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Aims and Scope

Journal of Electrical Engineering and Advanced Technology is a journal that publishes original research papers in the fields of Electrical Engineering and Advanced Technology and in related disciplines. Areas included (but not limited to) are electronics and communications engineering, electric energy, automation, control and instrumentation, computer and information technology, and the electrical engineering aspects of building services and aerospace engineering, Journal publishes research articles and reviews within the whole field of electrical and electronic engineering, new teaching methods, curriculum design, assessment, validation and the impact of new technologies and it will continue to provide information on the latest trends and developments in this ever-expanding subject.

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Contents

Adaptive Approach for Fault Detection in Power Transformer Based on Oil Testing

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ABSTRACT

Transformers are an integral part of power systems and their reliable operation directly impacts on the whole network. Statistics about failures of power transformers constitute an important basis for asset management of a fleet of transformers. Periodic review of these statistics becomes necessary where they can be used to influence transformer design and technology. Recent utility survey shows that a large proportion of transformers has attained their designed life and is operating close to their nameplate rating or beyond. The load growth is compounding this problem on the existing transformers due to fewer extension projects. To enhance utility reliability, it is pertinent to identify problems that normally encountered in the past on a particular class of transformers, Identify Manufacturer, type of fault, frequency of occurrence, failure analysis, failure origin and causes of probable physical damage leading to catastrophic failure & hence interruption in supply of electric energy in a given locality. This paper describes case studies of failure of power transformers and failure reports, effect of aging and loading conditions on the life of Power Transformer and test reports of various categories of power transformers belonging to several electric utilities.

Keywords: Power Transformer, Dissolved Gas analysis, Faults, Transformer Oil.

1. INTRODUCTION:

Power transformers are important equipments in power system. Smooth functioning is the key of ensuring hassle free operation of entire power system[1]. Once power transformer develops abnormality, the power supply will be interrupted and huge economic loss will occur. Therefore, it is very significant to detect and identify incipient failures of power transformer as early as possible. Power transformers, which are often the most valuable asset in a substation or plant, are indispensable components of high-voltage equipment for power generation plants, transmission systems and large industrial plants. Unexpected failures cause major disturbances to operating systems, resulting in unscheduled outages and power delivery problems. Such failures can be the result of poor maintenance, poor operation, poor protection, undetected faults, or even severe lightning or short circuits [11].

Power transformer failure could result in huge economic loss and unplanned outage of the power system, which may affect a large number of industries and commercial customers [2]. In order to

keep power transformers in health condition and reduce probability of transformer failures or abnormalities while simultaneously cutting the maintenance cost, a variety of factors that affect transformer performance should be analyzed carefully, including electrical, mechanical, and chemical properties. Some new techniques can play a key role to reach this objective, such as condition monitoring, predictive maintenance, and artificial intelligence (AI) based diagnostic techniques.

2. PROBLEM STATEMENT

Transformers have limited life. However, unlike other machines, it does not have any moving parts, except tap changers or cooling fan or pump motors. The outages, therefore, is not due to wear out. Unexpected failure is always a major disturbance in the system operation, resulting in unscheduled outages with power delivery problems. To reduce the risk of unexpected failure and the ensuing unscheduled outage, on -line monitoring has become the common practice [4].

3. PROPOSED TECHNIQUE.

The methods used to evaluate transformer internal condition is described below.

i. Dissolve Gas Analysis Method

To measure Dissolve Gasses in the transformer oil we can use gas Extraction method. In this process extraction involves separating the gases from oil. The oil sample is introduced into an inert gas filled viol which is heated and agitated for a period of time (15 to 30 minutes) and total gas content in percentage is measured [7].

ii. Measurement of Winding Resistance Method

The measurement of the winding resistance has to be carried out with the help of Kelvin Double bridge/transformer ohm meter. Resistance should be measured between the line and the natural terminal and average of 3 set of reading shall be taken as tested value for star connected winding with natural brought out. The resistance of the HV side is measured between HV terminal and LV terminal then between LV terminal and the neutral for star connected auto transformers [3]. For transformer provided with delta connected winding such as tertiary winding of auto transformer, measurement shall be made between pairs of line terminals and resistance per winding shell be calculated per formula as given below

Resistance per winding = 1.5 x Measured Value

iii. Dielectric Test Method

A sample of the oil to be tested is placed in a clean "standard" cup so that it covers the two disc electrodes that are one inch in diameter and have their faces apart by one-tenth of an inch. Voltage is applied across the electrodes and increased gradually until a flash-over occurs. It is an accepted practice to run a minimum of three tests and the average of the three being considered as the actual dielectric strength of the oil. The minimum acceptable value is 22KV for mineral oil, and 25KV for Askarel [13].

4. POWER TRANSFORMER TESTING AND FAILURE REPORTS WITH PROPOSED TECHNIQUE

The transformer, being a key element in the transmission and distribution of electrical energy, improving its reliability is of utmost importance. System abnormalities, loading, switching and ambient condition normally contributes towards accelerated aging and sudden failure, hence, it is, all the more essential, to employ continuous monitoring techniques and on-site diagnostics followed by quality maintenance for having trouble-free and reliable operation with minimum outages. This paper includes case studies as available from Himachal Pradesh State ElectricityBoard Limited (HPSEBL), Himachal Pradesh and Haryana and from some Private Firms. The data has been collected from various substations/Hydro projects of H.P. and based on it; it is tried out to analyses the major reasons for Transformers failures. This data includes testing results of particular transformers [12].

4.2. Transformer Failures

A typical power transformer has a life expectancy of more than 30 years. During this time it is obvious that such a device has several failures, thus needing maintenance to ensure that the expectancy is fulfilled. Because transformer failures are responsible for a very high amount of costs, this section is based on different studies about transformer failures [10]. William H. Bartley P.E, The Hartford Steam Boiler Inspection & Insurance Co., has done a research on 94 different cases of failures and their losses. In this study, he figured out, that in the period of 1997 to 2001 the total loss in 94 cases was over US$280,000,000[8] in the US only. This makes it clear why compensation of transformer failures is important. Apart from that, the different application types are researched and it is shown that most of the failures occur in the utility substations cases). Anyway, only 6% of the loss is generated in this area [15]. In total 36 failure cases 8 in the step up generator area generate 70% of the total losses. Most of the total failures are insulation faults (24 failures generate a loss of about US$150,000,000).

More detailed information about the Hartford Steam Boiler (HSB) research is available in [9]. Another study which was published by the CIGRE Working Group 05 took another approach. In that study the failure source was attributed to the different parts in a transformer. The result was that 40% of the

failures were caused by the on-load tap-changers. The problem with investigating different studies about this topic is that their definition and characterization of the failure groups are often different. A common denominator has therefore been sought in these studies. Apart from that, information provided by the German RWE AG (German Power Company) is integrated in this section. The failures are therefore separated to: winding, core, isolation, tank, bushing, oil, cooling and the load tap-changer. In this subsection, information is provided about the failures, their impacts on the transformer and typical reasons why these failures could occur. Moreover, fault trees for the different transformer parts can be found in the work of Anna Franzén and Sabina Karlsson from the Royal Institute of Technology, Stockholm. The life cycle curve of Power Transformer [14] is shown below in Fig. 4.1.

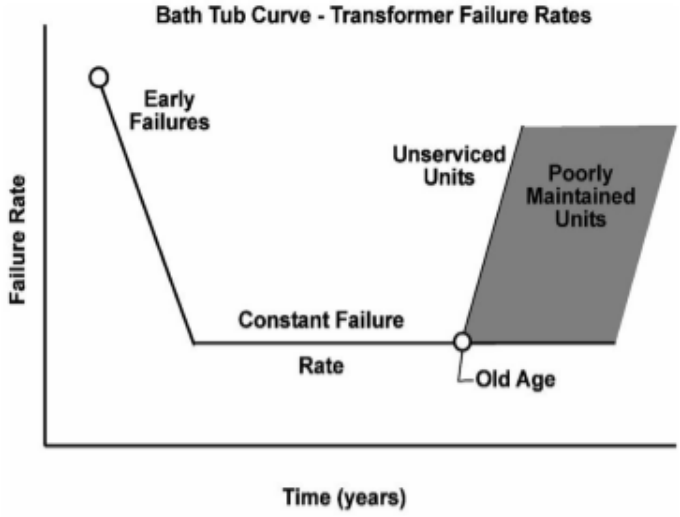

Fig 1:

4.3 CASE STUDY 1: DAMAGE REPORT OF TRANSFORMER.

The damage report of Transformer at subdivision Tissa, Chamba is studied in order to find out the major cause of fault in the transformer. In the investigation of the damaged transformer it is found that the major reason of failure is Defective mechanism of Incoming no-II ACB of Jhajja/Kothi, Tarek and Himgiri outgoing ACB. The 11 KV incoming and outgoing breakers were malfunctioning. The detailed investigation report of the damaged transformer is shown below in the Table 4.1.

Table 4.1:-

1	Devision	Chamba no-1
2	Sub-Devision	Tissa
3	Capacity	1 MVA
	Voltage	33/11 kv
4	Transformer	GEC NO. 4913
5	Year of Manufacture	1986
6	Date of Installation	14.08.2003
7	Date of Damage	14.08.2003
8	Area Effected	Jhajja Koti, Himgiri

9	Detailed reason for damage of Transformer	Defective mechanism of Incoming no. II ACB of Jhajja/ Kothi, Tarek and Himgiri outgoing ACB.
10	Whether reason for damage of Transformer	Yes
11	D.O. fuses	Yes
12	G.O Fuses	Yes
13	Oil insulation result last taken before damage	46 kv/min
14	Detail of latest dehydration result	46 kv/min
15	Earth Resistance	0.9 ohm
16	Max. Load during peak load hours	34 Amperes
17	Whether transformer over loaded	No
18	Megger Result-	
	H.V to Earth	130 Mega ohm
	L.V to Earth	250 Mega Ohm
	H.V to L.T	200 Mega Ohm
19	Whether burnt during warranty period	No

The IR value test results with effect to the above referred transformer are shown below in Table 4.2.

Table 4.2: Meggar insulation results of the damaged transformer

HT to Earth		LT to Earth		HT to LT		HT to Neutral		LT to Neutral	
R- Phase HT to Earth	130 M-Ohm	R- Phase HT to Earth	250 M-Ohm	R- Phase HT to Earth	200 M-Ohm	R- Phase HT to	Sho rt	R- Phase HT to Earth	200 M-Ohm
Y- Phase HT to Earth	130 M-Ohm	Y- Phase HT to Earth	250 M-Ohm	Y- Phase HT to Earth	200 M-Ohm	Y- Phase HT to	Sho rt	Y- Phase HT to Earth	200 M-Ohm
B- Phase HT to Earth	130 M-Ohm	B- Phase HT to Earth	250 M-Ohm	B- Phase HT to Earth	200 M-Ohm	B- Phase HT to	Sho rt	B- Phase HT to Earth	200 M-Ohm

- Transformer oil level:

The transformer oil level was reported to be okay.

- Breather provision:

The breather provision existed in the transformer and the Silica gel was checked and found okay.

- Position of lightening Arrestors:

i. The lightening arrestors were existing on the structure and were found to be in sound condition.

ii. Four pedestals of the Geo-Switches were found punctured/damaged

iii. The lightening arrestors were found existing on the HT line's emanating from the switchyard within 2 KMS radius.

- Weather conditions

The weather condition on the day of damage was rainy, Windy and with intermittent lightening i.e. it was not clear on the day of damage.

- Susceptible cause of damage:

Keeping in view the facts as mentioned above, the possible cause of damage in view of the investigation committee appears to be due to:

i. Atmospheric Lightening.

ii. Some internal defect: the dead fault on the 11 kV Himgiri feeder causing internal fault in the 1 MVA Transformer.

iii. Some manufacturing defect.

iv. Due to aging factor: the transformer has almost outlived its life as it is 1976 make.

v. Due to oil maintenance.

