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SECURITY BASICS FOR WEB APPLICATION DEVELOPERS

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ABSTRACT

In the present day digital scenario, internet based applications have become critical tools for doing business, sharing information and delivering service. People across the globe use various websites to send and receive information through browsers. This legitimate information can be stolen or accessed by attacking vulnerabilities, which can come from various loopholes at the network, host or application layer.

According to Global Surveys (Gartner & WSAC), application layer contains 90% of all vulnerabilities and to minimize occurrence of web attacks, developers must, therefore, use tried and tested tools and techniques to ensure security in all the phases of software development life cycle.

KEYWORDS

Security, Vulnerabilities, Web Application, OWASP etc.

WHY WEB APPLICATIONS ARE VULNERABLE?

Web applications are vulnerable to security flaws because of the following reasons:

- They are based on an external viewing interface i.e. browser, which cannot be controlled. Browser itself may contain vulnerabilities and is subject to frequent version changes.
- Custom code written for a web application contains custom vulnerabilities which are unique for that application and there is no one to provide security patches for them
- Application firewalls and IPS have restricted effectiveness, as they cannot defend against logic flaws in the code.
- Web applications comprise of a mix of number of frameworks, tools and platforms apart from the being network dependent.
- Most web applications are dynamic in nature and much of the content is created on the fly.
- As new/updated software tools (releases) enter market and are used in web applications, there is no guarantee that a perfect piece of code written today will be very safe tomorrow.

APPLICATION SECURITY STANDARDS BODY

Apart from ISO standards body, OWASP (Open Web Application Security Project) and WASC (Web Application Security Consortium) are both open not-for-profit charitable organizations that have been accepted globally as the standard bodies for improving Web application security. OWASP and WSAC [2] missions are purely focused on making software security visible, so that individuals and organizations worldwide can make informed decisions about true software security risks. OWASP has produced a list (called OWASP Top Ten) that represents what **the most critical and current web** application security flaws are [5]. Apprising one about the following OWASP Top Ten vulnerability exploits is perhaps the **most effective way of producing secure code by the developers**.

Common Application security vulnerabilities

Injection

Injection flaws, such as SQL, OS, and LDAP injection arise when unrestricted data is sent to an interpreter as part of a command or query in an application [8]. The untrusted data of the attacker can trick the interpreter into performing unexpected commands or data access without suitable authorization and therefore lead to security compromise of a website.

Broken Authentication and Session Management

These application level weaknesses occur due to the failure to protect the credentials and session tokens through their lifespan [5]. These flaws can lead to the stealing of user or administrative accounts, challenge authorization and accountability controls, and cause harm to secrecy. In practice, these weaknesses are more often introduced through application functions / features such as logout, password management, timeout, remember me, secret question, and account update.

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Cross-Site Scripting (XSS)

Also known as XSS, cross-site scripting is the biggest and most malicious web application security issue [9] [12]. XSS flaws occur whenever an application takes data from an end user and sends it to a web browser without first checking, validating or encoding that content. XSS allows attackers to execute script in the victim's browser, which can hijack user sessions, deface web sites, conduct phishing attacks, and take over the user's browser using scripting malware.

Direct Object References

This type of misuse occurs when an immature developer exposes the reference to an internal implementation object, such as a file, directory, database record, or key, as a URL or form parameter [5]. In other words, an attacker can manipulate references to access other objects without authorization, because an access control check is not in place.

Configuration Flaws

These attacks exploit configuration-setting faults found in web servers, application servers or database servers. These settings may provide a means for a hacker to dodge authentication methods and gain access to sensitive information. Likewise, default installations may include well-known usernames and passwords, hard-coded backdoor accounts, special access mechanisms, and incorrect permissions set for files accessible through web servers. Similarly, default samples or application-based configuration files that are not properly locked down may reveal clear text connection strings to the database. Sometimes the default settings in configuration files also may not have been set with security in mind. Misconfigured SSL certificates and encryption settings, the use of default certificates, and inappropriate authentication implementation with external systems may also compromise the confidentiality of information.

Data Exposure

Many web applications do not properly protect critical data, such as passwords etc. Attackers may therefore, steal or modify such weakly protected data to conduct identity theft or several such other similar crimes.

Function Level Access Control

This weakness is exploited when a user authenticated to a web site does not have full access to the entire content and functionality (based on the business logic of the application).

Cross-Site Request Forgery (CSRF)

Some applications miss to perform the access control rights on the server when any function is accessed [9] [12] [14]. If requests are not valid, attackers will be able to forge requests in order to access functionality without proper authorization. This is CSRF and it involves forcing a victim to send an HTTP request to a target destination without victim's knowledge.

Using Software Components with Vulnerabilities

Reusable components like libraries, frameworks, and other software modules always run with full privileges. If any components vulnerability is exploited, such an attack can facilitate serious data loss or server seizure [13].

Using invalid Redirects and Forwards

Web applications commonly redirect and forward users to other pages and websites. If this is executed without proper validation, attackers can redirect victims to phishing or malware sites, or access unauthorized pages.

WHAT RESTRICTS DEVELOPERS TO PROTECT APPLICATIONS?

It has been proven that the failure to use secure coding practices relates to proper training and education [15] i.e. developers cannot avert security flaws in code if they do not know how. Unfortunately, most computer science academic courses in our country lack content about best and up-to-date practices for secure application design and coding or security testing. In addition, some developers give least importance to security than to functional requirements because they consider security boring and uninteresting. Inexperienced and fresh coders have a general feel that incorporating security does not directly contribute to developing new and exciting applications. In fact, many developers also think that being an altogether different job; some separate team should take care of security, like Network Management group etc. However, what developers fail to understand and analyze is that their code is the prime target of attackers and should be effectively sealed and taken care of throughout the SDLC.

Another reason for neglecting security is that developers often see security practices as limiting the application functionality. What they cannot visualize, is that though additional features might enhance usability on one hand, it also lets attackers access data on the other hand. In practice, more features usually lead to more loopholes/hotspots that attackers can exploit with some intelligence and patience.

CYBER SECURITY POLICY OF INDIA

In our country, a National Level Nodal Agency CERT-In (Computer Emergency Response Team) has been designated to coordinate all the matters related to cyber security. CERT-In has created national level systems, processes, structures and mechanisms (as per ISO standards) towards effective resolution of cyber crisis management [6][7]. For securing e-Governance services and towards protection of critical information on the web, CERT-In mandates conduct of security audits of information hardware and software infrastructure by an independent IT Security Auditing Organization on periodic basis. Evaluated and empanelled third party agencies are available in CERT-In to carry our security-audit prior to hosting on server.

SECURITY EXPLOITATION MITIGATION MEASURES FOR DEVELOPERS (BEST PRACTICES FOR SECURE CODING)

Developers can easily avoid majority of OWASP vulnerabilities indicated in the above sections by:

- Sanitizing the user supplied data i.e. making input free of hazardous characters like &(ampersand sign), |(pipe sign), ;(semi-colon), $(dollar sign), %(percent sign), @(at sign), '(single apostrophe), "(quotation mark), <> (triangular parenthesis), \'(backslash apostrophe),\"(backslash quotation), rounded parenthesis(), line feed, carriage return, comma, backslash etc. These symbols can trigger unwanted O.S. command execution, change command context, cause shell command execution. However, if any potentially hazardous characters must be allowed as input, additional controls must be implemented.
- Ensuring that value and type of user input is valid.
- Using stored procedures to abstract data access so that the users do not directly access tables or views.
- Filtering out Java Script code from input.
- Enforcing a specific character set encoding.
- Using parameterized queries API.
- Adding input validation to Web Forms by using validation controls like Range Validator (to check that entered value falls between specified upper and lower boundaries) and Regular Expression Validator (which checks that user input matches a predefined pattern).
- Testing pages is valid property after completion of all data input.
- Making sure that every request to the server contains a unique identifier (e.g. session id taken from session cookie) that the attacker cannot easily guess.
- Restricting exposure of session identifiers in URLs, error messages or logs.
- Including authentication checks for access to all pages and resources, except those meant for public.
- Disclosing which part of authentication data is incorrect, incase authentication fails.
- Enforcing password length, hashing and complexity requirements established by regulation.
- Disabling accounts after an established number of unsuccessful login attempts occur.
- Re-authenticating privileged users if critical operations are to be performed. In fact, developers must go for multi-factor authentication in such cases.
- Taking utmost care when changing or resetting passwords or using the 'remember me' functionality.
- Establishing a session inactivity timeout that is as short as possible.
- Using a single site-wide component (such as LDAP) to check access authorization permissions.
- Restricting users to privileges and functionality that is only required to perform their task.
- Ensuring that servers, frameworks and system components are running the latest approved versions of software and have all the patches issued
- Storing connection strings to the database in a separate configuration file instead of hard coding it within the application.
- Removing unnecessary temporary files, default vendor content, default accounts, default passwords etc. In addition, user-uploaded files must be scanned for viruses and malware.
- Implementing safe updating of application using cryptographic signatures and encrypted channels to transfer code.

CONCLUSION

Web applications are becoming the standard for communications over the Internet and if left unprotected, unauthorized parties may exploit legitimate resources with harmful intent. It is, therefore, extremely essential to secure and maintain web applications to reduce the likelihood of compromise. As the major responsibility for the security of web applications lies in the hands of the

web developer, the latter must consider security during the entire software development and deployment life cycle. They must apply best practices in secure coding, perform testing and use attack detection systems for protecting applications at runtime. As such, they must be thoroughly equipped and updated from time to time to fix vulnerabilities and safeguard vital resources on the fly.

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THE SUCCESS OF THE EDUCATIONAL ERP SYSTEM DEPENDENCY ON CLOUD BASED DESIGN OF ERP FRAMEWORK COMPATIBLE WITH LATEST TECHNOLOGY: AN EXPLORATORY STUDY

Dr. Balasaheb Bhamangol[2] Sunil Khilari[3]

ABSTRACT

Success of the Educational ERP system depends on how we manage to keep intact with Technology, Vendors, Performance and Stakeholders satisfaction. Educational ERP represents the implementation of various educational services for the benefit of Management, staff, students, alumni and industry through which they can avail 24*7 services anytime and anywhere. The factors for successful Educational ERP system are unambiguous objectives, committed and effective team, planning, management controls, repeated reappraisal and communication. This research gives insight on various central dimensions, which are user friendliness, performance, satisfaction, communication, inter-department interaction. It is also on it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A conscious attempt was therefore made to construct such a framework. The researcher therefore presents a "Cloud based Educational ERP Framework for Educational Institutes" by considering all the positive aspects of Information communication Technology.

KEYWORDS

e-ERP-Educational Enterprise Resource Planning, Information Communication Technology, Cloud Based Design etc.

INTRODUCTION - ERP IN EDUCATIONAL INSTITUTES

To study the ERP operational requirement, it is very important to determine the flexibility of the ERP systems to support organizational changes. The ERP systems environment, which focuses on EPR software suitability, information quality and system quality, are the features to be accessed. In educational sector the survival of ERP systems are on it training of staff and technical staff, user involvement and user characteristics. The maintenance of ERP systems is an ongoing process of integration and transformation of the business needs and there is a requirement to understand its impact on the key organizational activities and processes. There are very limited research studies that endeavor to understand the user involvement–satisfaction relationship; although the ERP systems are more likely to succeed when user involvement is high and they have realistic expectations about the scope of the system and its functionality.

Success of the Educational ERP system depends on how we manage to keep intact with Technology, Vendors, Performance and Stakeholders satisfaction. The term Educational ERP represents the implementation of various educational services for the benefit of Management, staff, students, alumni, industry through which they can avail 24*7 services anytime, and anywhere. The factors for successful Educational ERP system are Unambiguous objectives, Committed and effective team, Planning, Management Controls, Repeated reappraisal and Communication.

For successful implementation of Educational ERP system, there is need to focus on various central dimension which are user friendliness, performance, satisfaction, communication, inter-department interaction, Third party software plug-ins, navigation-Help file, data security and Technology etc. The impact on implementation of Educational ERP is to improve access to accurate and timely information, Enhances workflow, increases efficiency, and reduces reliance on paper, tightens controls and automates e-mail alerts, Provides user-friendly Web-based interfaces, streamlines processes and eases adoption of best business practices and establishes a foundation for new systems and integrates existing systems.

The researcher has combined all the functionalities and operations of the successful implementation of Educational ERP system services and has developed a new framework to serve the need of today's environment. For designing framework, researcher has referred several significant initiatives have been taken by AICTE, DTE and government to promote ICT in educational sector which helps to increase in rate of growth of GDP. The current developed Frameworks from ION, Academy one Inc., Global Educational Network and connect2gurukul Educational ERP system which don't have promotion and transferring of previous records to the new system for further compliance of the students, staff, parents and industry information like Unique SSN (Social Security Number) in USA for unique identity, India has also implemented UID / Aadhar Card for unique Identity of each citizens using this UID. Researcher has developed Educational ERP framework by using UID through plug-in for UID information of students and employees. The current framework followed by the Educational ERP system is not adequate to the unique identity of the students and employees. To my knowledge, such a layered framework catering to the needs of the implementation of Educational ERP system has not been devised so far.

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REVIEW OF LITERATURE – FRAMEWORK DESIGN

C. Moller published article on ERP II: a conceptual framework for next-generation enterprise systems[2] **-** This article gives the emerging business requirements and conceptual framework for ERP II. The model compiled sets the concept into a comprehensive outline of ERP II and thus composes a generic map and taxonomy for contemporary corporate enterprise systems. The model is offered as a first step towards a tool to analyze the completeness of the ERP II vision in an enterprise to analyze the system from an ERP vendor. There is need of an instrument to measure the usage of the ERP II vision and to enhance the conceptual framework to be able to measure which processes are used and how they are executed. This also argues about inter-organizational integration, which is crucial to reaping the benefits of ERP II. ERP II is a new vision that has only recently been embraced by ERP vendors, and it will take a while before we are able to actually evaluate the impact of ERP II on Educational Institutes. It has also categorized ERP II as a non-disruptive technology based on the ERP theory and the retrospective analysis. The researcher will mostly work on generic ERP concepts are needed and have not yet managed to fully comprehend the complexity of internal process change. The tremendous challenges faced by the stakeholders and its inter-organizational business process integration, will emerge – the next challenge for researcher.

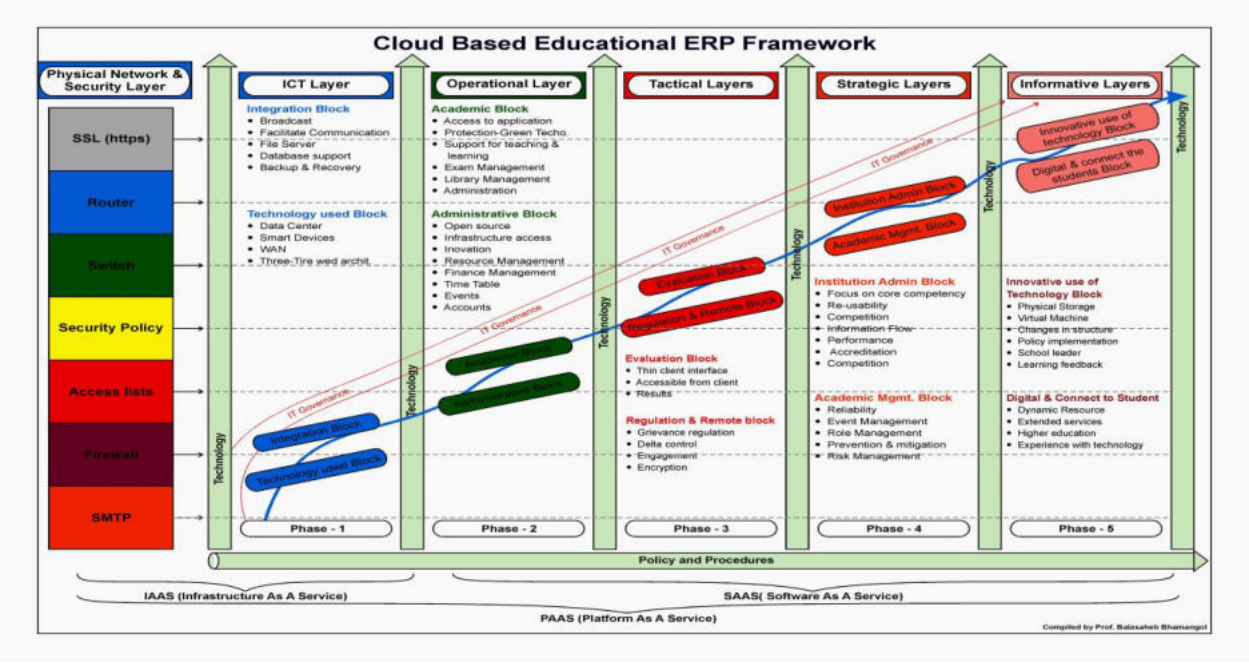
PARAMETERS FOR DESIGNING CLOUD BASED ERP

Parameters used for designing Framework of Educational ERP system: Parameters used for designing and for assessment of new innovative cloud based framework are Infrastructure facility, Parameters of required infrastructure facility, Security, Business process re-engineering, Request for business process re-engineering, Access control Plug-in and Types of Access control Plug-in used. Further for each institution are required to consider following sub-parameters as: a) Hardware, b) Software, c) Database, d) Backup Utilities, and e) Internet Bandwidth.

