous literature survey it is also found that no earlier researcher has attempted to concise the search result to get the relevant result in minimum time and cost. Hence the architecture shown in fig.2 is proposed as a new approach to design a PSE. Special efforts will be taken to keep the search results to very limited number without losing the accuracy and relevancy of users searching need and requirement. To get overall view of SE the general architecture is given in fig 1.

A. Search Engine Architecture

Fig.1 shows various phases involved in retrieval of information needed by the user.

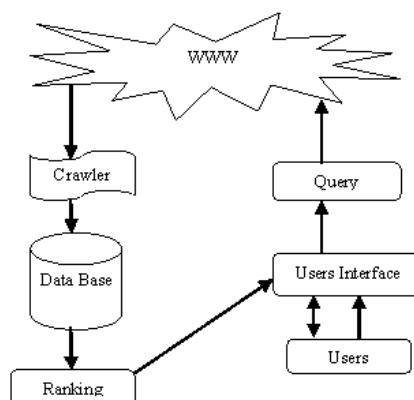


Fig: 1 Search Engine Architecture.



The basic functional modules in the architecture of search engine given below:

- *Users*: a person who uses the search engine over internet.
- *The user interface module*: It provides the registration or login interface for the user. In the user interface module, the user input some keywords. Such information is called the user's explicit personalized information which can compose the default information of the user keywords profile. These keywords are stored in to the Database.
- *Query Engine*: In this module users enters the keywords and send it to the search engine.
- *Crawler*: Crawler gets the data from the World Wide Web (WWW) and stores it into the search engine database.
- *Rank*: The rank of the web page is measured on the basis of click through Rate (CTR).

Fig.2 shows the new architectural approach for personalized search engine which is based on User Keywords Profile and Keywords optimization technique.

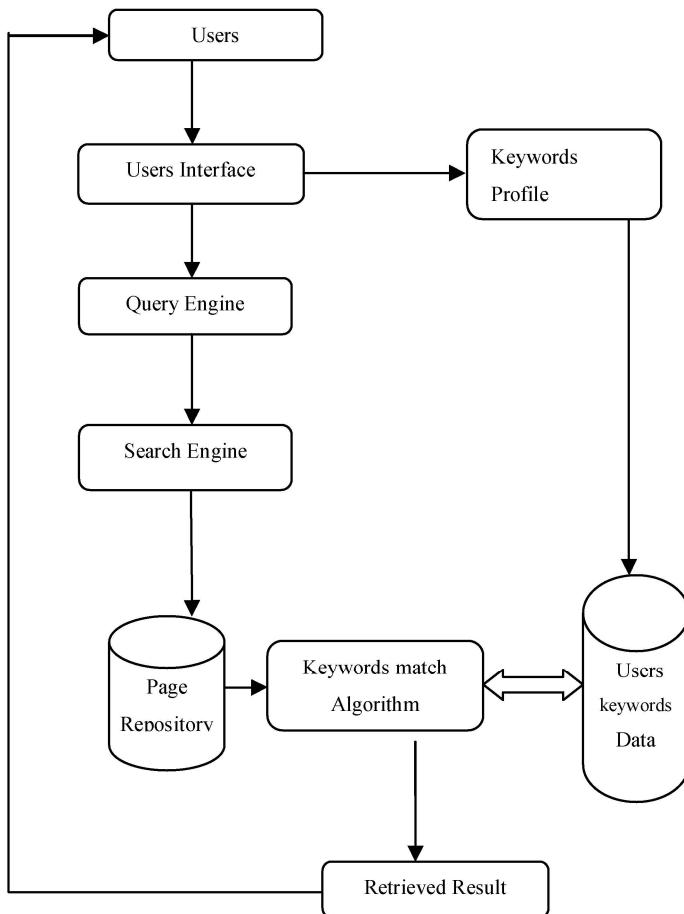


Fig: 2 The proposed Architecture of Personalized Search Engine

The functional module in the proposed architecture of personalized search engine is given below:

- *Users*: a person who uses the internet.
- *User interface module*: In this module we will create GUI for the users and provide the login and keyword registration forms.
- *Keywords Profile Constructor*: It constructs user keywords profile.

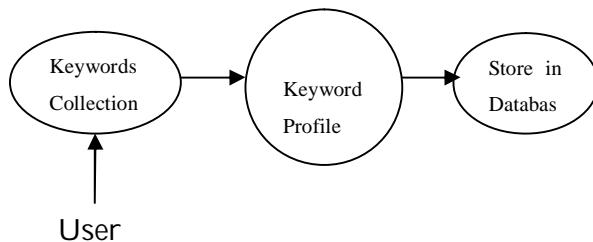


Fig 3 Design of user keywords profile constructs.

- *Keywords Collection:* To create users profile information will be collected from user. Profiles are built on the basics of user interest. Here the user enters interested keywords typically via HTML forms on which they want to search the information. Such information is called the user's explicit personalized information, which can compose the default information of the user keyword profile.
- *Users' keywords profile:* It is a set of keywords. The profile can be created by user's himself. The keywords profile will represent area of interest of the user who is using the SE. These keywords information profile will be stored in the user's keyword Database that will use browsers resources. Sample of profile representation is as shown in Table I.

Table I Profile Sample

Sr.No	Long Tail Keywords	Abbreviations
1	Knuth-Morris-Pratt Algorithm	KMP
2	Boyer-Moore Algorithm	BM
3	Brute-force algorithm	BF
4	Back Propagation Algorithm	BP
5	Search Engine	SE
6	Personalized search engine	PSE
7	Meta search engine	MSE
8	System Development Life Cycle	SDLC
9	Music Player	MP
10	World Wide Web	WWW



Query Engine: In this module query engine will accept keyword from users and then it will be forwarded to search engine for further process.

- *Search engine:* In this module search engine will send the user keyword on internet using Crawler. Crawler is a set of program that will find appropriate data on internet. Crawler brings up to date data from WWW and store it into its database.
- *Page Repository:* It will collect the result from search engine and store in XML database.
- *Keyword Matching Algorithm:* There are many matching algorithm are available like Brute-force algorithm, Boyer-Moore algorithm [12, 18] and Knuth-Morris-Pratt algorithm [13]. It works on string only. In the present study the author will try to match the search keyword from the profile by combining user keyword profile and long tail keyword optimization technique.
- *Retrieved Result:* The results are collected and send to the users.

Fig. 4 shows the steps of implementation of IPSEBUK

1. Get the keywords from user
2. Store in User Database
3. Get SE result
4. Store browser data in Page Repository
5. Initialize input character/string
6. Match User's keyword from database with Page Repository
7. Display filtered result based on user's profile.

Fig: 4 Proposed Keyword Matching Algorithm



CONCLUSION

The proposed work is aimed to improve the accuracy and relevancy of search result that will be obtained by the user through PSE. The goal of personalized retrieval is to provide correct and relevant information within a very short time, thus saving the cost of search. The result retrieved on the basis of user keyword will be fast, accurate and relevant. This will improve the utility of SE, giving the user required information search with great relevancy.

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HANDLING OF HUMAN RESOURCE ROLE IN WORKPLACE AT HOSPITALS

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INTRODUCTION

Human resources not only plan for the present and future jobs but also handling different roles at work places like further, human resource planning should plan for potentialities. Recruitment for HRD refers to searching for prospective employees having skills, talents and potentials to carry out the present and future jobs and also for development and motivate them to apply for jobs. HR can handle different techniques for selection process so it refers to designing selection techniques like written tests, selection tests, interview etc...fit for select in the candidates suitable for further development.

Human resources to be acquired and developed are determined in terms of skills, knowledge, abilities, values, aptitude, beliefs, commitment, etc. Suitable technique of human resources development is to be selected depending upon the resources to be acquired and developed. HR role handling workplace in many issues from promotions, transfers, Retentions, grievances, performance appraisal, and potential appraisal, training, management development and organizational development, career planning and development ,worker participation in management, employee participation in management, quality circles and social and Spiritual programmes.

Role of HR in Hospitals:

The hospital is an institution primarily indicated to the treatment of human ailment, diagnostic, health care and the promotion of health



development, cure and general health of the community, has to take care of the welfare of those who run it, i.e. is duty and its personnel. Every Individual engaged in the singular service of promoting the cause and mission of a hospital is a vital role in its overall chain, be he a skilled surgeon or an unskilled sweeper. The hospital staff should never be bracketed as labor in trade union terms. The administrators of government and voluntary hospitals have to adopt human resource as a part of hospital.

1. Managing human resources is one of the key elements in the co-ordination and management of work.
2. HRM is different from the traditional practice of personnel management.
3. HRM represents a wider conception of the employment relationship to incorporate on enabling and developmental role for individual employee.
4. HRM can be viewed as the part of strategic managerial function in the development of business policy.
5. To utilize the available human resources effectively.

Today human resources occupy, more than ever, the center stage of all economic activities. It is alarming time for all those organizations that wish to be successful in global markets to gear up and implement desired shift in their prevailing human resource management practices and leverage their human resources along with the other resources. Also to become more flexible and innovative organizations need to adopt new ways of attracting, retaining and motivating employees who are keen to learn and can contribute to the growth and development of the organization.

- ✓ To link human resources planning with hospital planning.



- ✓ To ensure optimum use of existing employees in hospital.
- ✓ To forecast future requirements of human resources in hospitals.
- ✓ To assess the surplus and shortage of human resources in hospitals.
- ✓ To meet the needs of expansion and diversification programmes of hospitals.

HR role handling work place Issues at Hospitals:

- One of the problems confronting health care institution is the lack of "right man for the right job". This is most happen by recruitment wise because most of the hospitals do not exercise care in their recruitment and selection policies and procedures.
- The increasing size of hospitals has made impossible the continuance of the employee-employer relationship in which employee and employer worked side by side knew each other as individual and understandable mutual problems. In small hospitals such a relationship is possible.
- In corporate or big hospitals supervisors have been appointed in between and they as links between administration and employees. But in most cases, these supervisors are keen only n getting the work done and are seldom, interested in human relationships.
- Another problem s hospital is the lack of adequately trained personnel. A right HR can follow the specific training needs, training programmes of its employees.
- It highly monetary problem in hospital is a right compensation is required to motivate the employees of the hospitals.