- Recommendations:

i. The 11 KV incoming and outgoing breakers were malfunctioning. These should be got repaired and if are beyond repairs, these should be replaced.

ii. The battery system should be got checked and if it is beyond repairs, these should be replaced as it is the back-bone of the substation.

iii. The transformer oil results through dehydration should be improved if required it is suggested that the dehydration set should be very near to the yard. should be got repaired.

iv. Earthing results should be got improved by recharging/providing fresh earthing electrode.

v. Each 11 KV outgoing feeder should have the separate breaker panel in the sub- station.

In this case, it can be seen that the major reason of transformer failure is aging and lack of proper condition monitoring with advanced techniques.

5. CONCLUSION

Power Transformers belong to the most expensive and strategically important components of any power generation and transmission system and thus, their reliability is of key importance for the availability and profitable operation of such systems to ensure quality electric power for the consumers in national endeavor. By adopting a disciplined monitoring and testing schedule for Power Transformer, the life of Power Transformer can be enhanced leading to reduction in revenue loss on account of damaged Transformer. Through relentless efforts of eminent researchers & Technologists including utility engineers, It has been established that better monitoring and awareness leads to more revenue/profit and also in case of transformer it enhances the consumer satisfaction.

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Extended Boolean Retrieval Model using P- Norm and Term Independent Bound Methods

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A B S T R A C T

This paper provides a comparison report of two processes of retrieving a keyword or information's from a given database or from a multiple databases. The process1 referred to as Extended Boolean Retrieval (EBR) model, it gives us an outcome in the database. Since EBR model implementation factors lead to a higher cost, we consider a p - norm method of the EBR execution. P - Norm approach plays a role in the EBR model to preserve strictness of the conjunctions and disjunctions to establish them with their own identification on the node. As Adaptive Boolean Retrieval Process (ABRP the process2 known). Within this paradigm of text categorization aspect, first it assigns a value to a specified key word or info then starts its hunting procedure with an index. This value includes the factors such as a position and appearances of phrase. In existing, they use these concepts in Bag-of-word approach. In this paper EBR model gives an edge of reformulation facet, which gives a hundreds or tens of thousands of answers for the given query. To finish, we assess together with the reported results of these models on query to demonstrate an better retrieving process according to their efficiency and correctness with the max score ranking algorithm.

1. INTRODUCTION:

Enabling users to easily search and retrieve info from database known as retrieval. Although there are lots of search process to give a better search result, their efficiency and precision is unknown to user. The user also unknown of schema of a structured information that's been offered by the engine to a user from a server. In such cases, the data in a database needs considerably more descriptions to match their originality to a given query. The attributes of the reported results could be failed to be understood by the user. Especially in an area of biomedical, officially authorized applications, their aspect fails

To demonstrate a better efficacy in a result that we received, in case that it is then their computational cost leads to infinite amount to our extent.

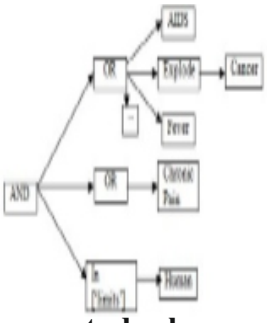

Fig: 1the above case study shows query tree functions

Fig. 1 shows how the operators work the retrieval procedure of Boolean concepts. Here, we've shown the AND-OR format representation for the aspect of efficient extended Boolean retrieval model for the given query.

Ergo, we here consider an two better processes of retrieving aspects to establish their efficiency and accuracy. We can pick the domain of biomedical, legal applications to get a superior result. In these applications, their work of assigning a rank to a database differs from one another and according to their rank basis; the query results have been overviewed and viewed in the output display. These processes overcome the failure of stop ranking the file one or many of highest ranked result are adequate based in the constraints supposition.

'EBR versions are believed to be considered a combination of both the Standard Boolean model and vector space models. Due to the disadvantages in a Typical Boolean model, we go for an Extended Boolean Retrieval (EBR) model. EBR model has an advantage of weighting factor additionally contained into it. The comparison results of Boolean model and EBR model are shown in an experiment environments of CSI, CACM and INSPEC. Through these relationship sources, we compare ABRP and EBR on their obtained result in conversion to the status. Here, in an EBR model, we use an p-norm approach for an implementation basis to reduce an cost. In EBR model, the and-or format rendering are regarded as an operators to show their Boolean condition in a searching aspect. Imagine whether the user query is Q= [Aids, Cancer, and Temperature] (1)

Then, the searches are based on an aspect of [Aids AND Cancer AND Fever], [Aids AND Cancer AND NOT Fever], [Cancer OR Fever], etc. Moreover, the identification of research has noted the expansion together with the extended Boolean retrieval query processing. EBR combines with the content based routing to give a greater result. The look of term in a pattern is disregarded because of complexity. These patterns using frequency of a word easier to rank is followed in an EBR.With the P-norm strategy implementation of EBR models done with the low cost.

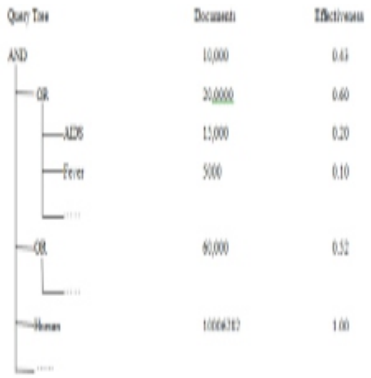

Fig: 2 the above diagram of enquiry assumed in biomedical application

The mentioned case study result shows the usefulness of the given keyword or sentence in a database and their hierarchy are also to be noted here and their variability activities are also to be noted over here in the application.Adaptive Boolean Retrieval Process, which is the opening for the query to execute its access for finding a result, followed by an indexing to notice their database format in an order that they must find a mandatory result for a corresponding query which has been given as input. With the benchmark of the n index, we frame the frequency of the keyword it occurs within the document as well as their document frequency is, in addition, to be noted for a paradigm that we consider. It beat response time resulted in Bag-of-word approach as well as their accuracy in frequency identification. Hence, the resultant of both ABRP and EBR are passed through a max-score ranking Algorithm for an objective to assign a priority to the idea of position obtained from a Maxscore ranking algorithm. The EBR and ABRP results can be compared for a finding of search prospect subsequent to the ranking allocation was completed.

II.RELATED WORK

Searching files or keywords involved in case of bio-medical, legal programs literature. J.H.Lee [1] has developed different kinds of designs for aspects of retrieval process that the Boolean format allows to flow are suggested. EBR model contains the Boolean queries into it that is deeply embedded in the considered method for a site of bio-medical as stated in S.Pohl et al. [2]. It contains a conclusion of that particular Boolean search isn't adequate to be supposed, since the facet of matching is not enough due to an indexing errors. Few documents like Karmietal [6] suggest that loosening the factor of the given query combines with the position basis precedence that we allocate according to a some of the ranking algorithms.

L. Zhanget al. [4], completed their study to the performance matrix that they've taken for allocation, such as efficiency, precision of the text retrieved from the techniques has continued in the inverted index within the sequence basis. Here, they use a method of term-at-a-time approaches. Because it is as they've preferred an efficient system for preparation, the result still remains sparse. However they produce a consequence on testing with GOV2 corpus with 61% faster than document time baseline. They've taken simply 50% of specified documents for judgment, to practice a classifier. Practically, this leads to an improvement. If these concepts were used for filtering the recently published documents with their relevance in consideration to systematic reviews more amount of documents should be found. For the case of standing in EBR models we have suggested many approaches, among that is a fuzzy set models proposed by T. Radecki [5] in case of a file retrieval to include non~binary keyword weights, but considers those effectiveness within the pure Boolean model. There are some of the other tactics implemented in EBR contain Waller-Kraft [14], Paice [16], infinite-one [8], inference

networks [17], and so forth. In an ABRP, the procedure includes various obtaining query classifications on to it. The R. Beckerman al. [10] proposes distributional term clusters verses words for text categorization, which applied to the realm of textual. It results the difficulty of assuming content of text to the already defined properties. As the value of text thought enhances fast on-line and in the domains, which acts as a method to join the content of script, which covers method as motivating not individual from the look but also from academic by the industrial aspects.

It out-performs powerful algorithm word-based setup, which is to be one of the best reported categorization. With these tactics and implementation, their contrast reports should be overviewed.

Our proposal

Architecture

The user A gives a query to the parser. The parser then persists its action to the database or an server where the data's are accumulate. After reaching its purpose aspects EBR works starts that is Extended Boolean Retrieval replica works based on its AND-OR format representation to the specified query by using following equations.

$$K_{OR}(N_1 \ldots\ldots N_n) = \left(\frac{1}{n}\sum (1-Q_i)^p\right)^{\frac{1}{p}} \quad (2)$$

$$K_{AND}(N_1 \ldots\ldots N_n) = 1 - \left(\frac{1}{n}\sum (1-Q_i)^p\right)^{\frac{1}{p}} \quad (3)$$

The mentioned equations gives the means to us by how that your AND-OR representation might be calculated. The two processes have to be calculated according to our suggestion. Additionally, it checks the total lists popularity. Within the optimization activities it identifies whether or not it is being approached for excessive search engine optimization. By the mentioned types EBR searches the pertinent data on the database. Following the searching aspect was finished in the process1 called EBR, the reported result is passed via the max score rating algorithm for the purpose of assigning rank to the useful data's to the given query depending on their priority shaped by and-or representation to show the regarded result on screen. Method waits for process2 to create a comparison report, with this received result from process1.

In the process2 elements as similar in process1 first the query needs to be given by the consumer B for the parser. Its action is then started by the parser with Adaptive Boolean Retrieval Process (ABRP). The ABRP first passes the query for the ensemble learning technique with which the ids are to be done, what

kind of query it is provided. Then with the completion of the technique, index needs to be framed in the database where the identification or relevance to given query is noted and used by the ABRP for the characteristic of seeking. The target of ABRP is really to work out during querying method, how many of the applicable records are retrieved based in the strictness of the operation. To reduce the complexity within the provided query the ABRP process transfers the text query for several other simpler formats to manage can become a vector which can be useful in describing the content of the record. With the end of index, another thing to do is to be considered passed through max score ranking to assign a standing and a expression identification by following equations and this result were used for comparison with the process1 to create a result.

$$Tf_{a,b} = n_{a,b} / \sum P^{n}{}_{p,j} \qquad (4)$$

$$Df_a = \log 1 D_1 / 1(d : t_a \notin d) 1 \qquad (5)$$

$$(Tf - df)_{a,b} = Tf_{a,b} * df_a \qquad (6)$$

Max-Score Ranking Algorithm

Max-score ranking algorithm is used here for recognize a rank from a hundred or thousands of documents from a database by means of a following pseudo code in both the cases of processes ERP and ABRP.

Max score ($\{A_{a1}, A_{b1}, \ldots\ldots\ A_{zn}\}$, P)

Initialize min score S and max P

Rank Lists $\leftarrow \{A_{a1}, A_{b1}, \ldots A_{zn}\}$

For all A_a do

S.push (Ak. curposting (), Ak. cur posting ().docID);

Ak.next ();

WhileSis Empty () $\neq$ true do

With this referred algorithm, the rank to the subsequent keyword works based on the processes account the result to the concerned system. As doing this, the illustration has been considered as shown in the table 1 in case of a biomedical submission to search a patient document by using their name as a keyword in the search box.

Table 1: Executed example result

Keyword	Rank	Postings
Access	10	(D1:2), (D2:10),
Draft	5	(D4:2) (DJ T), (Dj: 5),

Retrieval system and control flow

The overall procedure for the system and their control flow diagram of the retrieval system is shown in fig. 4 applied through the use of jdk 1.6. Flow diagram is just a graphical representation of the "stream" of data via an information system, modeling its process aspects. Often they're a preliminary measure used to make an overview of the system which could later be elaborated. It's also useful for visualization of data processing. Input query has been distributed by the user an and user B. In the specified query two procedures should be followed ABRP and ERP. The reported results from ERP and ABRP are passed through the Maxscore ranking algorithm by which the reported results are displayed on screen by using their allotted standing. With this specific position obtained from every procedures comparison report are to be defined with their performance metrics that they've resulted within the aspect of matching the given query with the related data from the database.

III. EXPERIMENTAL RESULTS

In this section we report results from experiments which we conducted to evaluate the proposed two-level query evaluation procedure. We attempted both short and long queries. The queries were made out of subjects 501-550 of the Web Track collection. We used the subject title for short query construction (average 2.46 words per query), as well as the title concatenated with the subject description for extended query construction (average 7.0 words per query). Additionally we attempted the size of the result set (the lot size). The larger the heap, more evaluations are needed to obtain the result set.