LAYERED CLOUD BASED ERP FRAMEWORK-DIMENSIONS AND DESIGN

In the course of the study, it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A conscious attempt was therefore made to construct such a framework. The researcher therefore presents a **"Cloud based Educational ERP Framework for Educational Institutes"** by considering all the positive aspects of Information communication Technology. It is therefore presented in the following Figure 1.

Figure-1: Cloud Based Educational ERP Framework



Sources: Authors Compilation

Any framework consists of various layers, components and a few other factors. Considering all these components, **Figure No. 1** gives the detailed mode of operation and functions of the Conceptual cloud based Layered Framework for the Implementation of Educational ERP system. This framework is created and presented based on earlier studies, the researcher's experience and the conclusions arrived. The researcher has presented this conceptual framework knowing that it cannot immediately replace the current framework. It requires some extra time as well as basic preparation before implementation. This framework is so designed

based mainly on the unique identity of students from KG to PG and employment through UID / Aadhar card. This framework is the best combination of the unique identity of students, staff, parents, alumni and employment in industry with high security of confidential data. As we studied in Educational ERP systems status according to students, staff, parents, alumni and industry point of view, this framework is the best combination of all the studied frameworks implemented by various vendors across globe. The detail design of the cloud-based framework is based on the input from as third party service provider to the educational institutes for further process and security of data. There are Internal as well as External inputs to the system. Internal inputs from Administration, Staff, Students, Placement and for External input Vendors, Parents, Industry, Alumni, authorized body like University, AICTE, DTE and Third party service provider. The user can avail Educational services through various delivery channels like mobiles, kiosks, web ports, personal computers, digital TVs as well as through video conferencing. The UID code will be first taken from UID system of each individual student and then the progress of education will be maintained by institutes and pass this information to other educational institutes where ever he/she moves for taking admission / further study. The report can be given by institutes in the format specified by the Authority of educational Institutes, which will be implemented in Educational ERP system. During the interaction, proper authentication and access management will take place for security purposes and after completion of the transaction; the details will be stored in the particular database.

LAYER CLASSIFICATION AND ITS USAGE IN CLOUD BASED ERP

The Educational ERP system platform will consist of mainly six layers namely Physical Network and security layer, ICT layer, Operational layer, Tactical layer, Strategic layer and Informative layer. The importance of each layer specified is as follow:

Physical, Network and Security Layer consist of physical communication between end stations. Physical layer controls are Locked perimeters and enclosures, Electronic lock mechanisms for logging & detailed authorization, Video & Audio Surveillance, PIN & password secured locks, Biometric authentication systems, Data Storage Cryptography and Electromagnetic Shielding. The Network layer is concerned with the global topology of the internet work - it is used to determine path and which packet would need to take to reach a final destination over multiple possible data links and paths over numerous intermediate hosts.

ICT Layer with Integration and Technology block consists of application server like file server, database, tools, backup and recovery and UID like Web, SMS, Smart card, Web Services, Universal Description Discovery and Integration, Web Services Description Language and Simple Object Access Protocol.

Operational Layer consists of academic modules like students, human resource, finance, research, placement, and timetable, library so on and administrative like configuration, assigning roles, authorizing events, news and content so on.

Tactical Layer it focuses on evaluation and regulation remote block, which consist of Remote students and outcomes of the system. Remote students mainly focus on grievance whereas outcome is related to result, engagement, and encryption of data. The tactical level factors help to Increase efficiency, Reduce operating cost, Respond more rapidly and flexible to a changing environment, Need to extract business intelligence from data over time, Retention and visibility and Students Relation Management (SRM).

Strategic Layer consists of Accreditation and Institute profit like completion, information flow, performance, event management, role management, prevention and mitigation and risk management.

Informative Layer which focus on Innovation use of technology and digital and connect with stakeholders technology consists of Promote equity and experience with technology for stakeholders, changes in structure, policy implementation, learning feedback and leadership whereas educations focus on appearance with technology:

- **Information Services:** This category of capabilities addresses the support of information services. Information services provide a uniform way of representing, accessing, maintaining, managing, analyzing, and integrating data and content across heterogeneous information sources. This approach is known as the Information as a Service (IaaS) approach.
- **Information Integration**: This category of capabilities addresses the support of information integration and enables capabilities for information services.
- **Basic Information Management**: This category of capabilities addresses basic information management concerns such as metadata and unstructured data management.
- **Information Security and Protection**: This category of capabilities addresses the support of information security and protection concerns.
- **Business Analytics**: This category of capabilities addresses the support of business analytics and business activity monitoring. It enables organizations to leverage information to better understand and optimize business performance.
- **Information Definition and Modeling**: This category of capabilities defines fundamental constructs of SOA information and events.
- **Information Repository:** This category of capabilities addresses support of the information repository in order to persist data such as metadata, master data, analytical data, operational data, and unstructured data.

Furthermore this Layered Framework is post implemented with Cloud computing. It is cost effective and saves implementation and maintenance costs.

This framework is prepared based on my knowledge and actual experience in the light of the present research study. The researcher has also discussed it with a technical and network expert in this area. It can be improvised in the light of actual experience so that it can be widely implemented and applicable at various levels.

Software and Data Dimensions on central using Cloud Computing

Here each software and hardware are on cloud computing and therefore it is fully scalable. Even though there is increase in users or Institutes using cloud computing it is scalable and can increase storage, there is no need to plan for a new server. The allocated space expands automatically and the charges are only for utilized capacity. No maintenance cost and up gradation cost as demand needs change the business process or change in the flow and to connect to the internet while doing transactions.

There are three types of models on which EERP can be implemented on cloud, the deference between those models are as shown in Table-1.

Table-1: Main Differences between Public, Private and Hybrid Models of Cloud

Model / Feature	Public	Private	Hybrid
Owned and Managed	Service provider	University	Service provider and University
Access	By subscription	Limited to students, faculty, staff of the university	By subscription and Limited to University stakeholders
Customization and control	None	Yes	Partially customization and control

Sources: Authors Compilation

Cloud based Activities provided by different vendors to Universities / Institutions

Universities implementing various cloud solutions provided by different vendors along with cloud services and type used by them are as shown in figure-2, which will give Universities / Institutions to know about the activities.

Figure-2: Cloud Solutions for Universities

Cloud service	Cloud model	Activities / Solutions	Business Intelligence	Student Lifecycle	E-learning	Admission	Accounting -financial	Human resources	Aquisition	Case management	Building administration	Digital library
SaaS	Public	Microsoft Live@edu			✓							
SaaS	Public	Microsoft Office Live Workspace			✓					✓		
SaaS PaaS	Private Hybrid	Microsoft Dynamics CRM Online		✓		✓		✓		✓		
SaaS IaaS	Private	CampusEAI Private Cloud		✓	✓	✓						
SaaS IaaS	Private Hybrid	Jaspersoft and RightScale	✓									
SaaS	Public	Google Docs			✓					✓		
SaaS IaaS	Private Community	educationERP .net		✓		✓		✓				✓
SaaS	Private Community	Campus management	✓	✓	✓	✓	✓	✓		✓	✓	
SaaS	Private	Coupa e-Procurement							✓			

Sources: Authors Compilation

Note: In all the options in Multiple Location, instead of Internet, dedicated Point-to-Point lines / Private Network / VSAT links can also be used. Any form of connectivity will work.

REPRESENTATIVE FEATURES AND KEY BENEFITS OF CLOUD BASED FRAMEWORK

The type of benefits arising from ERP systems use can be classified as operational, strategic, managerial, organizational and IT infrastructure benefit at different times during the ERP experience. These EERP system modules should cover all area of education management. The proposed ERP benefits framework is as follows:

- **Operational:** Cost reduction, stakeholders service improvement, cycle time reeducation, productivity improvement and quality improvement.
- **Strategic:** Build business innovations, build cost leadership, build external linkages (Students and Industry), generate customization, and support business alliance and support organizational growth.
- **Managerial:** Better resource management, improved decision making and planning and performance improvement.
- **Organizational:** build common visions, empowerment and facilitate business learning.
- **IT infrastructure:** build business flexibility for current and future changes, increased IT infrastructure capability and IT cost reduction.

EERP system modules should cover all area of education management.

CONCLUSION

Success of the Educational ERP system depends on how we manage to keep intact with **Technology, Vendors, Performance and Stakeholders satisfaction**. The term Educational ERP represents the implementation of various educational services for the benefit of Management, staff, students, alumni, industry through which they can avail 24*7 services anytime, **and anywhere**. The factors for successful Educational ERP system are Unambiguous objectives, Committed and effective team, Planning, Management Controls, Repeated reappraisal and Communication.

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In the course of the study, it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A conscious attempt was therefore made to construct such a framework. The researcher therefore presents a **"Cloud based Educational ERP Framework for Educational Institutes"** by considering all the positive aspects of Information communication Technology. Model suggested by researcher will be more cost effective and hence more Institutes can implement it.

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CHANGING PACE OF TECHNOLOGY @ WORK PLACE AND WORKFORCE FOR THE FUTURE

Dr. Muthu Natarajan[4] K. R. Kishore Kumar[5]

ABSTRACT

In the new global economy, knowledge is treated as greatest asset. Rapidly evolving information technology poses great challenges and opportunities for the organization in general and employees in particular. Yet many of the key issues do not yet seem too recognized or understood by either the leaders or stakeholders. Electronic commerce is the buying and selling of goods and services using the Internet and is predicted to grow at an ever-increasing rate.

Digital cash allows someone to pay online by transmitting a number from one computer to another. New jobs and new job categories are being developed because of the Internet and electronic commerce. Changing modes of production change the way work can be done, the nature of occupations and organisations with implications for learning. Digital economy can give rise to expansive and restrictive workplace learning environments.

The models for managing IT strategy, the IT function, and IT projects are changing in the twenty-first century. The past is inadequate for fitting the environmental turbulence. To survive, they have had to reduce costs, increase productivity, and improve quality. If IT to play a strategic role, CIOs must first reinvigorate the organization with a new structure that enables tighter business alignment and then implement new processes and technologies that generate better business value.

This paper presents few key challenges of changing work environment, factors affecting the new age of information technology and workforce of the future, and suggests ways and means of managing the globalized economy.

KEYWORDS

Technology, Workplace Interventions etc.

INTRODUCTION

"The significant problems we face cannot be solved at the same level of thinking we were at when we created them"-

Albert Einstein

We live in an era where change is imposed by regulatory or market forces are rapid, radical and far-reaching. Businesses today encounter near-constant upheaval, which they can endure and even benefit from when supported by a rejuvenated IT organization. In fact, in today's change-driven environment, it has become imperative for IT to transform from its traditional function as a technology provider and become an adaptive, responsive and nimble organization. The boom in high technology, particularly information technology, and in communications has had the overall effect of reducing the importance of distances. Business operations can now be located with greater freedom.

TECHNOLOGY IS EVERYWHERE: THE REALITY OF 21ST CENTURY

Twenty first century home becomes the center for work, entertainment, learning and health care. Technological advances that affect our personal lives a) Clothes that fight odor and bacteria, b) Flying car, and c) Sky Car; is able to operate in a less restrictive area than a helicopter and is less expensive and safer. Voice recognition will allow us to talk to computers or computer-like devices and they will respond. Nonlethal weapons – HSV Technologies, ultraviolet laser beams to harmlessly immobilize people and animals at a distance. Space travel-Companies developing a fleet of space commercial vehicles to provide public space travel. Smart shoes and seats – a technology called expansive polymer gel uses a micro voltage to expand or contract the gel to evenly distribute heat and weight.

Smart Houses

- Helps plan and prepare healthy meals,
- Keeps a house comfortable,
- Monitors devices and schedules maintenance,
- Monitors electricity being used.

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Online Shopping
No longer having to fight crowds and search for parking spaces

Figure-1: The Age of knowledge

Sources: Authors Compilation

THE DIGITAL AGE ERA AND WORK ENVIRONMENT

"The traditional link between jobs and incomes is being broken… The economy of abundance can sustain all citizens in comfort and economic security whether or not they engage in what is commonly reckoned as work."

Jacob Heilbroner, Linus Pauling, Gunnar Myrdal

- The changing ways we handle digital data, information, and knowledge.
- The exponential pace of the evolution of digital technology.
- The growing important of intellectual capital relative to physical or financial capital in the "new economy".
- The pervasive character of information (universal access to information, education, and research).
- The relaxation of the conventional constraints of space, time, and monopoly.
- The ubiquitous / pervasive character of the Internet.

FRUITS OF TECHNOLOGICAL ADVANCEMENT

"There is a central difference between the old and new economies: the old industrial economy was driven by economies of scale; the new information economy is driven by the economics of networks..."

Carl Shapiro and Hal R. Varian, Information Rules, 1998

- The exponential growth of new knowledge.
- The globalization of commerce and culture.
- The lifelong educational needs of citizens in a knowledge-driven, global economy.

The increasing diversity of our population and the growing needs of underserved communities. The impact of new technologies that evolve at exponential rates (e.g., info, bio, and nanotechnology). The compressed timescales and nonlinear nature of the transfer of knowledge from campus laboratories into the commercial marketplace. ICT has frequently been thought to be the driving force behind today's economy. It is generally felt that there is a direct relationship between investment in ICT and productivity improvements, which include:

- Better customer service,
- Greater product variety,
- Shorter response time, and
- Enhanced product quality and better customization of products and services.

Economics of Technology

- Technological and raises productivity and hence national income.
- Technological change is *not* necessarily (or even usually) *Pareto* improving: It creates winners
- *and* losers
- Workers can be directly displaced by machinery, their scarce skills devalued.
- The *market--clearing* wage is not necessarily wage.

Information and Communication Technology (ICT) is used to refer to infrastructure and product development that facilitate the collecting, storing and analysis of information that may be transmitted electronically. It includes equipment like telephones, communication lines used to enhance communication between employers and employees, businesses and customers, and business and business across physical boundaries.

TECHNOLOGY AND SOCIAL TRANSFORMATION

Technology will continue to be a major driver of organization change and transformation. The rise of new consumer: Highly educated, high level of income and familiar of information and communication technology. The new-knowledge-based economy will be driven by rapid innovation in technology, process.

The 20th century was the century of great Manufacturing Corporation; the 21st century will be the time of knowledge businesses. E-mail, text messaging, blogging, instant messaging, and cell phone. Dependent upon personal technology 24x7.Highly computer literate / technical savvy. Most likely already has a history of abusing technology in the workplace. Will introduce and utilize their personal technology in the office unless instructed or prohibited otherwise.