- Another essential problem that the employees of the hospital are provided with favorable working conditions and health, safety and welfare facilities provide by management.
- Proper human resources management can result in enhanced job satisfaction among employees of the hospital.
- HR must know the essential labor legislations enactment to imposing, it must be well versed with laws can be of immense use in hospital.
- In time manpower planning is an asset which grows but development of manpower is a time consuming process so present employee facing the work burden.
- To institute proper grievance redressal machinery for the employees.
- To evolve code of discipline for employees
- To offer counseling and guidance for the employees' personal problems and problems at work place.

Conclusion:

Human resources are critical in providing a high quality of health care. A refocus on human resources management in health care and more research are needed to develop new policies. Effective human resources management strategies are greatly needed to achieve better outcomes from and access to health care around the world. HR Focusing on the right recruiting and performance initiatives now - those capable of actually delivering significant business results now - will be an extremely effective way for healthcare organizations to differentiate themselves from the competition, maximize their recovery efforts, and better position themselves for growth as the recovery occurs and healthcare management is challenging yet rewarding, and it



requires that Persons in managerial positions at all levels of the organization possess sound conceptual, Technical, and interpersonal skills in order to carry out the required managerial functions of planning, organizing, staffing, directing, controlling, and decision making. In addition, managers must maintain a dual perspective where they understand the external and internal domains of their organization and the need for development at the self, unit/team, and organization levels. Human Resources are the source of achieving competitive advantage because of its capability to convert the other resources like money, machine, methods and material.

- Helping the organization to search its goal.
- Employing the skills and the activities of the workforce efficiently.
- Providing the organization with well trained and well motivated employee.
- Increasing to the fullest the employee's job satisfaction.
- Developing and maintaining quality of work life
- Communication
- To anticipate the impact of technology on jobs and human resources in hospitals.

The ultimate purpose of human resource planning is to relate future human resources to future organization need so as to maximize the future return on investment in human resources.

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IMPACT OF STRESS IN THE PATHWAY OF STUDENTS TO BE A SUCCESSFUL ENTREPRENEUR AND THE COPING MECHANISM

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OBJECTIVES OF THE STUDY

The following are the objectives of the study.

- To understand stress among the students to be an entrepreneur resulting from multiple-roles in terms of attitude to sex roles, risk taking, coping orientation etc.,
- To identify different factors causing stress among students in the steps to be an entrepreneur.
- To understand and suggest some remedial measures to suppress the entrepreneurial stress among students.

METHODOLOGY OF THE STUDY

A pilot study was conducted among fifty students in the district of Coimbatore. Observations and survey were made on the individual stress from various considerations. ANOVA along with Chi square analyses were adopted as the appropriate statistical method for data processing. This measure is a statistic that helps to indicate the proportion of different stress that prevailed among the students about their entrepreneurial career.



HYPOTHESES:

The following hypotheses are formulated in consonance with the objectives of the study.

H1: Perception on the entrepreneurial roles undertaken by the students and the risk involved.

H2: Factors causing stress and its positive impact on students.

REVIEWS:

a) *Stress:*

Different kinds of stress may emanate from the very same stressor. Despite the fact that negative relationships exists between stress and an individual's performance, have dimmed in light of recent studies, there is still only limited knowledge regarding the nature of the relationship between positive stress and work outcomes (Marino, 1997). Due to the extensive number of stressors that students face before emerging as an entrepreneur we restricted the investigation in this study to three dimensions of stressors.i.e., Kahn et al. (1964)- organizational stress models, Job Demand-Control model of Karasek (1979), work conflict, work overload, and social support etc., which are relevant to business performance as well as to the entrepreneurial realm. However, the foremost difference between those stressors refers to their relationships with stress has associated a higher extent of role conflict and work overload with negative stress, added with a greater extent of social support associated with lower levels of negative stress.

b) *Work overload:*

Work overload is defined by the resources individuals have available to them to complete tasks in a given time. In general, studies shown a positive relationship between work overload and negative stress (Sparks, Cooper, Fried and Shirom, 1997); For example, one



study based on a sample of high-position professionals found that experiences of work overload in terms of both tasks and responsibilities were perceived as challenging and stimulating for student entrepreneur; in another famous study, a model was tested in which the effects of work overload on various work domains were examined: work overload was found to decrease job performance and satisfaction; implying that work overload may induce negative stress.

STRESS:

Entrepreneurship is the process whereby an individual or a group of individuals uses organized efforts and means to pursue opportunities to create value and grow uniqueness, no matter what resources are currently controlled. According to Shelly E. Taylor, Stress is a negative experience accompanied by predictable biochemical, physiological, cognitive and behavioral changes that are directed either toward altering the stressful event or accommodating to its efforts.

ENTREPRENEURSHIP & ENTREPRENEUR:

The word 'entrepreneurship' comes from a French word **entrepreneur** which refers to a person who undertakes risks of a new business. **Entrepreneurship** is the quality and skill required to become an entrepreneur. It refers to the capacity required for identifying and generating innovative business ideas, mobilizing resources, organizing production, marketing the products, managing the risks and constantly working for growth and excellence of the business.

An entrepreneur is simply an individual who has the ability to see and evaluate business opportunities, gather the necessary resources, start a business and once started to take appropriate actions to ensure its success.



ENTREPRENEURIAL STRESS:

Entrepreneurial stress can be defined as “the harmful physical and emotional responses that occur when the requirements of the business or job do not match the capabilities, resources, or needs of the entrepreneurs”(Naik,2011).Entrepreneurial stress refers to work-related stress among entrepreneurs. Research on entrepreneurial stress and stressors uses employee models that are partially pertinent in this specific context. In these models stressors and coping are mixed. But, the former introduce the latter. Coping is the conscious and unconscious strategy used to cope with stress.

DISTINCT AND SALIENT ASPECTS OF STUDENT ENTREPRENEURS:

Student entrepreneurs use university knowledge to recognize opportunities and develop, launch, and operate new companies to exploit them. This definition is consistent with the definitions of entrepreneurship contributed by Shane (2003). There are at least five distinct and salient aspects to student entrepreneurs:

1. The students should use their university education to develop their core capabilities that underlie venture creation like opportunity refinement, resource acquisition, and venture championing.
2. They should rely on the university's reputation and networks to reach the credibility thresholds of their ventures.
3. Unlike corporate venturing, student entrepreneurs must learn that they cannot count on the university to provide them with the resources they require to develop their ventures. Also they should focus on the applications and not the attributes of the resources.
4. The quality of their educational experience is very much influenced by the quality of their entrepreneurial experience while studying at the university.



5. They should use the university to develop weak, strong, and bridging network ties.
6. The student entrepreneurs at university should have the stock of knowledge about various skills, knowledge, entrepreneurial capabilities etc.

NATURE OF ENTREPRENEURIAL STRESS AMONG STUDENTS:

Several variables have been shown to moderate the effect of stressors on physical and emotional well-being. These variables include personality type, tension discharge rate, and social support. Role conflict causes job-related stress and job dissatisfaction. Students to be an entrepreneur, may experience role conflict and work overload due to simultaneous demands for their attention at work. Role overload and the concern for quality have been shown to lead to high levels of stress. the sources of stress—role ambiguity, role conflict, job versus non-job conflict, concern for quality, and responsibility pressure—were predicted to be positively related to entrepreneurial health problems.

TYPES OF STRESSORS:

A stressor is thus something that produces stress. There exists much type of stressors, inducing stress among the individuals, mainly among the students who wish to be an entrepreneur is: Environmental stressor, psychosocial stressors, physical, psychological, external and internal stressors etc. Stress is, also, a stereotype in the body's responses to influences, demands or strains. These stressors cause more troubles in relation to work, in the family in his career, in his social relation. So the students should learn the methods of managing the entrepreneurial stress and the ways to reduce it.



CAUSES OF STRESS FOR ENTREPRENEURS AND ITS EFFECTS:

The typical analysis of entrepreneurial stress tends to confuse causes and effects. Poor eating habits, lack of exercise and reduced interaction with one's family are certainly manifestations of the conditionare some of the consequences of underlying issues.The true causes of business related stress tend to fall into the following categories:Financial matters, Sales Issues, Loss of Control, Role Overload, Employees, Reducing Stress through Better Practices etc.,

Since each individual play a pivotal role in the success of a business, particular care should be given to key personnel.An entrepreneur's life is fairly stressful. It is very important for them to implement some steps to reduce and manage stress.There is also evidence in the literature that barriers to entrepreneurship education and development exist such as faculty resistance, financial restrictions, existing attitudes and perceptions, and external influences.The other main source that causes stress among entrepreneurial students is:

1. The stress of "expectations".
2. The stress of "competition".
3. The stress of "closure".

STRATEGIES FOR COPING WITH ENTREPRENEURIAL STRESS:

Since there's no realistic way to avoid stress, it's important that student entrepreneurs and executives learn to deal with it well. Every entrepreneur should continually strengthen their strategies for dealing with the stress that emerges out of their work.Several strategies could help student entrepreneurs to reduce stress.

Due to the pressing demands of their business, entrepreneurs often do not attend to their health until it interferes with their ability to work. There are several general lifestyle changes which lead to



improved health. Regular exercise can reduce the deleterious effects of stress (Braun et al., 1987). Relaxations including meditation, prayer and faith have also been shown to have a positive effect in providing relief from stress (Matteson and Ivancevich, 1987). To reduce the pressures of decision-making responsibilities, student entrepreneurs could delegate/ share routine decision making whenever possible. Entrepreneurship has a significant impact on the economy. Small business accounts for almost 97% of all nonfarm business. Understanding the stresses generated by the entrepreneurial lifestyle and assisting entrepreneurs in developing more effective coping strategies could have economic as well as individual benefits in the years to come.