Recall that we compare the threshold parameter passed to the WAND iterate with the files' score upper bound. Records are fully assessed only if their upper bound is greater compared to the given threshold. C, therefore, governs the tradeoff between efficiency and precision; small C is, less files will be fully evaluated, in the cc $\neq$ of lower precision, and vice-versa. For practical reasons, as opposed to different C, we fixed its value and different the value of the threshold variable F that multiplies the true threshold passed for the WAND iterate. The variable C is in inverse relation to F, thus varying F is equivalent to varying C with the opposite effect. This is, big values of F lead to an estimated loss in precision and in fewer complete evaluations. Setting these values in Equation 1, a document will be returned by WAND $(X_1, C \quad \alpha_1,\ldots X_k, C_{ik}, F\,\theta)$ if and only if $C\sum_{1\le j\,k} x_{i\theta} \ge F\theta$ When setting F to zero the threshold passed to WAND is zero and thus all documents that contain at least one of the query terms are considered candidates and fully evaluated. When surroundings to an infinite value, the algorithm will only fully assess documents until the heap is full (until $\theta > 0$). The remainder of the documents will not pass the threshold since F0 will be greater than the sum of all uncertainty term upper bounds.

We measured the following parameters for changing values of the threshold variable:

- Average number of total evaluations per query. This is actually the dominant parameter that impacts lookup performance. Obviously, the more total evaluations, the slower the machine.
- Search precision as measured by precision at 10 (P@10) and mean average precision (MAP) [22].
- The difference between your search result set obtained from a run with no errors (the basic run) as well as the result set obtained from runs with negative errors (pruned runs).

Remember that documents get identical scores in both runs, because the evaluator is common and it assigns the final score; hence the relative order of common documents within the pruned and also the basic set B set P is kept. The topmost j documents returned by the run, for many, will take the exact same relative order and in the basic set, therefore if each run returns k documents.

We measure the difference between both result sets in two ways. First we measure the relative difference provided by the formula

$$\frac{|B \setminus P|}{|B|} = \frac{k - j}{k}$$

Second, since not all documents are equally important, we measure the difference between the two result sets using MRR (mean reciprocal rank) weighting. Any document that's in the basic set, B, in position I in the arrangement, but is not a member of the set, P, contributes 1 / i to the MRR space. The notion is the fact that missing records within the pruned set lead to the distance in inverse relation to their own standing within the order. The MRR space is normalized by

$$MRR(B, P) = \frac{\sum_{i=1, d_i \in B-P}^{k} 1/i}{\sum_{i=1}^{k} 1/i}$$

IV. PERFORMANCE ANALYSIS

Therefore, the utilization of max-score ranking algorithm attains a time and space exponential gain. Because the information in the db are undergone a Boolean retrieval procedure in comparison to ABRP which undergone a term frequency style equations to solve a query efficiency improvement is obtained in EBR. Thus, the graph shows the difference in accuracy of the executed result on variability of two queries executed in two process and undergone a ranking priority to the result based on a Maxscore Ranking. In the given graph, the x- axis takes the time taken and y-axis takes the truth in positions. With these aspects, the better retrieval process is achieved by EBR model compared with the ABRP.

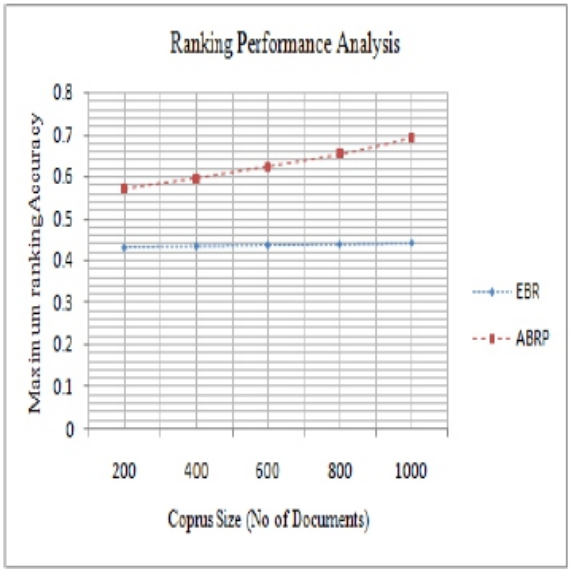

Figure 3: Performance Evaluation in accuracy

V. CONCLUSION

The system can perform static gesture training in comparison of any two retrieval processes. The results demonstrate that the proposed system permits quick training in locating of different queries at a time with the well procedures. The normal respect correctness of scheme in allocating a rank to relevant keywords from database is 79.8%. Term weight has an edge the document can itself calculate its score, which is of similar. The system provides the result that EBR model attains the retrieval process compared with the ABRP. The only limit of our system is that, the response time takes longer due to the conversion facet, search allocation predicated on precedence and position assumption. Future work will include extending the system with other distinct ranking algorithms.

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Electronic Waste Status in Jharkhand

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ABSTRACT

Technological advancement, increase in purchasing power of consumers and surge in consumerisaion has lead to a situation where everyone is mad about his comfort and is ready for parade to show himself well-off against one and all. This has lead to tremendous development of means for automation of life by means of electrical electronic equipments (EEE) resulting in fading out and compulsorily outdating the existing systems which have some life and may be can serve purpose. The advent of sophistication and services they offer is another matter of concern which increases the end of life situation of these EEE products forcing the world to a pool of land of discarded products which are deadly hazardous and toxic in nature. The contribution of this 1 % electronic waste in developed nations and 2 – 3 % in developing and underdeveloped nations has put the world to a hold on environmental degradation and in a situation where we need to conserve the rich mineral and rare metals and resources from depleting in ways of wrongful discards and allowing it to create our life endangered.

The situation of nation as panorama can be diversed. The situation of developed and educated states in India can offer a slightly better situation compared to the ones where illiteracy and poor living standards are compelling to make use of discarded EEE in name of automation and fashion parade and to be called that we live in elite society. The situation of Jharkhand is one which averages to the remotes of South Africa states where the live is threatened by these toxic and hazardous substances coming out from e wastes.

The situation in the state itself is diversified with the urbanization and literacy level. The connectivity to metro also plays an important role. Influx of discarded e wastes is more in well connected places and the secondary market for employment generation can be well evident from the study.

The local state government Luke worm approach towards tackling the grave situation in urgent manner can be well seen. The lack of regulatory enforcing arrangements makes the state haven for such dumping parties and the deadly wastes are getting accumulated in the places making life more and more dangerous. The western thinking of "one size fit al" cannot sustain here and is the most affecting philosophy responsible for continued environmental degradation and depletion of rare resources.

Keyword: Electronic waste, Buy back, Appropriate Technology, life Period, Discarded, Household, Business Sector, Software Sector.

INTRODUCTION

Industrialization, rapid technological growth and common man's desire to lead automated life with comfort are key factors for development and replacement of electrical & electronic equipments popularly known as EEE. The EEE and information technology (IT) sector is ever fastest growing segment in current scenario at par with the global phenomenon. Transmigration of technological growth of technology across national boundaries has lead to influx of leading multinational brands and companies in manufacturing sector of these EEE has reported as a result of changing policies & exchange of R&D facilities. Advancement in technology results in increase in updated EEE products and this leads to a situation of obsolesce of old products as they lose their usefulness and this leads to end of life rise and hence generation of Waste of Electrical & Electronic Equipments (WEEE)[3] i.e. electronics waste (e waste). Popular electronic products of main considerations mainly consists of audio equipment, batteries, copiers, computers, DVD, electronic gadgets, electronic toys , electrical home appliances, electric equipments, fax machines, laptops, lamps, mobiles, Printers, televisions, VCRs, stereos, etc. Trends of frequent influx and flow and trends have resulted in accelerated manifold growth of electronic waste also known as e waste.

Imports of used, outdated electronic products in name of technology transfer and up-gradation to third world countries having vast potential of consumerisation or market from the developed countries are the main reason of upsurge of e waste. As an estimate for developed countries waste accounts for 1 % of the total solid waste but in case of developing countries it ranges from 2.5 to 3 %[1]. The lesser amount of e waste may seem to be fewer volumes but due its toxic and highly hazardous nature is proving deadly to the environment and is becoming main source of almost all types of pollution degradation. Tackling of such menace requires adequate safeguard and regulatory measures. Identification of sources, availability of reliable data and extent of preparedness is to be ascertained for arriving at appropriate mechanism development thus we see that the development of such regulatory mechanism is at elementary level across the globe.

The physiological status symbolism idea of society, economical betterment i.e. increases in purchase power & affordability of population is creating larger markets for electronic products.

Contribution of gray market where computers, mobile repairing and other electronic items are assembled plays significant role in e waste generation. These gray markets can be seen well developed in the small cities where in name of local repair all sets of reuse, recycle, remove and rebranding takes place. These factors are well evident when we segmentise the total lot into subgroups. In market driven society out sourcing and services which createmore job avenues are taken prominent roles. The IT

sector in this connection plays an important role and is rapidly reaching almost all looks and corners. The mood and frequent changes in needs are resulting in increased optimized software, hardware and firmware's which is also proving to be intelligent area of e waste generation. Increased purchasing power and availability of hard cash without much effort are also resulting in frequent changes of electronic gadgets resulting in frequent exchange of old electronic products contributing more and more towards e wastes. BPOs and multiple activity centers contributing e wastes are identified and studied in detail.

Till 2011 census Jharkhand had 22 districts and each one had small or large towns of significant importance[20]. The survey and study of all segments has been taken up for identification of e waste situation. The segments are divided into sections and groups for proper representation. Questioners were prepared and distributed among the selected groups homogeneously identified. The data are collected and statistical manipulations and exercises were done to arrive at findings which have been put forth in the following sections of this paper.

E WASTE SCENARIO, CONCERNS & TRENDS

The MIAT and GTZ studies suggest that in India alone e waste has piled upto 800000 tones in India by 2012 itself showing an upsurge of 200 to 400 % growth for non computer e waste sections and in case of computers it is likely to cross 500 % growth rate by 2017[1,2]. Strategic Management Systems for electronic waste particularly for developing and underdeveloped countries can put in as comparative manner to show the approach among the e waste managing nations. These can be tabulates as represented in table1. Comparative strategies among the nations like China, India, South Africa and Switzerland representing most EEE generating nation, EEE consumer nation, third world nation and developed nation for EEE cases respectively[21].

Table 1 Approach Details of Developing country China, India, Third World Country S Africa & Developed Switzerland

Important aspect	*China*	*India*	*South Africa*	*Switzerland*
Technology Development	Indigenous & few borrowed	Borrowed, indigenous	Only Borrowed	Indigenous Developed & trans boarder migrated from fellow nations
Existing waste management system	Organized for urban areas	Mostly unorganized with rare exceptions for metros	Highly unorganized	Swiss Association for the Information, Commn and Organizational (SWICO) Technologies, Organized system
E waste management	Non specific & Semi organized	Mostly unorganized and informal	Not specific	Not specific

Actors	Manufacturers, distributors, traders, importers, consumers, recyclers, scrap dealers and disposers.	Manufacturers, distributors, traders, importers, consumers, formal and informal recyclers and scrap dealers.	Distributors, traders, importers, consumers,recyclers , collectors, sorters and disposers.	Manufacturers, distributors, traders, importers, consumers, recyclers, licensed collectors and licensed dismeltors and refiners.
Formal e waste collection centers	EMPA, GTZ and EECZ	Mostly under Pollution control boards	DESCO Electronic recyclers & Universal recycling co.	SWICO and SENS (Swiss Foundation for Waste Management)
Disposal / dumping sites	Outlined Municipal sites & illegal sites	Landfills	Landfills	Landfills
Disposal site technologies	Lacks legal collection systems	Lacks proper collection system	Partly Permitted sites with tech.	Systematic and meticulous process

Various studies have put the state wise e waste figures in percentage till 2012 as mentioned in table 2[21]. The graphical representation of it is shown in the figure 1.