Table-1: Moving Towards 21st Century Technologies

The 20th Century	The 21st Century
Transportation	Communications
Cars, planes, trains	Computers, networks
Energy, materials	Knowledge, bits
Nation-states	Nationalism
Public Policy	Markets

- **Speed:** blinding, touching every aspect of life.
- **Complexity: Q**uantum leap in mix of related forces.
- **Risk**: Upheaval raises threats and risks of "new."
- **Change**: Radical, drastic, quick.
- **Surprise:** Hard to imagine-challenging sensibility and logic.

Sources: James Canton, the Extreme Future (2006)

TECHNOLOGY INTERVENTION @WORK

Employers expect high levels of competence to handle tech driven organisations today. A society characterized by a high level of information in the everyday life of most citizens, in most organizations and workplaces. It is determined by the use technology for a wide range of personal, social, educational and business activities. It is also measured by the ability to transmit, receive and exchange digital data rapidly between places irrespective of distance.

- Effectively know how to use E-mail and sending attachment files,
- Maintaining and troubleshooting complex equipment,
- Selecting and using appropriate technology,
- Using a variety of software packages, especially Microsoft Office,
- Using technology to monitor tasks.

- First era (1954-1963) - Pioneers, penetration, and chaos (the proud age of transistor)
- Second era (1964-1976): Gaining control-centralization and a technical monopoly (after the IC breakthrough against the tyranny of numbers)
- Third era (1977-1984): Letting loose-distribution and decentralization (the dominant age of IBM)
- Fourth era (1985-1996): Distribution-a free market with issues of architecture and management (the frog-leap of Wintel)
- Fifth era (1997 into the 21st century): The worldwide web and anytime/anyplace computing (the Internet era)

Figure-2: Factors Affecting Workplace

Sources: Authors Compilation

Technology: The computer-driven technological revolution has brought the countries of the world ever closer together but it also divided countries. Technologies like faxes, cellular phones, computers and Internet connections registered almost zero growth per thousand people in developing countries in comparison to their counterparts in the developed countries during the same period. A good technological base depends a great deal on relevant inputs. Human capacity development is a complex multifaceted endeavor consisting of many parts including:

- Creating awareness of the potential for ICT to meet one's needs,
- Creating, developing, and strengthening capacity to use information and ICT effectively using local inputs,
- Building capacity to produce and package information so that it adds value to local inputs,
- Ensuring ongoing technical capacity development, and developing a format for knowledge and information sharing,
- Preventing the local capacity from being drained to other, usually, developed countries.

TYPES OF TECHNOLOGY USED IN THE WORKPLACE

- **Client**: Server Network a common business network in which clients make requests for information or resources and servers provide the services.
- **Computer Network**: A group of two or more computers linked together by some form of cabling or by wireless technology to share data or resources, such as a printer.
- **Electronic Conferencing**: IT that allows groups of people to communicate simultaneously, from various locations via email, phone, or video.
- **Extranet:** A system that allows outsiders limited access to a firm's internal information network.
- **Intranets**: An organization's private network of internally linked Web sites accessible only to employees.
- **Local Area Network (LAN)**: Computers that are linked in a small area, such as all of a firm's computers within a single building.
- **VSAT Satellite Communications**: A network of geographically dispersed transmitter-receivers (transceivers) that send signals to and receive signals from a satellite, exchanging voice, video, and data transmissions.
- **Wide Area Network (WAN): C**omputers that are linked over long distance through telephone lines, microwave signals, or satellite communications.
- **WI-FI**: Short for wireless fidelity; a wireless access points for PC users.
- **Wireless Wide Area Network (WWAN)**: A network that uses airborne electronic signals instead of wires to link computers and electronic devices over long distances.

MAJOR CHALLENGES: WHAT MAKES A CHANGE?

Casual zed work force; lifetime employment is gone; high unemployment; eroded job security; redundant traditional skills; downsizing; predictable work, pay, career, trust and loyalty have gone. Companies are demanding more; job flexibility, multi-skilling, employability, TQM, new technology. Increased stress, work-family conflicts, dropping living standards, but people are working longer hours, increasing work effort, intensifying pace of work. Instead of stability and certainty, now workplace offers change, uncertainty and anxiety.

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- The virtual organization,
- The just-in-time workforce,
- The ascendancy of knowledge workers,
- Computerized coaching and electronic monitoring,
- The growth of worker diversity,
- The aging workforce,
- The birth of the dynamic workforce,
- New computer and telecommunications technology,
- Structure of organizations,
- Outsourcing and just-in-time inventories.

Technology is the making, usage, and knowledge of tools, machines, techniques, crafts, systems or methods of organization in order to solve a problem or perform a specific function.

Technological Knowledge and Skills Needed

- Information Technology,
- Internet Use and Security,
- Job-Specific Technologies,
- Telecommunications,

Needed Skills

- Diversity Awareness,
- Integrity,
- Positive Work Ethic,
- Self-Representation,
- Teamwork,
- Conflict Resolution,
- Creativity and Resourcefulness.

TECHNOLOGICAL CHANGE AND HUMAN RESOURCE CHALLENGES

"We live in the era of smart phones and stupid people". Unknown

An increase in the pace of technological change can have two profound side effects in the labor market.

- It can increase the rate and the average duration of unemployment. Because firms may not consider it cost-effective to retrain some types of workers, notably the less-educated and older employees, these workers may be jobless for long periods, with some of them perhaps never working again.
- If technological change causes workers to become unemployed more often and for longer periods, not only will the level of unemployment increase, but the "natural rate of unemployment," the hypothesized minimum sustainable rate of unemployment, will increase as well.
- Technology both eliminates jobs and creates jobs.
- Generally, it destroys lower wage, lower productivity jobs, while it creates jobs that are more productive, high-skill and better paid.
- Virtually all types of technological change result in increases in the demand for labor in some labor markets and decreases in the demand for labor in other labor markets
- The introduction of assembly line production methods and the production of interchangeable parts resulted in increase in the demand for unskilled workers and decrease for skilled artisans. However, introduction of automated manufacturing processes has resulted in a decrease in the demand for unskilled workers and an increase in the demand for quality control technicians and computer programmers.

TODAY'S CHALLENGES IN THE WORKPLACE

INDIVIDUAL LEVEL	GROUP LEVEL	ORGANIZATIONAL LEVEL
• Individual Differences, • Job Satisfaction, • Motivation, • Empowerment, • Behaving Ethically.	• Working With Others, • Workforce Diversity.	• Productivity, • Developing Effective Employees, • Putting People First, • Global Competition, • Managing and Working in Multicultural World.

IMPACT OF TECHNOLOGY

One of the symbolic manifestations of globalization is the presence of multi-national brands across the globe. Companies like Coca-Cola, McDonalds, and Nike etc. are present in a number of countries and to conduct their business smoothly and effectively, they rely on communication technology largely. The latest innovations in web-conferencing have made it possible for businessmen to interact with each other in a better way. The developments that we have seen in the business sector would have never been possible without the presence of an effective communication system.

- Globalization can interconnect the world, support economic development, provide information availability and assist in developing a global village (Moahi 2007).
- Globalization is the cultural condition, or simply "culture", that appears with intense and continued exchanges among people of different cultures and ethnicities when the original cultures and ethnicities themselves are no more detectable.
- The advancement of technology dissolves international boundaries and opens cultures to a whole new arena enabling globalization to occur (Smith & Ward 2000).
- The term "globalization" has been associated with modern times through the strict linkage between modern technological discoveries; the Internet and the deriving "global village" (McLuhan 1962) is perhaps the most famous association.
- The world is becoming smaller every day because advanced technology is turning the world into a small village (Da Silva Rodrigues 2009).

THE IMPACT OF OUR TECHNOLOGY

- Globalization, 24/7 economy,
- Have blurred the traditional line between work and family. Technology once allowed work flexibility but now takes over our personal lives.
- Addiction, Stress, Fatigue and Burn Out.
- Strained Relationships at Home & at Work.
- Absence of Rest & Relaxation, Loss of Productivity at Work and Illness.
- Replacing human operators in tasks that involve hard physical work.
- Replacing humans in task done in dangerous environments (fire, space, volcanoes, nuclear facilities, underwater, etc.)
- Performing tasks that are beyond human capabilities of size, weight, speed, endurance, etc.
- Reduces operation time and work handling time.
- Frees up workers to take on other roles.
- Provides higher-level jobs in the development, deployment, maintenance and running of the automated processes.

STRATEGIC ROLES OF IT FALL INTO ONE OF THREE CATEGORIES

- "Working inward" (improving a firm's internal processes and structure),
- "Working outward" (improving the firm's products and relationships with customers), and
- "Working across" (improving its processes and relationships with its business partners).

TECH TOOLS USED FOR BUSINESS TRANSACTIONS: PRESENT DAY WORLD

- Aging workforces,
- Drive for "green" job creation,
- Global talent scarcity,
- Increasing with migration,
- Large scale world force consolidations,
- Need to adopt diverse and flexible work arrangements,
- Skills gap,
- Social networking,
- Technology reinventing work.

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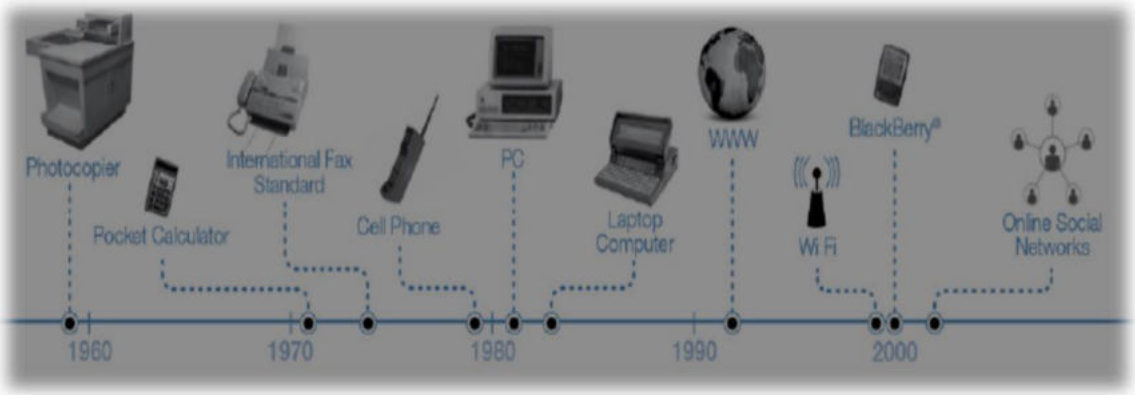


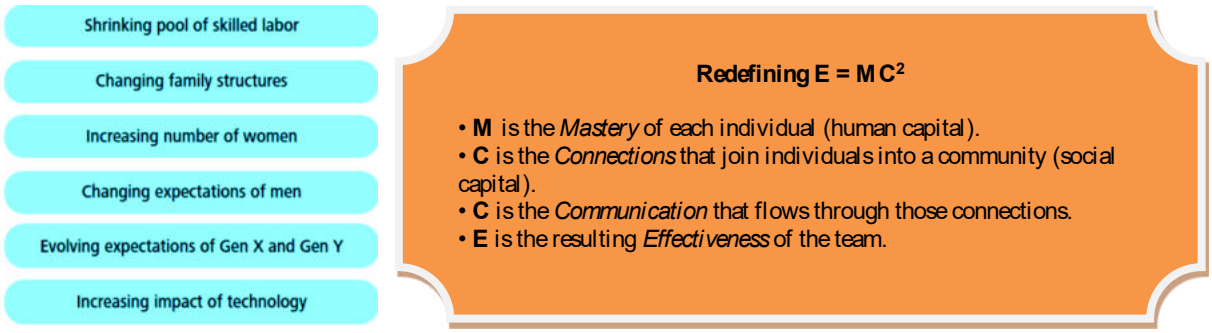
Sources: Adopted from Manpower Group

CHALLENGES FOR UPCOMING TRUSTWORTHY INFORMATION SOCIETY

"The future is already here. It is just not very evenly distributed yet.

William Gibson

- The spaces where we work affect us throughout our lives,
- We have control over the degree to which workplaces and job processes promote safe and productive work,
- We can promote healthy aging by designing age friendly workplaces,
  - Technology (Cyber-threats, cyber-crime),
  - The Future of the Internet,
  - Complex ICT Systems and Services,
  - underpinning Critical Infrastructures,
  - Users and Society (Trust, accountability, transparency, Identity, privacy and empowerment, Creativity, Usability and Human values and acceptance).
  -



It is worth to mention to jumbled campaign effort by Bill Clinton -"it's the economy, stupid." Adaptive 21C businesses see the benefits in managing connected organizations. We can adapt the old campaign slogan to reflect the new business reality – "it's the connections, stupid!"

EMPLOYEE SKILLS ON DEMAND

"Greatness is not a function of circumstance. Greatness, it turns out, is largely a matter of conscious choice, and discipline"

Jim Collins

In a rapidly changing global environment, one of the critical factors for business success, and even survival, is competitiveness. With globalization, markets have become highly competitive and this requires the ability to respond effectively to new trends and to provide an efficient, personalized service to customers and clients.

Figure-3: Thriving in the Changing World of Work

Well-designed workplace should be support by:

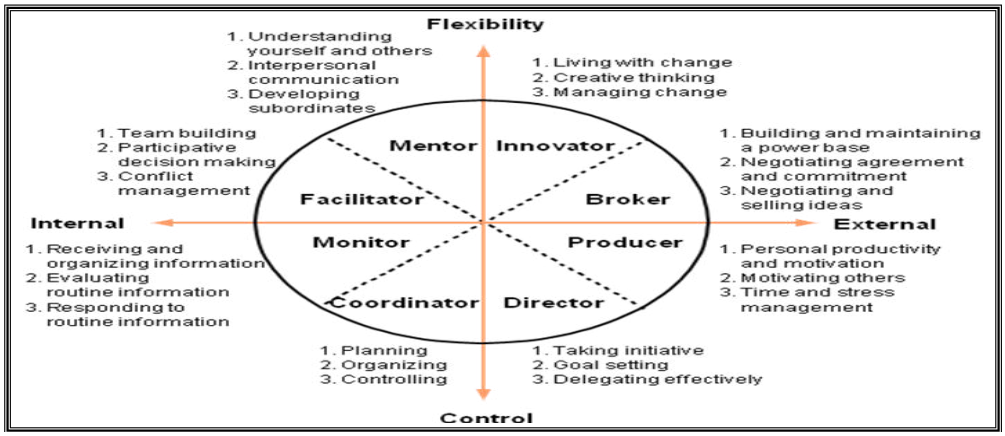
- A professionally-maintained plant program,
- Access to daylight,
- Accommodation of changing technology,
- Accommodation of personal work styles and workstation personalization,
- Adjacencies that support work flow,
- Clear way finding,
- Collaboration and impromptu interaction,
- Control of glare,
- Ergonomic accommodation,
- Individual control of thermal comfort,
- Individuals to perform distraction-free work,
- Undistracted teamwork and meetings,
- Workspaces allocated by function

Sources: Adopted from Kahelar Slater, "What Makes a Great Workplace?" Learning From the Best Place to Work Companies.

In the 21st century there are new demands for a future:

- Increased consumerism,
- More need to balance family demands & work,
- There are flatter, matrix-based structures,
- There are new work methods,
- There is ever-increasing change.

Figure-4: Skills for Mastery in the New Workplace



Sources: R.E. Quinn, "Beyond Rational Management", San Francisco: Jossey-Bass Inc., 1988

In the 21st century, many people will work from their homes. Some technological advances are clothes that fight odors, flying cars, voice recognition, nonlethal weapons, space travel, smart shoes, and smart seats, smart houses, and electronic shopping:

- Fiscal environment has changed significantly,
- Homeland security takes center stage,
- Defense budget increases dramatically,
- Domestic needs remain to be resolved,
- Effective management is essential,
- Financial managers need to change with the times.

