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Aims and Scope

The aim of the journal of Operations Management and Information Technology is to provide academically robust papers, research, critical reviews and opinions on the organizational, social and management issues associated with significant information-based technologies. It is designed to be read by academics, scholars, advanced students, reflective practitioners, and those seeking an update on current experience and future prospects in relation to contemporary information and communications technology themes.

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Human Resource Information System: An Innovative Approach To Improve Human Resource Management Effectiveness

Sarika Suri

Research Scholar,

Institute Of Management Studies & Research Maharshi Dayanand University, Rohtak

ABSTRACT

We are in the Information Age and information is the life blood of an organization. Real synergy is possible only by perfect information management in the organization. In order to keep pace with the changing business scenario, an organization should have improvements in technology as it has a major impact on the use of information for managing human resources. Human Resource Information System can help to achieve performance improvement. This paper studies the role of Human Resource Information System in improving the effectiveness of Human Resource Management functions. The main aim of the paper is to present an analysis of Human Resource Information System: its concept and features, reasons for introducing it in an organization, criteria for selecting it, steps for introducing it in an organization, its application in different areas of HR, improving productivity through Human Resource Information System, its vendors, its benefits and limitations to the organization..

Key Words: Information, Human resource, Management, Productivity.

INTRODUCTION

Information is a valuable asset to make quality business decisions that give an organization a competitive edge. To become effective HR planners, it is essential to have current, relevant information readily available for planning purposes. Specifically, to correctly calculate personnel demand and supply levels, it is must have access to information on the numbers, availability, skill qualification levels, performance evaluation results, career development plans, succession or replacement scenarios, training needs etc. for the entire workforce. It is to these elements of information, among many others, that Human Resource Information System (HRIS) is critical to effective human resource planning.

What is Human Resource Information System

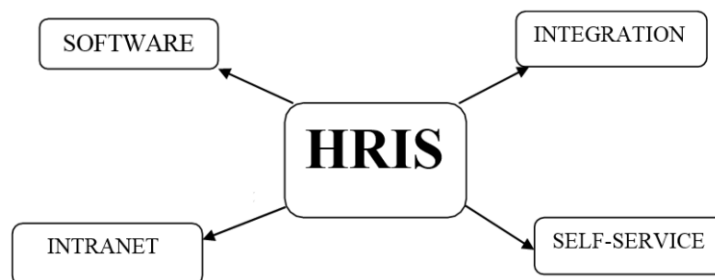
The most central use of technology in HRM is an organization's Human Resource Information System (HRIS). Larger companies typically integrate their separate HR systems into integrated Human Resource Information System (HRIS). A Human Resource Information System (HRIS) is a computer-based information system for managing the administration of HR processes and procedures. Tannenbaum (1990) defined HRIS as any system that helps an organization to „acquire, store, manipulate, analyze, retrieve and distribute information about an organization's human resources“. Kettley and Reilly (2003) defined an HRIS as a „fully integrated, organization-wide network of HR-related data, information, services, tools and transactions“.

Reasons for introducing an Human Resource Information System (HRIS)

The CIPD (2007d) survey established the top 10 reasons for introducing an HRIS. These are:

1. To improve quality of information available.
2. To reduce administrative burden on the HR department.
3. To improve speed at which information is available.
4. To improve flexibility of information to support business planning.
5. To improve services to employees.
6. To produce HR metrics.
7. To aid human capital reporting.
8. To improve productivity.
9. To reduce operational costs.
10. To manage people's working time more effectively.

Features of an HRIS: are the use of software, integration with other IT systems in the organization, use of the intranet and provisions for self-service.



1. Use of software: it is customary to buy software from an external supplier. There is a choice between buying a „vanilla system“ (i.e. an „off-the-shelf“ system without any upgrades) or customize the supplier's system to meet specified business requirements.

2. Integration: Enterprise resource planning (ERP) systems integrate all data and processes of an organization into a unified system with the same database. As the CIPD(2005b) pointed out, integration of the HR system with IT systems in the wider organization so that they can „talk to one another“ will aid human capital reporting, comply with supply- chain partner requirements, improve profitability, reduce headcount and deliver against economic criteria.

3. Intranet: an intranet system is one where computer terminals are linked so that they can share information within an organization or within part of an organization. HR intranet systems can be used for purposes such as updating personal details, applications for internal jobs online, requests for training, access to e-learning, administration of queries and communication. For example, LG&E Energy Corporation uses its intranet for benefits communication.

4. Self-service: a human resource self-service system (HRSS) allows managers and employees access to information and the facility to interact with the system to input information or make choices of their own.

For managers, self-service means that they can access information immediately. This might be HR metrics (human capital reporting measures) in areas such as absenteeism, personal details, performance management data, learning and development progress, and pay (as a basis for pay reviews). This facilitates the devolution of responsibility to line managers and reduces the administrative burden on HR.

Employees can also access information, input data about themselves, request training and apply for jobs online.

CRITERIA FOR SELECTING AN HRIS

1. Integration: is the ability to link with other databases and computers. HR managers make quality decisions by harmonizing information from various sources. Therefore, the HRIS selected must be compatible with all other systems and databases. The HRIS must be linked:

- To other computers
- To intranet applications
- To other databases
- To payroll
- To other software
- To reporting systems
- To e-mail and fax
- To word processing
- To legal help
- To other HR software

Such integration combines information for better decision making.

2. Cost-effectiveness: the HRIS should be able to give a fair rate of return to the organization in terms of reduced costs. It must reduce back office work and costs and bring speed in transactions and sharing of information for better decision-making.

3. Data Access Control: the HRIS must be able to configure the information. Access should be granted only on a “need to know” basis, with passwords, personal identification numbers(PINs), and codes serving as entry barriers prohibiting unauthorized access to other data elements that are not required by the legitimate work requirements of a particular jobholder.

4. Upgrades: the HRIS must have the capability to be upgraded. The arrangement with the vendor of the HRIS must ensure that upgrades are part of the contract, provided at cost or free so that the system is current and fresh.

5. In-depth Reporting: the main purpose of HRIS is information for the organization's benefit. The HRIS must be able to analyse, interpret and present visually data and information, so that decisions can be made. The kind of features required for reports are-

- Analysis trees
- Drag and drop use
- Unlimited user license
- Integrations
- Graphics
- Analysis through different databases
- Interactive graphs
- Response to pre-determined formulae
- Customizable and configurable system

6. Warehousing: is the ability to store information. Organizations store information to retrieve at appropriate times for decision-making. The HRIS must factor in exactly the kind of information and its volume each year required for warehousing.

7. Mining: is the ability to retrieve information easily from the morass of information stored in the warehouse. The HRIS must have the „search“ capability to retrieve information quickly.

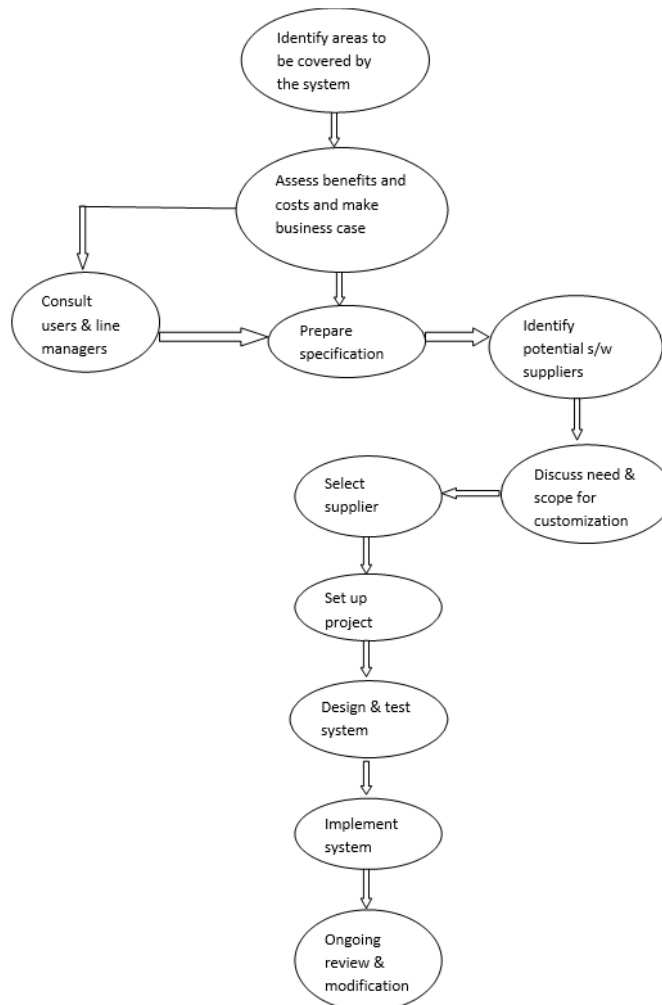
8. Scalable: is the ability of the HRIS to be expanded in capacity and features as the business grows.

9. Training: the vendor that supplies the HRIS must provide training to the employees using it. This training is ongoing as new features and upgrades are incorporated. It is only through training that the HRIS can be fully exploited in its potential.

10. Maintenance: the vendors must provide maintenance in case of systems breakdowns. Their response must be quick and the downtime minimal.

Some of the most popular HRIS systems include People Soft and SAP.

Steps for introducing HRIS



The following steps should be followed in setting up an HRIS:

1. Inception of an idea: an idea must originate somewhere. The originator of the idea should make a preliminary report justifying the need for an HRIS. The most critical part of this step is to clearly illustrate how an HRIS can assist in making certain decisions.

2. Feasibility study: the present system should be studied to highlight the problem areas and the cost-benefit analysis of an HRIS. Economic Feasibility, Technical Feasibility and Operational Feasibility of HRIS should be studied.

3. Selecting a project team: once the feasibility study is accepted and the resources have been allocated, a project team should be selected. The project team should consist of a human resource representative, who is knowledgeable about the organization, its human resource functions and activities and also a representative of the management information system. The project team should also have clerical people from the human resource department.

4. Defining the requirements: a statement of requirements specifies in detail exactly what the system needs to do. The objective here is to make sure that the mission of an HRIS truly matches with the management's needs of an HRIS.

5. Vendor analysis: the purpose of this step is to determine the availability of hardware and software that will best meet the organization's needs at the least price. This involves discussions with various vendors and will help in making a decision of going off-the shelf package or to develop the system internally.

6. Contract negotiations: the contract stipulating the price, delivery, vendor's responsibilities with regard to installation, service maintenance, training to organization employees, etc. may be negotiated.