Table 2 Showing Details of State wise E Waste Contribution in India

Sl	States	E waste in % in India	Sl	States	E waste in % in India
1	Maharashtra	13.88121	19	Uttarakhand	1.123886
2	Tamil Nadu	9.235316	20	Himachal	1.092317
3	Andhra Pradesh	8.751912	21	Jammu & Kashmir	1.041916
4	Uttar Pradesh	7.108937	22	Goa	0.292682
5	West Bengal	6.888625	23	Tripura	0.259058
6	Delhi	6.662478	24	Chandigarh	0.246321
7	Karnataka	6.244472	25	Pondicherry	0.194619
8	Gujarat	6.159256	26	Meghalaya	0.144903
9	Madhya Pradesh	5.341829	27	Nagaland	0.099364
10	Punjab	4.765149	28	Arunachal Pradesh	0.090188
11	Rajasthan	4.332633	29	Andaman Nicobar	0.063138
12	Kerala	4.226421	30	Mizoram	0.054647
13	Haryana	3.086305	31	Manipur	0.05451
14	Bihar	2.092461	32	Sikkim	0.053483
15	Orissa	2.011792	33	Diu & Daman	0.02794
16	Assam	1.490594	34	Dadar & Nagar Haweli	0.019928
17	Chhattisgarh	1.472242	35	Lakshadweep	0.005067
18	Jharkhand	1.384383			

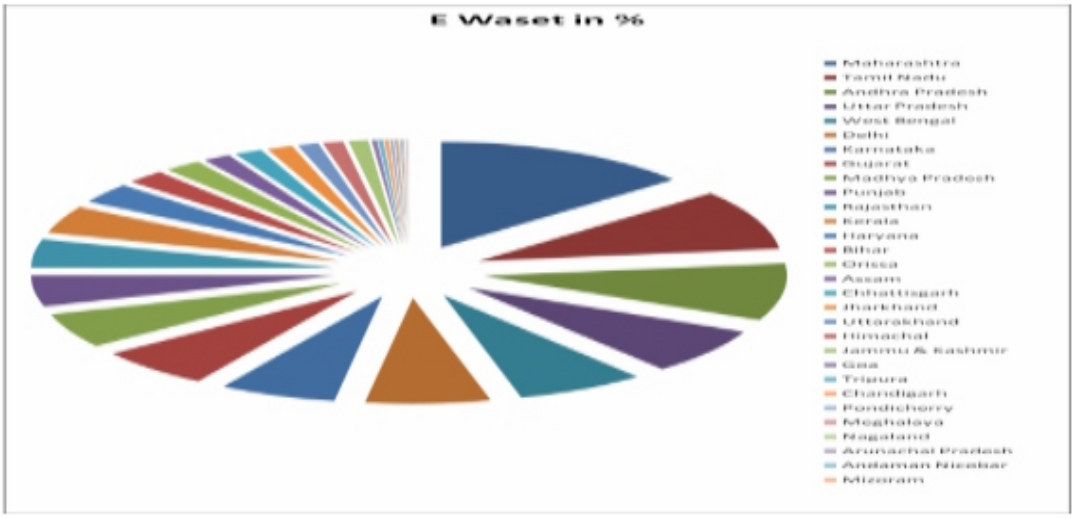

Figure 1 Showing percentage representation of E waste generation in India state wise

Jharkhand State: Studies and Data Outlines

To get the overall scenario and situation of e waste stocks in Jharkhand following strategies were employed for obtaining data in order to conduct our studies:-

1. Think group was involved to frame a proper questioner. The questioner was developed, circulated among the target group identified and data's based on the questioner were collected from door to door survey by the self help group members. These datas received basically from the diversified socio economic groups across the sections for proper ascertaining practical sample data of the state of affairs so far practicable. The group identified and created were as follows :-

   a) Households,

   b) Business organizations & institutions including offices

   c) Manufacturers, dealers, Importers / exporters, EEE second-hand shops, EEE repair shops, Recyclers / dismantlers, Processors of recyclable materials, Re-users, EEE collectors, R&D units including similar types of institutions and organisations.

2. Interview and fact collection efforts were undertaken from selective group. This was done to get facts & figures, intents flowed by principle of thoughts of the end users.

3. Purchasing pattern, resource availability, recycling, reuse and disposal practices were obtained and tabulated i.e. ascertained and processed.

Effectively main seven types of commonly used consumer commodity of EEE were identified and taken account of for determination of pattern of e waste disposal. These seven identified EEE items are Computers including its monitors of either LCD / CRT types, Laptops, most frequently used by masses Mobiles, Refrigerators finding places in almost all urban houses, Air conditioners (AC) , Batteries used for UPS or alternate lighting arrangements.

In all districts of Jharkhand the 100 sets of questioners making it total 2200 sets in equal numbers were delivered to three groups through email, post and distributed manually.

Responses from the three categories of target groups are as follows mentioned in the table.

In household category for all districts responses from 1484 were received back. The responses mentioned in table 4 are mainly the response that reflects the mood of the consumers on individual basis.

Business organizations & institutions including offices: Out of total 2200 targets, the 1713 receipts reveal the mood of the bulk user and policymakers. The details of responses are in table 5.

The Manufacturers, Importers / exporters responses from the targeted 2200 which is 1670 in numbers are in conformity of the e waste generation as it was most likely that the e waste would be nil only as the EEE products are not put to use themselves and are extended to others only for conversion to e waste after extensive use and handling, recycling and reuse. The details are in table 6.

Figure 3 indicates the targets verses responses of all the three categories.

Table 3 Showing the Responses in the three Segments Identified and Planned

Districts	Household			Business organizations & institutions including offices			Manufacturers, Importers/exporters etc.		
	Population in lac	Questionnaire sent	Questionnaire received	Districts	Questionnaire sent	Questionnaire received	Districts	Questionnaire sent	Questionnaire received
Ranchi	22.14	100	95	Ranchi	100	91	Ranchi	100	79
Lohagrdaga	2.89	100	69	Lohagrdaga	100	79	Lohagrdaga	100	81
Gumla	7.08	100	54	Gumla	100	74	Gumla	100	64
Sindega	4.46	100	46	Sindega	100	66	Sindega	100	76
Palamu	11.83	100	75	Palamu	100	79	Palamu	100	78
Latehar	4.67	100	43	Latehar	100	73	Latehar	100	63
Garhwa	8.01	100	54	Garhwa	100	64	Garhwa	100	74
W Singhbom	10.81	100	66	W Singhbom	100	76	W	100	76
Saraikela	7.07	100	76	Saraikela	100	86	Saraikela	100	84
E singhbom	16.13	100	91	E singhbom	100	81	E singhbom	100	75
Dumka	9.51	100	74	Dumka	100	79	Dumka	100	77
Jamtara	5.45	100	56	Jamtara	100	86	Jamtara	100	84
Sahabganj	7.37	100	49	Sahabganj	100	79	Sahabganj	100	69
Pakur	5.64	100	51	Pakur	100	71	Pakur	100	81
Godda	8.61	100	52	Godda	100	82	Godda	100	79
Hazaribagh	18.36	100	83	Hazaribagh	100	83	Hazaribagh	100	83

Chatra	6.13	100	55	Chat	100	75	Chat	100	71
Koderma	3.95	100	79	Kod	100	82	Kod	100	79
Giridih	15	100	71	Girid	100	76	Girid	100	74
Dhanbad	19.5	100	91	Dha	100	71	Dha	100	79
Bokaro	14.5	100	83	Bok	100	81	Bok	100	73
Deoghar	9.33	100	71	Deo	100	79	Deo	100	71

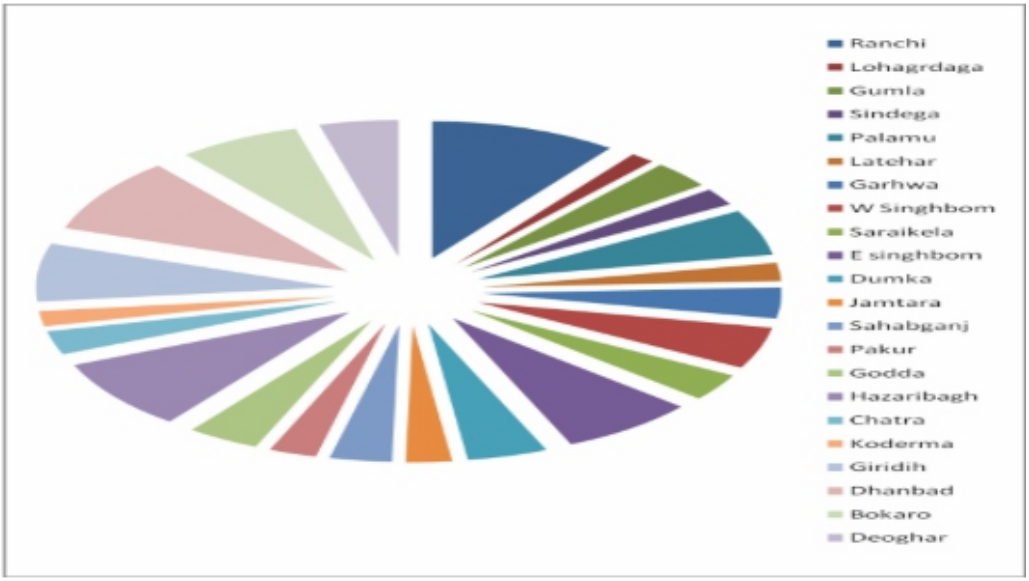

Figure 2. showing population demography of districts

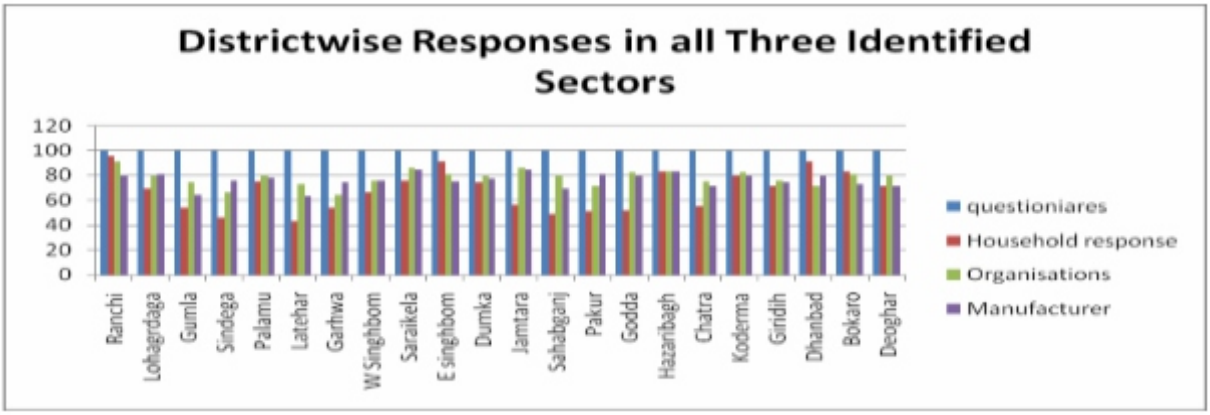

Figure 3 depicting distributed and received questionnaire for three groups

Sample Surveys Details

In survey for household segment e wastes scenario all together 2200 questionnaires were sent and only 1484 were received i.e. 716 did not bother to respond/reply.

In the next segment of business organizations and institutions the received number of responses were 1713 i.e. 487 chose not to respond/reply.

In the last segment i.e. manufacturers, importers / exporters etc category responses from 1670were received indicating that 530 chose to be non responsive.

Re-users / Recyclers/ Second hand market holders Questionnaires In this category mainly four groups existed and they were

a. Raddiwala / kabariwala i.e. Scrap metal collectors

b. Second hand dealers and repairing shops

c. Formal pollution board listed/licensed vendors and

d. Informal vendors irrespective of that they are raddiwala or otherwise but are active in this field.

Since the target group is not elite or educated, responses were collected by the interview with such individuals or groups. The volumes and weight of the e wastes calculated in this study are as per the standards fixed or maintained in report of UNEP volume I published.

Obtained informations were tabulated for statistical evaluations. Details data for all eight listed segments of the e waste are as enumerated / documented in the tables listed here under.