So ultimately, stress reduction is most acute when the fundamentals of the business are strong, sales are robust and the staff is happy and productive. These are the best methods for reducing or eliminating stress and anxiety for the entrepreneur. Stress is a common side effect of almost any job, but entrepreneurs seem to have it the worst. As stress is a psychological state, involving aspects of both cognition and emotion, as a student, they have to learn and adopt to reduce stress by various methods.

TABLE 1.1 / CHI SQUARE ANALYSIS

TABLE SHOWING STRESS FACTORS AND ITS IMPACT ON INDIVIDUAL

Null Hypothesis(H0): There is no relationship stress factors and its impact on students



Alternative Hypothesis (H1): There is relationship between relationship stress factors and its impact on students

S.No	Stress Factors / Impact	Education	Salary	Work overload	family	External stressors	Total
1	Positive	21	19	15	25	20	100
2	Negative	12	11	33	14	30	100
	Total	33	30	48	39	50	200

INFERENCE:

As calculated value (0.213) is less than the table value (0.5), NH₀ is accepted and no relationship between entrepreneurial roles and risks undertaken by the students.

TABLE 1.2 / ANOVA

TABLE SHOWING RELATION BETWEEN ENTREPRENEURIAL ROLES AND RISK FACTORS

Null Hypothesis (H0):

There is no relationship between entrepreneurial roles and risks undertaken by the students.

Alternative Hypothesis (H1):

There is relationship between entrepreneurial roles and risks undertaken by the students.

S.N o	Roles / RiskFact ors	Decisi on Maker	Communica tor	Proble m solver	Initiat or	Entrepren eur	Tot al
1	High Risk	4	21	13	3	3	44
2	Medium Risk	13	34	24	5	2	78
3	Low Risk	24	12	10	6	8	60
4	No Risk	4	7	4	1	2	18
	Total	45	74	51	15	15	200



INFERENCE:

Calculated value is less (1.572) is less than the table value (2.146), Null hypothesis is accepted and that there is no significance difference between entrepreneurial roles and risks undertaken by the students.

CONCLUSION:

To sum up, this study shows that environmental, personal and role stressors are pertinent among student entrepreneurs. Work and study related stress is recurrent in the entrepreneurial context. Identifying and measuring stressors that are salient to student entrepreneurs, has significance for promoting new venture success and preventing stress-related illness/disease. Moreover the students are to be guided and motivated in all means to take up the entrepreneurship, by managing the stress to take up their career successfully. Reducing stress and illness among student entrepreneurs should enhance the quality of both their personal and professional businesslives. This study has also helped to identify the factors that increase one's likelihood of undertaking entrepreneurship; however, it does not explore the factors that trigger engaging in entrepreneurship. Further research should aim to identify the triggers that motivate the students who have a high likelihood of engaging in entrepreneurship to actually undertaking entrepreneurship.

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“हिंदी यात्रा साहित्य में आदिवासी जीवन”

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हिंदी साहित्य में अनेक विधाएँ हैं जिनमें ‘यात्रा साहित्य’ यह भी एक विधा है। वैसे तो साहित्यकारों का कथा साहित्य की ओर जितना लगाव रहा है उतना गद्य की अन्य विधाओं की ओर नहीं। जब हम यात्रा साहित्य पर विचार करते हैं तो स्पष्ट होता है कि यह विधा कुछ मात्रा में उपेक्षित रही है। इस विधा की ओर कुछ इर्णगने साहित्यकारों का ही रुझान रहा है। जो अधिक रूप में घुमक्कट रहे।

वर्तमान युग और साहित्य का जब विचार करते हैं तो सामने आती है कि, वर्तमान युग विमर्श का युग है। इस विमर्श के युग में ‘आदिवासी विमर्श’ पर भी लेखन हो रहा है। यह लेखन हाशिए के बाहर के इस समाज को हाशिए के अंदर लाने के प्रयासों को लेकर चल रहा है। यह विमर्श मुख्य धारा से कटे इस समाज को प्रवाह के साथ जोड़ने का कार्य कर रहा है। यह साहित्य इस उपेक्षित समाज को न्याय देने की भरपूर कोशिश में लगा है।

आदिवासी समाज का चित्रण उपन्यास, कथा, कविता में हो रहा है। केवल हिंदी साहित्यकार ही नहीं अपितु भारतीय भाषाओं के अन्य साहित्यकार भी अपने लेखन द्वारा आदिवासी विमर्श पर संजग होकर चर्चा कर रहे हैं। उपन्यास, कहानी तथा कविता के अलावा भी एक विधा है जिसे हम यात्रा-साहित्य कहते हैं। इसमें बड़ी मात्रा में आदिवासियों का चित्रण हमें मिलता है। यात्रा वृत्तांतों में आदिवासी समाज का चित्रण सभी पहलुओं से दिखाई देता है। इसमें आदिवासी समाज की जीवन शैली, श्रद्धा-अंधश्रद्धा, विवाह, उत्सव, चित्रकला, खान-पान, रहन-सहन, सभ्य समाज द्वारा शोषण, उनका भोलापण, प्रकृति से जुड़े रहने का संदेश इन सब चीजों का बारीकी से चित्रण मिलता है।

आदिवासियों की जीवनशैली बड़ी ही साधारण होती है। वह पूरी तरह से जंगल पर निर्भर होते हैं। वह अपनी आदिम संस्कृति, परंपराओं, रीत-रिवाजों, त्योहारों में गहरी आस्था लिए शान से अपना जीवन यापन करते हैं। ऐसा नहीं कि यहाँ अभाव नहीं है। अभाव में भी वह बिना किसी मायूसी या शिकचे शिकायत के जीवन यापन करते हैं। इन सब बातों का चित्रण हिंदी यात्रा साहित्य में हुआ है। इसी जीवन-शैली का वर्णन करते हुए गोवर्धन यादव ने ‘पातालकोट-धरती पर एक अजूबा’ इस यात्रा-वृत्तांत में बड़ी ही बारीकी से इसका चित्रण किया है, “बित्ता भर पेट के गढ़दे को भरने के लिए वनोपज ही उनका मुख्य आधार होता है। पारंपरिक खेती कर ये कोदो-कुटकी, बाजरा उआ लेते हैं। महुआ इनका प्रिय भोजन है। महुआ के सीजन में ये उसे बीनकर सूखाकर रख लेते हैं और इसकी बनी रोटी बड़े चाव से खाते हैं। महुआ से बनी शारब इहें जंगल में टिके रहने का जज्बा बनाए रखती है। यदि बीमार पड़ गए तो भुमका-पडिहार ही इनका डाक्टर होता है तो गंडा-ताबीज बांध कर इलाज हो जाता है। शहरी चकाचौंथ से कोसों दूर, आज भी वे सादगी के साथ जीवन यापन करते हैं। कमर के इर्द-गिर्द कपडा लपेटे, सिर पर फडिया बांधे, हाथ में कुन्हाडी अथवा दराती लिए, होठ पर मंद-मंद मुस्कान ओढ़े ये आज भी देखे जा सकते हैं। ... हाट बाजार के दिन ही ये उपर आते हैं और इकट्ठा किया गया वनोपज बेचकर, मिट्टी का तेल तथा नमक आदि लेना नहीं भूलते। जो चीजें जंगल में पैदा नहीं होती, यही उनकी न्यूनतम आवश्यकता है।”¹ इसी प्रकार का वर्णन डॉ. हीरालाल बाछेतिया-‘नहीं रुकती हैं नदी’ में बस्तर के आदिवासी कितने अभावों में जीता है - इसका आँखों देखा वर्णन करते हुए लिखा है, “जितने बड़े टॉवेल का हम मुँह पोछने के लिए प्रयोग



करते हैं, उतने बड़े कपड़े के टुकड़े से वे अपना तन ढकते हैं - चाहे मर्द हों या औरत।”² इस प्रकार आदिवासी यायावर साहित्य में आदिवासी लोगों के अभावों से जूँझते हुए हार न मानने और गाते रहने की झाँकियाँ देखी जा सकती हैं।

उत्तर-पूर्व का क्षेत्र जनजातीय क्षेत्र है। यहाँ मिजो, गारो, नागा, खाँसी, जयतीयाँ जैसी अनेक जनजातीयाँ निवास करती हैं। इनके बारे में हिंदी में लिखा यात्रा साहित्य भी उपलब्ध है। यद्यपि यह बहुत ज्यादा नहीं है किंतु उत्तर-पूर्व की जीवन शैली का उसमें अच्छा चित्रण है। हिमांशु जोशी जाने-माने यायावर तथा यात्रा साहित्य के लेखक हैं। उन्होंने नागालैंड की यात्रा भी की है। नागा जनजीवन का चित्रण करते हुए लिखते हैं, “सिरपर पंख बाँधे हाथ में भाला लिए नागा पुरुष गोल धेरे में नाच रहे थे। एक ओर परंपरागत नृत्य चल रहा था, दूसरी ओर उन्हीं नागा आँ के आधुनिक वातावरण में पले बच्चे गिटार लिए, किसी अप्पेजी फिल्म की धून के साथ सिर मटका - मटका कर नाच रहे थे”।³ प्राचीन और आधुनिकता का यह अनोखा मेल यहाँ देखने को मिलता है। उसीके साथ उन्होंने एक ‘मल्लो अंगामी’ नामक आदिवासी युवक से वार्तालाप की जो गाँवबाड़ा (गाँव का मुखियाँ) है। वह इस प्रकार -

“कितना बच्चा हैं?”

“सात।”

“कितना शादी किया?”

“एक भी नहीं?”