7. Training: firstly project team members should be trained to use the system and then they could train all users from all other departments.

8. Tailoring the system: it involves making changes to the system to best fit the organizational needs.

9. Testing the system: the purpose of testing is to verify output of HRIS and make sure that it is doing what it is supposed to do.

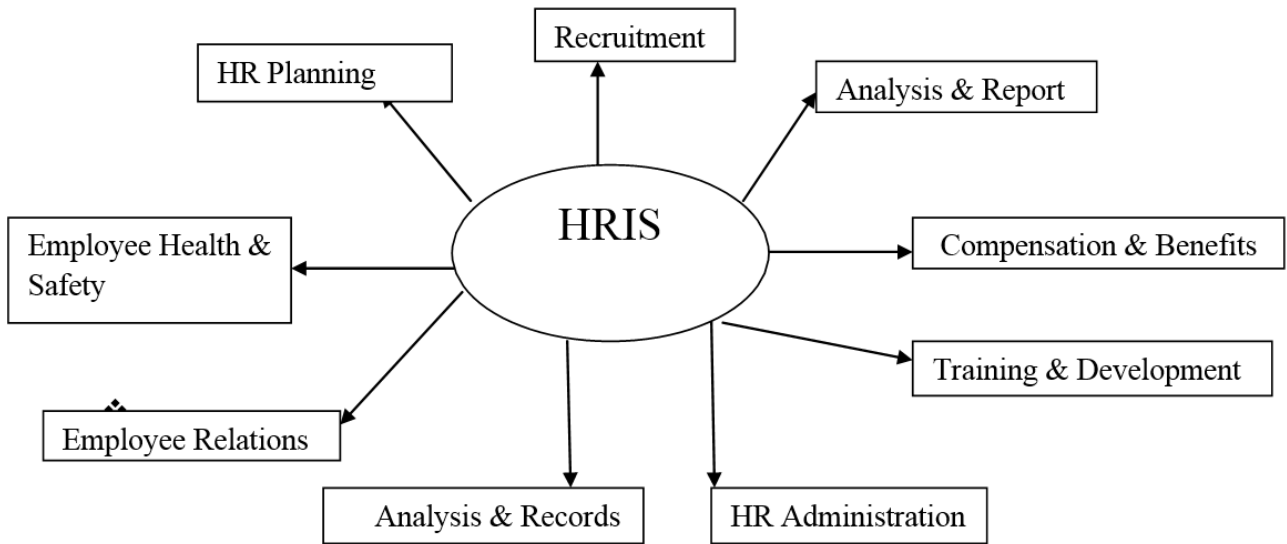
10. Setting up: is also known as the implementation stage. During implementation, whatever shortfalls are found are rectified while operating the system.

11. Running in parallel: for the security, the new system is run in parallel with the old till the new system stabilizes and confidence is gained in its operation.

12. Maintenance: the HRIS needs to undergo modifications with the change in requirements. This requires maintenance on the part of vendor. In case of systems breakdowns their response must be quick and the downtime minimal.

APPLICATIONS OF HRIS

Important uses of HRIS are:



HR Planning

- Organisation charts
- HR policies and procedures
- Organization rules and regulations
- HR Budget
- Job Analysis and Design
- Succession Plans Software and records
- Job Evaluation Software and records

- Organization information
- Organisation standards
- HR Annual Plan
- Industry standards
- Career Plans Software and records
- Knowledge and Skills inventory
- Hospitality Staffing Norms

Recruitment

- Job Descriptions
- Talent Bank
- Vacancy details
- Applicant search
- Applicant correspondence
- Applicant addresses contact numbers
- Online applications
- Compensation structure
- Photographs of applicants
- Standard Job Offer and Appointment Letters

- Applicant details
- Job Specifications
- Job Advertisements & postings
- Applicant status
- Applicant tracking
- Departmental and unit vacancies
- Job-person matching
- Interview scheduling
- Record of Orientation Programmes

Analysis and Reports

- Sourcing cost analysis
- Recruitment cost analysis
- Sourcing statistics
- Vacancy costing

Compensation and Benefits

Compensation and benefits structure	Salary grades
Overtime records	Pay reviews and proposals
Individual pay slips	Deductions
Leave records	Maternity benefits and trails
Leave request and entitlements	Ad hoc payments
Wages administration	Allowances
Performance Appraisal rating	Payroll costs
Vacation entitlements	Attendance
Progressive Payroll costs to sales turnover percentage	Information on rewards issued (bonuses, increments, etc)

Training and Development

Training Needs Analysis	Programme scheduling (colour planner)
Budget control and cost allocation	Online Course Booking
Trainee profiles	Lecturer profiles
Cancellation management	T&D administration
Classroom bookings	Performance appraisal recommendations
Post Training Knowledge inventory	Training Records
Skills gap analysis	Company Details
External training programmes	
Course evaluations	

HR Administration

HR files	Personnel files
Standard letters	Staff Lists
Contracts with vendors	Employment history
Labour Laws	Competition data
Budget control	Absenteeism
Employee turnover records	Disciplinary reviews
Grievance reviews	HR reports
Expense control and management	Time-recording
On-line expense approvals	New employee joining records

Analysis and Records

Expense cost analysis	Expenditure analysis
Administrative Costs	

Employee Relations

Union Contract	History of Union issues
History of Disciplinary cases	Suggestion Scheme records
Employee Recognition records	

Employee Health and Safety

Employee Accident Records	Emergency Plan (on intranet)
Safety Rules (on intranet)	

Improving Productivity Through HRIS

HR Portals, usually hosted on a company's intranet, provide employees with a single access point or "gateway" to all human resource related information. They let employees, managers and executives interactively (and selectively) access and modify that information. They thereby streamline the HR process and enable human resource managers to focus more on strategic issues.

Technology	How used by HR
Application Service Providers (ASP's) and technology outsourcing.	ASP's provide software applications, for instance, for processing employment applications. The ASP's host and manage the services for the employer from their own remote computers
Web portals	Employers use these, to enable employees to sign up for and manage their own benefits packages and to update their personal information
PCs and high-speed access	Make it easier for employees to take advantage of the employer's Web-assisted HR activities
Streamlining desktop video	Used, for instance, to facilitate distance learning and training or to provide corporate information to employees quickly and inexpensively
The mobile Web and wireless net access	Used to facilitate employees' access to the company's Web-based HR activities
E-procurement	Used for ordering work materials more efficiently online
Internet and network monitoring software	Used to track employees' Internet and e-mail activities or to monitor their performance.
Bluetooth	A special wireless technology used to synchronize various electronic tools like cellular phones and PCs, and thus facilitate employees' access to the employer's online HR services.
Electronic signatures	Legally valid e-signatures that the employer can use to more expeditiously obtain signatures for applications and record-keeping
Electronic bill presentment and payment	Used, for instance, to eliminate paper checks and to facilitate payments to employees and suppliers
Data warehouse and computerized analytical programs	Help HR managers monitor their HR systems. For example, they make it easier to assess things like cost per hire, and to compare current employees' skills with the firm's projected strategic needs.

HRIS Vendors

Many firms offer HRIS applications ranging from benefits enrollment to applicant tracking, time and attendance records, training and development, payroll, pension plans and employee surveys.⁶ Some of the HRIS vendors are: Automatic Data Processing, Inc., Business Information Technology, Inc., Human Resource Microsystems, Lawson Software, Oracle Corporation, PeopleSoft, Inc., Restrac Web Hire, SAP America, Inc., etc.

Benefits of HRIS

The following benefits are derived from the system:

- Higher speed of retrieval and processing of data
- Reduction in duplication of efforts leading to reduced costs
- Ease in classifying and reclassifying the data
- Better analysis leading to more effective decision-making
- Higher accuracy of information/report generated
- Fast response to answer queries
- Improved quality of reports
- Better work culture
- Establishing of streamlined and systematic procedures
- More transparency in the system

Limitations of HRIS

The computerized Human Resource Information System also has many problems which need to be addressed to:

- It can be costly in terms of finance and manpower.
- It can be threatening and inconvenient to those who are not comfortable with computers
- Often, the personnel designing HRIS do not have a thorough understanding of what constitutes quality information for the users. Inadequate documentation or training can undermine the system's utility, and increase resistance to the system by exactly those employees and managers who are supposed to aid in its use.
- Computers cannot substitute human beings. Computers can at best aid the human effort. The quality of responses is dependent upon the accuracy of data input and queries fired. The garbage-in-garbage-out concept many a time defeats the purpose of HRIS.

Installing of HRIS therefore needs to be viewed as a whole but also as a process composed of separate projects, each of which must be planned and realistically scheduled.

CONCLUSION

The most central use of technology in HRM is an organization's HRIS. It can significantly improve the efficiency of HR operation. It is an essential element of a properly functioning HR planning process. It can be used to support strategic decision making, to avoid litigation, to evaluate programs or policies, or to support daily operating concerns. An HRIS must be specific to the needs of the organization. HRIS is expensive and a capital investment that must ensure a return on investment in terms of cost savings and profitable use of information.

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Prediction of M-commerce User Behavior by Pattern Mining

Ms. Pranjali P. Ghode

Dept. of Computer Science and Engineering.,
Sipna college of engg. and technology Amravati

ABSTRACT

Information plays a major role in any organization .Due to a wide range of potential applications, research on mobile commerce has received a lot of interests from both of the industry and academia. Among them, one of the active topic areas is the mining and prediction of users' mobile commerce behaviors such as their movements and purchase transactions. In this paper, we propose a novel framework, called Mobile Commerce Explorer (MCE) which is a new approach for mobile commerce behavior mining and prediction. The MCE framework consists of components like Personal Mobile Commerce Pattern Mine (PMCP-Mine) algorithm for efficient discovery of mobile users' Personal Mobile Commerce Patterns (PMCPs); and Mobile Commerce Behavior Predictor (MCBP) for prediction of possible mobile user behaviors. The proposed work is to recommend stores and items previously unknown to a user. The framework MCE achieves a very high precision in mobile commerce behavior predictions and the experimental results show that our proposed framework are highly accurate under various conditions. We have conducted experiments that implement our approach on real-life aggregated data and the results support the viability of our integration approach as well as the appropriateness of extended association rules. We also intend to undertake a further performance study with larger data sets, using different hardware platforms and various types of indexes.

Key Words: data mining, mobile commerce , MCBP, PMCE, F-transaction.