POTENTIAL LONG-TERM IMPACTS ON THE WORKFORCE FOR THE FUTURE

Timeframe	Anticipated Changes	Workforce Impacts

2010-2020	• Focus on performance,
	• Talent and experience shortfalls,
	• Baby boomers delay retirement,
	• Rise of Asia,
	• 24/7 information,
	• Short-term focus on career advancement,
	• Shortened retirements,
	• Global technical expertise marketplace,
	• HR as decision science,
	• New labor market mix,
	• Self-managed teams,
	• Lifelong learning,
		• Rigorous accountability systems,
		• Labor shortages,
		• Leadership shortages,
		• 3 generations in workforce,
		• Global competition for local talent,
		• Work-life balance and flexible benefits issues,
		• eBay labor markets,
		• Pension planning changes,
		• New generation of older workers,
		• New 21st Century skill requirements,
		• Flexible work arrangements,
		• New class of managers,
		  • Data on everyone,
		  • Diverse workforce,
		  • Accountability systems,
		  • Competency-based systems,

2021-2040	• People are the last frontier for organizational performance and differentiation, • Global competitions and dominance change functional specialties, • HR executives increasingly in CEO roles, • Anytime, anywhere collaboration, • HR becomes transparent,	• People are valued as key organizational assets, • Virtual organizations, • HR experience critical to CEO advancement, • Reconfigurable legal entities change government practices to match business peers, • Management does the visible HR work,
2041-2060	• Human Resources becomes the bedrock of national economies, • Labor Unions as partners.	• Public service draws the best CEO leaders from the best industries using best human resource practices, • Labor Unions as champi. •

Sources: Adopted From Workforce for the Future

CLOSING REMARKS

"Change is hard; it's hardest on those caught by surprise."

Tom Friedman, the World is flat

In a knowledge intensive society, the need for advanced education and knowledge will become ever more pressing, both for individuals and societies more broadly. Yet it is also likely that the university as we know it today–rather the current constellation of diverse institutions comprising the higher education enterprise–will change in profound ways to serve a changing world. Just as it has done, so many times in the past. The extraordinary evolutionary pace of information technology is likely to continue for the next several decades. The impact of information technology on the university will likely be profound, rapid, and discontinuous–affecting all of its activities (teaching, research, service), organization (academic structure, faculty culture, financing and management), and the broader higher education enterprise. Rather it will be more akin to the discovery of fire by early ancestors, since it will prepare the way for a revolutionary leap into a new age that will profoundly transform human culture. We see the future as one of great challenge for employers' organizations, both in terms of their relevance as well as usefulness to enterprise. At the same time, it offers them the opportunity to redefine their role and strengthen their capacity to meet the needs of their members more effectively, thereby, making a positive contribution to the economic and social progress of society. **Technology now threatens… "a whole new group of skills…as machines continue to invade society, duplicating greater and greater numbers of social tasks, it is human labor itself-at least, as we now think of 'labor'-that is gradually rendered redundant".**

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IMPACT OF RECENT TRENDS OF TECHNOLOGY AND BANKING PERFORMANCE

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ABSTRACT

Computers and communication technology has not only increased the competition among the financial institutions in general and the banks in particular, but have also opened new vistas for them to innovate themselves and come up with newer products and services. Globally, the trend is towards using computer technology for designing customer need-based products and services. With the new RBI, guidelines for small banks are also being benefited with telecom companies and can compete with established banks, by integrating IT in their operations. NPA will also be maintaining at certain level with the help of technology and speed up the recovery process.

IT has a direct impact on the vital aspects of banks. All the major components of a bank, viz., its organizational structure, the customers, the personnel and the data evolve under the impact of the technology and react to the changes it brings about. IT has stiffened the competition and the banks have come out with newer products and service delivery systems.

KEYWORDS

Information Technology, Innovation, Banking Services, Non-performing Assets etc.

INTRODUCTION

The wind of liberalization sweeping through India has affected all sectors of the economy and the center of all these activities is the Indian Banking Industry. In such a fast-changing environment, to meet emerging needs, the operations in banks need immediate automation to provide services comparable to best international standards and to match technological changes taken place in other countries.

Technology has given new dimensions to the banks' service delivery mechanism, and the banks are enthusiastically absorbing the latest technological innovations for devising new products and services. Indian banks have taken to adoption of core banking system is now old story. Brick and mortar banking has been given a quiet burial and emerged the new, sophisticated but snazzy, technology platform changing the face of banking drastically. With technology bank branches becomes only one of the many channels that are now available to customers for performing routine banking transactions. Transition from single channel banking to multi-channel banking has brought about tremendous customer convenience. Having achieved tremendous growth in implementing technology driven transaction-banking systems, banks in India have upgraded their capability to handle business volume.

Telecom companies have welcomed the guidelines for small banks put out by the RBI. The potential players indicating the number and value of transactions would need to be very high for the business to make money. However, the quality improvement of business, the key criteria for sustainable growth, is yet to emerge. Besides transactional convenience, Small banks may hardly in a position to leverage on their humongous technology capability in identifying potential business, mitigating operational and business risks and improving the standards of government.

Increasing customer expectations and regulatory pressure that has marked the post sub-prime financial world are, in fact posting too many questions to the business leaders to answer. This trend has made the business leaders, technology providers sit up look deep into the future, and come with solutions that are definitely going to change the way banking services are delivered today. Significant shifts in the business environment, economic volatility, and changing customer expectations make it increasingly challenging banks to prioritize technology investments. Following trends are likely to occupy the mind space of business leaders and technology solution providers in the days to come. Many of the trends are already reasonably visible.

OBJECTIVES OF STUDY

- To understand the trends in information technology.
- To explain the new delivery systems of bank services and products.
- To understand the concepts of electronic data interchange and its effect on NPA.

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METHODOLOGY OF RESEARCH

Only secondary data has been used to prepared research paper. It is descriptive study.

The concept of Bank computerization practically started after 1980-81 and more precisely gained pace in the year 1983-84, after setting up a committee in the year 1983 under the chairmanship of the then Deputy Governor of RBI, Dr. C. Rangarajan. This committee was set up to study the possibilities and stages involved in bank computerization and to prepare guidelines for the same. The report submitted by the committee in the year 1984 was known as First Rangarajan Committee Report on Bank Mechanization.

INTEGRATION AND EMERGENCE OF REAL-TIME ORGANIZATIONS

Most of the banking solutions are now operating in silos Even if one takes the Core Banking, the solution is not fully integrated with all other business lines, say, treasury operations, card business, investment advisory business etc. integration, in its ideal sense would mean both system level and logical integration. For example, if example, if we talk of 360-degree view of customer, a necessary condition for determining risk profile of the customer, it would imply a customer profile across products, relationships and units. Merely system level loose coupling will not meet the requirements unless all the systems can become intelligently interactive.

Electronic Data Interchange (EDI): Electronic data interchange is the inter-organizational exchange of business documentation, which can be processed by computers; it takes the form of interchange of standard formatted data between the computer application systems of the trading partners with a minimal manual intervention. Banks have been using EDI in the form of SWIFT (Society for Worldwide Inter-bank Financial Telecommunications) message. In India, Videsh Sanchar Nigam Ltd. (VSNL) provides Gateway for Electronic Data Interchange Services (GEDIS) worldwide. EDI is usually referred to as electronic funds transfer (ETF). Credit clearing and debit clearing are different forms of EDI, for making transfer of funds electronically. The credit card network is another EFT system using EDI standards. Electronic data interchange for administration of commerce and transport (EDIFACT) is the universal set of standards and guidelines for communication by EDI.

DATA AND DECISIONS

Traditionally, banks have spent heavily on large databases and even larger data warehouses, producing reams of output of often dubious or questionable value. Data and decision tools will greatly enhance decision making, both within the bank and among its customers and prospects. Employees will be able to make instant decisions and customers will have the right information about products, services and billing, when they need it, delivered in the way they want it. To support these functionalities, more and more emphasis will be on a variety of sophisticated data visualization tools, which has recently entered the market, integrated into popular business intelligence software. During the next three to five years, banks will have significantly better data and greater intelligence about customers. It will be available at the "fingertips" of all customer-facing functions, enabling more efficient and effective sales and service.

Mobility: Mobility is the new 'e'. The speed of innovation, worldwide penetration and rate of growth, support predictions that mobile devices will augment and in many cases supplant personal computers as the new e-business channel for employees and customers going forward. Innovation in mobile devices continues at breakneck speed. They are becoming full-fledged 'platforms" in their own right, capable of running a wide range of third-party applications. Mobile devices are beginning to eclipse personal computers as the electronic channel for business and customers. Nearly 70 percent of the world's population is mobile customers. Interestingly, 75 percent of the world's population is mobile customers. Interestingly, 75 percent of all subscribers are located in emerging markets, where the mobile phone is often their sole means of electronic communication. Mobility provides banks with access to new and better use of channels such as independent financial advisors employed by banks to prospect for new clients. For employees, mobility means using location-aware mobile devices and applications, as well as being able to access remote data from afar, to make key decisions quickly. With telecom technology proliferating in India at a break-neck speed, and large part of population outside the banking coverage, mobile banking innovation appears to hold a promise that is far more inclusive than any single initiative for taking banking all. Can there be a proper regulatory policy environment to upgrade the mobile operators' capability to service the basic banking needs of the vast unbanked majority.

GLOBAL TRENDS IN BANKING SYSTEMS

Globally, the banks are recognizing the need to embrace technology in the area of products and services to compete successfully in the years ahead. In fact, the commercial banks, the world, over, are among the largest consumers of information technology. The banks perceive the future of the financial services industry as becoming heavily dependent on electronic delivery mechanism and are working towards bringing banking right into their customer's homes.

Not only at the global level, but also in India, Real Time Gross Settlement (RTGS) system has been thrown open to customers. In fact, the general belief is that the absence of these services could affect the banks' ability to retain critical segments of their

customers. In fact, the general belief is that the absence of these services could affect the banks' ability to retain critical segments of their customers. However, as a strategy, most of the banks are targeting home banking facility at the top ten to twenty per cent of banks' customers that deliver eighty to ninety per cent of the banks' profits, and are investing heavily to develop and market high-tech services.

Banking sectors in most advanced economies except the USA are marked by a high degree of concentration in the Table-1. It is interesting to note that the Chinese banking sector, known to be predominantly public in nature.

Table-1: Degree of Concentration in the Banking Sector

Country	Concentration Measure	Country	Concentration Measure
Germany	78.1	China	51.5
South Africa	77.8	Japan	44.6
Australia	69.0	Argentina	35.6
France	62..6	USA	35.4
Brazil	62.6	Russia	31.7
UK	57.8	India	29.4

Note: Concentration measure refers to the share of top three banks in total banking assets. Countries are ranked in a descending order according to the measure. Data relate to 2011.
Sources: Financial Structure Database, World Bank and RBI Annual Report.

Convergence of collaboration, communication, community and content

The nature of human interaction is changing, both between a bank and its customers and between employees. Face-to-face discussions are increasingly being replaced by a wide range of technologies; social networks, wikis, blogs, tele-presence, etc. emerging into the workforce now are a group of young people who grew up in the milieu of e-mail, multi-player games and the other trappings of the digital world. Their approach to IT is profoundly different, affecting their behaviour as customers and their behaviour as they join the workforce. As the workforce is becoming more globally distributed and remote working increases, collaboration becomes more of a necessity, forming an integral part of many organizations and banks' workforce strategy. With innovation at a premium, more and fresher thinking will come from outside banks. For example, rapid expansion in the use of collaboration tools (such as tele-presence, video conference, co-browsing, etc.), are beginning to facilitate many new ways of interacting with customers. State Bank of India has recently started digital banking outlet, SBI INTOUCH, in Mumbai. It offers multiple services, like instant account opening, issuance of debit card, live interaction with experts and option to buy financial products. Syndicate Bank, public sector units, has introduced the Lending Automation Processing System (LAPS) to process (MSME) Micro, Small and Medium Enterprise proposals mandatorily. Online tracking of applications for MSME proposals is made available to the MSME beneficiaries who have applied online through the Bank's website or submitted the proposals across the counter.

Internet Computing and Cloud Computing

Internet computing is what we use, as a label, to pull together a flood of seemingly unrelated technologies as under:

1) Virtualization enables the decoupling of hardware and software to enable economies of scale and ease of management and systems.

2) Multi-tenancy architectures and software-as-a-service allow banks to outsource the development and support for noncore applications. The emergence of cloud platforms as well as integrated online "markets" for hosted software are dramatically lowering the barriers for software developers to develop and sell software and significantly altering the economics of ongoing business applications and support. These technologies, when combined, can dramatically change the end users experience, but probably more importantly, can fundamentally change how IT is organized and delivered within banks.

Even though India is considered the back office of the world in terms of providing back-end tech services, Indian banks are far too shy of outsourcing tech services. Nor is there a significant initiative to create a shared infrastructure. For example, all the banks are creating their own ATM network whereas a common ATM network would have used by all bank customers on shared basis. Recently, on regulatory direction, ATMs have become bank agnostic. In the same way, there are ample scopes of building up of large data centers where smaller banks can use the facilities on rental basis to integrate their business in cost-effective manner. There are also far too many services in banks that can be outsourced like transaction reconciliation, settlements, customer data integration, ATM operations, Kiosk Management etc. with a little more relaxation of the regulatory stance, specialized services can be outsourced thereby leaving the banks to focus on customer acquisition and services. From the following table-2, one can

easily understand that with the use of technology in private and foreign banks NPA is also comparative with nationalized bank are positively correlated so that technology is helpful to reduce NPA, which is very important factor in banking Industry.

Table-2: Trends in Non-performing Assets - Bank Group wise

Item	**Public Sector Banks**	Nationalized banks*	SBI Group	**Private Sector Banks**	Old Private Sector Banks	New Private Sector Banks	**Foreign Banks**	**Scheduled Commercial Banks**
1	2	3	4	5	6	7	8	9
Gross NPAs								
Closing balance for 2011-12	**1,178**	696	482	**187**	42	145	**62**	**1,429**
Opening balance for 2012-13	**1,178**	696	482	**187**	42	145	**62**	**1,429**
Addition during 2012-13	**1,198**	772	425	**128**	41	87	**41**	**1,368**
Recovered during 2012-13	**648**	429	219	**63**	30	33	**24**	**736**
Written off during 2012-13	**78**	17	60	**42**	1	40	**0**	**120**
Closing balance for 2012-13	**1,650**	1,022	627	**210**	52	158	**79**	**1,940**
Gross NPAs as per cent of Gross Advances**								
2011-12	**3.3**	**2.8**	**4.6**	**2.1**	**1.8**	**2.2**	**2.6**	**3.1**
2012-13	**4.1**	**3.6**	**5.0**	**2.0**	**1.9**	**2.0**	**2.9**	**3.6**
Net NPAs								
Closing balance for 2011-12	**593**	391	202	**44**	13	30	**14**	**652**
Closing balance for 2012-13	**900**	619	281	**59**	20	39	**26**	**986**
Net NPAs as per cent of Net Advances								
2011-12	**1.5**	1.4	1.8	**0.5**	0.6	0.4	**0.6**	**1.3**
2012-13	**2.0**	2.0	2.0	**0.5**	0.8	0.4	**1.0**	**1.7**

Notes: 1*: Includes IDBI Bank Ltd.
2**: Calculated taking gross NPAs from annual accounts of respective banks and gross advances from off-site returns.
Sources: Annual Accounts of banks and off-site returns and RBI report 2013-2014.

Security Issues in Modern Banking

Faster technology of Banks have made customer more convenient banking transactions, the concerns about e-payment security have increased contemporary threats are like phishing and pharming, carding and Skimming, spear phishing, crime ware and spyware, money laundering, scams, mules, spams, Nigerian advance fee frauds etc.