“फिर बच्चा कहाँ से आया? सहज आश्चर्य से पूछता हूँ।”⁴

‘अपना नहीं, किसी और का बच्चा है, उसे पालती हूँ।’⁵

आदिवासी जिसे हम पिछड़ा कहते हैं वह हम जैसे सभ्य कहलानेवाले समाज से भी ज्यादा प्रगत दिखाई देते हैं। सभ्य समाज आज अपनी ही संतान को लावारिस की तरह जीने के लिए छोड़ रहा है तो यह आदिवासी समाज का नागा औरौ की संतान को अपनी संतान की भाँति पाल-पोस रहा है।

देवेंद्र सत्यार्थी किसी फक्कड़ फक्कीर की तरह एकके यायावर थे। वह आजीवन लोक साहित्य की तलाश में रहे। इसी यायावरी में वह आदिवासियों के हाट और मैलों का बारीकी से चित्रण करते हैं। भीलों के भगोरिया नृत्य का रोचक वृत्तांत प्रस्तुत करते हैं, “यह मेला होली से पहले लगता है, जिसमें पुरुष सर्वोत्तम वस्त्र पहनकर आते हैं और हाथों में धनुष्य बाण लेकर धेरे में नाचते हैं। इस नृत्य में स्त्रियाँ बहुत बड़ी संख्या में आती हैं और धेरे में खड़ी होकर नृत्य का रस लेती हैं। ढोल की आवाज पर नृत्य की गति चलती है। ... भगोरिया हाट का नृत्य चरम सीमा पर पहुँचने से पहले ही कुछ भील युवतियाँ नाचनेवाले युवकों में से अपने लिए दूल्हा चून लेती हैं।’⁶

गोविंद मिश्र एक जानेमाने यात्रा साहित्यकार रहे हैं। उन्होंने अपने यात्रा साहित्य में आदिवासी जीवन के पहलुओं को बड़ी बारीकी से उकेरा है। लेखक आदिवासियों की विवाह पद्धति का चित्रण ‘झूलती जड़ें’ यात्रा वर्णन में करते हैं। बस्तर के आदिवासियों के लिए घोटपाल गाँव के मेले में जाना एक विशेष अवसर होता है। वहाँ, “लड़कियों के हाथ एक-दूसरे में गुथे हुए, एक साथ लयबद्ध कदमों में आगे-पीछे जाती वे बस्तर का आदिवासी नृत्य कदमों की इस लयबद्धता के लिए मशहूर ही है। धीरे-धीरे युवक भी लड़कियों के झुंड में शामिल हो जाते हैं। यहाँ के आदिवासी लड़के-लड़कियों के संबंध या तो ऐसे मौकों पर या फिर घोटुलों में शुरू होते हैं, जो आगे चलकर विवाह का रूप लेते हैं।’⁷



आदिवासी समाज में आज के प्रगत कहलाने वाले समाज से भी ढेर सारी अच्छाईयाँ भरी पड़ी हैं। कुछ आदिवासी समाज में “घोटुल” की प्रथा है। इस घोटुल में ‘युवा शक्ति’ को सही दिशा में कार्यरत किया जाता है। राजेंद्र अवस्थी ने अपने यात्रा-वृत्तांत “जंगल से शहर तक” में “घोटुल” का वर्णन किया है, “कुछ जातियों में एकता का माध्यम एक विशेष प्रकार की संस्था होती है। कुमारगृह बस्तर के मुड़िया, झारखण्ड के उर्मांव और आसाम के नागाओं में प्रमुख रूप से पाए जाते हैं। मुड़िया उन्हें घोटुल कहते हैं। उर्मांव ‘दुम-कुरिया’ और नागा ‘रंगकी’ या ‘दकछंद’ कहते हैं। घोटुल के सदस्य गाँव के सभी कुमार और कुमारी होते हैं ... यहाँ सदस्य उसी समय तक रहता है, जब तक उनका विवाह नहीं हो जाता। विवाह होते ही वे सदस्यता से अलग कर दिये जाते हैं। घोटुल के सदस्य गाँव भर की रक्षा करते हैं। यदि गाँव में आग लग जाए ... किसी की झाँपड़ी में आग लग जाए तो घोटुल के सदस्य मिलकर उसे नया बना देते हैं।”¹⁷ इस तरह की सारी जिम्मेदारी घोटुल के सदस्यों की होती है।

यात्रा साहित्यकारों ने आदिवासियों के रोजमर्ग के जीवन का चित्रण करते समय उनके धार्मिक -अंधविश्वासों तथा श्रद्धा का भी चित्रण किया है। यह लोग प्रकृति पूजक होते हैं। अमृतलाल वेगड़ ने अपने यात्रावृत्तांत - ‘तीरे-तीरे नर्मदा’ में इसी श्रद्धा का वृत्तांत दिया है। वह नर्मदा परिक्रमा कर रहे थे। नदी जीवन दायिनी है। आदिवासी नदी को बहुत ही श्रद्धा से पूजते हैं। इसी परिक्रमा दौरान वह एक आदिवासी महिला से रात्री बिताने के लिए अपने साथियों के साथ आश्रय माँगते हैं तब, “मालाबाई ने अपने यहाँ रहने की अनुमति इस शर्त पर दी कि चौंकि आप मैया की परकम्मा कर रहे हैं, इसलिए पहले में आप लोगों के पांव पखारँगी, फिर रहने दौँगी।”¹⁸ इसी श्रद्धा के साथ-साथ आदिवासी समाज में अंधविश्वास की भी कमी नहीं। माधुरी छेड़ा ‘आदिवासी से अमेरिका तक’ इस यात्रा वृत्तांत में लिखती हैं, ‘दाद, खुजली या और कोई भी रोग हो अस्पताल, डॉक्टर या दवा में इनकी कोई आस्था नहीं है। कोई भी दुःख या बीमारी हो ये देवगुड़ी जाकर मन्त्र मांग आते हैं - इहें देवी की शक्ति में विश्वास है।’¹⁹ इसी तरह के अंधविश्वास का चित्रण राजेंद्र अवस्थी ने भी ‘जंगल से शहर तक’ में किया है, “जादू-टेनों के पीछे उनके अंधविश्वासों का ही मुख्य हाथ होता है। ... अच्छी फसल हो और रोगों तथा दुर्घटनाओं से मुक्ति मिले, इसके लिए धरती माता को बलि दी जाती थी। खोंडों का विश्वास था कि जब तक धरती माता को खून की भेंट न दी जाए, अनाज की बालें नहीं भरती। आज भी ये लोग बकरी या मुर्गी बराबर भेंट देते आ रहे हैं।”²⁰ इसी तरह के कई अंधविश्वासों से यह आदिवासी समाज भरा पड़ा है।

आदिवासी समाज का शोषण इस सभ्य समाज के हातों हमेशा होता आया है। इस शोषण में भी स्त्री शोषण बहुत हुआ जिसके कारण यह आदिवासी सभ्य समाज से नफरत करने लगा। यात्रा वृत्तांत में साहित्यकारों ने इसका चित्रण किया है। विनोद साव ने “‘मेनलैण्ड का आदिवासी’ इस यात्रा वृत्तांत में अंदमान के आदिवासियों की शोषण की गाथा को उजागर किया है।

आदिवासियों ने जिस सभ्य समाज पर विश्वास किया उसी सभ्य समाज ने उनकी स्त्रियों का शोषण कर विश्वासघात किया। माधुरी छेड़ा ने भी अपने यात्रा साहित्य में इसी स्त्री शोषण का चित्रण किया है। बस्तर के इलाके में, “विकास योजना ओं में आये चपरासी से उच्च अधिकारी तक सभी ने वहाँ की भोली-भाली किशोर व युवा लड़कियों को धोखा दिया। उनके जीवन में चले गए।”²¹ इन चित्रण को पढ़कर यह प्रश्न उपस्थित होता है कि आखिर सभ्य कौन? और पशुवृत्ति या जंगली कौन?



यह आदिवासी बहुत ही सौंदर्यात्मक दृष्टि के होते हैं। कई कलाओं के यह निर्माता हैं। चित्रकला में यह माहिर होते हैं। अनेक यात्रावृत्तांतों में इनकी चित्रकला के उत्कृष्ट नमूनों का चित्रण साहित्यकारों ने किया है। अवस्थी जी ने भी यह चित्रण 'जंगल से शहर तक' में किया है। वे लिखते हैं, "सघन जंगलों की चट्ठानों पर भी बहुत-से चित्र देखे गए हैं। ये झन्झनी वनिवासियों के हैं। पंचमढ़ी में अनेक गुफाओं में कई प्रकार के चित्र बने हैं। ये प्रायः शिकार के हैं।"^{१२} इसी प्रकार वारली चित्रकला की शैली भी बहुत प्रसिद्ध है। मोर और हाथी यह आदिवासियों के प्रिय जानवर हैं। इनके चित्रों में यह जहाँ-नक्त दिखाइ देते हैं।

आदिवासी जातियाँ दिन-ब-दिन लुप्त होती जा रही हैं। इसका कारण सभ्य समाज द्वारा जंगलों का दोहन और प्रदूषण है। कपिलदेव निषाद 'पोर्ट ब्लेयर की एक यात्रा' इस यात्रा-वृत्तांत में आदिवासी समाज जो इन द्विपों पर रहता आया है वह आज नामशेष हो रहा है। इसके कारणों कौन से हैं का खुलासा देते हैं कि, "प्राकृतिक संपदाओं का भारी मात्रा में दोहन। ...पेड़ों की कटाई भी शामिल है ... टुरिज्म जितना अच्छा है उतना ही आदिवासियों के लिए नुकसान दायक भी है। इसके कारण प्रदूषण फैला, शायद उससे भी आदिवासियों के जीवन व प्रजनन पर प्रभाव पड़ा।"^{१३} प्रकृति की गोद में रहनेवाला आदिवासी प्रदूषण जैसी महाकाय बीमारी से पीड़ित हो रहा है।

हिंदी साहित्यकारों ने यात्रा-साहित्य इस उपेक्षित विधा के द्वारा बहुत पहले से ही आदिवासियों के रीति-रिवाज, परंपराएँ, जीवन-शैली, खान-पान, उनके अंधविश्वास, उनका सभ्य समाज द्वारा हो रहा शोषण, प्रकृति से उनको तोड़कर छूट की बीमारी की तरह प्रदूषण की बीमारी से ग्रस्त, प्राकृतिक चित्रकला के जन्मदाता, भौगोलिक स्थान के अनुसार बदलती शारीरिक रचनाएँ, नागरी समाज के प्रति आक्रोश आदि बातों को बड़ी ही बारीकी से चित्रित ही नहीं किया तो इन प्रश्नों के उपर चर्चा कर उन समस्याओं के हल ढूँढ़ने के प्रयास भी किए हैं।