1. INTRODUCTION

Data mining refers to extracting or mining knowledge from large amounts of data. Data Mining(DM) uses the powerful software tools to separate important or significant qualities that are previously unknown from databases or data warehouses[1]. Data mining uses information from past data to analyze the outcome of a particular problem or situation that may arise. Data mining works to analyze data stored in data warehouses that are used to store that data that is being analyzed. The advantages of data mining are, Marketing/Retailing, Banking/Crediting, Law Enforcement, Researchers. Mobile Commerce, also known as M-Commerce or m Commerce, is the ability to conduct commerce using a mobile device . Mobile Commerce is a new emerging technology with greater scope. Mobile commerce is the buying and selling of goods and services through Wireless handheld devices. Mobile devices mainly smart phones overcome laptops and desktops in many perspectives. Its size, portability, convenience and so on. It is advantage to the customers during purchasing; customers usually carry a mobile device mainly a smart phone than laptops because of its smaller size and portability. Mobile commerce has several

applications, in that Localization of products and services plays a major role. It is used to know user locations and the services requested by the user. Information plays a major role in any organization. We suggest a novel way of acquiring more information from corporate data mining without the complications and drawbacks of deploying additional software systems.

Due to a wide range of potential applications, research on mobile commerce has received a lot of interests from both of the industry and academia[3].data mining captures many different aspects of the business process such as manufacturing, distribution, sales, mobile commerce and marketing. This data reflects explicitly and implicitly customer patterns and trends, business practices, strategies, know-how and other characteristics. Therefore, this data is of vital importance to the success of the business whose state it captures, which is why companies choose to engage in the relatively expensive undertaking of creating and maintaining the data mining (a recent study reports the median cost of \$1.6 million for creating a data mining with additional \$0.6 million for annual operating cost). While some information and facts can be gleaned from the data mining directly, much more remains hidden as implicit patterns and trends. The discovery of such information often yields important insights into the business and its customers and may lead to unlocking hidden potentials by devising innovative strategies. The discoveries go beyond the standard on-line analytical processing which mostly serves reporting purposes (albeit in an increasingly complex and sophisticated manner). Information plays a major role in any organization . One of the active topic areas is the mining and prediction of users' mobile commerce behaviors such as their movements and purchase transactions. In this paper, we propose a novel framework, called Mobile Commerce Explorer (MCE) which is a new approach for mobile commerce behavior mining and prediction. The MCE framework consists of components like Personal Mobile Commerce Pattern Mine (PMCP-Mine) algorithm for efficient discovery of mobile users' Personal Mobile Commerce Patterns (PMCPs); and Mobile Commerce Behavior Predictor (MCBP) for prediction of possible mobile user behaviors.

When a user enters a building, the user may lose the satellite signal until returning outdoors. By matching user trajectories with store location information, a users' moving sequence among stores in some shop areas can be extracted[4]. The mobile transaction sequence generated by the user is $\{(A, \{i1\}), (B, \emptyset), (C, \{i3\}), (D, \{i2\}), (E, \emptyset), (F, \{i3, i4\}), (I, \emptyset), (K, \{i5\})\}$. There is an entangling relation between moving patterns and purchase patterns since mobile users are moving between stores to shop for desired items. The moving and purchase patterns of a user can be captured together as mobile commerce patterns for mobile users. To provide this mobile ad hoc advertisement, mining mobile commerce patterns of users and accurately predicts their potential mobile commerce behaviors obviously are essential operations that require more research. Fig 1 Example of Mobile Transaction

Sequence To capture and obtain a better understanding of mobile users' mobile commerce behaviors, data mining has been widely used for discovering valuable information from complex data sets. They do not reflect the personal behaviors of individual users to support M-Commerce services at a personalized level. Mobile Commerce or M-Commerce, is about the explosion of applications and services that are becoming accessible from Internet-enabled mobile devices. It involves new technologies, services and business models. It is quite different from traditional e-Commerce. Mobile phones impose very different constraints than desktop computers.

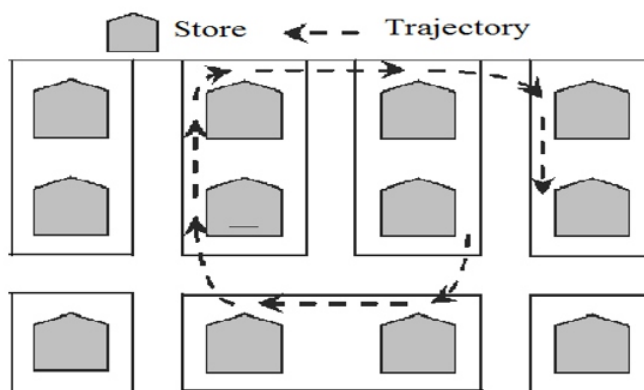


Figure 1. An example for a mobile transaction sequence

2. EXISTING WORK

2.1 Association-Rule Data in Data Mining

Association rule mining is a popular and well researched method for discovering interesting relations between variables in large databases . It is used to identify strong rules discovered in databases (e.g. Basket data analysis, clustering, and classification). The association rule mining can be of two types:

1. **Frequent item sets:** The items that frequently occur in the database and satisfies the minimum support count.
2. **Generate strong association rules from the frequent item sets:** Satisfy the minimum support and minimum confidence based on the rules.

Once the frequent itemsets from transactions in a database D have been found, it is straightforward to generate strong association rules from them, where strong association rules satisfy both minimum support and minimum confidence. This can be done using the following equation:

$$\text{confidence}(A \Rightarrow B) = P(B|A) = \frac{\text{support_count}(A \cup B)}{\text{support_count}(A)}$$

The conditional probability is expressed in terms of itemset support count,

where: $\text{support_count}(A \cup B)$ is the number of transactions containing the itemsets AUB and $\text{support_count}(A)$ is the number of transactions containing the itemset A. Based on this equation, association rules can be generated as follows:

For each frequent itemset l, generate all nonempty subsets of l.

For every nonempty subset s of l , output the rule “ $s \Rightarrow (l-s)$ ” if $\text{support_count}(l)/\text{support_count}(s) \geq \text{min_conf}$, where min_conf is the minimum confidence threshold. ARM may not discover any association rules in situations when there are several meaningful associations that involve multiple dimensions.

2.1 Mobile Pattern based Mining

Sequential pattern mining has been first introduced to search for time-ordered patterns, known as sequential patterns within transaction databases. Chen et al., propose the path traversal patterns for mining web user behaviors. Tseng[6] and Tsui, first study the problem of mining associated service patterns in mobile web environments. Tseng et al., propose the TMSP-Mine for discovering the temporal mobile sequence patterns in a location-based service environment. Jeung et al.,[2] propose a prediction approach called Hybrid Prediction Model for estimating object's future locations based on its pattern information. The algorithm involves several different parameters that are database specific. The following example illustrates the general optimization principles without going into system specific issues.

Example 1: Consider mining extended association rules from the data mining based on the following question:

Find products bought frequently together by customers from a particular zip-code in a particular month.

This question involves four tables, namely Product, Customer, Calendar, and Sales. Typically, the size of a fact table (such as Sales) will be several orders of magnitude bigger than the size of any of the dimension tables. In order to make the example concrete, suppose that the sizes and attribute cardinalities for these tables are as follows:

- Table Product has 10 thousand tuples (records)
- Table Customer has 10 thousand tuples within 100 different zip-codes
- Table Calendar has 300 tuples within 12 different months
- Table Sales has 1 million tuples.

Furthermore, suppose that the support threshold is 100. Ultimately, in order to find pairs of products bought frequently together we have to join some portion of the Sales table with itself. A naïve approach, writing the query directly. The cost of this join is likely to dominate the cost of the mining process so the optimization goal is to reduce the size of the portion of Sales before we do the self-join.

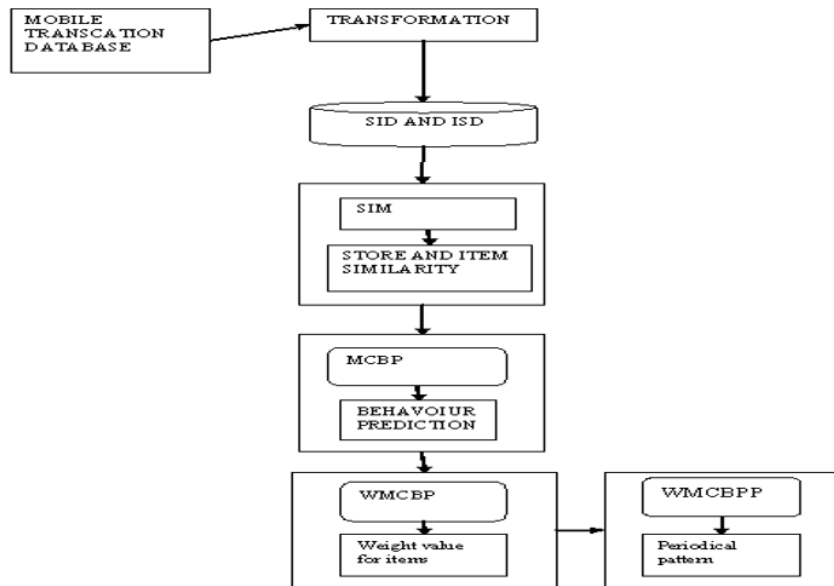


Figure 2. The mobile commerce explorer framework

3. PROPOSED METHOD

3.1 Discovery of PMCPs

In this section, we describe the PMCP-Mine algorithm to mine the personal mobile commerce patterns efficiently. The PMCP Mine algorithm is divided into main phases: 1) Frequent Transaction Mining. A Frequent-Transaction is a pair of store and items indicating frequently made purchasing transactions. In this phase, we first discover all Frequent-Transactions for each user. 2) Mobile Transaction Database Transformation. Based on the all Frequent-Transactions, the original mobile transaction database can be reduced by deleting infrequent items. The main purpose is to increase the database scan efficiency for pattern support counting.