Carding/skimming: carding sites can be found on the internet, where fraud-maker buy and sell access to bank accounts, stolen card numbers, dumps from magnetic strips and even personal profiles. 'Skimming' constitutes the unnoticed duplication of electronic data from a payment card. A copying device is installed in front of the original card slot of an ATM, which transcribes the information from the magnetic strip on the card inserted by the customer. Sometimes this device can be a camera or a fake touch pad to duplicate the keystrokes used for password entry. Such important information obtained by this method enables fraud maker to easily create duplicate cards and withdraw money from the accounts.

Phishing: it is fraudulent capture and recording of customers' security details, to be used later for making fraud. The fraud makers are using email lures to 'fish' for financial data as well as passwords from innocent internet banking customer. It has several form, they are as under:

- Pharming is the use of spyware to redirect internet users from genuine. Web sites to fraudulent ones. It carries out modifications in the name resolution system, such a way that when innocent customer opens the web site of his bank, it actually takes the user to the fraudulent web site.

- Phlash phishing uses macromedia Flash to build an entire web site. The use of flash is intended to make it more difficult to determine whether or not the page is malicious and could bypass antiphising toolbars.

- Spear phishing: it is highly targeted phishing attack that focuses on a whole group i.e. Government agency or employees of certain organisations. The message would appear as though it would be generated the employer, asking for updating of passwords or any other personal information. Spear phishing might gain access and wreak havoc on an entire company's computer system.

CONCLUSION

Data privacy, involving individuals' right and privileges about personnel information is a very sensitive issue being debated and examined, the world over. Cyber-crime is an ever-increasing threat, becoming more organized and profit driven. NPA Non-performing Assets can also be under controlled with the use of the latest technology compare to public sector banks. We are moving away from the era of the lone hacker try to get into a government NASA system into something far more sinister and potentially far more costly to banks. Banks need to look deep into the IT governance structure and organizations to prevent any type of potential unholy collaboration to best the system. In an integrated world, the risk of loss could be enormous even if the reason may be too insignificant.

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A STUDY ON VM LEVEL LOAD BALANCING ALGORITHMS IN CLOUD ENVIRONMENT

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ABSTRACT

As Cloud Computing is spreading globally and number of users demanding more cloud services and better results are growing rapidly, cloud load balancing become a very interesting and important research area. Generally, cloud is based on powerful datacenters that handle large number of users, so it must be featured with load balancer to achieve reliability, which depends on the way it handles the load. Cloud load balancing helps to enhance the overall cloud performance. Many algorithms were suggested for assigning the users requests to Cloud resources to provide services efficiently.

This paper presents the analysis of three contemporary algorithms in cloud analyst tool to resolve the issue of cloud load balancing as a preparation phase for new load balancing technique. A Weighted Signature based load balancing (WSLB) algorithm is proposed to minimize user's response time. Further, this paper also provides the anticipated results with the implementation of the proposed algorithm.

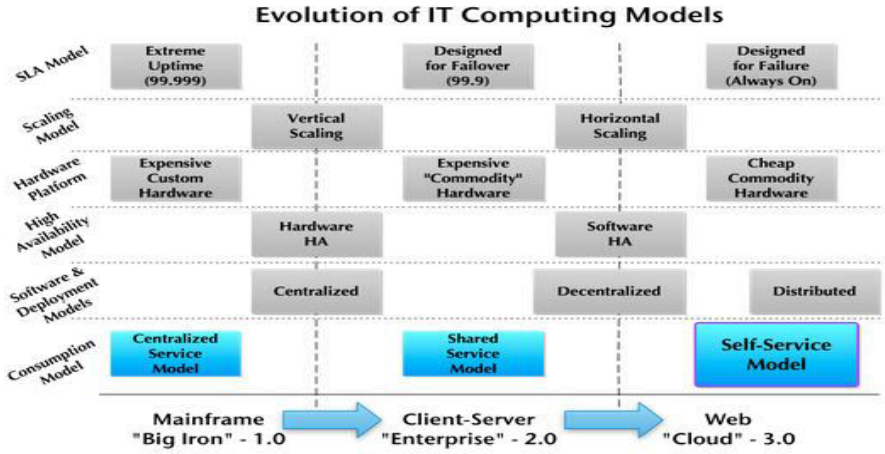
KEYWORDS

Cloud Computing, Load Balancing, Static / Dynamic LB etc.

INTRODUCTION

In recent years, the internet can be represented as a cloud and the term "Cloud Computing" in computing research and industry today has the potential to make the new idea of 'computing as a utility' in the near future. Overview if cloud computing is covered in Figure-1.

Figure-1: Cloud Computing Environment



Sources: Authors Compilation

In IaaS, the physical resources can be split into a number of logical units called Virtual Machine (VM). User make request for resources by making an image of configuration requirement. These images get mapped on VM, which is present on the server at provider side. Load balancing (LB) is done on consumer as well as on provider side. On provider side, load balancing is the problem of allocating vms to servers at runtime. VM need to be reassigned so that servers do not get overload as demand changes. Just like VM load is distributed across servers, application load of client can be balanced across VMs on Consumer side. This paper addressed the load balancing issue on consumer side. All VM load-balancing methods are designed to determine which VM is selected for the execution of next task units. Therefore, Resource management plays vital role in the performance of the entire cloud system and the level of user satisfaction provided by the cloud system.

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To provide the utmost user satisfaction, the datacenter ought to make proper resource management to insist the system with minimum SLA (Service Level Agreements) violation.

Load balancing is one of the key terms that affect the system performance dependent on the amount of work allotted to the system for a specific time. In general, it can be described as anything that distributing computation and communication evenly among resources, or a system that divides many client requests among several servers. So there is need to manage the resources and work accordingly. The discussion on such various objectives and some LB algorithm, which can be used to achieve those objectives, are studied in this paper.

There are several LB algorithms for the improvement and optimization of cloud performance parameters such as:

- **Throughput:** The total no. of tasks that have completed execution is called throughput. A high throughput is required for better performance of the system.
- **Associated Overhead**: The amount of overhead that is produced by the execution of the LB algorithm. Minimum overhead is expected for successful implementation of the algorithm.
- **Fault tolerant**: It is the ability to perform correctly and uniformly even in conditions of failure at any arbitrary node in the system.
- **Migration Time**: The time taken in migration or transfer of a task from one machine to any other machine in the system. This time should be minimum for improving the performance of the system.
- **Response Time**: It is the minimum time that a distributed system executing a specific load-balancing algorithm takes to respond.
- **Resource Utilization**: The resources of the system are utilized to the degree. A good load-balancing algorithm provides maximum resource utilization.
- **Scalability**: It determines the ability of the system to accomplish load-balancing algorithm with a restricted number of processors or machines.
- **Performance**: It represents the effectiveness of the system after performing load balancing. If all the above parameters are satisfied optimally then it will highly improve the performance of the system. Load balancing, as the name implies, is a technique that allows workloads to be distributed across multiple resources, to make effective resource utilization and to achieve better response time by handling a condition in which some of the nodes are over loaded while some others are under loaded.

The aim of load balancing is to optimize utilization and throughput while reducing the response time. As on demand self-service model, load arrives randomly or dynamically in cloud computing environment, which causes some VM/servers to be heavily loaded, while others idle or lightly loaded which in turn leads to poor performance and make user unsatisfied.

Therefore, if we distribute the load in proper way, it will improve system performance, throughput, response time etc., to meet user satisfaction. The important things to consider while developing such algorithm are: estimation of load, comparison of load, stability of different system, performance of system, interaction between the nodes, nature of work, node selection and many other ones.

Load balancing is also needed for achieving Green computing in clouds, with help of limited Energy Consumption and Reducing Carbon Emission. The nature of the load-balancing algorithm can be dynamic or static, although some algorithms are simple but under some conditions, they work more effectively.

Static load balancing algorithms take the decision of allocating the load to VMs in system based on prior knowledge about the applications and resources of the system. The performance of the VMs is determined at the time of request arrival. Static load balancing algorithms are non-preemptive and therefore each machine has at least one task assigned for itself. Its objective is to minimize the execution time and delay and limit communication overhead.

Dynamic load balancing algorithms make any decision for load balancing based on dynamically changing state of the system. It allows processes to move from an over utilized machine to an underutilized machine dynamically for faster execution. This means that dynamic load balancing is preemptive which helps in improving the overall performance of the system by migrating the load dynamically.

RELATED WORKS

The motivation of the survey of existing load balancing techniques in cloud computing is to encourage the amateur researcher to contribute in developing more efficient load balancing algorithms. This will benefit interested researchers to carry out further work in this research area. The existing load balancing algorithms prevalent in cloud environment are,

A. Vector Dot [1]
Environment used: Datacenters with integrated server and storage virtualization. It uses dot product to distinguish node based on the item requirement. It handles hierarchical and multidimensional resource constraints and removes overloads on server, switch and storage.

B. Carton [2]
Environment used: Unifying framework for cloud control. It uses Load balancing to minimize the associated cost and uses Distributed Rate Limiting for fair allocation of resources. It is simple and Easy to implement and very low computation and communication overhead.

C. Compare and Balance Environment used: Intra-Cloud.
It is based on sampling process and uses adaptive live migration of virtual machines. It balances load amongst servers and reaches equilibrium fast. It assures migration of VMs from high-cost physical hosts to low cost host. It assumes that each physical host has enough memory.

D. Scheduling strategy on LB of VM resources Environment used: Cloud Computing. It uses Genetic algorithm, historical data and current state of system to achieve best load balancing and to reduce dynamic migration.

E. LBVS Environment used: Cloud Storage.
It Uses Fair-Share Replication strategy to achieve Replica Load balancing module which in turn controls the access load balancing and uses writing balancing algorithm to control data writing load balancing.

F. Honeybee Foraging Behavior Environment used: Large scale Cloud Systems.
It achieves global load balancing through local server action.

G. Biased Random Sampling Environment used: Large-scale Cloud systems.
It achieves load balancing across all system nodes using random sampling of the system domain.

H. Active Clustering Environment used: Large-scale Cloud systems.
It optimizes job assignment by connecting similar services by local re-wiring.

I. ACCLB Environment used: Open Cloud Computing Federation.
It uses small world and scale-free characteristics of complex network to achieve better load balancing.

J. OLB + LBMM Environment used: Three-level Cloud Computing Network.
It uses OLB (Opportunistic Load Balancing) to keep each node busy and uses LBMM (Load Balance Min-Min) to achieve the minimum execution time of each task.

K. Server-based LB
Environment used: Distributed web servers.
It uses a protocol to limit redirection rates to avoid remote servers overloading and uses a middleware to support this protocol. It uses a heuristic to tolerate abrupt load changes.

L. Join-Idle-Queue Environment used: Cloud data centers.
It first assigns idle processors to dispatchers for the availability of the idle processors at each dispatcher and then assigns jobs to processors to reduce average queue length of jobs at each processor. Table-1 gives various objectives addressed in the literature.

Table-1

Objectives
Minimization of response time
Maximization of resource utilization
Fairness
Throughput
Performance

Scalability
Overhead
Efficiency
Fault tolerance
Migration time

Sources: Authors Compilation

III. LOAD BALANCING ALGORITHMS

After studying various load-balancing algorithms, it is necessary to execute at least two or three algorithms to observe where they are improving and lacking as well. In real scenarios, executions of such algorithms are not possible in exact cloud computing environment. Therefore, simulating of these algorithms might be supportive in order to accomplish this research. Therefore, research work is done on cloud analyst simulation tool to resolve the cloud load balancing issue as a preparation phase for new load balancing technique.

Load balancing algorithms present in cloud analyst are,

A. Round Robin: As name implies, it is simplest load balancing algorithm uses the time slicing mechanism. It works in the round trip where a time is divided into slices and is allotted to each node. Each node has to wait for their turn to perform their task. This algorithm has less complexity as compared to the other two algorithms. Open source simulation software knows as cloud analyst uses this algorithm as default algorithm in the simulation. This algorithm has less complexity as compared to the other two algorithms. This algorithm simply assigns the jobs in round robin fashion without considering the load on different machines. Though the algorithm is very simple, there is an additional load on the scheduler to decide the size of time slice and it has longer average waiting time, higher context switches higher turnaround time and low throughput.

A. Round Robin Algorithm Round-robin is by far the simplest algorithm available to distribute load among nodes. It is therefore often the first choice when implementing a simple scheduler. One of the reasons for it being so simple is that the only information needed is a list of nodes. However, this is only when several key assumptions are true: 1) The nodes must be identical in capacity. Otherwise, performance will degrade to the speed of slowest node in the cluster; 2) Two or more client connections must not start at the same time. Should they, the node chosen will be the same, because the order of nodes retrieved from the cluster is the same every time, 3) The jobs must be similar to achieve optimum load distribution among the nodes. If a single node is more loaded than others, it will become a bottleneck in the system.

B. Weighted Round Robin in a weighted round-robin algorithm, each destination (server) is assigned a value that signifies, relative to the other servers in the list, how that server performs. This "weight" determines how many more (or fewer) requests are sent that server's way; compared to the other servers on the list

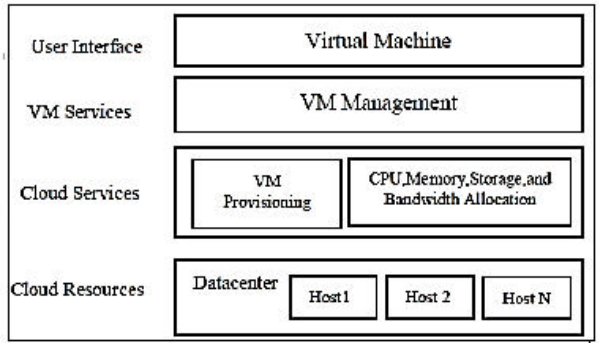
C. Equally Spread Current Execution Load (ESCE): Equally Spread Current Execution, The random arrival of load in such an environment can cause some server to be heavily loaded while other server is idle or only lightly loaded. Equally, load distributing improves performance by transferring load from heavily loaded server. Efficient scheduling and resource allocation is a critical characteristic of cloud computing based on which the performance of the system is estimated. The considered characteristics have an impact on cost optimization, which can be obtained by improved response time and processing time. A scheduling algorithm is compared with the existing round robin scheduling to estimate response time, processing time, which is having an impact on cost. A Comparison of Dynamic Load Balancing Algorithms. Here the jobs are submitted by the clients to the computing system. As the submitted jobs arrive to the cloud, they are queued in the stack. The cloud manager estimates the job size and checks for the availability of the virtual machine and the capacity of the virtual machine. Once the job size and the available resource (virtual machine) size match, the job scheduler immediately allocates the identified resource to the job in queue. Unlike the round robin scheduling algorithm, there is no overhead of fixing the time slots to schedule the jobs in a periodic way [6]. The impact of the ESCE algorithm is that there is an improvement in response time and the processing time. The jobs are equally spread, the complete computing system is load balanced and no virtual machines are underutilized. Due to this advantage, there is a reduce in the virtual machine cost and the data transfer cost.

ESAE LOAD ALGORITHM ACTIVE VM LOAD BALANCER
[START] Step1:- find the next available VM
Step2:-check for all current allocation count is less than max length of VM list allocate the VM
Step3:- if available VM is not allocated, create a new one in
Step 4:- count the active load on each VM
Step5:- return the id of those VM, which is having least load
[END]

PROPOSED WORK AND RESULT ANALYSIS

Cloud analyst is used to test the performance of these three algorithms and compare them with proposed one with respect to the response time. Cloud analyst simulation tool is based on cloudsim library written in java and provides a GUI interface to configure various parameters to perform the experimental work. Figure-2 shows cloudsim components considered in the environment of cloud analyst simulation tool used for experimental work.

Figure-2: Environment for Experimental work



Sources: Authors Compilation

This research work considers Datacenter, VM, host and Cloudlet components from CloudSim for implementation of a proposed algorithm. Datacenter component handles service requests. VM consist of application elements, which are connected with these requests, so Datacenters host should allocate VM requested by user. Cloud Analyst can evaluate any algorithm or application deploying in the cloud. VM life cycle starts from provisioning of a host to a VM, VM creation, VM destruction, and VM migration.