विमर्शों के इस दौर में वर्तमान स्थिति में हम आदिवासी विमर्श पर चर्चा कर रहे। परंतु यात्रा साहित्य में शुरू से ही आदिवासी समाज का बड़ी ही बारीकी से चित्रण हुआ है। जिसमें उनकी समस्या तथा अभावों की ओर सभी का ध्यान आकर्षित करने की पूरी कोशिश की गयी है। जिन प्रश्नों को हम आज गंभीरता से ले रहे हैं उन प्रश्नों की गंभीरता को यात्रा साहित्य में अप्राप्ती स्थान रहा है। यात्रा साहित्य ने समय-समय पर आदिवासियों की जीवन-शैली को चित्रित कर समाज को यह बतलाने की कोशिश की है कि इनकी समस्याएँ हमारी समस्याएँ हैं। हम देश का विकास तथा प्रगति की बात कर रहे हैं परंतु जब तक यह हाशिए के बाहर का समाज मुख्य धारा से कटा रहेंगा तब तक विकास असंभव है। इस प्रकार यात्रा साहित्य ने आदिवासी समाज पर प्रकाश डालने का महत्वपूर्ण काम किया है।



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E-RESOURCES IN ENGINEERING AND TECHNICAL EDUCATION: AN OVERVIEW

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1. Introduction:-

Modern time is the time of information and communication technology. Every educational institution has play vital role in the development and growth of the country. In engineering and technical institution a library and information centre has also an important role. In this era of information technology libraries are playing key role as information centers. With changing era and user expectation libraries also change their policies to provide more facilities to the user. Present time library has changed to information center and subscribed various print journals and various e-resources. Today libraries have looked more responsibilities to provide e-information facilities to its users.

Electronic resources are any information source that the library provides access to in the electronic format. The library has purchased subscription of many electronic information resources in order to provide users with access to them free of charge. E-resources include lots of things: full text journals, news papers, institute information, e-books, dictionaries, encyclopedias, economic data, digital image, career information, e-consortium etc. Today exchange of information has not been confined to a library. All libraries from local level to international level are interlinked by e-resources, internet-books, e-journals etc.

2. E-resources and engineering and technical college libraries:-

With the explosion of information technology the powerful competitive forces that realize fundamental question about the role of libraries. The



engineering college libraries should be engaged in the creation and dissemination of knowledge. These are also tools and services that provide instant access. Today engineering and technical education institution require the latest and pin pointed information in their respective fields. Due to increasing cost of information resources libraries could not provide these resources to their users. But e-resources with its advantage make available the way for the libraries access information at a very low cost. Present time technical institution should provide e-resources to both teachers and students with the expectation that e-resources will be used for engineering education purpose.

3. Need and purpose of e-resources:-

E-resources are the fast and web resources so the main purpose of using e-resources is to improve the efficiency of library, to sender service to end users and to provide effective information service to faculties and students of engineering college. E-resources have become more effective to provide library service and fulfill the main aspect of a digital library. E-resources play a vital role in creation and dissemination of knowledge. Main purpose of e-resource is to change the format of document typed matter to electronic form. E-resources have moved from accessing on line data bases with dumb terminal to surfing the World Wide Web (www).

4. Advantage of e-resources:-

1. With e-resources libraries have no need for more physical space to store them.
2. Consortia based subscription to electronic resources provides access to wide number of electronic resources at substantially lower cost.
3. With e-resources we can provide better services like current awareness services (CAS) and selective dissemination information (SDI).



4. E-resources are multi access. We can access 24 hours a day and seven days of a week of these e-resources.
5. It is possible to accessibility from anywhere like from home, school, libraries, even during travel etc.
6. E-resources give facilities to build up digital library.

5. Type of e-resources:-

Various types of e-resources are available in World Wide Web for engineering college library. It helps to become a digital concept of a library also. Some of e-resources are as followings for engineering or technical education:-

1. **Consortium** – Consortium is an association of two or more individuals companies, Government organizations with the objectives of participating in consortium played an important role in acquiring licensee and sharing electronic resources by acting as a platform for promoting activities and progress in the era of e-resources sharing.

The main purpose of consortium ids to access particular information for all higher educational institutions, research centers in the world. Various types of consortium exist at national and International level.

Library Consortium mainly deals with resources sharing in digital or electronic format. Library cooperation meant sharing collections. It also included sharing of resources or of processes, such as joint cataloguing of material or if staff and user training. The Library consortium is also often called Library networks. These formal organizations operate for the mutual benefits of all particular libraries. In India, some successful set up of various consortium by INDEST-AICTE, UGC INFONET, FORSA, HELINET, CSIR, ICMR, J-GATE, ISRO, IIM etc.

2. **Internet-** Role of internet is very important in a library as a resources. The internet is a global network of networks and consists



of millions of host computers. Internet connects to library with outside of library for providing e-resources.

3. **E-journal:-** In the present information era the e-journals is the most widely used digital resources. Today thousands of e-journals are made available by commercial agencies, academic institutions and the agencies promoting open access institutive. The main features of e-journals are the simple and advanced search facility. Today any e-journal who available in the web can search whole contents including the back files for any topic. All these can be access any time, any where or 24x7 mobility. Although many e-journals subscription rate are very high and not be very convenient to the libraries but after negotiate intelligently the incensing terms and condition can subscribed in library budget.
4. **E-books:-** Electronic version of a traditional print book that can be read by using a personal computer or by using an e-books reader is e-book. these book covering its full contents texts, tables, diagrams, illustrations etc. e-book collection usually mounted in an e-data base which support full text searching within an acrose titles advanced search and book marks. User can view also full text of e-books in HTML and PDF formats on line.
5. **E-Data base:-** Various number of data base today available on the network, they are either free or charges. E-database is an organized collection of information of particular subjects or multi disciplinary subject areas, information sources within databases can be searched and retrieved electronically. Presently two types of e-database available like 1. Full text database and 2. Bibliographic database.
6. **E-thesis and dissertations:-** thesis and dissertation is the most important primary documents made available in limited copies to universities and reach institutions where the researcher has carried out his research work. However the academic world believes that the these should be made available for further researcher and easily, so various centre are providing e-version of these thesis for beneficial of researcher. Institution like Vidyanidhi and Sodhganga of INFLIBNET are making available these in the digital form over



his website on sodhganga, there are Ph.D., e-thesis and dissertation of various Indian universities are available in soft copy and full text version.

7. **E-resources in Engineering Colleges as per AICTE Norms:** - Presently Engineering colleges in India are approving All India Council of Technical Education, (AICTE) New Delhi. The AICTE is controlling body of all Engineering college. For Best and quality education the AICTE make some mandatory norms for these colleges, as per the norms of AICTE 6 national print journal should be compulsory subscribed in a library for 60 student intake capacity. Every college if have 300 students, should have 30 Journals. Beside this International Journals is desirable. Before these e-journals, AICTE approved Institute has been subscribed Indian National Digital Library for Engineering, Science and Technology (INDEST-AICTE). But last three years AICTE have planned mandatory e-journals package for every Engineering, Management, Architecture, Pharmacy, Hotel Management colleges. Some of the followings important e-resources are available for Engineering and Technical Educations in India.
1. IEEE (www.ieee.org): IEEE is the world's largest professional association for the advancement of technology. IEEE stands for Institute of Electrical and Electronics Engineers. IEEE an association dedicated to advancing innovation and technological excellence for the benefit of humanity is the world's largest technical professional society. It is designed to serve professionals involved in all aspects of the electrical, electronics and information technologies modern civilization. The association established on 1884 with a small group of individuals in electrical professions met in New York. Presently IEEE has more than 430000 members in more than 160 countries. It has more than 3.5 million documents in the IEEE explore digital library with more than 8 million downloading each month.
2. ASME (www.asme.org) : ASME stand for American Society of Mechanical Engineers, is a not for profit membership organization



that enables collaboration, knowledge sharing, career enrichment and skills development across all engineering disciplines towards a goals of helping the global engineering community develop solutions to benefits lives and livelihood. ASME was founded in 1880 by a small group of leading industrialist. ASME providing e-journals, conference proceeding, e-books, topic collections etc. for their members.

3. ASTM (www.astm.org/digitallibrary) : ASCE stand for American Society for Civil Engineers. ASCE founded in 1852 and has more than 1,45,000 members of the Civil Engineering professions. ASCE provide books and journals, code and standards, conference proceeding, research tools. ASCE has published construction/materials, engineering mechanics, environment and water resources, geotechnical engineering, Management, professionals issues, structured engineering, transportation and urban development water way, ports, coast and ocean and other various technical areas. ASCE's journals have been providing all above topic in electronics formats.
4. ASTM (www.astm.org/digitallibrary) : ASTM stand for American Society for Testing and Materials is a globally recognized leader in the development and delivery of International voluntary consensus standards. Presently about 12000ASTM standards are used around the world to improve product quality enhances safety, facilitate market access and trade and build consumer confidence. ASTM standards and engineering digital library (SEDL) is a vast collection of industry leading standards and technical engineering information. The ASTM SEDL cover broad range of engineering discipline, including aerospace, biomedical, nuclear, petroleum, social science and solar engineering.
5. Elsevier (www.elsevier.co.in): Elsevier is a world leading provider of scientific, Technical and medical information products and services. The Elsevier works in partnership with the global science and



health communities to published more than 2000 journals and 2000 books titles of general engineering and references.