TABLE 1 Frequent Transactions

User ID	Store	Item Set	Itemset Mapping	Large Transaction	Path	Sup.
U_1	A	$\{i_1\}$	LI_1	(U_1, A, LI_1)	A	4
U_1	D	$\{i_2\}$	LI_2	(U_1, D, LI_2)	D	3
U_1	F	$\{i_3\}$	LI_3	(U_1, F, LI_3)	F	2
U_1	F	$\{i_4\}$	LI_4	(U_1, F, LI_4)	F	2
U_1	K	$\{i_5\}$	LI_5	(U_1, K, LI_5)	K	2
U_2	A	$\{i_1\}$	LI_1	(U_2, A, LI_1)	A	4
U_2	K	$\{i_2\}$	LI_2	(U_2, K, LI_2)	K	4
U_3	B	$\{i_1\}$	LI_1	(U_3, B, LI_1)	B	3
U_3	E	$\{i_3\}$	LI_3	(U_3, E, LI_3)	E	2
U_4	D	$\{i_4\}$	LI_4	(U_4, D, LI_4)	D	3
U_1	F	$\{i_3, i_4\}$	LI_6	(U_1, F, LI_6)	F	2

3.3.1 Frequent-Transaction Mining

In this phase, we mine the frequent transactions (FTransactions) for each user by applying a modified Apriori algorithm[3]. Several of these variations are summarized as follows:

1. Hash-based technique can be used to reduce the size of the candidate k-itemsets, C_k , for $k > 1$. For example when scanning each transaction in the database to generate the frequent 1-itemsets, L_1 , from the candidate 1-itemsets in C_1 , we can generate all of the 2-itemsets for each transaction, hash them into a dif repeated until no more candidate transaction is generated. The frequent transactions are shown in

ferent buckets of a hash table structure and increase the corresponding bucket counts:

a. $H(x,y)=((\text{order of } x) \times 10 + (\text{order of } y)) \bmod 7$

b. A 2-itemset whose corresponding bucket count in the hash table is below the threshold cannot be frequent and thus should be removed from the candidate set.

2. Transaction reduction – a transaction that does not contain any frequent kitemsets cannot contain any frequent k+1 itemsets. Therefore, such a transaction can be marked or removed from further consideration because subsequent scans of the database for j-itemsets, where j>k, will not require it.

3. Partitioning (partitioning the data to find candidate item sets): A partitioning technique can be used that requires just two database scans to mine the frequent itemsets. Table 2 shows the mobile transaction database. At first, the support of each (store, item) pair is counted for each user. The patterns of frequent 1 transactions are obtained when their support satisfies the user-specified minimal support threshold TSUP. A candidate 2 transaction, indicating that two items are purchased together in the transaction, is generated by joining two frequent 1 transactions where their user identifications and stores are the same. For example, the candidate 2-transaction (F, { i3; i4 }) is generated by joining (F, { i3 }) and (F, { i4 }), because the user identifications and purchased stores of them both are U1 and F, respectively. Thus, we keep the patterns as frequent 2 transactions, when their support is larger than TSUP . Finally, the same procedures are Table 1. In the table, we use an item mapping table to relabel item sets in order to present F- Transactions in Table 1. For each unique item set, we use a symbol LLi (Large Item set i) to represent it, where i indicates a running number. The mapping procedure can reduce the time required to check if a mobile commerce pattern is contained in a mobile transaction sequence. Finally, the frequent 1-PMCPs (same as the F Transaction) are obtained in Table 2.

3.3.2 Mobile Transaction Database Transformation

In this phase, we use F-Transactions to transform each mobile transaction sequence S into a frequent mobile transaction sequence S'[5]. According to Table 1, if a transaction T in S is frequent, T would be kept as an F-Transaction. Otherwise, the store of T is taken as part of a path. The main objectives and advantages of the transformation are: 1) item sets are represented as symbols for efficiently processing, and 2) transactions with insufficient support are eliminated to reduce the database size.

TABLE 2 Frequent-1 PMCPs

Frequent-1 PMCP	Path	Support
(U ₁ , A, LI ₁)	A	4
(U ₁ , D, LI ₂)	D	3
(U ₁ , F, LI ₃)	F	2
(U ₁ , F, LI ₄)	F	2
(U ₁ , K, LI ₅)	K	2
(U ₂ , A, LI ₁)	A	4
(U ₂ , K, LI ₂)	K	4
(U ₃ , B, LI ₁)	B	3
(U ₃ , E, LI ₃)	E	2
(U ₄ , D, LI ₄)	D	3
(U ₁ , F, LI ₆)	F	2

3.2 Mobile Commerce Behavior Predictor

In this section, we describe how to use the discovered PMCPs to predict the users' future mobile commerce behaviors which include movements and transactions[5]. In existing pattern-based prediction models, the pattern selection strategy is based on exact matching, i.e., the similarity between different locations is treated as 0. To provide a high-precision mobile commerce behavior predictor (MCBP), it mainly focus on personal mobile pattern mining. Besides, to overcome the predictions failure problem and incorporate the similarities of stores and items into the mobile commerce behavior prediction. MCBP, which measures the similarity score of every personal mobile pattern mining with a user's recent mobile commerce behavior by taking storeand item similarities into account. In MCBP, the premises of personal mobile pattern mining with high similarity to the user's recent mobile commerce behavior are considered as prediction knowledge; more recent mobile commerce behaviors potentially have a greater effect on next mobile commerce behavior predictions; personal mobile pattern mining with higher support provide greater confidence for predicting users' next mobile commerce behavior. In a proposed system a weighted scoring functions evaluate the scores of Personal mobile pattern mining.

Weighted Mobile Commerce Behaviour (WMCBP)

In this module weight values are assigned for each item because all items are not equally treated in many transactional databases. A support of each itemset is usually decreased as the length of an itemset is increased, but the weight has a different characteristic. A support value is taken by only considering the similar item and stores frequently the user made a purchase. In WMCBP system calculate the weight value of the item before calculating the support value. A weighted support of a pattern is defined as the resultant value of multiplying the pattern's support with the weight of the pattern. A pattern is called a weighted frequent pattern if the weighted support of the pattern is greater than or equal to the minimum threshold it should be equal to one in the itemset.

4. CONCLUSION

In this paper, we have proposed a novel framework, namely MCE, for mining and prediction of mobile users' movements and transactions in mobile commerce environments. In the MCE framework, we have proposed Techniques such as PMCP-Mine algorithm for efficiently discovering mobile users' PMCPs; and MCBP for predicting possible mobile user behaviors. To evaluate the performance of the proposed framework and proposed techniques, we conducted a series of experiments.

To our best knowledge, this is the first work that facilitates mining and prediction of personal mobile commerce behaviors that may recommend stores and items previously unknown to a user. Besides, the prediction technique MCBP in our MCE framework integrates the minedPMCPs . The experimental

results show that our proposed framework are highly accurate under various conditions. The weighted frequent pattern assigns weight values for each item; transaction table result was changed in terms of the performance than the existing system. The experimental results show that the proposed system framework achieves a very high precision in mobile commerce behavior predictions. The system achieve superior performs in terms of precision, recall, and Fmea sure.

5. FUTURE ENHANCEMENT

Many advanced tools for data mining are available either as open-source or commercial software. They cover a wide range of software products, from comfortable problem-independent data mining suites, to business centered data warehouses with integrated data mining capabilities, to early research prototypes for newly developed methods. For the future work, we plan to explore more efficient mobile commerce pattern mining algorithm and develop profound prediction strategies to further enhance the MCE framework. In addition, we plan to apply the MCE framework to other applications, such as object tracking sensor networks and location- based services, aiming to achieve high precision in predicting object behaviors.

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Freight Operation Information System Of Indian Railways and its Effectiveness in South East Central Railway

Dr. Sanjay Pandey¹, Dr.(Mrs.) B.B. Pandey², Somnath Mukherjee³

¹Professor & Head, Department of Management, Chouksey Engineering College, Bilaspur (C.G)

²Assistant Professor (Senior Scale), Department of Management Studies, Guru Ghasidas University,
Bilaspur (C.G)

³Research Scholar, Dr.C.V.Raman University, Kargi Road, Kota, Bilaspur (C.G.)

ABSTRACT

Indian Railways decided to adopt the use of information technology to improve the utilization and maintenance of its rolling stock for better capacity utilization, increased output and to give better service to the customers. It was also realised that such computerised management information system will help in planning, monitoring and decision making. It was a very difficult task, due to its enormous size, consisting of different types of vehicles, rolling stocks, cargo, loco, geographical areas, ghat sections, number of stations, different gauges, electrified and non- electrified sections each having complexities of its own. Gradually all the information was collected and integrated almost all the activities of the freight operations were included. This led to an integrated information and management system for controlling and monitoring the multifarious activities and is known as Freight Operations Information System. In this paper, we are going to present the effectiveness of the Freight operations Information System in SECR based on survey conducted over different FOIS locations of SECR.

Key Words: Freight operations information System, Rake Management System, terminal Management System, Crew Management System, Integrated Coaching Management System, Control Office Application.

INTRODUCTION

Freight is the backbone of the Indian Railways and contributes more than 66% of earnings even subsidizing the losses of Passenger operation. The Indian Railways decided to adopt the use of information technology to improve the utilization and maintenance of its rolling stock for better capacity utilization, increased output and to give better service to the customers. It was also realized that such computerized management information system will help in planning, monitoring and decision making. All the information were collected and integrated for controlling and monitoring, almost all the activities of the freight operations were included. This led to an integrated information and management system for controlling and monitoring the multifarious activities of the freight operations which is known as the Freight operation information system.

FREIGHT OPERATIONS INFORMATION SYSTEM (FOIS)

Freight operations information system (FOIS) has been developed to take care of the operational

functions relating to Freight train operations, yard management and activities pertaining to Good shed working.

FOIS comprises of two modules

1. Rake management system (RMS)
2. Terminal management system (TMS)

STRATEGIC ADVANTAGES DERIVED FROM THE FOIS SYSTEM

1. Extension of the current business practice of bulk movement freight traffic in train.
2. Global tracking of consignment in real time.
3. Facilitates acceptance (customer's orders), billing and cash account of freight traffic are handled systematically.
4. It reduces the burden of logistics management.
5. An essential element in reducing inventory costs.

SCOPE OF FOIS SYSTEMS

- Rake based consignment tracking and pipeline
- Train/Rake operation
- Stock holding in terms of summary of wagon types
- Train and stock interchange
- Terminal Handling performance
- Loco holding, outage and power on line
- Reporting to take care of Train/Load on summary basis
- Invoice based consignment tracking
- Wagon wise Stock Holding
- Reporting of consist wagon wise
- Invoice based loading originating tonnage and revenues
- Wagon wise Interchange
- Statement of missing Wagons/wrongly delivered

SUB-SYSTEMS IN FOIS

CREW MANAGEMENT SYSTEM

Crew consists of various combination of running staff in different categories depending on variety of factors like type of service, traction. Indian Railways has approximately 1.05 lakh running staff based over 300 crew locations, forming the most important human element directly involved in the freight train operations.