A brief description of these components and the working relationship between them is presented in the following:

1) Datacenter: Each Datacenter has a number of hosts with homogeneous or heterogeneous configurations (memory, cores, capacity, and storage). It also creates the bandwidth, memory, and storage devices allocation.

2) Virtual Machine (VM): VM characteristics comprise of memory, processor, storage, and VM scheduling policy.
Multiple VM can run on single hosts simultaneously and maintain processor-sharing policy. The research work considers the demands for VMs with homogeneous configuration.

3) Host: Hosts are present in the datacenter with homogeneous or heterogeneous configuration. This experiment considers VM need to handle a number of cores to be processed and host should have resource allocation policy to distribute them in these VMs. Therefore, host can arrange sufficient memory and bandwidth to the process elements to execute them inside VM. Host handles creation and destruction of VMs.

4) Cloudlet: Cloudlet is an application task, which is responsible to deliver the data in the cloud service model, which are executed on VM mapped on host.

5) VM Provisioner: It is used to allocate host for demanded VM. In cloud analyst, VMs are randomly mapped on VM, and requests are executed on VM selected by load balancer as per load balancing policy.

In this paper, we have proposed the VM load-balancing algorithm at the VM level where, individual task is assigned to VM mapped on host with different computing power. So the load assignment factor is determined for each host based on its configuration to achieve optimization goal such as minimization overall response time. The tasks/requests are assigned or allocated to the VM mapped on host with highest load assignment factor and then to the lowest and so on. This research work done into three parts: calculation and assignment of load assignment factor to hosts, provisioning and balancing. Load assignment factor is used to identify the host with high configuration that gives faster response than the other gives and is assigned to host based on the value calculated as in:

$$Capacity_{host} = \sqrt{CPU^2 + Memory^2 + Storage^2}$$

Host with high capacity value get highest load assignment factor. Provisioner allocate host to demanded VM according to the free processing elements. Once demanded VMs are get allotted on host, load is distributed on these VM according to load balancing

policy. When request arrives at datacenter, datacenter call load balancer for VM to execute request. Load balancer searches list of VMs mapped on host having high load assignment factor. Once found, it select the VM which is found available first and send to the datacenter for allocation and update the status of that VM as busy.

Following are the steps performed in our algorithm,

Step1: Creation of host within datacenter with homogeneous or heterogeneous configuration.

Step2: Calculation and assignment of load assignment factor to created hosts in a datacenter. Homogeneous hosts has same load assignment factor whereas heterogeneous hosts has varying load assignment factor according to configuration.

Step3: Provisioning of VMs. In this step, hosts are assigned to VMs demanded by user for their execution. Here the host with highest load assignment factor has highest priority for mapping VM.

Step4: Load balancer keeps the track of all VMs along with their allotted host and status (Available/Busy). At start, status of all VMs is Available.

Step5: When request arrives from datacenter controller to allocate VM for execution, it searches all the VMs and identifies powerful VM in the sense it is mapped on host with highest load assignment factor, which is available to take the request immediately. If no VM is available on that host, lowest one is searched for available VM. Selected VM is then returned to datacenter controller.

Step6: Datacenter controller allocates the request to selected VM return by load balancer and notifies load balancer about this new allocation.

Step7: Load balancer updates the status of that VM as busy.

Step8: When request execution completed, datacenter controller de-allocates that VM and notifies load balancer about this de-allocation.

Step9: Load balancer updates the status of that VM as available.

Step10: continue from step5 until all requests are processed. We execute these algorithm steps by assuming there is one data center having 3 hosts with configuration given in Table II, and 40 VMs with 1024MB memory and 1000 bandwidth demanded by setting configuration given in Table II, III, and IV.

Table-II: Host Configuration

Host ID	Memory GB	Storage GB	No of Processors
1	204800	1000000000	4
2	102400	500000000	2
3	51200	25000000	1

Sources: Authors Compilation

Table-III: Advanced Configuration

User grouping factor	1000
Request grouping factor	100
Executable instruction length	250

Sources: Authors Compilation

Table-IV: User base Configuration

User Base	Request per user per hour	Data Size per request
UB1	15	100
UB2	15	10000
UB3	15	100000
UB4	15	1000
UB5	15	10000

Sources: Authors Compilation

Algorithms give average response time (RT) and Data Center Request Servicing Time (DC-RST) with these parameters setting in the same region as well as in the different region as shown in Table V and Table VI respectively.

Table-V: Average Response Time Obtained

Parameters	Load Balancing Algorithms			
	RR	**Weighted RR**	**ESCE**	**WSLB**
Avg.RT (ms)	315.03	310.51	314.06	269.06
Avg DC-RST (ms)	9.88	9.05	5.64	10.59

Sources: Authors Compilation

Table-VI: Average Response Time

Parameters	Load Balancing Algorithms			
	RR	**Weighted RR**	**ESCE**	**WSLB**
Avg.RT (ms)	353.08	350.28	352.79	304.76
Avg DC-RST (ms)	10.25	5.72	9.16	5.79

Sources: Authors Compilation

From this, it is seen that our proposed method gives better response time than the contemporary algorithms. It is possible because virtual machine is placed on heterogeneous host based on its processing performance and host with high configuration is faster than the others. It is also observed that DC servicing time is more than other three. Because, in contemporary algorithms, there is searching of VM list only, but our algorithm searches the host list to find host with maximum load assignment factor and then searches the all VMs placed on that host for available one. There is extra overhead for searching host than the others. Therefore, DC requires more serving time than other does. As compared to average response time reduction, it is not as much considerable.

CONCLUSION AND FUTURE WORK

Cost and time are the key challenge of every assignment to develop products that can enhance the business performance in the cloud based IT sectors. Current strategies lack efficient scheduling and resource allocation techniques leading to increased operational cost and time. This paper aims towards the development of enhanced strategies through improved job scheduling and resource allocation techniques for overcoming the above-stated issues. Here, Equal Spread Current Execution Load algorithm dynamically allocates the resources to the job in queue leading reduced cost in data transfer and virtual machine formation. Comparisons of various load-balancing algorithms are made with respect to overall time and cost.

In this paper, we proposed a new VM load-balancing algorithm:

Weighted Signature based Load Balancing (WSLB) and implemented it using cloud analyst tool with help of CloudSim library (an abstract cloud computing environment) using java language. Our algorithm finds the load assignment factor for each of the host in a datacenter and map the VMs according to that factor. Load balancer sends virtual machine id, which is available on highest configuration host having maximum load assignment factor then lowest one and so on. According to the experimental results, it conclude that if we select a virtual machine mapped on powerful host, then it affects the overall performance of the cloud Environment and decrease the average response time. Proposed method work out on homogeneous VMs mapped on hosts. Mapping of heterogeneous VMs based on dynamic workload on heterogeneous hosts will be considered in future for further improvement.

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NEW TREND IN CLOUD COMPUTING

Dr. Ramandeep Kaur[11]

ABSTRACT

Cloud computing is a new concept in technology, all data can access through remote, this technology has huge services which are provides for mobile devices as well as computer such as PaaS, SaaS, IaaS. Cloud computing is four types like public cloud, private cloud, hybrid cloud and community cloud technology. Currently many organizations are used these technologies. This is making with many new trends like graphics services with web browsers, excellent efficiency and scalability in small to large businesses, big data with services, and many web applications. It has good compatibility of devices. Cloud computing will be very powerful services for databases as well as limitless storage capacity in future.

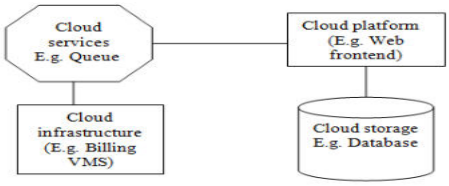
KEYWORDS

Web Apps, PaaS, SaaS, IaaS, Cloud Database etc.

INTRODUCTION

Cloud computing is a computing with cloud terminology based on resource's consumptions and utilities. It is based on remote services. It is also called remote networking with virtual space those services centralized data storage and online access. The cloud computer is a cloud of networking that focus on effectiveness on the sharing resources to maximum end users. The main goal of cloud computing is for end users to take the advantages from all the technologies without any need of technology. Cloud computing is mainly used with virtual technology. The virtual technology is separated from physical devices into one or more virtual devices. Main benefit of virtualization is providing speed up of data, and reduces the cost by increasing infrastructure utilization. This type of computing is also called grid computing. It accesses the quality of services (QoS). It is also provide the tools and technologies to make up data with expectable prices. This type of technology has become a hot computing test technology from last two years. There is a structure of cloud computing include services, platform, infrastructure and storage give below:

Figure-1: Architecture of Cloud Computing

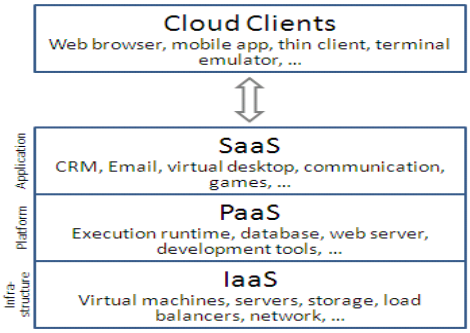


Sources: Authors Compilation

SERVICES OF CLOUD COMPUTING

There are three types of services in cloud computing a) SaaS, b) PaaS, and c) IaaS. The structure of cloud computing is given with all services.

Figure-2: Services of Cloud Computing



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SaaS (Software-as-a-Services)

Software as services is a basic term of cloud technology. SaaS provides SaaS applications, which can offer the powerful tools for web browser. SaaS has very good example of Google Docs. It is suitable for all types of documents on Google. It allows to usage of cloud applications. Anyone can create a Google account free of cost. In addition, all have login to google.com/docs and person can access word process, excel sheet and presentations. All documents are provides online by web browser. It can be access on computer, ipad, or mobile device.

PaaS (Platform-as-a-Services)

It is a service for using on my platform in cloud computing. PaaS is concerned with reduce the cost in IT companies as well as increase the application development work in efficient manner and reliable for development methods.

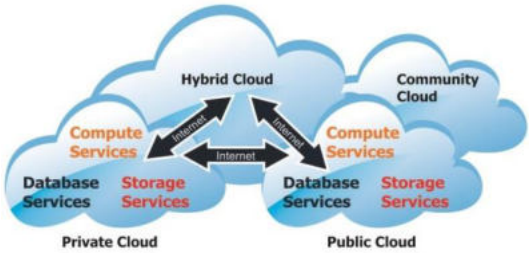
IaaS (Infrastructure-as-a-Services)

These services are mainly useful for full time developers or large-scale consumers, and used for creating and developing as well as storing the applications in cloud computing environment with suitable infrastructure. The main advantage of infrastructure as services is virtually unlimited storage capacity without any physical hardware on site. For example: Amazon, It is a small web application with full scale. End users have the flexibility to create a variety of tools from window environment, LINUX, iOS etc.

TYPES OF CLOUD COMPUTING

The cloud computing technology has a large pool of resources and services which are used to connected with large network by end users There are four types of cloud computing. These are given below:

Figure-3



Sources: Authors Compilation

Private Cloud Computing Technology

This type of cloud computing technology allows to business host applications and it all are concerned with data protection and security as well as to control the data on remote accessing. It is not share the data to other organization and it is always concerned with internal and external databases. Private cloud is more efficient and secure but expensive rather than public cloud computing. Whenever users and companies are needs consistent data services in efficient manners, then private cloud computing mostly used.

Public Cloud Computing Technology

This type of cloud computing technology mainly used to creates apps for public services. It is mainly concerned web applications such as Amazon, Google, and Microsoft and to access other internet. All customers of public cloud technology shares all documents from a pool with limited configurations, security and resources availability. It is mainly used on that time when an applications used by many people like email. Second reason for using public cloud is on testing and developing a large application and it is useful to increase the capacity of resources. Whenever we need the collaboration of application then public cloud is always preferred.

Hybrid Cloud Computing Technology

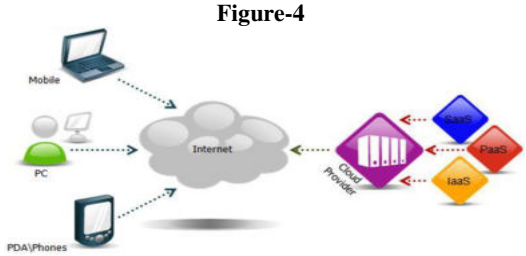
Hybrid cloud computing technology is a combination of two technologies: public and private cloud computing technologies services. This cloud is mostly used with online resources and offsite server bases infrastructure. It has multiple choices of security. It is also increase the efficiency and flexibility of cloud computing. When we want to use SaaS apps and it can use as a public cloud but keep the security of data by using private cloud computing technology.

Community Cloud Computing Technology

The community cloud computing technology network is mostly allow sharing several organizations and also managed and secured by all participating organizations. The main objective of community cloud is to took the advantages of public cloud with tight privacy, polices and security of private cloud. Community is mostly useful in some situations such as government companies need share data as well as private group like hospitals or clinics.

REASONS TO ADOPT THE CLOUD COMPUTING

Figure-4



Sources: Authors Compilation

There are so many reasons for adopt this technology. These are given below:

File Storage and Sharing

In few years ago, we have large amount of files with large size, and it was not possible to send together and receive together, but now it is possible with cloud computing technology. The creator of cloud computing is apple industry. The file sharing and home sharing becomes possible through icloud technology; it is useful with iphone, ipad, etc. A virtual team including customers and partners of organization can have a place in cloud where they share all documents and information.

Cloud Database

Cloud database is mainly used to store all information and documents. It is very powerful tool to sharing the data for IT professionals and developers. Everything is done by services of data from the infrastructure to the database software tuning and monitoring.

CRM

The companies are adopting the cloud computing technology for complex software. Customer relationship management (CRM) systems are mission of complex and critical software and deal with two pieces of data contained in database: customer information and revenue. The CRM is a blueprint for moving more line of for business applications to the cloud.

Email

Many persons uses cloud based consumer email services like Hotmail and Gmail. All consumers enjoy the benefits and access the data through internet with any knowledge of capacity and server update time. The main advantage of email with cloud is for every business because it becomes low cost emails with small and large business for customers.

File Backup

A backup of files and documents means it makes a backup to disk or we can say shipping these to a storage facility, which was complex and take more time to access and load. The cloud-based backup is very effective and powerful concept. The backup is automatically run on devices and information is stored in secure remote server location, where it will always available for access whenever we need without any problem of storage capacity.

Web Site Hosting

The website hosting is also good advantage in cloud computing. Cloud provides the services for web hosting and focus on the best website contents. Cloud based websites provide scalability and reliability with designs. In the cloud computing is also available more effective graphic designs.

E-Commerce

Electronic commerce is more effective with scalability and availability of online stored databases. Online stores no longer have to pay for, and cloud computing is allowed to scale as their traffic scale. The cloud is also makes easy to maintain web servers in different locations with load the pages and increase the availability. Also adding the services of content delivery network (CDM) makes it easy to distribute high-bandwidth contents like heavy images and videos.

Test and Development

At the development time, team needs infrastructure only in cloud computing technology. It is advantage of application development. It makes best efficiency for infrastructure. In addition, instances can be set for testing with high rate efficiency. Different hardware configuration has no effect on the cloud to access, develop and test the applications.

Private and Hybrid Clouds

Private cloud computing gives many benefits to IT companies with different advantages of public clouds. Collection of private and public clouds is called hybrid clouds. Private clouds gives IT companies many of the benefits of public cloud with additional benefits of having an isolated network and computing resources that being additional security is called hybrid clouds.

Graphics Technologies

The cloud computing technology is also available in graphics. High-resolution images and videos are always need new hardware infrastructure. Now all are easy because of cloud computing technology. There are many new cloud based graphic technologies for companies. Such as NVIDA and AMD to end users to run high-end graphic design applications with HTML 5 web browser.