6. Mc Graw Hill General Engineering and reference (www.accessengineeringlibrary.com) : Mc GrawHill is general engineers and reference provide various e-resources and tools by online. It has providing by access engineering library various discipline like engineering, medical etc. access engineering delivers multidisciplinary information in a dynamic interactive format straight to device, providing integrated access to thousands of pages of trusted content from such renowned resources.
7. NPTEL (www.nptel.ac.in) : NPTEL Stand for National Programme on Technology enhanced Learning. NPTEL is a project funded by MHRD, Govt. of India provides e-resources through online web and video courses in engineering science, technology, management and humanities. This is a joint initiating by seven IITs and IISc, Bangalore. NPTEL is curriculum building exercise and is directed towards providing learning materials in science and engineering by adhering to the syllabus of all India Council for Technical Education (AICTE) and the slightly modified curricula of major affiliated universities. NPTEL has developed curriculums based video courses and web based e-courses targeting students and faculties of institutions offering UG engineering programmes. The online courses were provided by NPTEL is free and any one can access these courses utilizing various methods like through NPTEL website, video streams on demand through you tube, on demand hard copy can received from NPTEL office IIT, Madras or can listen on Eklavya channel provided by Gyan darshan (Doordarshan).
8. **Conclusion and Suggestion:** E-resources and services have been ever increasing day by day in the present day contemporary information environment. Libraries and Information centers are finding it hard to maintain the subscription for core journals due to ever increasing of costs of journals subscription and also shrinking budget improving the quality standards of research in Universities



and research institution in India and bringing it to a level of global recognitions by improving the access base of literature to them. Today in all world are moving towards electronics publishing and the cost of the e-resources is much cheaper than that of the print version. Faculties and Students can now access to learned journals in electronic form.

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IMPLEMENTATION OF AHO CORASICK ALGORITHM IN INTRUSION DETECTION SYSTEM USING TCAM FOR MULTIPLE PATTERN MATCHING

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I. INTRODUCTION

In almost every information recovery and text applications it is essential to locate quickly some or all occurrences of user defined patterns in text. String matching problem is to locate all the occurrences of a given string pattern in a string text. This string matching can be performed through single pattern and multi pattern occurrences. For many string matching problems multi pattern is the only solution provided. Thanks for Alfred V. Aho and Margaret J. Corasick who invented one of the best string matching algorithms named Aho-Corasick algorithm. The multi patterns matching in a text string can be easily found by means of this algorithm as it is the only one which performs exact matching of patterns in a given text. Just like a dictionary matching algorithm it also starts searching pattern from basis of sub-string matching. For every unit of time, a character is read from the pattern string and then it tries to find same character in the automata that is already constructed, after reading the whole pattern string if the automata is found to be entered in the final state then that pattern occurrence will be submitted. Similarly for all patterns it matches simultaneously. Intrusion detection systems at multi-gigabit rates are achieved using hardware acceleration; one prospect is the usage of Ternary Content Addressable Memories (TCAM). Ternary Content Addressable Memory (TCAM) is a type of memory that can execute parallel searches at high speeds. A TCAM contains a set of



entries. The top entry of the TCAM has the least index and the bottom entry has the biggest. Each entry is a bit vector of cells, where each cell can store one bit. As a result, a TCAM entry can be used to store up a string. The working of TCAM is as follows: for a certain input string, it compares against all entries in its memory in parallel, and reports the one which match the input.

II. AHO CORASICK ALGORITHM

Aho-Corasick is the Multi-pattern matching algorithm which traces all the occurrence of set of patterns in a string. It is done by creating Deterministic Finite Automata (DFA) for all the predefined patterns; along with it using automaton, which process a text in a single pass.

Example: Let us consider a finite set of patterns,

{OTHER, HER, HATE, HEIGHT}

Preprocessing Phase

Step 1: Construct finite state automata for the set of Predefined patterns which is supposed to be originate in the text string. The states will be numbered by their names and transitions are represented by the characters between the defined states would be accessible in the particular pattern

As a first step, Aho-Corasick algorithm constructs finite automata for the set of patterns

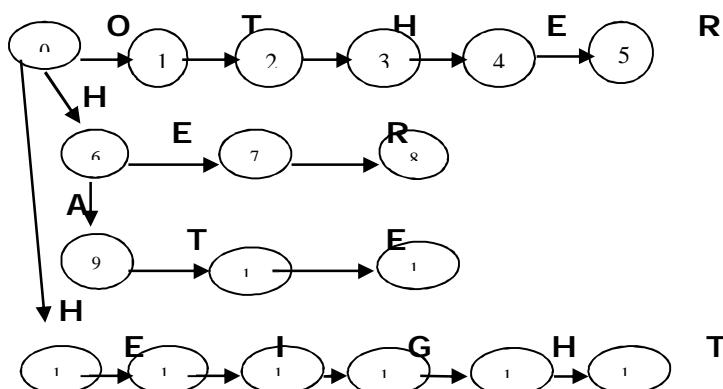


Fig.1.Automata for pre-defined patterns

Step 2: After constructing automata, failure function of each node is calculated and its corresponding transitions are also required to be mentioned, so the constructed automata would be called as "Automata with failure links".

This is highlighted in fig.3. Fig.2. represents transition tables of finite automata

STATE	INPUT							
	O	T	H	E	R	A	I	G
0	1	--	--	--	--	--	--	--
1	--	2	--	--	--	--	--	--
2	--	--	3	--	--	--	--	--
3	--	--	--	4	--	--	--	--
4	--	--	--	--	5	--	--	--
5	--	--	--	--	--	--	--	--
6	--	--	--	--	--	7	--	--
7	--	--	--	--	8	--	--	--
8	--	--	--	--	--	--	--	--
9	--	10	--	--	--	--	--	--
10	--	--	11	--	--	--	--	--
11	--	--	--	--	--	--	--	--
12	--	--	--	13	--	--	--	--
13	--	--	--	--	--	--	14	--
14	--	--	--	--	--	--	--	15
15	--	--	16	--	--	--	--	--
16	--	17	--	--	--	--	--	--
17	--	--	--	--	--	--	--	--

Fig.2. Transition table of finite automata

Step 3: Lastly in the automata output function for final states has to be calculated for recognizing the pattern string which may be found in the text string. And the resulting automata would be called as “Automata with Output Functions”

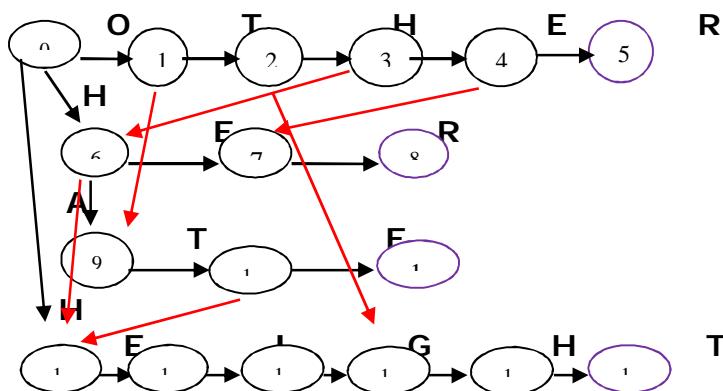


Fig.3. Failure functions of automata

FAILURE FUNCTION:

Failure function is defined as the longest suffix of the string that is also the prefix of some other node. The main goal is not to scan any character more than once. The red colored arrow marks in fig.3 represents failure transitions.

OUTPUT FUNCTION:

The set of patterns recognized when entering in to final state is the output function of that automata. Node 5, 8, 11, 17 represents output functions in fig.3.

APPLICATIONS: This algorithm can be in practical used to solve various problems like detecting plagiarism intrusion detection, text mining, bioinformatics, and digital forensic etc. Intrusion Detection is a



method in which intrusions are detected by Intrusion Detection System (IDS). The process of finding plagiarism inside a Text or document is known as Plagiarism Detection. The application of computer technology for managing biological information is Bioinformatics. Digital Forensic is a technique to retrieve information from digital devices after being processed along with generating outcome. Text Data or Text mining is developed with the intention of attending attempts to find out patterns in great data sets.

INTRUSION DETECTION SYSTEM: With each passing day there is added critical data available in some form over the network. All publicly reachable system on the Internet today is quickly subjected to break-in attempts. These attacks are able to range from email viruses, to corporate intelligence, to general damage of data, to attacks that hijack servers from which to spread added attacks. Intrusion Detection Systems (or IDSs) are emerging as one of the most promising ways of providing protection to systems on the network.

Compared with end-host based solutions, NIDS will respond and can be rationalized at faster rates. The time they could save is much significant for prevention, particularly when the network is under the attacks from new worms. The traditional software-based NIDS structural design failed to compete with the throughput of high-speed networks because of the large number of patterns and complete payload scrutiny of packets. This led to hardware-based schemes for multi pattern matching. To organize intrusion detection systems at multi-gigabit rates by means of hardware acceleration, one option is to use Ternary Content Addressable Memories (TCAM). TCAMs are extensively used for IP header based processing such as longest prefix match. Because of their built-in parallel search capability, TCAM's can also be used efficiently for the pattern matching functions desirable in intrusion detection systems.



III.TCAM

The traditional approaches to facilitate security and high speed packet forward in the Internet are in general complex and costly. For instance, network-based intrusion detection is usually implemented by means of dedicated chips or separate boxes, rather than standard components, adding up complexity and integration costs. Also, packet classification has been recognized as the most critical data path function, creating potential bottlenecks for high speed packet forwarding. To eliminate these potential bottlenecks, a variety of algorithmic and hardware approaches have been developed, attempting to meet the targeted performance for different single packet classification tasks

A promising approach is to use TCAM for packet classification and intrusion detection. A TCAM-based solution usually applies to different packet classification tasks, and allows parallel rule matching against all the rules in a rule table, offering the highest possible packet classification performance. As a result, TCAM coprocessors are extensively used in industry to perform multiple packet classification tasks classically seen in an Internet router. Ternary content addressable Memories (TCAMs) are increasingly used for high-speed packet classification. TCAMs compare packet headers against all rules in a classification database in parallel and thus provide high throughput unparalleled by software-based solutions. TCAM based architecture which are a programmable or reconfigurable, are commonly adopted for a hardware-based pattern matching.