Crew management system automatically evaluates employee's skill sets against established train schedule to determine optimal staff assignments. The system tracks the locations of working employees in real time, manager can easily shuffle assignments to accommodate any issues. The order is dispatched in turn to the employees via text messages as well as in-terminal kiosk.

Crew Management System is software in which accuracy and monitoring is automatically maintained. The systems installed in 300 crew booking points and are spread over Indian Railways the data base covers about 1.04 lakh crew members and more than 48500 crews are booked daily through the system. In South East Central Railway there are 19 Crew booking points working successfully and three more crew booking points are going to be installed. There are 6425 crews in SECR and 2800 crews are booked per day. The Crew Management System has a unique system of booking the crew through SMS. It is sent to the crew through the central database to serve it a call. If the crew acknowledges the call by sending back an acknowledgement through SMS, the crew is booked. Manual serving of call books to the crew has been stopped completely.

System generated alerts are also sent to the required personnel as given below.

1. Morning position of crew strength at various crew booking locations.
2. Alert for crew strength at particular crew booking point going below a critical limit.
3. Automated alerts for the nominated Inspector, for crew becoming due for monitoring.
4. The crew can have his personal information like turn of crew booking, Status, PME (periodical medical examination), mileage and other Training due dates on his mobile.
5. Birthday greetings to the crew members whose date of birth is in the data base.

INTEGRATED COACHING MANAGEMENT SYSTEM

Coaching Stock Module is the second vital phase of Integrated Coaching Management System. There has been a substantial growth of passenger traffic on Indian Railways in the last few years and in the number of coaches for the different types like vacuum and air brake, AC Ist class, 2- tier, 3-tier, chair car, and non A/C Sleeper coaches, Day coaches, Pantry cars and Brake vans etc.

Objectives of Coaching Management System:

- To monitor the condition and location of the coaching stock.
- To monitor the coaching rakes their locations, arrival and departure.
- To work as a management tool to provide for planning and rescheduling of rakes.
- To optimize utilization of each coach and timely maintenance (POH) and repairs.
- Prompt planning for idle coaches and their timely bookings and usage to generate more revenue for the Railways.

- To avoid manual manipulations and to provide full-proof service to enhance the image of the Railways.
- To provide MIS Coaching Operations.
-

CONTROL OFFICE APPLICATION (COA)

COA is comprehensive software for the automation of Control charting at Railway Divisional Control office. COA is intended to replace the tedious manual plotting of running trains on a chart. The benefits of COA include better planning and decision making in train operations and thus contribute to increased operational efficiency. COA is designed to form core application to drive the existing allied system like FOIS, NTES and COIS. The integration with allied system will be facilitated through a central application server at CRIS.

COA covers the following core functionalities of the control office operations:

Train Ordering, Maintain Train information, Manage Train movement (Abnormal working, stabling, banker movement), Report unusual occurrences, Management of maintenance blocks, Caution orders, Plot graphs, Advance plotting System/manual, Maintain referential data, MIS report, Yard management/siding, miscellaneous functions, and View Station layout.

The application will have interfacing capability with Data Logger to capture data pertaining to train movements in the final version of the product.

Table-I FOIS LOCATIONS OVER SECR

DIV	RMS	TMS	CMS	ICMS	COA
BILASPUR	7	49	7	7	7
RAIPUR	7	28	5	3	3
NAGPUR	4	18	7	3	3
TOTAL	18	95	19	13	13

Objectives of the Study

1. To study the Freight Operations Information System of South East Central Railway.
2. To determine the factors influencing the effectiveness of FOIS.
3. To analyse the Strategic advantages derived from the FOIS system in SECR.

Methodology

Universe	South East Central Railway
Sample Size	30
Sample Unit	Employees of SECR
Sampling Technique	Survey Method
Research type	Descriptive and Exploratory Research
Data source	Secondary data

Data Analysis based on Survey Report

- Control Office Application(COA) based on Controllers
- Crew Management System (CMS) based on Train Drivers
- Terminal Management System (TMS) based on commercial supervisors
- Rake Management System (RMS) based on Train clerks

Sn	Information	COA	CMS	TMS	RMS
1	No. of Railway staff	30	30	30	30
2	No. of private staff	0	0	0	0
3	Education qualification- HS	-	-	4	21
4	Education qualification- Graduate	-	-	19	7
5	Education qualification- Post Graduate	-	-	7	2
7	No. of staff having IT experience	17	21	24	26
8	No. of staff having knowledge of trouble shooting	7	5	17	27
9	No. of staff having working of 6 hrs	30	0	0	0
10	No. of staff having working of 8 hrs	0	10	29	30
11	No. of staff having working of 12 hrs	0	20	1	0
12	No. of staff having working of 24 hrs	0	0	0	0
13	No. of staff satisfied with available software	22	21	30	30
14	No. of staff given any suggestion to improve COA	13	-	-	-
15	No. of staff not given any suggestion to improve	17	-	-	-
16	No. of staff who accepted that implementation of COA minimizes work load of SECR	25	-	-	-
17	No. of staff who accepted that present Rly administration training (IT) is sufficient to work in	18	-	-	-
18	No. staff co-ordinating with divs/Zonal/CRIS	-	25	-	-
19	No. of staff who availed roster rest	-	29	-	-
20	No. staff co-ordinating with crew controller/Trains	-	15	-	-
21	No. of staff taking remedial steps to eradicate field problem	-	15	-	-
22	No. of staff using all the option of kiosk	-	0	-	-
23	Are you Satisfied with the available present system of working after implementation of IT application in train operation?	Satisfied	Satisfied	Satisfied	Satisfied

DISCUSSIONS:

The current study reveals that with the recent application of Freight Operations Information System in South East Central Railway (SECR), the staffs present in the various sub systems of the Railways are satisfied and feels that it decreases the work load and work time. About 73% controllers working in COA system are satisfied with the available current software, about 70% Train Drivers (CMS), 100% commercial supervisors (TMS) and 100% Train clerks (RMS) are satisfied with the same. Therefore it can be concluded that the Freight Operations Information system is effective in SECR.

CONCLUSIONS:

The current study reveals that with the recent application of Freight Operations Information System in South East Central Railway (SECR), the staffs present in the various sub systems of the Railways are satisfied and feels that it decreases the work load and work time. About 73% controllers working in COA system are satisfied with the available current software, about 70% Train Drivers (CMS), 100% commercial supervisors (TMS) and 100% Train clerks (RMS) are satisfied with the same. Therefore it can be concluded that the Freight Operations Information system is effective in SECR.

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Human Face Recognition using Pca and Neural Network

Yogesh B Sanap

PG Student, Department of Computer Science & Engineering,
TPCT's College of Engineering, Osmanabad, Maharashtra, India

ABSTRACT

Security and authentication of a person is a vital part of any business. There are many techniques used for this purpose. One of technique is human face recognition. Human Face recognition is an effective means of authenticating a person. The benefit of this approach is that, it enables us to detect changes in the face pattern of an individual to substantial extent. The recognition system can tolerate local variations in the face expression of an individual. Hence Human face recognition can be used as a key factor in crime detection mainly to identify criminals. There are several approaches to Human face recognition of which Image Processing Principal Component Analysis (PCA) and Neural Networks have been included in our project. The system consists of a database of a set of facial patterns for each individual. The characteristic features called „eigenfaces“ are extracted from the stored images using which the system is trained for subsequent recognition of new images.

Key Words: Biometrics, Neural Networks (NN), Principal Component Analysis (PCA), Eigen Values, Eigen Vector, Image Processing

1. INTRODUCTION

Face Recognition System

A face recognition system is a computer application for automatically identifying or verifying a person from a digital image or a video frame. One of the ways to do this is by comparing selected facial features from the image and a facial database. Security and authentication of a person is a crucial part of any industry. There are many techniques used for security and authentication one of them is face recognition. Face recognition is an effective means of authenticating a person the advantage of this approach is that, it enables us to detect changes in the face pattern of an individual to an appreciable extent the recognition system can tolerate local variations in the face expressions of an individual. Hence facial recognition can be used as a key factor in crime identification and detection, mainly to identify criminals there are several approaches to facial recognition of which Image processing principal component analysis (PCA) and neural networks (NN) have been incorporated in our project face recognition as many applicable areas. Moreover it can be categories into face recognition, face classification, one, or sex determination. The system consists of a database of a set of facial patterns for each individual. The characteristic features called „eigen faces“ are extracted from the storage images using which the system is trained for subsequent recognition of new images.

It is typically used in security systems and can be compared to other biometrics such as fingerprint or eye iris recognition systems.

Basic of Face Recognition

The first step in Human face recognition system is to detect the Human face in an image. The main objective of human face detection is to find whether there are any human faces in the image or not. If the Human face is present, then it returns the location and position of the image and extent of the each Human face. Pre-processing is done to remove the noise and reliance on the precise registration. The block diagram of a typical face recognition system can be shown with the help of Figure. The face detection and Human face extraction are carried out simultaneously. The complete process of face recognition can be shown in the Figure 1.

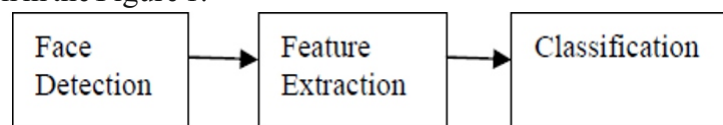


Figure 1 Block diagram of a Face Recognition

There are various factors that makes the human face detection is a challenging task. Pose presence or absence of structural mechanism, Facial look and expression, Occlusion, Image direction. The facial feature detection is the process to detect the presence and location of features like eyebrow, nose, eyes, lips, nostrils, mouth, ears, etc. this is done with the assumptions that there is only a single human face in an image. In the Face recognition process the input image is compared with the stored database. The input image is also called as probe and the database is called as gallery. Then it gives a matching report and then the classification is done to identify the sub-population to which new observations belong

II. LITERATURE REVIEW TECHNIQUES USED FOR FACE RECOGNITION

a. Traditional

There some facial recognition algorithms identify faces by extracting important features from an image of the subject's human face. For example, an algorithm may analyze the relative position, size, shape of the eyes, eyebrows, nose, cheekbones, and jaw. These features are then used to search for other images with matching features from stored database. Other algorithms normalize a gallery of face images and then compress the face data, only saving the data in the image that is useful for human face detection. A probe image is then compared with the face data. Popular recognition algorithms include Eigen- face, fisher face, the Hidden Markov model, and the neuronal motivated dynamic link matching.

b. 3D

A newly trend, claimed to achieve previously unseen accuracies, is three-dimensional face recognition. This technique uses 3D sensors to gather information about the shape of a face. This information is then

used to identify unique features on the surface of a face, such as the contour of the eye sockets, nose, and chin. One advantage of 3D human face recognition is that it is not affected by changes in lighting like other techniques. It can also identify a human face from a range of viewing angles, including a profile view.

c. Skin texture analysis

It is another trend which uses the visual details of the skin, as captured in standard digital or computer scanned images. This technique, called skin texture analysis, turns the unique lines, patterns, and spots apparent in a person's skin into mathematical calculations. Tests have shown that with the addition of skin texture analysis, performance in recognizing human faces can increase 20 to 25 percent.