CURRENT TRENDS IN CLOUD COMPUTING

Cloud computing has rapidly growth from last years. According to the survey this growth was 60% in 2013, but in 2014 this growth is increased up to 72%.it has a large change in small businesses to large businesses. Now, current trends in industries are:

Web Apps

Cloud computing technology is also useful to make the powerful applications for web applications and web browsers. It is also compatible with multiple platforms.

Rapidly Increase of Hybrid Cloud

The hybrid cloud feature is comes from private cloud and public cloud. In the big and small businesses which are involved in multiple cloud, these multiple cloud provides on different demands such as private cloud security and cost-effective features and services. The cloud computing provides resources to businesses. Many companies adopt the cloud technology to design and development of applications, and drop old model design technology.

BYOD (Bring your own Device)

Bring your own device is increase the trend in own devices within businesses. For example: smart phones, tablets, USB drivers. Nowadays larger amount of customers uses mobile devices in all over the world. All users are using their own mobile devices and put more and more data into personal cloud computing services for storage and usage. Mobile device management always provides personal cloud computing services and resources for storage data to access.

Big Data as a Services

Big data as services means services and resources for big businesses. Big data analysis is mainly used to competing with cloud computing. This data is scalable and reliable for every organization without size matters (unlimited storage space) for competing in the world market (global market). It is also beneficial for reduce the technical barrier to transfer the storage data.

Protection for small- medium business

The cloud computing has greatest advantage for small-medium size businesses. Most businesses may not afford the whole application for testing software to protect purpose, it is possible through cloud computing. These types of technologies just check the code of software on the web applications and always protect from the cyber-attacks. This is always checking the safety and security and it is always available in huge demand rather than others.

FUTURE OF CLOUD COMPUTING

In the short, the cloud computing is currently running in successful mode, but it will also proceed in future with rapid change. This change will improve the growth rate in market, and hope with more applications will provide in coming years. In the future aspects, more innovations will be providing in the cloud computing technology.

CONCLUSION

Cloud computing is good tool for access the online data with remote technology. Today numbers of users are using it with icloud in apple smart phones, and this company took huge profit in year 2014. This type of technology is very cheap for companies to have the resources they need in the location where data is stored. It has a good facility of backup of device. Furthermore, it works with fully secure data with efficient and reliability facilities.

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A STUDY ON EMPLOYEE RETENTION AMONG SOFTWARE INDUSTRY IN CHENNAI

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ABSTRACT

Employee Retention is one of the key challenges faced by IT Organizations in India. It has been observed that there is a great demand for skilled IT professionals within India and abroad, which has resulted in technocrats leaving the Organization in search of greener pastures. The IT Organizations in today's context cannot afford to lose their critical workforce due to uncertainty of changing economy, increasing competition and scarcity of skilled workforce as this would in turn affect their bottom lines drastically. This created the need for designing effective retention strategies.

The aim of the present report is to study factors like salary, superior–subordinate relationship, growth opportunities, facilities, policies and procedures, recognition, appreciation, suggestions, co-workers by which it helps to know the Attrition level in the organizations and factors relating to retain them. This study also helps to find out where the organizations are lagging in retaining. In Chennai researcher collected sampling data from 130 respondents from software industry.

KEYWORDS

Attrition, Retaining Employees, Reinforcement, Technocrats etc.

INTRODUCTION

Retaining employees is a critical and ongoing effort. One of the biggest challenges in having managers in the place that understands it is their responsibility to create and sustain an environment that fosters retention. Staff requires reinforcement, direction and recognition to grow and remain satisfied in their positions. Managers must recognize this and understand that establishing such fundamentals demonstrates their objectives to support nature and motivate their employees.

In order to create a successful company, employers should consider as many options as possible when it comes to retaining employees, while at the same time securing their trust and loyalty so they have less of a desire to leave in the future. Employees need to be retained because good, faithful, trained and hardworking employees are required to run business. They have acquired good product knowledge over the long run and a trained employee can handle customers better and solve problems of peers who are new to the organization. When an employee leaves, he takes away with him all company information such as ongoing projects, etc. Goodwill of the company is hampered due to more employee turnover rate and the competitors start poking their nose to recruit best talents from them. In the current scenario, this research yield best support to HR managers to retain the top talent in Chennai software industry.

BACKGROUND OF IT INDUSTRY IN INDIA

IT industry in India witnessed a dramatic change since its inception. Though some IT firms like TCS was established way back in late 60's in India, India did not see development in IT industry during mid-70's and this period was not so effective due to restricting imports of computer peripherals, high import tax, strict Foreign Exchange and Regulation Act limiting its allocation. A notable turning point in the Indian software and IT industries policy environment was when Shri Rajiv Gandhi became PM in 1984.

In India IT companies are concentrated in certain places like Bangalore, Bhubaneswar, Cochin, Coimbatore, Chandigarh, Chennai, Delhi, Gurgaon, Hyderabad, Calcutta, Mysore, Madurai, Maneshwar, Mumbai, Noida, Pune and Trivandrum. Out of these Bangalore is considered to be the Silicon Valley of India as it houses many domestic as well as Multinational IT Companies and some the companies have its headquarters here. The Organizations are competing with one another in terms of their employee friendly policies and practices aimed at attracting and retaining potential workforce, as there is acute shortage of skilled IT professionals. This is because the above situation has bred highly demanding and egoistic workforce who leave or threaten to leave the Organization even at the slightest discomfort and join the competitor organization. Job-hopping is a common phenomenon among IT professionals. The study therefore aims at having a holistic understanding of the factors influencing employee retention in Chennai both Indian and Multinational IT Companies to enable the HR Managers of IT industry to design effective employee retention strategies to control attrition.

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ABOUT CHENNAI SOFTWARE INDUSTRY

Chennai was recently rated as having the highest quality of life among Indian cities ahead of the other three metros and Bangalore, based on the "Location Ranking Survey" conducted by ECA International. Chennai has improved its global ranking to 138 in 2006–07 from 179 in 2002–03.As of 2012, the city has about 34,260 identified companies in its 15 zones. Of these, 5,196 companies has a paid-up capital of over ₹ 5 million, about 16,459 companies are in the paid up capital range of ₹ 100,000 to ₹ 200,000, and 2,304 companies have a paid-up capital of less than ₹ 100,000.

Since the late 1990s, software development and business process outsourcing and more recently electronics manufacturing have emerged as major drivers of the city's economic growth. Chennai has been rated as the most attractive Indian city for off shoring services according to A.T.Kearney's Indian City Services Attractiveness Index 2005. The city is now the second largest exporter of IT and IT enabled Services in the country behind Bangalore. The IT Corridor, on Old Mahabalipuram Road in the southeast of the city houses several technology parks, and, when completed, will provide employment to close to 300,000 people. Besides the existing Tidel Park, two more Tidel Parks are on the anvil in the IT corridor. One is under construction at the Siruseri IT Special Economic Zone ("SEZ") and the other one is being planned at the current location of MGR Film City, which is just before the existing Tidel Park, in Taramani on the IT Corridor. A number of SEZ have emerged in and around Chennai. The Mahindra World City, New Chennai, a Special Economic Zone (SEZ) with one of the world's largest high technology business zones, is currently under construction in the outskirts of Chennai. It also includes the World's largest IT Park by Infosys.

REVIEW OF LITERATURE

Numerous studies have been conducted on employee retention so far. The exponential growth of IT sector in India in the last few decades have prompted the Organization to focus on employee centered employment relationship to hold back the employees. A considerable amount of literature has been published on retention so far. Review of literature of the related studies gave an insight about the subject matter and also helped in analyzing the existing gap that could be taken up for further research.

According to Gopinath and Becker (2000), effective communications improve employee identification with their agency, build openness, and trust culture. Increasingly, organizations provide information on values, mission, strategies, competitive performance, and changes that may affect employees' enthusiasm. Many companies are working to provide information that communication, through the most credible sources (e.g., CEO and top management strategies) on a timely and consistent basis.

Stauss et al (2001) have suggested a more detailed and recent definition for the concept of retention which is customer liking, identification, commitment, trust, readiness to recommend, and repurchase intentions, with the first four being emotional-cognitive retention constructs, and the last two being behavioral intentions.

Boxall, Macky and Rasmussen (2003) have conducted a study of retention variables for New Zealand employees in which they state that the variables are multidimensional. These include interesting work, which was rated as the strongest factor in attracting and retaining employees in both public and private sector organizations. The research outcome showed that employees expect management to make personnel decisions based on merit and demonstrated that extrinsic rewards (such as pay, promotion & job security) play a role in both employee retention and turnover management. The research further suggested that management lent support to the idea of good relationships with co-employees and supervisors.

According to Samuel and Chipunza (2009), the main purpose of retention is to prevent the loss of competent employees from leaving the organization as this could have adverse effect on productivity and profitability. However, retention practices have become a daunting and highly challenging task for managers and Human Resources (HR) practitioners in a hostile economic environment. One of the traditional ways of managing employee retention and turnover is through organizational reward system.

The above-mentioned studies explain many situations in contemporary corporate life in India wherein many employees are no longer having the sense of organization loyalty towards the organization. Increasing number of organizational mergers and acquisitions have left employees feeling displeased from the companies that they work and they are haunted by concerns of overall job security. As a result, employees are now making strategic career moves to guarantee employment that satisfy their need for security. On the other hand, employers have a need to keep their stuff from leaving or going to work for other companies. This is true because of the great expenses associated with hiring and retraining new employees.

The above review of literature suggests that here are gaps in the existing literature. This study attempts to fulfill the gaps by analyzing the impact of three R's i.e. Respect, Recognition and Rewards on satisfaction level of the employees and by examining the various practices adopted by Chennai software companies in retaining their employees.

NEED & IMPORTANCE OF STUDY

Employee turnover is very high in IT Organizations in Chennai as skilled workforce has umpteen numbers of opportunities to choose from, prompting each organization to compete with the other in continuously developing attractive and innovative

retention strategies to hold back their critical workforce and to attract prospects. A clear understanding of consequences of employee turnover enables us to understand the importance of this study.

The success of any organization depends largely on the workers, the employees are considered as the backbone of any company. The study was mainly undertaken to identify the level of employee's attitude, the dissatisfaction factors they face in the organization and for what reason they prefer to change their job. Once the levels of employee's attitude are identified, it would be possible for the management to take necessary action to reduce attrition level. Since they are considered as backbone of the company, their progression will lead to the success of the company for the long run. This study can be helpful in knowing, why the employees prefer to change their job and which factors make employee dissatisfy. Since the study is critical issue, it is needed by the originations in order to assess the overall interest and the feelings of the employees towards their nature of job and organization.

This study can be helpful to the management to improve its core weaknesses by the suggestions and recommendations prescribed in the research. This study can serve as a basis for measuring the organization's overall performance in terms of employee satisfaction, which results in employee retention.

STATEMENT OF PROBLEM

The aim of the present report is to study factors like salary, superior–subordinate relationship, growth opportunities, facilities, policies and procedures, recognition, appreciation, suggestions, co- workers by which it helps to know the Attrition level in the organizations and factors relating to retain them. This study also helps to find out where the organizations are lagging in retaining.

OBJECTIVES OF STUDY

- To examine the employee retention in IT industry with special reference to Chennai city.
- To know the satisfactory level of employees towards their job and working conditions
- To identify the factors, which make employees, dissatisfy about company's policy and norms.
- To find the areas where companies are lagging behind
- To know the reasons, why attrition occurs in Chennai software industry.
- To find the ways to reduce the attrition in Chennai software industry.
- To provide some suggestion to reduce the employee turnover and retain the employees

HYPOTHESES OF STUDY

H_1: There is a significant relation between age and attrition factors of the employees.
H_2: There is a significant relation between educational qualification and attrition factors of the employees
H_3: There is a significant relation between experience and attrition factors of the employees.
H_4: There is a significant relation between age and motivational factors relating to employee retention.
H_5: There is a significant relation between educational qualification vs. motivational factors relating to employee retention.
H_6: There is a significant relation between experiences vs. motivational factors relating to employee retention.

METHODOLOGY OF RESEARCH

Research Design

The survey method used in the present study is sample survey and the research design choice, particularly for software industry and descriptive research design was used for the research.

Sample Size and Sampling Method

The target respondents of the study are the employees' software industry located industrial parks Chennai. The total sample size taken for the present study is 130 and the sample method used is convenient sample method.

Primary Data

The primary data were collected through questionnaire followed by the discussions with management and employees of software industry located in Chennai.

Analysis

The statistical tools used for the analysis of data are tables with percentages, t-test and Analysis of Variance (ANOVA).

RESULTS & INTERPRETATION

Employee's Opinion about Salary

A salary is a form of remuneration paid periodically by an employer to an employee, the amount and frequency of which may be specified in an employment contract. The following table shows the employee's opinion about salary in various attributes.

Table-1

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
My Salary when compared with Competitor company.	(17) 13.1%	(58) 44.6%	(37) 28.5%	(18) 13.8%	(0) 0%	(130) 100%
Performance Bonus given to me by the company.	(64) 49.2%	(24) 18.5%	(30) 23.1%	(12) 9.2%	(0) 0%	(130) 100%
Standard of Increment in the company.	(38) 29.2%	(35) 26.9%	(28) 21.5%	(24) 18.5%	(5) 3.8%	(130) 100%
Satisfaction level in Salary & Increment.	(53) 40.8%	(32) 24.6%	(14) 10.8%	(31) 23.8%	(0) 0%	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 44.6 percent of employees have the opinion that their salary compared with the competitor company as high, 28.5 percent said it is medium, 13.8 percent said it is low. In addition, 49.2 percent of employees have an opinion that the performance bonus they getting is very high, 23.1 percent said as medium and 18.5 percent as high. In addition, 29.2 percent of employees have an opinion that the standard of increment in the company is very high, 18.5 percent said it is low. In addition, 40.8 percent of employees has an opinion that they are satisfied with the level of salary & increment, 23.8 percent said it is low. It leads to conclusion that 44.6 percent of employees have the opinion that their salary compared with the competitor company as high, 49.2 percent of employees has an opinion that the performance bonus they getting is very high, 29.2 percent of employees has an opinion that the standard of increment in the company is very high and 40.8 percent of employees has an opinion that they are satisfied with the level of salary & increment.

Employee's opinion about Superior – Subordinate Relationship

In an organization, communication occurs between members of different hierarchical positions. Superior-subordinate communication refers to the interactions between organizational leaders and their subordinates and how they work together to achieve personal and organizational goals. The following table shows the employee's opinion about superior–subordinate relationship in various attributes.

Table-2

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
The encouragement getting from supervisors to work as team.	(25) 19.2 %	(54) 41.5 %	(31) 23.8 %	(12) 9.2 %	(8) 6.2 %	(130) 100%
The Supervisor's effort for job promotion.	(41) 31.5 %	(32) 24.6 %	(18) 13.8 %	(39) 30.0 %	(0) 0%	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 41.5 percent of employees have the opinion that their encouragement from superior is high, 23.8 percent said it is medium and 6.2 percent said it is very low. In addition, 31.5 percent of employees have an opinion that the superior's effort to help for job promotion is very high, 13.8 percent said it is medium and 30 percent said it is low. It leads to conclusion that 41.5 percent of employees have the opinion that their encouragement from superior is high and 31.5 percent of employees have an opinion that the superior's effort to help for job promotion is very high.

Employee's Opinion about Growth Opportunities

An employee's perception of internal opportunities for growth and development is one of the more important predictors of employee engagement. Understanding this, there were disappointed to discover, through our latest research, that the employee perception of internal opportunities is the lowest it has ever been. The following table shows the employee's opinion about growth opportunities in various attributes.