Table 4 Showing E waste generation from household

Components	*Household sector e waste survey (Total received records 1484 from all districts)*								
	Large scale			*Medium scale*			*Small scale*		
	Used	*Repaired/ discarded*	*E waste*	*Used*	*Repaired/d iscarded*	*E waste*	*Used*	*Repaired / discarded*	*E waste*
Computers	1409	1121	22420	1131	126	415.9	12	3	8.72
Laptops	1242	167	585.5	298	123	80.5	32	4	6
Printers	454	111	555	223	72	210	9	2	4.1
Mobile phones	8052	3246	1623	1678	1054	106	890	341	34
TV	3436	803	16060	1231	491	3211	776	456	451
Refrigerator	959	137	4110	328	91	1121	35	6	30
AC	998	153	3060	541	148	412	4	2	8
W machines	2256	223	4460	349	171	98	80	36	181
Total e waste	52873.5 kg/yr			5654.4 kg/yr			722.82 kg/yr		

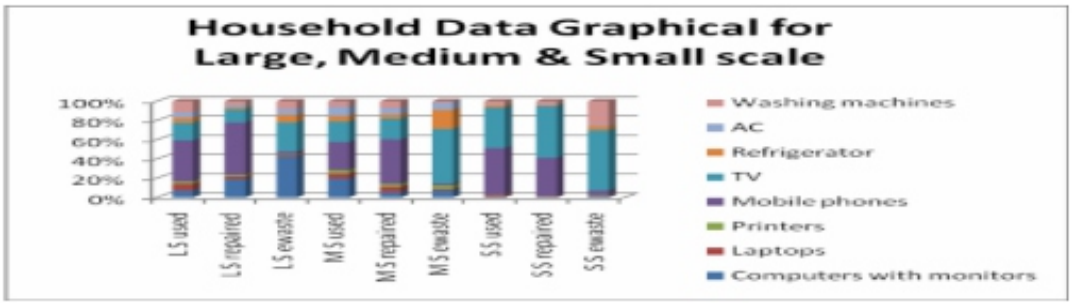

Figure 4 showing Household E waste details as per table 4

The major e waste generated in this segment is in the TV field followed by computers although the mobile users was the second largest i.e. after TV. The e wastes figures from the Singhbhom and Ranchi districts were largest compared to the districts of Latehar, etc which registers the least ones. This is understand as major markets and availability of products, paying capacity and alertness and sense of safeness of the population in places of Jamshedpur and Ranchi are higher compared to the other areas.

Table 5 showing E waste generation from Business organizations & institutions including offices

Components	Software sector e waste survey (Total received records 713 from all districts)								
	Large scale			Medium scale			Small scale		
	Used	Repaired / discarded	E waste	Used	Repaired / discarded	E waste	Used	Repaired / discarded	E waste
Computers	81265	8098	241802	2987	812	23360	698	146	4343
Laptops	19826	1665	5877.5	421	146	512	268	73	180.5
Printers	2872	976	4880	1321	638	3190	121	28	140
Mobile	21748	1289	317.3	1173	456	45.9	164	51	6.36
TV	1357	291	4376	962	216	1756	175	43	644
Refrigerator	767	123	3680	146	81	1940	41	23	692
AC	2189	1141	21640	856	232	4280	112	46	860
W machines	123	49	980	41	12	240	13	4	80
Total e waste	283552.8 kg/yr			35323.9 kg/yr			6945.86 kg/yr		

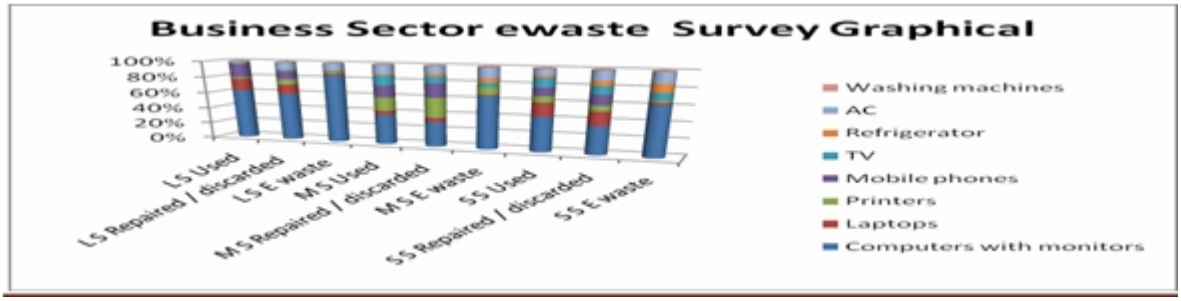

Figure 5 Showing details of Business Sector e waste

As the major business, official and educational organizations are situated in the Jamshedpur, Ranchi and Dhanbad in the respective districts showing bulk users are in the computer, laptop, and all other segments responsible for e waste generation. These sections alarmingly represent such behavior for major e waste generations also. The less populated and poverty driven districts markedly generated lower e waste in such segments.

Table 6 Showing E waste generation from Manufacturers, Importers/exporters etc.

Components	*Software sector e waste survey (Total received records 375 from all districts)*								
	Large scale			*Medium scale*			*Small scale*		
	Used	*Repaired/ discarded*	*E waste*	*Used*	*Repaired / discarded*	*E waste*	*Used*	*Repaired / discarded*	*E waste*
Computers	10046	25	Returned	1608	6	Returned	1361	4	Returned
Laptops	6471	21	Returned	289	2	Returned	6	0	0
Printers	6847	16	Returned	331	3	Returned	69	0	0
Mobile	26123	9	Returned	491	9	Returned	113	0	0
TV	14347	11	Returned	1928	39	Returned	1291	31	Returned
Refrigerator	4711	5	Returned	11	0	0	10	0	0
AC	1258	6	Returned	1071	12	Returned	11	0	0
W machines	2218	4	Returned	392	6	Returned	282	18	Returned

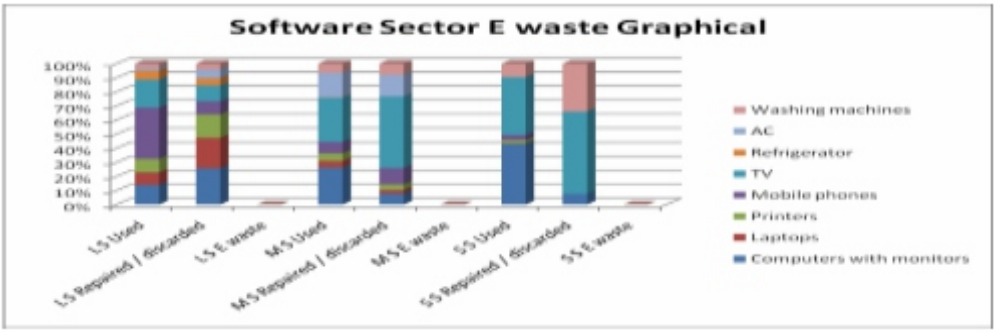

Figure 6 showing e wsate in Software Sector organisations

Prime manufacturer/importer/exporter/ distributors/ dealers are located in Jamshedpur, Ranchi and well connected Dhanbad major cities. The connectivity of Jamshedpur and Dhanbad to Kolkata is easier and hence these cities were better having facilities of returning the damaged products. The company owned maintenance and service centers or franchise for this matter are mostly located in Ranchi followed by Jamshedpur. The Dhanbad is well connected to Kolkata so the service providers are mostly attending form the nearby metro only.

Segment wise Results and Discussions

Household: Responses from survey of total 2200 out of which 1484 responded indicates trend of generation of e waste in particular pattern as depicted in the graphical. Here the consumers are divided per family members in large, medium and small sections. The overall trend in this survey shows that EEE are improperly maintained conditions. In most of the time get repaired when they get defects to the extent it can squeezed for maximum life span of any product for getting maximum worth without facing tackling the other factors which prevail for changes of product in society. The authorized centres personals or even second hand dealers come for the repairing and reuse.

The minimization of neglect, lesser care of products, lack of proper use, improper use and frequency are the sole causes of low generation of e waste. The outdated Computers, Laptops, Printers, Televisions, Air conditioners nd other EEE products etc get exchanged in the market and often get their reflection as e waste in the next group where we deal with the reusers and recyclers etc. The table for this survey shows the details of use and e waste generation. The e waste generation from the products which came from the gray market is seen as major contributors. The items and products of the standard companies often do not contribute much to this stream as these are properly matched and employ proper technology for sustainability of products and other are taking care of preventive management. The Maximum of e waste generated in computer and laptops are because of their low life span and fast changing technology, frequent upgradation of software versions requiring even new match able hardware for matching available speed of peripherals. Another important factor is choice of lesser repairs resulting in lesser generation of e waste.

In case of TV the changing technology and pattern of consumers are basic cause of shifting of product say from CRT to LCD to LED to newer curved LED technology have one group to lower affordable groups and ultimately resulting in the obsolesce i.e. e waste.

The refrigerator is the other EEE product which often gets converted to e waste mainly because of high repairing cost resulting in less preventive maintenance, rough use frequent power fluctuations improper earthing in house wirings. The high rate of recovery of the items is not easy and volumes of metallic part results in the major e waste by weight and volume in this case. The second hand market for such products is also not that promising even though in day to day life but back systems by dealers and shop ones are frequently evident. These exchanged products often reach market with repairing and result in large delayed e waste in turn.

From the above discussion one may like to enumerate the disposal trends prevailing in market and masses. The disposal trends can be seen as shown in table 7 obtained from the study survey.

Table 7. Methods of disposal of EEE

Activity	*Frequency*	*Percentage*
Disposable EEE keep in house	231	15.6
Send to manufacturer	56	3.8
To Repair/ Recycle centre	281	18.9
Transfer to relative	154	10.4
Charity transfer	182	12.3
Waste bins	393	26.5
Others	187	12.6

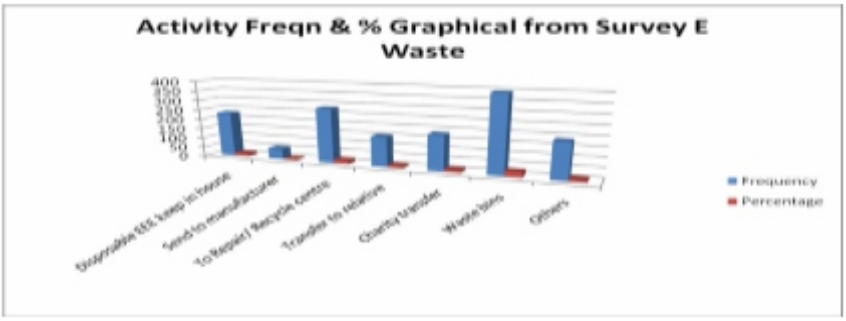

Figure 7 showing Disposal Activity Freq. & Percentage

Business organizations & institutions including offices: The survey for 2200 distributed questionnaire out of which 1713 were received/ collected and related details/information were tabulated and statistical findings were made out from these. The analytical analysis of trends of e waste generation percentage and Volume wise can be explained in different ways. The volume wise e waste generation reported in this situation is also maximum in cases of computers, Laptops and printers in IT sector followed by TV, AC, fridge, washing machine and mobile.

The weight-wise/volume-wise e waste generation percentage wise is maximum in case of Refrigerator section followed by AC, TV, Washing machine, Computers, Printers, laptops and Mobile respectively. The amount of e waste generated is understandably largest in the large scale sector and minimum in small sector seeing the use of segment wise units in it and awareness towards it.

E waste generation from Manufacturers, Importers/exporters etc: In this category we observe that since the perishable products are not in use hence the generated e waste is minimum. The e waste generation in these cases is only due to transportation in which these get damaged during transportation and hence may require repairs resulting in small amount of e waste. The e waste produced is almost nonexistent in this case. The damaged items are often returned back to the importers / exporters / manufacturers or assemblers hence the e waste volumes are not with these units. These parties make use of the new parts for repairing other unit and hence the e waste accumulation / generation is negligible. In this survey study only branded parties and reputed assemblers of area/region were contacted hence the actual real story/representation of very small, cottage type industries or local manufacturers scenario could not be studied.