III PROBLEM STATEMENT

In face recognition system, the face detection and feature mapping is core concern to analyze the face. There is need of training for detection of faces from different perspective. The efficiency is the main concern for feature selection and multiple algorithm proposed for solve the accuracy problems. In the past techniques, there is need to provide the large test or training images to detect and assign the particular class means efficient image processing. Automatic recognition of human face is a challenging problem which has received much attention during recent years due to its many applications in different fields. Human Face recognition is one of those challenging problems and up to date, there is no technique that provides a robust solution to all situations.

EXISTING SYSTEM

- Human Face recognition is the computer application technique to recognize a human face. When a person is registered in a face recognition system, a video camera takes a series of snapshots of the human face and then represents it by a unique code
- When person has their face verified by the computer system, it captures their current appearance look and compares it with the facial unique codes already stored in the database system.
- When human faces match, the person receives authorization for the system; otherwise, the person will not be authorized. The existing human face recognition system identifies only static face images that almost exactly match with one of the images stored in the image database.
- When the current image captured almost exactly matches with one of the images which is stored in database then only the person is authorized and granted access.
- When the current image of a person is considerably different, after comparing with image database say, in terms of facial expression then person will be denied

PROPOSED SYSTEM

The proposed human face recognition system overcomes certain pitfalls of the existing human face recognition system. It is based on extracting the important features of a set of human faces stored in the database and performing mathematical operations for the comparison on the values corresponding to them. Hence when a new image is fed into the system for recognition the important features are extracted and compute result to find the distance between the input image with the stored database images. Proposed system can tolerate some variation in the new face image. When the new image of a person varies from the images of that person stored in the database, the system will be able to recognize the new face and identify person. The proposed system is better mainly due to the use of facial features rather than the entire face. Advantages in terms of

- Human Face recognition accuracy and better unfair power Computational cost because smaller images require less processing to train the image processing PCA.
- The use of dominant features and hence can be used as an effective means of authentication

IV IMPLEMENTATION FACE RECOGNITION USING NEURAL NETWORK

We classify our project into two parts. These two stages are:-

- 1) Feature Extraction (Training)
- 2) Classification (Testing)

The first part of our project is feature extraction (Training). Feature Extraction is done with the help of image processing PCA (Principle component Analysis) Technique and Classification will done with the help of Neural Network.

Here we considered the Yale Database, in which the database is having the images of 15 persons with 11 different positions. Every image in the database is of size 240 X 300 pixels means each image is having 72000 pixels and the number of images are 165. So the total pixels processing is 72000 x 165. The processing of such a huge data is difficult and also time consuming. So we required to minimize the data first without interfering the image features and contents. So to reduce the number of pixels processed per image we use here the concept of image down sampling.

Training Faces

Step 1: Prepare the data

In this step, the faces constituting the training set (Γ) should be prepared for processing. Firstly we down sampled these images to 60 X 80 pixels i.e. the down sampling ratio is 0.25. So the number of pixels is reduced from 72000 to 4800 pixels. Due to that, the speed of operation of our project has increased.

Now from those images, we considered either all eleven images for training or depends on our choice, although we can say that eight images are used for training but it may be possible that subject came in front of system may having passion from that remaining three images. As the number of images for training is increased the result has also increased.

$$\text{Down Sampling} = |X_n / N|$$

Where, X_n - Image Pixel Values and N - Down Sampling Rate. Here we considered $N=4$. Figure bellow shows the Down sampling image.

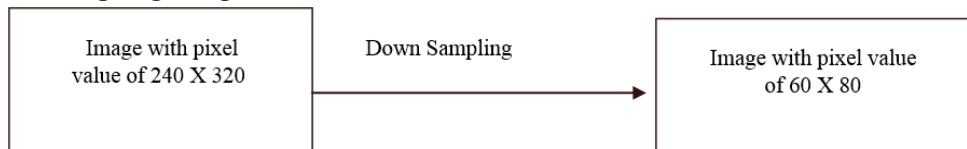


Figure 2 down sampling of Image

The Example of down sampled image is shown in figure bellow. The input image is of size 240 X 300 pixels and the down sampled image is of size 60 x 80 pixels.



Figure 3 Input image with 240 x 300 pixel Down sampled image with 60 x 80 pixels

- We has arranged all the images in the in the row wise with each row size of $60 \times 80 = 4800$ pixels per row

Step 2: find the mean

The average matrix Ψ has to be calculated, then subtracted from the original faces (Γ) and the result stored in the variable ϕ_i

$$\Psi = M \sum_{n=1} M \Gamma$$

$$\phi = \Gamma - \Psi$$

Step 3: find the covariance matrix, Covariance C is calculated

$$C = \frac{1}{n} \sum_{i=0}^{n-1} (R_i - \bar{R})(R_i - \bar{R})^T$$

- We formed a matrix of size 4800 X 165 pixels. From that we had calculated variance and covariance. After covariance the new matrix is formed of size 4800 X 4800 pixels
- The formula for variance and covariance is shown bellow

$$\text{Var}(X) = E((X - \mu)^2). \quad \text{----- Variance}$$

$$\frac{1}{n} \sum_{i=0}^{n-1} (R_i - \bar{R})(R_i - \bar{R})^T \quad \text{----- Covariance}$$

Step 4: find the eigenvectors, Eigen-values of the covariance matrix in below step

Description of the correct algorithm for determination of eigenvectors and Eigen-values is absent here, as it belongs to the standard arsenal of most math programming libraries.

- After that, we had calculated Eigen Values of matrix size 4800 X 4800 and Eigen vector of size 4800 X 1.
- From these Eigen values and Eigen vector we drawn the Eigen face. The Eigen faces we calculate are 20 instead of 15 (as we use 15 persons) for our convenience and for result improvement

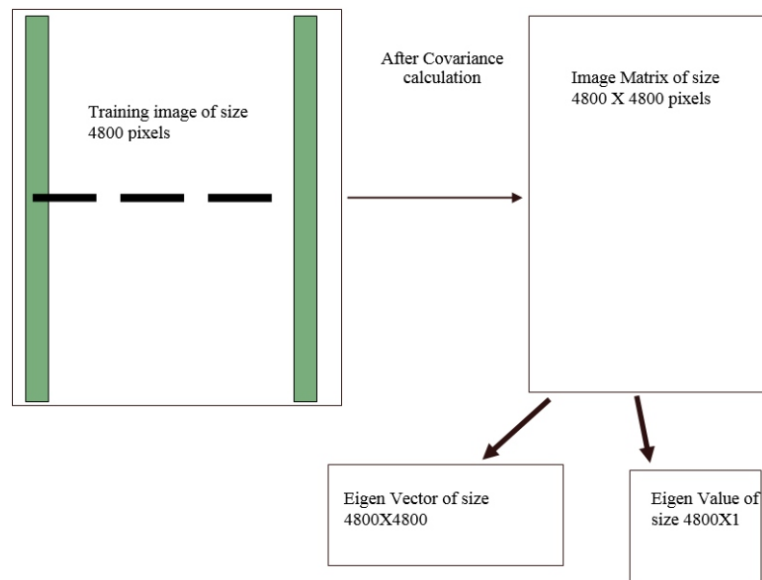


Figure 4 Rough sketch for Eigen value and vector calculation

Step 5: find the principal components

M eigenvectors (Eigen-faces) u_i , only M' should be chosen, which have the greatest Eigen-values. The greater the Eigen-value, the more characteristic features of a human face does the particular eigenvector describe. Eigen-faces with low Eigen-values can be retrieved, as they explain only a small part of characteristic features of the faces.

After M' Eigen-faces u_i are determined, the “training” phase of the algorithm is finished.

- We had calculated the 20 PCA values as we consider here 20 Eigenface. So for each Eigenface the PCA is being calculated. The size of that calculated PCA is 4800 X 20 for all images. Now, PCA value is 240 X 20 matrixes for every person i.e. for 11 posses of a person. PCA is well known statistical procedure that can be used to derive important features by reducing the dimensions of given input vector without losing information. The features of interest may not be available explicitly, and must be derived from the available attributes of individuals.

The feature extraction step is completed after image processing PCA values are being calculated. Once PCA values are being calculated, the same PCA values are used for testing purpose to avoid the overhead of the project and increase the speed of our system.

V. RESULT

Face recognition result

The input image was given to program for recognition. The input images have different positions. For this, whether the input image with different poses was matched or not was shown in figures bellow.