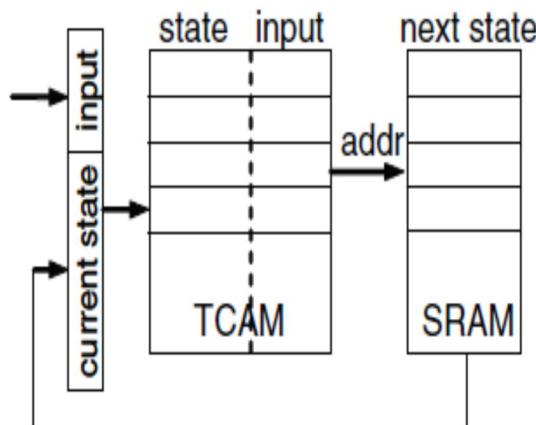


Fig.5.TCAM based architecture

Content-addressable memory (CAM) is a special type of computer memory used in certain very high speed searching applications. Binary CAM is the simplest type of CAM which uses data search words consisting entirely of 1s and 0s. Ternary CAM (TCAM) allows a third matching state of "X" or "Don't Care" for one or more bits in the stored data word, thus adding flexibility to the search. For example, a ternary CAM might have a stored word of "10XX0" which will match any of the four search words "10000", "10010", "10100", or "10110". The architecture consists of a TCAM, SRAM, and logic. Each TCAM entry represents a lookup key, which consists of current state and input. It consists of corresponding data, which is the next state, in the SRAM whose address is given by the TCAM output. Two registers current state and the input are initialized to the state 0 and the start data of the input buffer respectively. If there is a matching entry for the state and input value in the TCAM, the TCAM outputs the index of the matching entry and then the SRAM outputs the next data located in the corresponding location. Because a TCAM has "don't care" bits, multiple entries can be simultaneously matched. If there is no such match in the TCAM, the next state is the initial state



Because a TCAM has “don’t care” bits, multiple entries can be matched simultaneously. The next state is the initial state when there is no match in the TCAM. In the AC DFA the number of transitions increases rapidly as the number of patterns increases so that the TCAM-based implementation is impossible when there are a large number of patterns.

IV.AUTOMATA THEORY

The theory of computation is the branch of computer science that deals with the problems that are solved by means of algorithms. One of its branches is the automata theory that explains the study of abstract mathematical methods or else systems that can be used to resolve computational problems.

An automata is made-up of systems and transitions that can be classified as Deterministic Finite Automata (DFA) and Nondeterministic Finite Automata (NFA)

DETERMINISTIC FINITE AUTOMATON (DFA):

The AC algorithm first constructs a deterministic finite state machine from the set of patterns and then uses the finite state machine to process the text string in a single pass by constructing the goto and cross transitions. In the DFA, the dotted lines represent transitions, called by cross transitions, which are newly added by eliminating failure transitions. Shaded states represent the pattern matching states called output states. The trivial transition going to the early state is omitted.

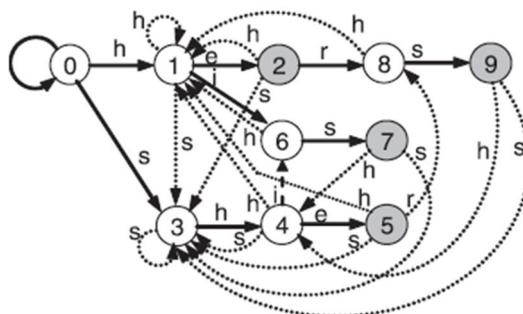


Fig.6.DFA for {he, she, his, hers}

One starts from the initial state (usually 0) to match a string. If a goto transition or a cross transition is matched with an input in the current state, the current state is moved all along the matched transition. Otherwise, the current state goes back to the initial state and the matching procedure repeats for the next input. In matching a text string of length n , the DFA makes n state transitions. If the pattern is not matched then the current state goes back to the initial state and process repeats. It examines each input only once and so it requires a huge amount of memory in a RAM based implementation that keeps a table of pointers to next states for every input. The AC DFA can be implemented with added efficiency using a TCAM since it needs only nontrivial transitions.

NFA (NONDETERMINISTIC FINITE AUTOMATON):

ACDFA has more transitions than the corresponding NFA. In the NFA, the solid lines and dotted lines represent goto and failure transitions, respectively. For an NFA-based matching, the current state is moved along its failure transition and the matching process repeats for the current input. The DFA examines each input only once while the NFA may examine each input several times along the failure transition path. In matching a text string of length n , the NFA makes fewer than $2n$ state transitions.

In the NFA, the solid lines are represented by go to and dotted lines by failure transitions. In the DFA, there is cross transitions is representing the dotted lines, they are newly added by eliminating failure transitions. Output states are represented by shaded states.

The multi pattern matching can be performed by using either the NFA or the DFA. To match a string, the initial state is usually taken as 0. With an input in the current state, if a goto transition or a cross transition is matched, the current state is moved along the matched transition.

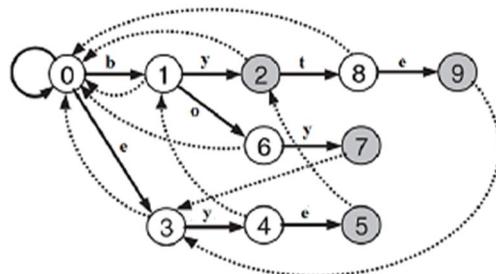


Fig.7.DFA for {by, byte, boy, eye}

In a DFA-based matching, the current state goes back to the initial state and the matching process repeats for the next input. In a NFA-based matching, the current state is moved along its failure transition and the matching process repeats for the current input. The DFA will examine each input only once while the NFA along the failure transition path may examine each input several times. The DFA makes n state transitions and the NFA makes fewer than 2n state transitions for matching a text string of length n.

V. COVERED STATE ENCODING SCHEME

5.1. Basic Idea

Since the AC NFA has a smaller number of transitions than the AC DFA, the NFA can be implemented with smaller TCAM entries than



DFA. The number of TCAM entries in the NFA-based implementation is the sum of the number of goto transitions and the number of nontrivial failure transitions in the NFA. In NFA design, 1-bit field 'F' indicating a failure transition is further added in each SRAM entry. If an entry is connected with a failure transition, then F=1 and its input field is "_", which means that it can match with any input value. Fig. 9 shows TCAM/SRAM entries for AC NFA in Fig.7.

CS	IN	NS	F
	E	9	0
6	y	7	0
4	E	5	0
3	y	4	0
2	T	8	0
1	y	2	0
1	o	6	0
0	b	1	0
0	E	3	0
9	*	3	1
7	*	3	1
5	*	2	1
4	*	1	1

CS CS	IN	NS
8	E	9
6	Y	7
4	E	5
3,7,9	Y	4
2,5	T	8
1,4	Y	2
1,4	O	6
All states	B	1
All states	E	3



If the matched transition is a failure transition, or $F = 1$, an input is not advanced and current input is used once more for next matching. One character may be frequently processed along the states in the failure transition path until a non failure transition is matched ($F = 0$) or a state goes back to the initial state, which is a key drawback of the NFA-based structural design. The failure transition graph is a graph consisting of only Failure transitions in the AC NFA.

5.2. Covered State Encoding Algorithm

In a FSM design to identify the state of the machine, each state is represented by a binary code. These codes are the possible values of the state register. The procedure for assigning the binary codes to each state is known as state encoding. The choice of encoding plays a key role in the FSM design which depends on the form of technology used like FPGA, CPLD ASIC, etc. and also the design specifications. It influences the complexity, size, power consumption, speed of the design. If the encoding is such that the transitions of state register are minimized then the power will be saved. The timing of the device is often affected by the choice of encoding. An algorithm is proposed for performing the covered State encoding for the AC NFA. The proposed algorithm consists of four stages as follows

Step 1 Construct a failure tree.

Step 2 Determine the size of a cover Code of each state.

Step 3.Assign a unique code and a cover codes to all states.

Step 4 Build the TCAM entries.

Step 1- Construction of a Failure Tree

The graph consisting of only failure transitions is known as

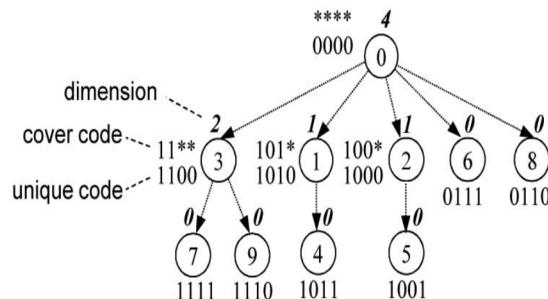


Fig. 8. Failure tree and covered state encoding.

Unnecessary failure transitions can be avoided. Primarily, a failure tree is constructed by reversing failure transitions in the failure transition graph so that each state s can easily find $\text{PRED}(s)$. The initial state becomes a root of the failure tree and the set of all descendants of a state s in the failure tree is $\text{PRED}(s)$.

Step 2-Determining the Size of a Cover Code

The numeral of “_” bits within a cover code is called its dimension and the numeral of unique codes enclosed in a cover code is called its size. The size and dimension of the cover code of a state s can be represented as $\text{size}(s)$ and $\text{dim}(s)$ respectively. $\text{Size}(s)$ is $2\text{dim}(s)$. In a failure tree if a state s has no child, $\text{dim}(s) = 0$ as $c_code(s)$ need not cover any other code, in addition to that its cover code is same as its unique code. If in any case a state s has children in a failure tree, $c_code(s)$ ought to cover not only $u_code(s)$ but also $c_code(s)$ for all its children c .