Challenges, Concerns and Economics of E Wastes

The compounding pool, mammoth growth and arising concerns for e waste in a sustainable, sound environmental technological development with updating processing advancements, growth of use and

throw mindset, pattern of matching the next man psychology and tremendous increase in purchasing power of mankind is increasingly resulting e waste management task a challenging one. The outburst of toxic hazardous constituents of e wastes in the environment resulting in irreparable damage to environment in all aspects is proving that current generation of policymaker are failing in striking balance between safety, cost, advancement of technology, its use with proper environment protection for greener world. Facts and measures for reduction of e waste through recovery reuse and recycle to minimize toxic substances in order to arrive at technology for such labour intensive and safe product development with enhanced participation of stakeholders in fixing responsibility of managing e waste in more sensible manner needs to be addressed adequately.

We are aware that worldwide formal sectors for recycling are 5 to 10 % where as facility for recycling in informal sector is the remaining mammoth percentage. The initial estimate suggests that 90-95 % of e-waste gets recycled in India in the informal sector which is performed and actuated in highly hazardous conditions by the masses without proper or least know how. The e waste is one which simultaneously posses threat to environment and human kind and opportunity as employment generator at other hand at same time. The e waste contains different hazardous and toxic elements responsible for multiple health problems.

Scraps and remains of the end of life/ discarded products are main source of e waste. Further one can say that products which suffer from the technological obsolescence and permanent damaged conditions and have lost all usefulness results in e waste. Developed nations are addressing this problem by separately designating location for storage of e waste so that it does not mix with solid waste and cause damage to environment. It is becoming inevitable in India also. The much talked but back/ take back/ EPR (extended producers responsibility) which entitles the manufacturers or its importers / agents to take back discarded product or e wastes for disposal in most technological manner as buy back or otherwise arrangement is day by day becoming fact and figure for strict requirement. Lack of awareness of contents, its toxicity and hazardous effects among the users is often becoming source of disaster. Here consumer's ignorance in handling and handing over of product even in case of buy back offers are the main causes. The lack of knowledge of consumer/user regarding usefulness and retrieval of valuables from the e waste which can pay back those handsome amounts often creates a situation that these e wastes are thrown for causing environmental degradation. It these e wastes are returned back to the manufacturers by chain or by official collectors the rare metals and elements useful in further manufacturing of EEE products can be reused and will result in further lowering of cost as a return. There is urgent need of creation of proper awareness about belongingness of e wastes among the handler group is need of hour for minimizing hazards and proper utilization of raw materials and reduction of e waste.

Preservation of environment is nation's state subject so stringent regulatory measures have to be enacted for such purposes. Currently situation of regulations and strictness of adherence is also a divided lot. The overall reaction is that the “who cares” or “it's his responsibility not mine” is the situation among the different groups. The Indian business leaders are also in no mood to change them and are reluctant towards e waste handling through its proper management. In current situation as a common man is sufferer and he is the consumer so it is primilarly his or duty of user to handle the e waste in safe and purposeful manner for mitigating the e waste hazards.

In the current situation since underdeveloped or least developed countries do not have more sophisticated gadgets and EEE so level of pollution or environmental degradation due to e waste is low but the developed nations are forcing them to cut pollution level for their quotas also for meeting the international levels in name of compensating the efforts by providing a small sum and making provision for dumping of their e waste in these counties boundary. Environmental protection from pollution resulting from these EEE and other factors among the developed and under developed nation has given rise to economics of its own kind in needed items and trade and opened new venues. These days health, hygiene and aesthetic reasons for environmental protection have become luxury of the developednations. Reduction of pollution levels is increasingly becoming need of all nations resulting in under developed nations becoming experimental grounds of the developed nations for new adventures and experimentations for mitigations resulting in unknown dangers for coming generations.

CONCLUSIONS

The position and preposition of Jharkhand state in the Indian scenario has been studied in the present context of developing EEE use and its impacts and presence in all the districts. The society is a dived lot. The prepositions are as predictable among the aware and unaware masses. Awareness for toxicity and harardness among the masses is minimal and needs a radical exercise. Recycling and reuse in name of repairing and jugad/ managing technology is popular. Wastage of raw materials which can be retrieved from the products is continuing. Regulatory mechanism in Jharkhand is at the bottom level. There is no awareness in the local municipal units nor in the pollution board for the specialized waste namely e waste. There are no collection centers not the manufacturers or dealers are in mood of creating awareness for such efforts. The divide for waste generation is as predictable. These have ones are transferring the products to lesser ones and the groups are changing the products till it comes to discarded condition and finally one can see that it ends up in the worst effected social setup. The situation of e waste in the house hold sector, business organizations and software sections are as follows:

House hold sector: Large scale 52873.5 kg/year, medium scale 5654.4 kg/year and in small scale it was reported as 722.82 kg/year.

In case of Business organization and institutions for large scale it is 283552.8 kg/yr, medium scale 35323.9 kg/year and in small scale 6945.86 kg / year.

In Manufacturers / importers / exporters etc sector since they are themselves producers so the wastes are transferred to the organization itself so no evidence of e waste was reported.

Need for reduction of e waste is to be taken up. Creation of awareness about ill effects of e wastes constituents and possible retrieval of rare materials for preservation and optimal use needs to be looked into. Regulatory mechanism development and strict implementation at one end and creation of collection centers with inclusion of EPR/ buy back options or take back options needs to vigorously introduced for technology supported disposal.

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Wireless Security Issues in Ubiquitous Computing using Biometrics

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ABSTRACT

Security services, resembling verification and access control, have not only maintain user actions prepared with a variety of devices but also guarantee the security issues, privacy, and discretion for resources of ubiquitous computing.

New impression of action-based computing is used in order to prolong human actions in ubiquitous environments. Need for supporting users with wireless applications becomes essential in such kind of environments where users are using a massive quantity of diverse computing devices. Though, without taking into account fundamental protection issues, it could be widespread with vulnerabilities.

In this paper, security method is discussed which is based on biometric system. The planned method aims to boost security services on wireless devices and make easy user activities. The standard protocols that are newly and existing used for wireless security are explained.

Keywords:Ubiquitous computing (UC), Ubiquitous (Ubi) Security, Authentication, Biometrics central control system (CC system).

I. INTRODUCTION:

The vision of ubiquitous computing is to push the traditional or desktop interface into highly transparent environment and interface. History is full of model shifts in which human and computer relationship is perceived. Recently paradigm shift is of ubiquitous computing or UC in short. The idea of UC is proposed by weiser [7,8]. Basically the trends followed by computing are as follows Fig 1:

1) Mainframe(past)
2) Personal computers(present)
3) Distributed computing
4) Ubiquitous computing

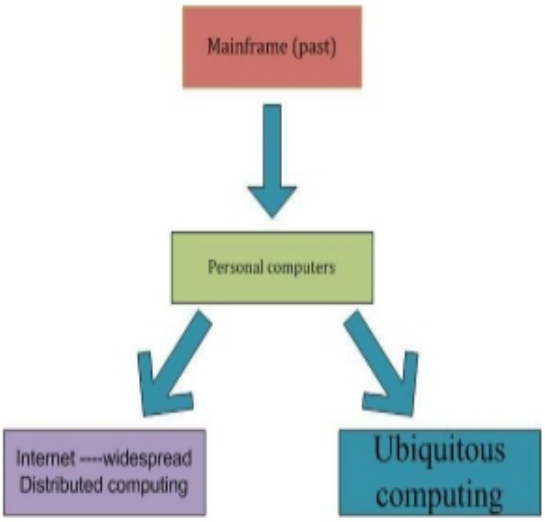

Fig .1 Major trends in computing

Ubi wireless world systems generate a number of necessities, e.g.; interoperability, mobility and compliance for Ubi systems and technologies of software. The major challenges of ubiquitous software are a adaptive and standardized technology of middleware, services interoperability, networks and set of enabling technologies.

Since ubiquitous computing deals with the amalgamation of the isolated fixed entities, it is not sufficient to launch a stand-alone solution or application. Every new theory, idea, application or service should be able to interoperate, join together and collaborate with already available services and infrastructure. Every testing for evaluation of a fresh idea essentially needs the presence or production of a detailed environment [3].

Elements that define ubiquitous computing: [5]

1) Ubiquity/Pervasiveness – lots of devices.
2) Connectedness – the devices are networked.
3) Context-awareness – the system is aware of the context of users.
4) Invisibility – devices are apparently becomes invisible.

The technology of Ubi computing embeds in our daily life routine by giving services, information and applications over various networks with the help of different devices. UC is a precondition for insidious computing which insist on mobile data entrance and other strategies for wandering users or nomadic users.

Technology required for UC :

1) economical, VLSI technology (nanotech),

2) Very low-power computers with convenient displays,

3) Low-power, ultra-fast network for communication:

   i. wireless end-points

   ii. cellular topology

   iii. wide-bandwidth range

In this paper, main focus is on wireless security issues and also suggests possible solutions as this is one of the main parts of UC framework.

II. Problem statement

Many people and organizations have tried to build ubiquitous environment for his own use but they are failed because they are utilizing their own techniques and methods no doubt they have build some applications but these applications are only for themselves and are bounded to be used in their specific environment. While, UC is the concept of utilizing this kind of infrastructure for everyone and for anyone at any place and time.

There are so many issues regarding implementing UC applications. So, it is not possible to move further before analyzing the hurdles and issues faced by engineers until all issues are resolved. Hence, it is highly important thing to do an analysis of all UC applications made up till now so that all facing challenges can be identified. Further it is also imperative that their current status be identified that whether they are resolved or still unresolved.

No doubt there are so many challenges in the way of UC implementation but In this paper all possible wireless security challenges found in ubiquitous computing are identified. Several wireless security challenges for UC found so far along with their possible solutions followed by the conclusion are presented below:

A. Some Security Threats of Wireless

In spite of the efficiency, ease and price tag benefit that are offered by Wireless, the use of radio waves in network of wireless generate a threat of hacking. The basic three threats are as follows:

1) Denial of Service

2) Spoofing

3) Eavesdropping

1) Denial of Service:

In such type of hit, the accessibility of the network resources is affected by legal or illogical messages or by network floods created by burglar. As radio transmission is more susceptible to hacking so there are extra probabilities of rejection of service. Comparatively short bit charge of Wireless can easily be decreased and make them undo to attacks of denial of service [9]. Radio interference can effortlessly be generated by using a dominant transceiver, which makes wireless incapable to communicate using radio path.

2) Spoofing And Session Hijacking

By assuming the distinctiveness of a legal user the invader possibly will get access to confidential data and assets present in the network. This occurs due to 802.11.The source addresses are not authenticated by network, which is MAC (Medium Access Control). MAC consists of frame address. Attackers hijack the sessions by using MAC addresses. Furthermore, an Access Point is not needed for 802.11.These helpattackers who pretend to be as AP's [4]. There is a strong need of access control which can control these threats.

3) Eavesdropping

Attack on private data that is transmitted over a network is called eavesdropping. By design wireless spread network load towards space consequently it is not viable to have power over the access to signals. Eavesdropping is the largest part of threat in these circumstances due to the attacker that can easily interrupt the broadcast slightly away from the area of company.

III. Proposed Solution

In spite of the risks and threats linked with networking of wireless, there are surely so many situations that require their usage. There is a possibility still for users to make safe their Wireless network to a satisfactory level. This can be completed by implementing the actions to reduce attacks into the core networks which are following [10]:

a) Using innovative Standards for WLAN Security enhancement:

The standards are defined previously such as 802.1x and 802.11i that can also be used for securing our wireless networks.

b) Think Like Hackers:

The second solution is to develop applications by thinking like hackers so that there are no loop holes remains to enter in our system illegally or in an un-authorized way.

c) Using Biometrics For Authorization:

Biometrics is the use of physiological and behavioral characteristics to offer the detection of individuals as applied to physical and network security within a business [4].A major feature of information security is the ability to protect a resource from internal and external threats. The field of biometrics serves as the way of protecting both the physical building of a business and the IT tools that provide as its information resource. Biometrics signatures are used in different form like[1].