Figure 5 Wink face position



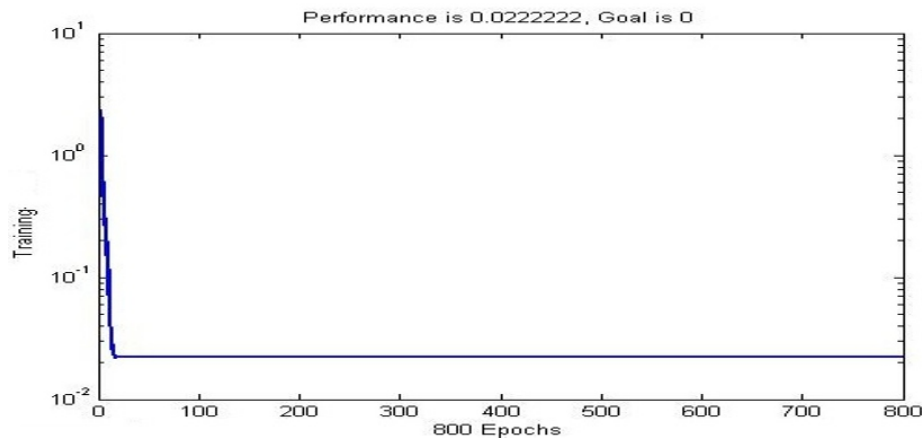
Figure 6 Left light position



Figure 7 Surprised Face Position



Figure 8 Wear Glass position



VI. CONCLUSION

This work illustrates the use of Neural Network for face detection, which gives the improved result as compared to conventional face recognition methods. The main limitation of the available (Current) face recognition system is that they only detect upright faces looking at the camera. Separate versions of the system could be trained for each head orientation, and the results could be combined using different arbitration methods similar to those presented here. In previous work, the face position must be center-light position; any lighting effect will affect the system. Similarly the eyes of person must be open and without glass. If such obstacles are on the face of person, the feature detection is complicated. Preliminary work in this era indicates that detecting profiles views of human faces is more difficult than detecting frontal views, because they have smaller amount of stable features and because the input window will contain more background pixels. When an image sequence is available, temporal coherence can focus attention on particular portions of the images. As a face moves about, its location in one frame is a strong predictor of its location in next frame. Standard tracking methods, as well as expectation-based methods, can be applied to focus the detector's attention. Other methods of improving system performance include obtaining more positive examples for training, or applying more sophisticated image preprocessing and Normalization techniques. The previous work required more complication in systems as well as the result of matching is not up to the satisfaction of any system. In our system special face features are not required for recognition process. The face features are detected using PCA. The feature face formed is Eigen face. Due to Eigen face, calculations in the specific face features are not required. So the overhead of the system is reduced as number of user of the system is going to increase.

The results we got here using Yale face database is up to the satisfaction of requirement of any system. As we were worked on more posses of the persons, so for our system, the center-light position is not required every time. For our algorithm, we say that as numbers of images for training are more and the epochs are more the result is increases. But the problem is that time require to complete the recognition is increases. As numbers of images are increases, time required to complete the recognition is increases.

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Applications of Knowledge Management in University Research and Higher Education

Prof. Babasaheb R Jadhav¹, Prof. Dr. D. B. Bharti²

¹Assistant Professor, MAEERS, MIT College of Engineering's, Centre for Management Studies and Research (CMSR), Kothrud, Pune, Maharashtra, India

²Professor and Director, RIMRD, Dhankawadi, Pune, Maharashtra, India

ABSTRACT

The ability to manage knowledge is crucial in today's knowledge economy. The creation and diffusion of knowledge have become increasingly important factors in competitiveness. More and more, knowledge is being thought of as a valuable commodity that is embedded in products (especially high-technology products) and embedded in the tacit knowledge of highly mobile employees. While knowledge is increasingly being viewed as a commodity or intellectual asset, there are some paradoxical characteristics of knowledge that are radically different from other valuable commodities. These knowledge characteristics include the following:

- *Using knowledge does not consume it.*
- *Transferring knowledge does not result in losing it.*
- *Knowledge is abundant, but the ability to use it is scarce.*
- *Much of an organization's valuable knowledge walks out the door at the end of the day.*

The objective of this research paper was to make understanding about applications of knowledge management in various areas of university research and higher education such as University Research, Administration and Management, Examination Department, Institutional Repositories and Library Management and E-learning and Virtual learning among Students, Research scholars, National and International universities, Research Institutes, Research and Development Centers, Knowledge Management Professionals, Knowledge Management System, ERP Vendors, Database managers, knowledge Management Research Groups, Knowledge Transfer Networks and so on.

Key Words: knowledge Management, University Research, Administration and Management, Examination Department, Institutional Repositories and Library Management and E-learning and Virtual learning.

1. INTRODUCTION

Meaning:

Knowledge management (KM) is the process of capturing, developing, sharing and effectively using organizational knowledge. It refers to a multi-disciplinary approach to achieving organizational objectives by making the best use of knowledge in research.

Knowledge management (KM) is the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical and strategic requirements; it consists of the

initiatives, processes, strategies and systems that sustain and enhance the storage, assessment, sharing, refinement and creation of knowledge through research.

Knowledge- the insights, understandings, and practical know-how that we all possess- is the fundamental resource that allows us to function intelligently. Over time, considerable knowledge is also transformed to other manifestations- such as books, technology, practices, and traditions- within organizations of all kinds and in society in general. These transformations result in cumulated expertise and, when used appropriately, increased effectiveness. Knowledge is one, if not THE, principal factor that makes personal, organizational, and societal intelligent behavior possible.

Knowledge management systems refer to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge or in some other way enhances the KM process.

Multidisciplinary Nature of KM:

Knowledge management draws upon a vast number of diverse fields such as:

- Organizational science
- Cognitive science
- Linguistics and computational linguistics
- Information technology
- Information and library science
- Technical writing and journalism
- Anthropology and sociology
- Education and training
- Storytelling and communication studies
- Collaborative technology

The above is by no means an exhaustive list but serves to show the extremely varied roots that KM grew out of and continues to be based upon today. Disciplines in KM are: Library and Information Sciences, Web Technologies, Decision Support Systems, Document and Information Management, Electronic Performance Support Systems, Organizational Science, Collaborative Technologies, Database Technologies, Help Desk Systems, Cognitive Science, Technical Writing, Artificial Intelligence and so on.

According to Bridgstock (2009), the application of KM to the career center of the university can

enhance and facilitate the employability in tertiary students because the self-management and career establishment skills can be transmitted to the graduates effectively if the KM is well implemented to the career center. Apart from that, based on Lamont (2011), after carrying out the KM, admission department in the university becomes one very process-intensive for the reason that large amount of information is well organized and the tacit knowledge of staff are also monitored through using the method of knowledge mapping so that the expertise of the staff are fully utilized. Apart from that tertiary students could get more diverse employment information when the University' career center employed the Knowledge Management because of the fact that employment student advisers with various background expertise (for example business and social sciences) could give professional advice for the students from different faculties and disciplines.

Besides, Ngulube and Mngadi (2009) stated that social interaction and knowledge sharing can be facilitated by the Communities of Practice (CoP) at the University of KwaZulu-Natal and the University of Zululand but policy of Cop is needed in order to enhance the efficiency of KM implementation. Furthermore, by implementing the Knowledge management, various explicit is knowledge is captured and tacit knowledge is codified into documents so complete learning resources can be provided to students. In the Higher Education in Britain, distance learning is greatly promoted because knowledge management helps to collect suitable information and knowledge to the learners.

Although there are articles regarding to the commercial organizational culture, the university departments' cultures with the use of online platform, particularly Web 2.0 are rarely investigated. Hence, it is worth to spend time research this area.

2. RESEARCH METHODOLOGY

1) Research Objectives:

- a) To study the concept of knowledge management.
- b) To study the applications of knowledge management in university research and higher education.

2) Hypothesis:

The knowledge management has applications in university research and higher education.

3) Scope Of Research:

The present research study concentrated upon applications of knowledge management in Administration and Management, Examination Department, Institutional Repositories and Library Management and E-learning and Virtual learning.

4) Data Collection Methods:

- a) **Type of Data:** Secondary data has been collected and used for the present research study.
- b) **Sources of Data:** Secondary data was collected from internet, reference books, journals, articles, publications and various printed material.
- c) **Duration:** The study covered time duration for last decades.

5) Limitations of study:

- a) The present research paper was based on available info of applications of knowledge management.
- b) Time span taken for this study was last decade.

3) DATA ANALYSIS:

3.1 Applications of Knowledge Management in University Research:

By its nature, university and higher education environment is suitable for the application of knowledge management principles and methods in university research. The reasons include the followings:

- i) Universities usually possess modern information infrastructure and databases
- ii) Knowledge sharing with others is natural for lecturers, linkages, tie-ups, exchanges, collaborations etc.
- iii) The desire of students is to acquire knowledge from accessible sources as fast as possible for best possible outcomes or decisions making.

Universities and higher education have to live up to expectation of the global society. They must adopt good practices that derive from ICT and globalization. Traditionally, the main functions of universities are to create and disseminate knowledge and these are done through their research and teaching activities as well as their outreach programs.

The study of applications of knowledge management in university research outlines the following major objectives: *f*

1. Teaching and Learning: To prepare students to become successful lifelong learners. Teaching is undertaking certain ethical tasks or activities the intention of which is to induce learning. Teaching is becoming increasingly important in academic careers. Many research institutions - including such big names as Harvard, Oxford and the MIT - have noticed that their previous, exclusive focus on research skills at the moment of hiring their academic staff compromised the quality of their teaching and the learning process of their students.

In professional education, **learning by teaching** designates currently the method by Jean-Pol Martin that allows pupils and students to prepare and to teach lessons, or parts of lessons. Learning by teaching should not be confused with presentations or lectures by students, as students not only convey certain content, but also choose their own methods and didactic approaches in teaching classmates that subject. Neither should it be confused with tutoring, because the teacher has intensive control of, and gives support for, the learning process in learning by teaching as against other methods.^f

2. Research, Innovation and Development :To expand the frontiers of human knowledge and to promote creativity^f
3. Administration and Service: To serve on communities and in leadership positions within the university and in professional organizations, and to participate in outreach activities that serve the local, national and international communities.
4. Easy availability and accessibility of database
5. Knowledge management practices adopted by various universities (i.e. acquisition, generation, storage and dissemination)
6. Protect and license university-owned intellectual property
7. Enable and attract more sponsored research funding
8. Purely generate income by licensing and other IP commercialization
9. Gain reputation and recognition for the institution, faculty or administration
10. Create jobs for graduates, consulting and research opportunities for faculty
11. Facilitate the creation of new or start-up businesses and jobs based on University intellectual property
12. Stimulate cluster and regional economic growth
13. Develop science parks and incubators
14. Disseminate university expertise embodied in IP generation to society

With rapid changing economic environment, the role of universities or higher education institutions as knowledge providers has been scrutinized and challenged by the various stakeholders, including the public. To answer this challenge, knowledge management ideas and principles have been proposed to be employed by universities for the purpose of doing fundamental and applied research, teaching suitable curricular program, utilization of knowledge for management decision support to improve internal document management and exploitation to increase the level of knowledge dissemination, and utilization of knowledge for a qualitative change in the educational process. The introduction of KM methods and tools would enable the universities to share their knowledge, to improve the level of teaching and research collaboration, and to improve the working relationships among the staff and students and other stakeholders.