The dimensions of each and every state are determined

Fig. 9. TCAM/SRAM entries in NFA architecture

recursively during the computation of $\text{dim}(0)$, where ‘0’ indicates the initial state



Step 3-Assigning State Codes

For a state 's', the unique code u_code(s) can make use of a code covered by c_code(s) and in this case a code is used which is obtained by replacing *with 0 in c_code(s) as u_code(s). The codes are recursively assigned. Initially, the code of the root 0 is assigned as follows:

$$C_code(0) = ** \dots * \text{ and } u_code(0) = 00 \dots 0.$$

The codes of the children are assigned in declining order with respect to dimension for a state's' in order to assign codes efficiently.

```
procedure AssignCode(node s, int base)
    // assign codes to this node s
    U_code(s)=base // unique code
    C_code(s)= covercode(base,dim(s)) // cover code
    if s has no child then return
    sort the children of node s in decreasing dimension
    order
    cbase=base+ 2dim(s)
    // assign codes to children recursively
    for each child node c of node s do
        cbase =cbase _ 2dim(c)
        AssignCode(c, cbase)
    endfor
end
```

Fig. 8 shows the failure tree for AC NFA in Fig. 7. In example shown in fig.8, the dimension of a root is 4 and it has five children whose



dimensions are 2, 1, 1, 0, and 0, respectively. The cover codes of the children are assigned 11**, 101*, 100*, 0111, and 0110. Their unique codes are 1100, 1010, 1000, 0111, and 0110 which are obtained by replacing * with 0. The codes of children is allocated with the fixed bit values (0 or 1) which is based on the cover code of their parent and new values are assigned only in “don’t care” bit locations.

Step 4- Building TCAM Entries

Any child entry in a failure tree should be located more front than its parent entry in TCAM. To build TCAM/SRAM entries the procedure BuildTCAM is used.

Current state	Input	Next state
11** (3)	Y	1011 (4)
1011 (4)	E	1001 (5)
101* (1)	Y	1000 (2)
101* (1)	O	0111 (6)
100* (2)	T	0110 (8)
0111 (6)	Y	1111 (7)
0110 (8)	E	1110 (9)
**** (0)	B	1010 (1)
**** (0)	E	1100 (3)

Fig. 10. TCAM/SRAM entries using cover state encoding.

procedure BuildTCAM(node s)



```
// insert entries of children recursively
for each child node c of node s do
    BuildTCAM(c)
// insert the entry of this node s
for each goto transition gðs; iP of node s do
    next =g(s,i)
    insert (c)_code[s], i) into TCAM
    insert (u_code[next]) into SRAM
endfor
end
```

The procedure BuildTCAM inserts children in the failure tree first into TCAM by Calling BuildTCAM(0) which constructs all the TCAM/SRAM entries recursively

VI. MULTICHRACTERS PROCESSING USING COVERED STATE ENCODING

The covered state encoding scheme for efficient TCAM-based implementation is proposed in this section. However, Aho-Corasick algorithm processes only one character at a time and multi character processing is required to achieve high-speed matching.

In this section, a finite state Machine is proposed called k-AC NFA which has state transitions on k input characters by combining k consecutive goto transitions of the Aho-Corasick NFA. Since k-AC NFA consists of goto transitions and failure transitions like the AC NFA, the covered state encoding scheme can be used in the TCAM based implementation of the k-AC NFA. The major advantage of the k-AC NFA is that the state transition consumes exactly k input characters

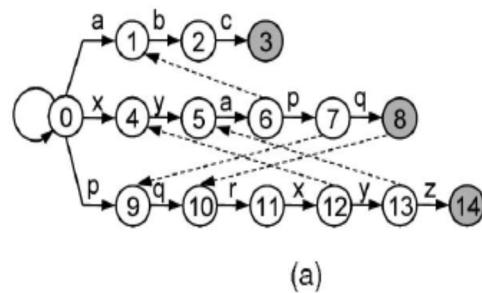


while in the compressed DFA, the state transition is done on variable length (between 1 and k) of characters.

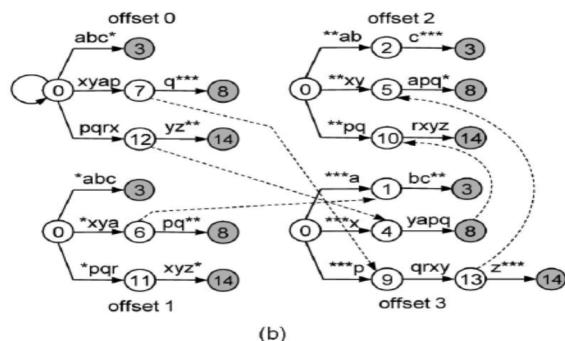
6.1 Construction of k-AC NFA

When k input characters are processed at a time, the patterns can be started at one of k possible offsets of the input characters. In order to detect the patterns starting at any of k offsets, we construct k finite state machines each of which corresponds to one of k offsets.

For example, we consider the set of patterns {abc, xyapq, pqxyz}. Fig. 11a shows the AC NFA for these patterns. We construct the 4-AC NFA by creating four state machines each of which can detect the patterns starting at one of four offsets, as shown in Fig. 11b. In Fig. 11, the states with the same label are the same state and the gray colored states are output states.



(a)



(b)

Fig.11. Construction of k-ACNFA, k=4 (a) ACNFA (b) k-ACNFA



In Fig. 11b, the dotted lines represent the failure transitions. The failure function of the k-AC NFA is the same as that of the AC NFA.

transition TCAM			output TCAM		
current	input	next	current	input	output
9,7	qrxy	13	0	*abc	out 1(3)
all	xyap	7	0	abc*	out 1(3)
all	pqr	12	1	bc**	out 1(3)
all	*xya	6	2	c***	out 1(3)
all	*pqr	11	4,12	yapq	out 2(8)
all	**ab	2	5,13	apq*	out 2(8)
all	**xy	5	1,6	pq**	out 2(8)
all	**pq	10	7	q***	out 2(8)
all	***a	1	10,8	rxyz	out 3(14)
all	***x	4	11	xyz*	out 3(14)
all	***p	9	12	yz**	out 3(14)
			13	z***	out 3(14)

(a)

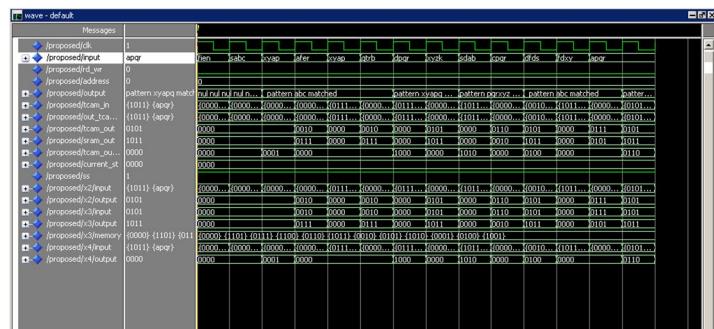
(b)

Fig.12.TCAM entries in k-ACNFA

6.2 Implementation of k-AC NFA

The k-AC NFA can be implemented in the TCAM-based architecture using the covered state encoding. In the k-AC NFA, start transitions from the initial state may be done on inputs with leading *'s (e.g., ** pq) and output transitions may be done on inputs with trailing *'s (e.g., bc **). Both transitions may be simultaneously matched with k input characters (e.g., bcpq) and we cannot determine the priority between two transitions since they have no inclusion relationship. In order to solve this problem, we use two TCAMs called a transition TCAM and an output TCAM, which can simultaneously generate the matched entries. The output transitions are stored in the output TCAM. The output TCAM detects the final pattern matching and the transition TCAM controls the state transition in the k-AC NFA. If two TCAMs generate the matching results simultaneously, the state is moved according to the result of the transition TCAM and the output is generated by the output TCAM.

The simulated response for multi pattern matching algorithm for given example is as shown:



VII.RESULTS AND CONCLUSION:

The results for existing and proposed methods are displayed in figures shown below. The existence of failure transitions is added in each SRAM entry in NFA-based architecture. A 1-bit field F is used for indicating a failure transition. If an entry is associated with a failure transition, its F is 1 and its input field is "*" which can match with any input value. A covered state encoding scheme for the TCAM-based implementation of Aho-Corasick algorithm is proposed in this paper which is extensively used in network intrusion detection systems. The covered state encoding takes the benefit of "don't care" feature of TCAMs and information of failure transitions is implicitly captured in the covered state encoding. By using covered state encoding, the failure transitions are not implemented as TCAM entries because all the states in the failure transition path can be examined simultaneously. The covered state encoding requires the smaller number of TCAM entries than NFA-based implementation. The covered state encoding thus enables an efficient TCAM-based implementation of a multipattern matching algorithm.

The scheme for constructing the finite state machine called k-AC NFA for multi character processing, which uses a covered state encoding is also proposed. The k-AC NFA using the covered state encoding has the smaller TCAM memory requirement and can process exact k characters at a time. Thus, a covered state encoding can be



efficiently used in multi character processing.

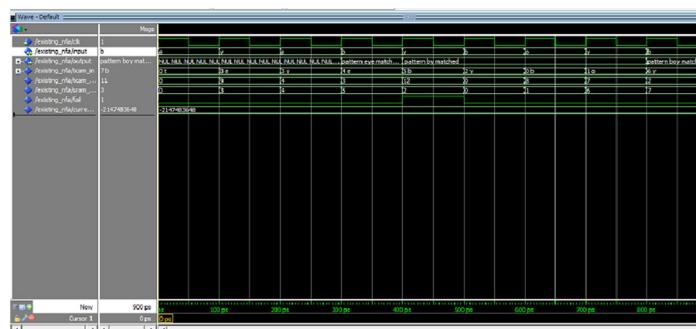


Fig.13.Simulated outputs for existing version

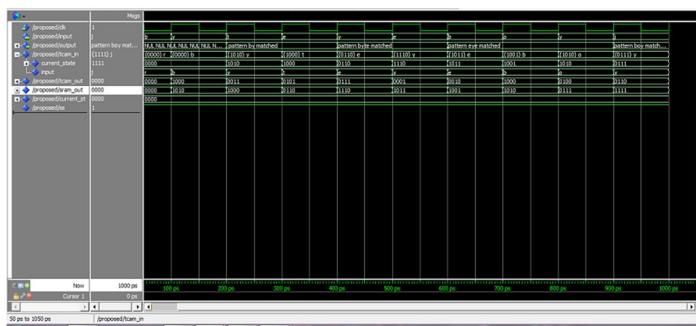


Fig.14.Simulated outputs for proposed version

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