1) Thumb impression
2) finger line feature
3) palm feature
4) teeth shape extraction
5) eye retina contact etc

So we can use biometrics instead of passwords for our wireless security.

d) Working

This system work by comparison of existing biometrics saved in database as existing password is matched with entered password. The system working or initialization is explained through diagram shown bellow. Fig.2

By using biometric the access to the system is provide only to those that are real authorized persons. Also these security plans definitely eradicates or minimize the hacker attacks. For the implementation of biometric security system we need tools that are already in usage.

The proposed suggestion is an effort to make the UC a real world technology and also acceptable to a common user as it minimizes the security risk.

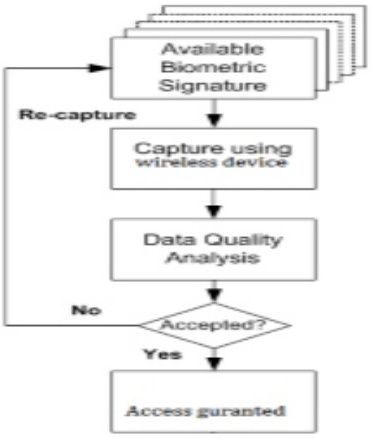

Fig.2. Authorization by pattern matching using biometric as a wireless security

e) Implementation model

The proposed implementation model for UBI—HOME which can be secured by using biometrics and specially thumb impression. Ubi-home is kind of smart home in which there is no interventions of human being .the decision are taken by itself or by following the context [2].

In proposed model all home appliances are attached to central control system (CC system) and anyone who want access to home or any appliance at home can only get access by using biometric system. The user may connect from home or remote area.The nomadic/remote user first attached with WIFI-cloud near to home after that by using biometric system the user can get access to their home's central control system. In this way authorized person can enter to the UBI-home system only. And the risks of threats and security issues are minimized. All scenarios are shown in fig 3:

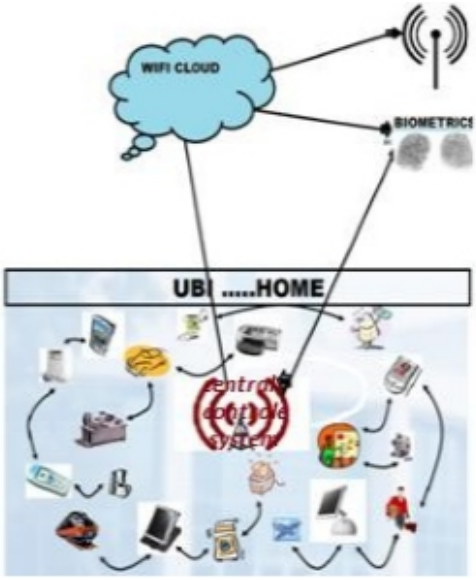

Fig.3: Authorization by using biometric as a wireless security in ubi—home

IV. CONCLUSION

In this paper, the major security concerns in the Ubiquitous Computing are analyzed. In order to handle such concerns, effective solution dealing with key security concerns are introduced and proposed. A kind of novel system is proposed for UC wireless security user verification by using biometrics. The proposed solution can be functional in diverse wireless platforms and can also used to boost protection over invasion, robbery and exploitation of UC devices.By practicing the recommended actions users of Ubiquitous Wireless can defend their networks that are mentioned in the paper which is totally

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Design of A Novel PC Based Digital Notice Board on Scrolling Led

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ABSTRACT

This study presents an alternative design for a notice board known as a PC based digital notice board on scrolling LED. Key features of the project design include availability of a PC interface and scrolling of messages. The PC interface enables the message on display to be changed at will using computer interface software from any computer that has the RS 232 port. The scrolling of messages from right to left enables the notice board to effectively display messages that are longer than its length. The scroll function and changeability of message on display when combined yields a versatile notice board.

INTRODUCTION

Conventional notice boards vary in size and are used in a variety of locations, and the simple functionality they provide is put to a wide range of uses depending on where they are used [8]. Notice boards are very important means of making information available to people in places such as schools, corporate establishments, and the general public at large [9]. Schools for example, rely heavily on notice boards for dissemination of information to their staffs, students, prospective students and the general public. This factor makes the quest for better infrastructure for implementing notice boards to be of high research priority in the university.

The computer age has seen advancements in the field of electronics and computing made possible the development of electronic notice boards. Electrical notice boards followed the invention of the light bulb, and included light bulbs arranged in a pattern where, by lighting some light bulbs and not the others, letters and numerals could be spelled out [7].

With the advent of solid-state circuitry in the early 1970s, digital notice boards with changeable signs became possible. The first of these products were simple text message displays using incandescent lamps. These lamps were very inefficient. They used a great deal of power and had short life expectancies. LED (light emitting diode) technology had been used in displays of electronic notice boards since the mid-1970s. Originally, LEDs were available in three colours: red, green and amber, but were typically used for indoor systems because the light intensity was insufficient for outdoor

applications and the durability of the diodes suffered in the changing temperatures and weather conditions. As technology improved, manufacturers were able to produce displays that had the intensity and long life required for outdoor use. However, they were limited in the viewing angle from which they could be effectively seen. Recently, breakthroughs in this field have made available high intensityLEDs in red, green, blue and amber. These LEDs have made it possible to produce notice board displays bright enough for outdoor use with viewing angles that are equal to, or better than, other technologies currently available.

Digital notice boards are known to be energy-efficient, can be programmed and operated remotely, and require little maintenance. In addition, the computer software has evolved such that a broad range of visual effects can be used in digital notice boards and in displaying messages and images[7].

Today, digital notice boards on scrolling LED display constitute an effective and economical means of data distribution to the masses. They have also found application in bus stops, terminals, ferry harbors, car mounted signs, chain stores, square message boards, factories, banks, real estates, stock exchanges, post office, hotels, traffic control, etc., [5].

RESEARCH METHODOLOGY

The requirements for this design are subdivided broadly into hardware and software requirements.

The hardware design

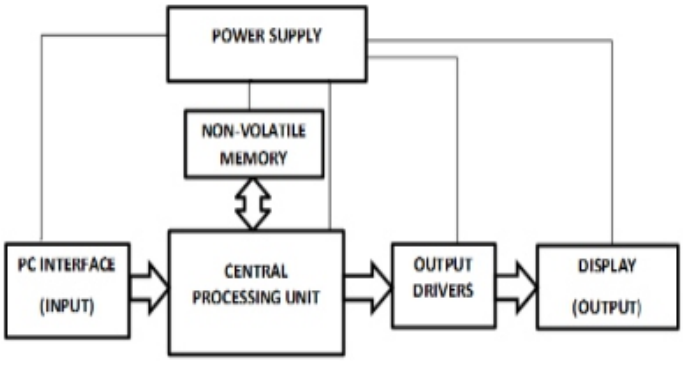

Fig.1. Block diagram of PC based digital notice board

The major blocks are shown and the arrows show the direction of the flow of the operation of the complete system. The circuit design is approached through designing the various components differently and at the end to couple them together to realize the finished circuit.

POWER SUPPLY

The operation of the circuit requires a well regulated power supply that can supply constant 5V needed for the operation of the circuit. The power supply uses a 5V fixed 1A positive power supply regulator IC (LM7805), silicon rectifier diode (IN4001) and filtering capacitors of 10 and 0.1µF. The power takes in 9V DC to yield a well regulated 5V for the circuit operation.

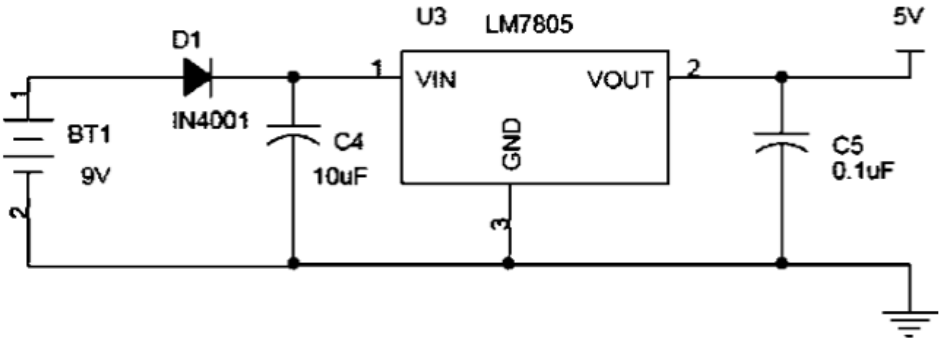

Fig.2. Circuit diagram showing thePower Supply Module [Drawn with Microsoft office Visio 10 for Windows]

Input PC Interface

The RS 232 to TTL voltage level converter IC (MAX233) handles the task of converting the voltage level of RS 232 port of the PC which is -18V to -3V for high and 3V to 18V for low into the standard TTL voltage level which is the acceptable level of the microcontroller. The pin 14 and 13 of the level converter IC is connected to pin 2 and 3 of the RS 232 port. While the 11 and 12 of the level converter IC is connected toTx and Rx pins of the controller.

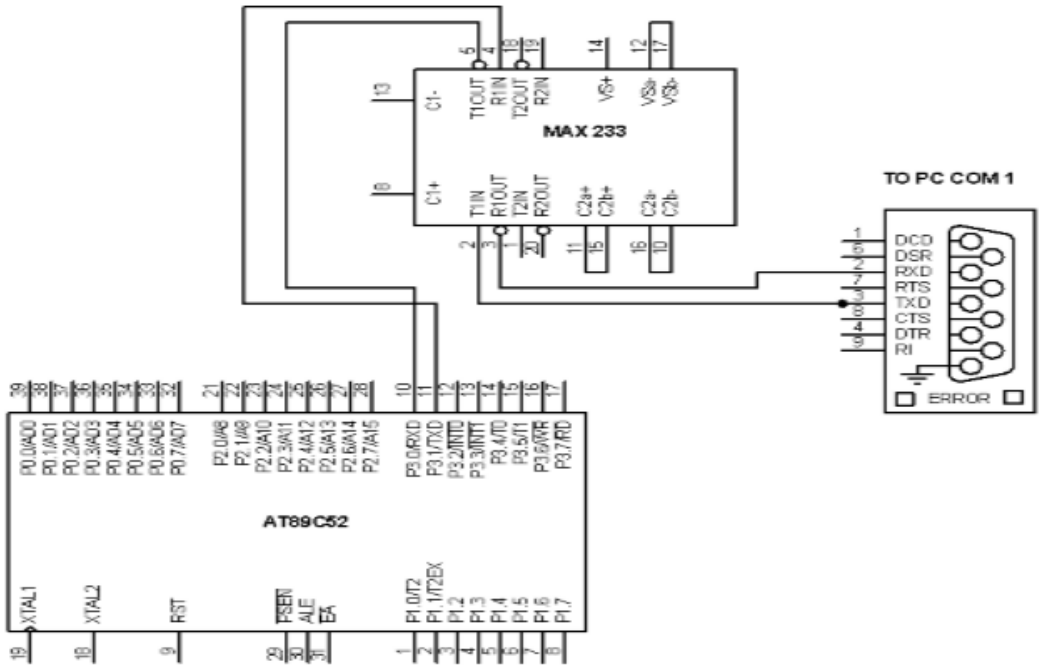

Fig.3.Circuit diagram showing the input circuit [Drawn with Proteus version 7.8 for Windows]

The memory circuit

A non-volatile serial EEPROM memory IC (24C02C) provides a means of saving characters to be displayed. The EEPROM is interfaced with the microcontroller using two wires as shownbelow.