To successfully manage KM initiatives in universities, the management need to consciously and explicitly manage the processes associated with the creation of their knowledge assets, and to recognize the value of their intellectual capital to their continuing role in society. However, focusing on the technical side alone, such as increasing the level of computer literacy and providing adequate information and communication infrastructure will not ensure the success of the KM initiatives. The management needs to also overcome the more difficult problems related to social and cultural issues in organizational knowledge management

3.2 Applications of Knowledge Management in Administration and Management:

However, there is a paradigm shift in university and higher education administration with the initiation of information and communication technology (ICT). Universities are today making substantial investments in ICT to meet their goals with a view to increasing the effectiveness of their operations. They are striving to, if not to meet up with their peers in other parts of the world, but at least, to stay not too far away from them. Even at that, the emphasis on change in the global environment puts knowledge management at the heart of what universities and higher education needs to do to cope up with today's fast changing globalized environment.

The study of applications of knowledge management in Administration and Management outlines the following major objectives:

1. Focus the KM vision and practice to align with the organizational direction.
2. Provide effective governance for the KM practice.
3. Promote integrative management culture by fostering a knowledge: Promote integrative management culture by fostering a knowledge-supportive culture – including safe environment, ethical and mutually respectful behavior, minimal politicking, collaboration, and a common focus on delivering quality work without delay – i.e., “getting the right thing done quickly and with as little fuss as possible
4. Implementation of KM for promotions and admissions
5. Implementation of KM for examinations
6. Implementation of KM for database
7. Implementation of KM for payroll solution
8. Implementation of KM for ERP solutions
9. Implementation of KM for vendor management
10. Provide shared understanding of organization's mission, current direction and individual roles to support the organizations and individual's own interest.
11. Practice accelerated learning by pursuing a broad range of knowledge transfer activities: by

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- pursuing a broad range of knowledge transfer activities to ascertain that valuable IC is captured, organized and structured, deployed widely, and used and leveraged.
12. Educate employees by providing opportunities to teach professional, craft and navigational knowledge: by providing opportunities to learn professional, craft, and navigational knowledge and Meta knowledge, and by providing information and other resources necessary to deliver quality work products that satisfy work requirements and service paradigms.
 13. Provide opportunities by placing employees in situations where they can use their capabilities.
 14. Give permission by providing employees with safe environments in which to do their work: by providing employees with safe environments in which to do their work and have understanding of how far they can improvise enterprise guidelines and policies to serve individual situations and customers.
 15. Foster motivation by motivating employees to act intelligently: by motivating employees to act intelligently – 'to do the right thing' – and providing understanding and emotional acceptance of how actions will be of value to stakeholders, the enterprise, and most importantly, to themselves.
 16. Create supportive infrastructure capabilities by including extensive IT applications.
 17. Governance functions to direct and support KM related efforts throughout the organization.
 18. Staff or infrastructure functions that support KM objectives and individual activities: Staff or infrastructure functions that support KM objectives and individual activities of many kinds including supporting capabilities like special expertise teams, institutions, and technological facilities.
 19. Operational functions to obtain and create knowledge and to capture, organize, distribute, and manipulate it.
 20. Functions to realize the value of knowledge related investments through understanding.

3.3 Applications of Knowledge Management in Examination Department:

University and higher education not only in India but also all over the world has become a complex, challenging and difficult task in recent time. This originated from the pressures occasioned by the changes in technology and globalization which have become the hallmark in world affairs. As a result, there are greater expectations from the universities as training points for high level manpower. Knowledge management is looking for determining the required information through storing, developing, spreading and functioning for achieving the main goals of the universities and examinations, besides contributing in achieving fundamental examination and administration tasks that appears through the ability of setting plans, taking decisions along with problem solving.

The study of applications of knowledge management in examination Department outlines the following major objectives:

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1. Implementation of ERP system for database
 2. Involve upper management to emphasize the systems importance
 3. Foster a cooperative environment for sharing knowledge
 4. Initiate policies that reward those who share knowledge
 5. Appoint someone to manage and update the system
 6. Make sure employees should get something from it
 7. Develop an information system that is easy to use
 8. Select knowledge management team
 9. Establish knowledge management strategy and business case
 10. Perform knowledge assessment and audit
 11. Perform information technology assessment
 12. Develop project plan and measurement systems

3.4 Applications of Knowledge Management in Institutional Repositories and Library Management:

Academic libraries have transformed drastically from MARC (Machine Readable Cataloguing) and circulation desk to metadata and web information, print collection and inter library loans to online databases and e-resources, quiet areas to learning and knowledge recreational area, bibliographic instruction to information literacy and life-long learning, information management to knowledge management and so on. Accordingly, the roles of academic librarians have changed radically at both library practitioners and library school educator's levels. They are no more traditional information protectors and managers. Open access, knowledge management, digital scholarship, institutional repositories are all often owned by the libraries and the librarians.

The study of applications of knowledge management in Institutional Repositories and Library Management outlines the following major mission:

1. Implementation of ERP
2. Digital library
3. KM requires specific planning and alignment with organizational objectives
4. Fulfills the knowledge gap
5. Survival factor with increased user demands and competition
6. Increased visibility of libraries
7. Academic libraries as knowledge creating organizations
8. Increased value of knowledge in the knowledge economy
9. Need of improved library services and customer satisfaction

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10. To improve library services and productivity
 11. Enhance database through Software's, journal's, CD's, periodical's, magazine's, newsletter's etc.
 12. Use of online library services and software's
 13. Manage information explosion
 14. Manage rapid knowledge decay
 15. Make timely decisions
 16. Establish best practices
 17. Reduce duplication of effort

3.5 Applications of Knowledge Management in E-learning and Virtual learning:

The e-learning and virtual learning framework of applications of knowledge management includes management, resource support, ethical, institutional, pedagogical, technological, interface design and evaluation. E-learning can be defined as learning using electronic means the acquisition of knowledge and skill using electronic technologies such as computer and Internet- based courseware and local and wide area networks. E-Learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV and CD-ROM, e-learning, focuses on the individual's acquisition of new knowledge and the technological means to support this construction process. Simulations close to the real world are the answer to constructivist learning theories, demanding situated learning with a high degree of engagement of the learner.

- E-learning is best defined as the category consisting of training and learning over the Web – training that can be delivered over an intranet, extranet or the Internet.
- E-learning is learning at a distance that uses computer technology (usually the Internet).
- E-learning is essentially the network-enabled transfer of skills and knowledge. E-learning refers to using electronic applications and processes to learn. E-learning applications and processes include Web based learning, computer-based learning, virtual classrooms and digital collaboration.

The study of applications of knowledge management in E-Learning and Virtual learning outlines the following major objectives:

1. Socialization: Competency and skills measurements help identify the people with specific interests, skills and knowledge in the organization.
2. Externalization: Knowledge is captured by the system with the intent of teaching that knowledge to other people.
3. Combination: Knowledge about products and processes of the business is organized to make learning the knowledge more effective and efficient.

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4. Internalization: Competency and skills measurements help identify which people lack the knowledge to do their job effectively and provide them with online training.
 5. Cognition: People can be provided with on demand performance support by getting just the training that they need at the time that they need it to complete a business task.
 6. Feedback: Assessments provide feedback concerning how well a person has learned and how well they have applied what they learned to a business problem.
 7. Attention: Help students to focus on explained concept or specified sentence.
 8. Discussion: help students to discuss assignment based on each one's aspect in an efficient manner.
 9. Market based e-learning is based on supply and demand. Used by educational institutions, it uses e-learning integrated into traditional course offerings as well as for continuous learning for professional qualification.
 10. Activity based e-learning is related to customer needs. The learning is often based upon one or more specific business products, usually software. The learning may be provided directly from the business or through a service provider.
 11. Asset based e-learning is used by academic institutions and by private businesses. Again, academic institutions may have all or a part of the costs of providing the education subsidized by the state. Students pay directly for the e-learning content independent of other educational costs.
 12. Use of ICT, IT and ITES
 13. Case studies and Teaching notes
 14. Simulations and Mini projects
 15. Peer based learning
 16. Field work and Experimental learning

4) RESEARCH FINDINGS:

1. University and higher education environment is suitable for the application of knowledge management principles and methods in university research. The reasons includes Universities usually possess modern information infrastructure and databases, Knowledge sharing with others is natural for lecturers, linkages, tie-ups, exchanges, collaborations etc. and the desire of students is to acquire knowledge from accessible sources as fast as possible for best possible outcomes or decisions making.
2. There is a paradigm shift in university and higher education administration with the initiation of information and communication technology (ICT). Universities are today making substantial investments in ICT to meet their goals with a view to increasing the effectiveness of their operations.
3. Knowledge management is looking for determining the required information through storing, developing, spreading and functioning for achieving the main goals of the universities and examinations, besides contributing in achieving fundamental examination and administration tasks that appears through the ability of setting plans, taking decisions along with problem solving.

4. Academic libraries have transformed drastically from MARC (Machine Readable Cataloguing) and circulation desk to metadata and web information, print collection and inter library loans to online databases and e-resources, quiet areas to learning and knowledge recreational area, bibliographic instruction to information literacy and life-long learning, information management to knowledge management and so on.

5. The applications of knowledge management in e-learning and virtual learning include management, resource support, ethical, institutional, pedagogical, technological, interface design and evaluation. E-learning can be defined as learning using electronic means the acquisition of knowledge and skill using electronic technologies such as computer and Internet-based courseware and local and wide area networks.

5) CONCLUSION:

Knowledge is the most important asset to a university and higher education. The ability to proficiently manage the diverse types of knowledge used by both academics and non-academics, in particular decision makers, is crucial for the sustainable improvement in the performance of the university as a whole. A variety of computer-based techniques for managing knowledge has been developed and will continue to be developed to supplement inborn human knowledge management skills. Knowledge management is concerned with a range of practices used by organizations to generate, store and disseminate knowledge for reuse, especially in research, teaching and learning, decision making and others. In universities and higher education, knowledge management initiative is usually knotted to its objectives and intended to achieve specific outcomes such as improved performance through shared intelligence and higher levels of innovation.

The socio, economic and technical components have become the parameters in enhancing the performance of university and higher education. It can be concluded that the universities and higher education community can be effectively performing their core work if they utilize and manage knowledge in a proper way when they are aware of the benefits as well as added value that knowledge management brings and also when they are provided with adequate info-structure support, thus the implementation of knowledge management throughout the organization is instilled as an organizational corporate culture. Deployment of inputs such as infrastructure or Knowledge Management System enables the utilization of human capital and organizational knowledge through best practices, rules and procedures, which will produce outcomes through effective teaching and learning.

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