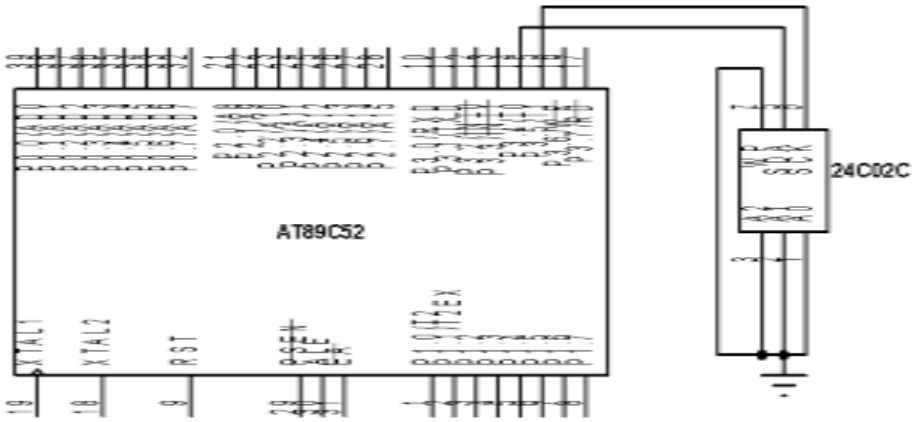

Fig.4. Circuit diagram showing the interface of the EEPROM IC and the Microcontroller [Drawn with Proteus version 7.8 for Windows]

Microcontroller

The program that controls the operation of the whole circuit is written in assembly language and stored in the code ROM of the microcontroller. The microcontroller uses the instructions of the program and with the help of its input and output pins carry out the task of receiving character data from the PC, saving them in external memory device first, and then generate a pattern appropriate for displaying the characters and continuously output them to the display. The circuit is designed around two identical microcontrollers: AT89C52. The two microcontrollers are clocked at speeds. One is clocked at 11 MHz and the other at 32 MHz and they together control and coordinate the functioning of the various paths of the circuit. The connection between the two controllers is illustrated below.

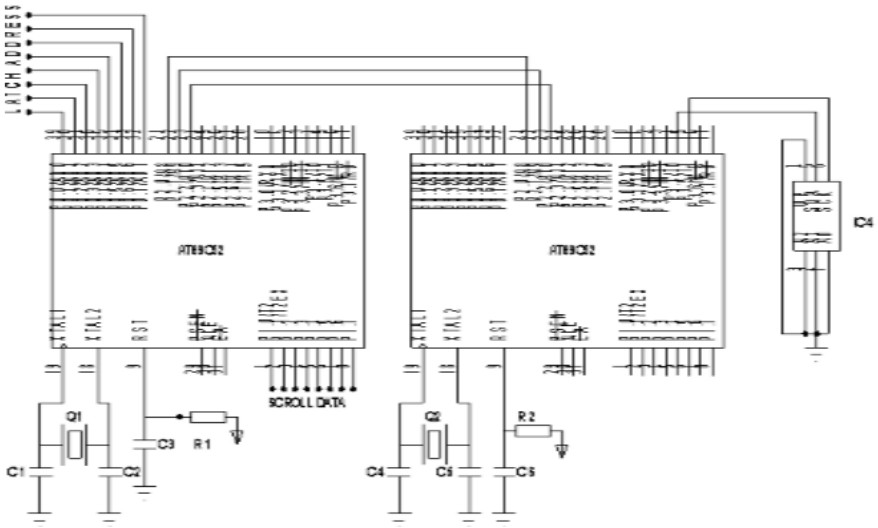

Fig.5.Circuit diagram showing the connection of the microcontrollers [Drawn with Proteus version 7.8 for Windows]

The display

A 64 x 7 matrix of 5mm LEDs is formed in such a way that all the positive terminals of the 64 LEDs in given row are connected together while the negative terminals of all the seven in each column are connected together as shown in figure below.

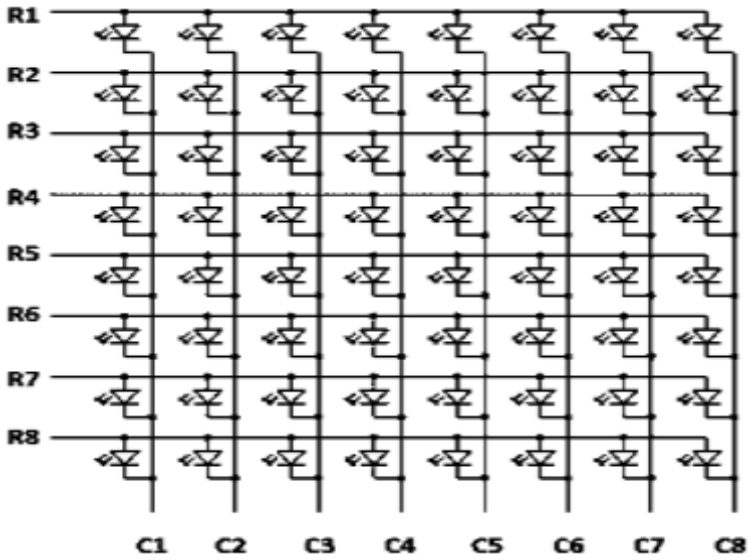

Fig.6.Circuit diagram showing the connection of the Dot matrix arrays of LEDs[Drawn with Microsoft office Visio 10 for Windows]

The complete circuit

The components are assembled on a Vero board using electric soldering iron. Jumper wires are used to establish connection between components on a common node but separated by a reasonable distance. The schematic diagram of the complete circuit is shown in Fig. 7which shows the complete circuit diagram of the PC based digital notice board.

IC 1, IC 2 - AT89C52 Microcontroller
IC 4 - 24C02C (2 Kbit EEPROM MEMORY)
IC 5 - IC 12 - 74HC573 (OCTAL D-TYPE TRANSPARENT LATCH)
T 1 - BC 337 NPN BJT
Q 1, Q2 - QUART CRYSTAL
C 1 - C6 - 30 pF Ceramic Capacitors R 1, R2 - 10 K Resistors
R 3 - 1K Resistor

Operational flow chart

The flow chart for receiving and displaying data are shown below

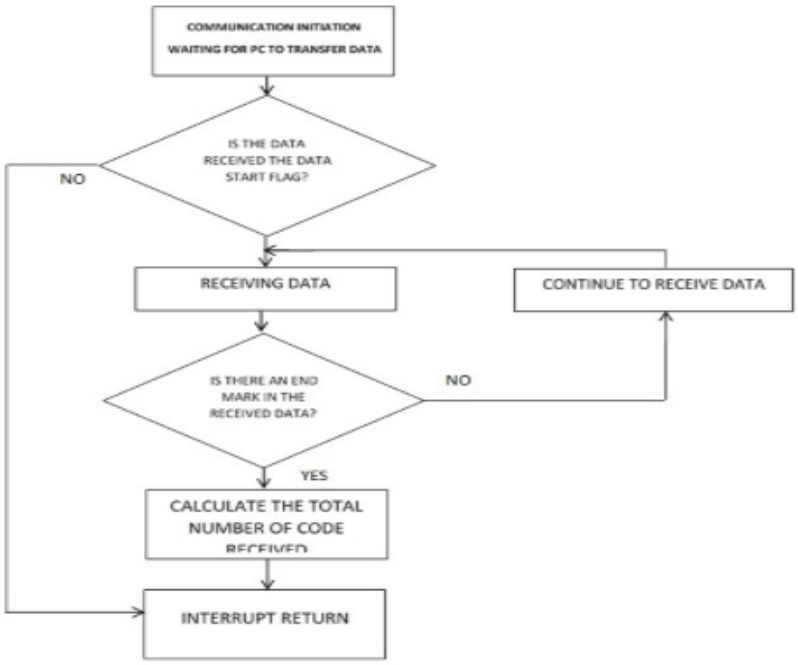

Fig.7. Flowchart of the program for receiving data from PC

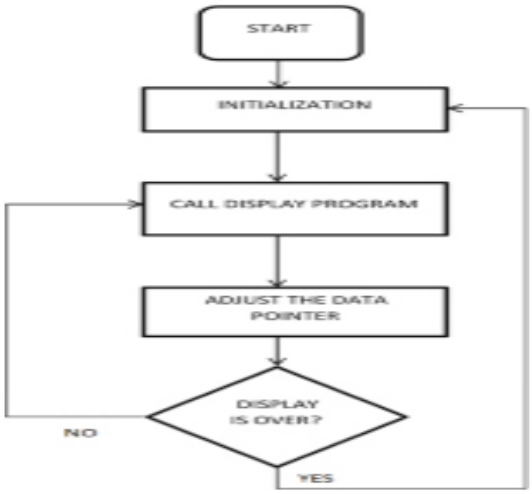

Fig.8. Flowchart of the display program

Program source code: Software

The two flow charts that have been presented above are converted into executable computer programs using the assembly language. The complete source code of the program is available on request. The programs are compiled and burnt into the appropriate microcontrollers.

Theory of operation

On power up, the microcontroller labelled MIC1 which is clocked at 11.0592 MHz will start retrieving ASCII character data stored in the internal memory chip with the help of program instructions stored in

its code ROM. As the data is being retrieved, the program also enables the microcontroller to be alert for new incoming data. If there is a new incoming data, an interrupt occurs and retrieval stops as the microcontroller readies to receive new data from the PC using RS232 serial port protocol. The microcontroller first erases the old character data in the external memory, receives the incoming data and stores them in the external memory. When the reception and storage operation is complete, the retrieval of character data from the external memory continues again till another incoming data causes an interrupt. The second microcontroller labelled MIC2 is clocked at 32 MHz, on power up it starts requesting for data from the microcontroller MIC1. MIC1 respond to this request by retrieving the ASCII character data from the external memory and convert them into the appropriate pattern and send them to MIC2. In the code rom of MIC1 are embedded the patterns for the ASCII codes in six bytes array. At the receipt of an ASCII code MIC1 downloads the corresponding six bytes of character pattern using the routine/procedure "downloadptn". The first row (r0) of the downloaded pattern are fed into the latches and r0 of the LED matrix is set high followed by two milliseconds delay and r0 is pulled low. Now, replacing r0 (as stated above)

with r1, r2…r6, the successive rows are scanned one after the other. After r6 is scanned, the operation starts afresh. Since this operation is carried out fast enough, the result is that the images of the selected characters persist on the screen as a result persistence of vision.

Scrolling of the characters is simulated by manipulating the columns of the first character on the screen. Initially scanning starts with the first column of the first character. After a delay (¼ sec) the starting point for scanning the first character becomes the second column. After another ¼ sec delay the starting point becomes the third column, and so on till the sixth column, after which the second ASCII code in the buffer is shifted into the first character position using "shiftLeft" procedure/routine. In other words the second ASCII code overwrites the first, till the 11th replaces the tenth after which MIC1 requests for another ASCII code from MIC2, receives another ASCII if any, and replaces the 11th character with the just received character code. Thus a column-wise shift to the left is simulated.

RESULT AND DISCUSSION

The assembled circuit was tested by plugging it to a 220V AC/12V 5A/ DC travel adapter. On doing so the device powered on. It was monitored for about five minutes with the power supply maintained and the device kept working on properly. A serial DB9 cable was connected on the RS 232 port of the device while the other end was plugged into the corresponding port of Pentium 4 desktop computer booted on, and on which was installed the Toochiosoft Display Interface. From Start/All programs/Toochiosoft Display, the interface program was launched and "Hello World" was typed into the textbox and the

SEND button was clicked. The device responded by lighting up the correct character pattern and scrolling them from right to left. The scroll was observed for some seconds. The test was repeated four more times respectively replacing "Hello World" with other characters and the result was that each word pattern was replicated correctly by the notice board display.

Costing

The cost of constructing the project is presented in a table 1below.

Table 1. Items and their cost

S/N	QTY	Description of items	Rating	Unit Cost (NGN)	Amount (NGN)
1	4	Capacitor	30pf	30	120
2	4	Capacitor	10uf/16v	50	200
3	4	Resistor (1/4 watts)	3k	5	20
4	7	Resistor (1/4 watts)	1k	5	35
5	7	Transistor	BC337	50	350
6	2	Crystal Oscillator	11.059MHz, 32MHz	150	300
7	5	Voltage regulator	7805	50	250
8	2	Microcontroller	AT89C52	200	400
9	6	IN4001		10	60
10	2	Vero board	Dotted	150	300
11	11	Connecting wire		30	330
12	8	Latch	AT89C52	80	640
12	500cm	Soldering Lead		5	250
13	1	RED LED panel	64 × 7	250	250
14	1	DB 9 RS 232 socket		100	100
		Total			**3,585**

CONCLUSION AND RECOMMENDATION

The major advantage of this design is that the PC interface enables the message on display to be changed at will using computer interface software from any computer that has the RS 232 port. Also, the power consumption of the digital notice board is considerably minimal at about 24 W. However display are limited to only the ASCII characters and therefore not all messages can be put to display. Further research on display of non ASCII character is recommended.

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