Table-3

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
Opportunities provided by the company.	(57) 43.8 %	(28) 21.5 %	(20) 15.4 %	(17) 13.1 %	(8) 6.2 %	(130) 100%
Chances of getting promotion.	(39) 30.0 %	(40) 30.8 %	(20) 15.4 %	(26) 20.0 %	(5) 3.8 %	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 43.8 percent of employees have the opinion that their opportunities provided by the company is very high, 15.4 percent said it is medium and 6.2 percent said it is very low. In addition, 30 percent of employees have an opinion that the chances of promotion are very high and 15.4 percent said it is medium and 3.8 percent said it is very low. It leads to conclude that 43.8 percent of employees have the opinion that their opportunities provided by the company are very high and 30 percent of employees have an opinion that the chances of promotion are very high.

Employee's Opinion about Facilities

Facilities management is very important whatever type of organization is considered, the management of the pool and sports halls in a leisure center, including changing pool water, making sure that electricity and lighting is regularly maintained etc., the machinery and equipment in a manufacturing plant, the maintenance of the pitch, and stadium for a sports club - including regular checks on floodlights, health and safety equipment etc. The following table shows the employee's opinion about facilities in various attributes.

Table-4

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
Benefit and welfare facilities provided by the company.	(48) 36.9 %	(31) 23.8 %	(17) 13.1 %	(19) 14.6 %	(15) 11.5 %	(130) 100%
Satisfaction getting with the physical working condition.	(45) 34.6 %	(43) 33.1 %	(11) 8.5 %	(16) 12.3 %	(15) 11.5 %	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 36.9 percent of employees have the opinion that the welfare facilities provided to them by the company is very high, 13.1 percent said it is medium and 11.5 percent said it is very low. In addition, 34.6 percent of employees have an opinion that the physical working conditions are very high, 8.5 percent said it is medium and 11.5 percent said it is very low. It leads to conclusion that 36.9 percent of employees have the opinion that the welfare facilities provided to them by the company is very high and 34.6 percent of employees have an opinion that the physical working conditions are very high.

Employee's Opinion about Policies and Procedures

A policy is a principle or rule to guide decisions and achieve rational outcomes. A policy is a statement of intent, and is implemented as a procedure or protocol. The Board of generally adopts policies or senior governance body within an organization whereas procedures or protocols would be developed and adopted by senior executive officers. The following table shows the employee's opinion about policies and procedures in various attributes.

Table-5

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
Employee policies and procedures.	(51) 39.2 %	(28) 21.5 %	(33) 25.4 %	(5) 3.8 %	(13) 10.0 %	(130) 100%
Administration of employee policies.	(50) 38.5 %	(29) 22.3 %	(35) 26.9 %	(16) 12.3 %	(0) 0%	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 39.2 percent of employees have the opinion that the employee policies and procedures of the company is very high, 25.4 percent said it is medium and 10.0 percent said it is very low. In addition, 38.5 percent of employees have an opinion that the administration of the policies is very high, 26.9 percent said it is medium and 12.3 percent said it is low. It leads to conclusion that 39.2 percent of employees have the opinion that the employee policies and procedures of the company are very high and 38.5 percent of employees have an opinion that the administrations of the policies are very high.

Employee's Opinion about Recognition

Employee Recognition is the timely, informal or formal acknowledgement of a person's or team's behavior, effort or business result that supports the organization's goals and values, and which has clearly been beyond normal expectations. The following table shows the employee's opinion about superior–subordinate relationship in various attributes. The following table shows the employee's opinion about recognition in various attributes.

Table-6

Opinion / Attributes	Very High	High	Medium	Low	Very Low	Total
Recognition received abilities, efficiency and good work done.	(43) 33.1 %	(22) 16.9 %	(46) 35.4 %	(19) 14.6 %	(0) 0 %	(130) 100%
Cash award / salary increase / promotion getting for outstanding performance.	(10) 7.7 %	(32) 24.6 %	(59) 45.4 %	(21) 16.2 %	(8) 6.2 %	(130) 100%

Sources: Authors Compilation

From the above table it was inferred that 35.4 percent of employees have the opinion that the Recognition received by the company for their abilities, efficiency and good work done are medium, 16.9 percent said it is high and 14.6 percent said it is low. And 45.4 percent of employees has an opinion that the Cash award/salary increase/promotion getting for outstanding performance are medium, 7.7 percent said it is very high and 6.2 percent said it is very low. It leads to conclusion that 35.4 percent of employees have the opinion that the Recognition received by the company for their abilities, efficiency and good work done are medium and 45.4 percent of employees has an opinion that the Cash award/salary increase/promotion getting for outstanding performance are medium.

Age vs. Attrition Factors

H_1: There is a significant relation between age and attrition factors of the employees.

The following table shows relation between age and attrition factors.

Table-7

Factors	Mean	Square	F Sig.
Salaries	10.579	23.820	.000
Superior – Subordinate Relationship	4.293	9.364	.000
Growth Opportunities	4.931	11.174	.000
Facilities	5.549	17.551	.000
Policies & Procedures	3.243	5.524	.005

Sources: Authors Compilation

It was found by ANOVA test that there is a significant difference (at 0.05 levels) amongst the different categories of age of the respondents with the attrition factors. So, null hypothesis is accepted.

Educational Qualification vs. Attrition Factor

H_2: There is a significant relation between educational qualification and attrition factors of the employees.

The following table shows relation between educational qualification and attrition factors.

Table-8

Factors	Mean	Square	F Sig.
Salaries	9.393	23.562	.000
Superior – Subordinate Relationship	2.850	31.177	.000
Growth Opportunities	3.988	19.544	.000
Facilities	4.370	26.618	.000
Policies & Procedures	2.273	23.661	.000

Sources: Authors Compilation

It was found by ANOVA test that there is a significant difference (at 0.05 levels) amongst the different categories of educational qualification of the respondents with the attrition factors. So, null hypothesis is accepted.

Experience vs. Attrition Factors

H_3: There is a significant relation between experience and attrition factors of the employees.

The following table shows relation between experience and attrition factors.

Table-9

Factors	Mean	Square	F Sig.
Salaries	13.378	4.033	.009
Superior – Subordinate Relationship	4.381	5.598	.001
Growth Opportunities	5.101	6.118	.001
Facilities	6.538	3.865	.011
Policies & Procedures	2.886	9.708	.000

Sources: Authors Compilation

It was found by ANOVA test that there is a significant Difference (at 0.05 levels) amongst the different categories of experience of the respondents with the attrition factors. So, null hypothesis is accepted.

Age vs. Motivational Factors Relating to Employee Retention

H_3: There is a significant relation between age and motivational factors relating to employee retention.

The following table shows relation between age and motivational factors relating to employee retention.

Table-10

Factors	Mean	Square	F Sig.
Training	3.243	5.524	.005
Recognition	3.534	3.118	.048
Appreciation	2.512	.599	.551
Suggestions	2.126	4.330	.015
Co-Workers Relationship	3.047	.747	.476

Sources: Authors Compilation

It was found by ANOVA test that there is a significant Difference (at 0.05 levels) amongst the different categories of age of the respondents with the motivational factors relating to employee retention. So, null hypothesis is accepted.

Educational Qualification vs. Motivational Factors Relating to Employee Retention

H_4: There is a significant relation between educational qualifications vs. motivational factors relating to employee retention.

The following table shows relation between educational qualifications vs. motivational factors relating to employee retention.

Table-11

Factors	Mean	Square	F Sig.
Training	2.273	23.661	.000
Recognition	2.556	19.405	.000
Appreciation	1.636	23.624	.000
Suggestions	1.605	17.877	.000
Co-Workers Relationship	1.763	32.018	.000

Sources: Authors Compilation

It was found by ANOVA test that there is a significant Difference (at 0.05 levels) amongst the different categories of educational qualification of the respondent with the motivational factors relating to employee retention. . So, null hypothesis is accepted.

Experience vs. Motivational Factors Relating to Employee Retention

H_5: There is a significant relation between experiences vs. motivational factors relating to employee retention

The following table shows relation between experiences vs. motivational factors relating to employee retention.

Table-12

Factors	Mean	Square	F Sig.
Training	2.886	9.708	.000
Recognition	3.647	1.032	.381
Appreciation	2.390	2.917	.037
Suggestions	2.143	2.849	.040
Co-Workers Relationship	2.646	7.331	.000

Sources: Authors Compilation

It was found by ANOVA test that there is a significant Difference (at 0.05 levels) amongst the different categories of experience of the respondent with the motivational factors relating to employee retention. So, null hypothesis is accepted.

Marital Status vs. Attrition Factors

The following table shows relation between marital status and attrition factors.

Table-13

Factors	Marital Status	Mean	Standard Deviation	t	Significance
Salaries	Married	7.0345	2.73999	22.452	.000
	Unmarried	11.0000	3.85389		
Superior-Subordinate Relationship	Married	4.0690	1.74579	12.130	.001
	Unmarried	5.6613	2.43569		
Growth Opportunities	Married	3.5345	1.67767	59.562	.000
	Unmarried	5.4516	2.75608		
Facilities	Married	3.6724	1.43133	60.762	.000
	Unmarried	6.0000	3.10473		
Policies & Procedures	Married	4.3276	1.47954	12.907	.000
	Unmarried	5.4194	2.16945		

Sources: Authors Compilation

It was found by independent samples t-test that there is a significant difference (at 0.05 levels) between the factors of attrition and their marital status.

SUGGESTIONS

- Many employees have suggested improvement in working environment and employee motivation in the survey. Therefore, the companies should give attention to the factors, which it can improve itself internally.
- Even though the employees are satisfied with their nature of job, it is identified in the study that many employees prefer to change their job due to lack of growth opportunities in their job. Therefore, the companies can look for some innovative technologies to decrease their attrition level by providing growth opportunities.
- The companies should conduct regular meetings to know about what exactly employees expect. Organizations should focus on exit interviews.
- The companies may give training like Personality Development and Self - improvement training to the employees, every three or six months once this status has to be reviewed and necessary action can be taken. It is better to have such training in the future.

RECOMMENDATION

It is worth considering the following elements, all of which have been shown to play a positive role in improving retention:

Job Previews - give prospective employees a 'realistic job preview' at the recruitment stage. Take care not to raise expectations only to dash them later. Advances in technology present employers with increasing opportunities to familiarize potential candidates with the organization before they accept a position.

Make Line Managers Accountable - for staff turnover in their teams. Reward managers with a good record for keeping people by including the subject in appraisals. Train line managers in people management and development skills before appointing or promoting them. Offer re-training opportunities to existing managers who have a high level of turnover in their team.

Career Development and Progression - maximize opportunities for individual employees to develop their skills and move on in their careers. Where promotions are not feasible, look for sideways moves that vary experience and make the work more interesting.

Consult Employees - ensure wherever possible that employees have a 'voice' through consultative bodies, regular appraisals, attitude surveys and grievance systems. This will provide dissatisfied employees with a number of mechanisms to sort out problems before resigning. Where there is no opportunity to voice dissatisfaction, resigning is the only option.

Be Flexible - wherever possible accommodate individual preferences on working hours and times. Where people are forced to work hours that do not suit their domestic responsibilities they will invariably be looking for another job, which can offer such hours.

Avoid the Development of a Culture of 'Presenteeism' - where people feel obliged to work longer hours than are necessary simply to impress management. Evaluation of individual commitment should be based on results achieved and not on hours put in.

Job Security - provide as much job security as possible. Employees who are made to feel that their jobs are precarious may put a great deal of effort in to impress, but they are also likely to be looking for more secure employment at the same time. Security and stability are greatly valued by most employees.

Treat People Fairly - never discriminate against employees. A perception of unfairness, whatever the reality when seen from a management point of view, is a major cause of voluntary resignations. While the overall level of pay is unlikely to play a major role unless it is way below the market rate, perceived unfairness in the distribution of rewards is very likely to lead to resignations.

CONCLUSIONS

The main aim of any organization is to earn profit. However, to attain the maximum profit, the organization should concentrate more on employees and the ways to retain them for their long run. From the study, it is identified that lack of growth opportunities, salary and stress are the major factors, which force employees to change their jobs. This study concludes that to reduce attrition industries should create some opportunities for the growth of their employees within the organization by adopting new Innovative Technologies and Effective training programs to retain the talent.

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AUTOMATION OF SUBJECTIVE ANSWER EVALUATION USING DOMAIN ONTOLOGY MATCHING

Pallawi Bulakh[14] Dr. Ajit More[15]

ABSTRACT

Semantic Web and ontology are the new area of interest for researchers, industry and academia. Ontology provides a conceptual specification of the content or meaning. The information is not only treated and presented as document but the semantics of the information is considered as well. Ontologies have been very useful in information integration, peer-to-peer systems, e-commerce, semantic web services, social networks etc. The most valuable use of Ontologies is that they are used to share common understandings. This motivates to use the property in assessment of subjective answer papers of candidates.

Today there are various technologies for assessment of the objective (Multiple-choice questions) paper assessment. However, the assessment of subjective answer paper is still done manually. Manual assessment of the answer paper has its own pros and cons. In this paper, we propose the ontology matching method for assessment of subjective answer papers of candidates. Ontology matching is potential solution for semantic diversity problem. Here we focus on the concept of domain ontology.

KEYWORDS

Domain Ontology, Ontology, WordNet etc.

INTRODUCTION

Information retrieval is most important task in today's era of Information Technology. Finding the information required by user is a crucial task as the information content may be similar but may have different lexical format. Traditional method of keyword matching is not sufficient in this task as a single word can take many forms. Furthermore being lexically different does not imply that the two words are semantically different. The lack of common terms in two documents does not necessarily mean that the documents are not related. To answer this scenario, the concept of semantic similarity is proposed.

It is very easy for humans to recognize if a pair of word is similar to each other in some way or not. Also, if two words are lexically different does not imply that both are not similar to each other. Semantic relatedness refers to the degree to which two concepts or words are related [10] semantic similarity is used when similar entities such as apple and orange or table and furniture are compared. [11] Ontology can be used to find the similarity between two documents.

Ontology is the philosophical study of the nature of being, becoming, existence, or reality, as well as the basic categories of being and their relations.[2] Ontologies are often equated with taxonomic hierarchies of classes, class definitions, and the sub-assumption relation, but ontologies need not be limited to these forms.

Ontology defines a common vocabulary for users who need to share information in their domain. The reasons for developing ontology are [2].

- Share common understanding of structure of information in a particular domain.
- Enable reuse of domain knowledge.
- To separate domain knowledge from operational knowledge.
- To make domain assumptions explicit.
- To analyze domain knowledge.

Sharing common understanding of structure of information in a particular domain [2] is the most common goal of developing the ontology. For example, if several web sites provide the information of real estate and transactions related to it than the different terminologies used by these web sites can be constituted a single ontology, which will be serving the diversified information needs of users.

Enabling the reuse of domain knowledge is also the second important goal of developing the ontology. If we create ontology for a particular domain, others can use either the same or part of that ontology or may extend the same ontology for their own purpose.

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Separating domain knowledge from operational knowledge is also important goal. We can describe a task of configuring a product from its components according to a required specification and implement a program that does this configuration independent of the products and components themselves [4]. We can then develop ontology of PC-components and characteristics and apply the algorithm to configure made-to-order PCs. We can also use the same algorithm to configure elevators if we "feed" elevator component ontology to it [5].

TYPES OF ONTOLOGY

There are three types of ontology:1) Domain Ontology, 2) Upper Ontology, and 3) Hybrid Ontology.

Domain Ontology: It represents the concepts, which belong to part of world. Meaning of all word is provided in the domains. As an example, the word *card* has many different meanings. Ontology about the domain of poker would model the "playing card" meaning of the word, while ontology about the domain of computer hardware would model the "punched card" and "video card" meanings. These ontologies represent the concepts in very specific ways. Due to different languages, different ontologies in the same domain came into picture. These ontologies provide basic set of elements.

Upper Ontology: It is the model of the common objects that are generally applicable across wide range of domain ontologies. This ontology actually contains terms and its associated object descriptions.

Hybrid Ontology: It is the combination of domain and upper ontology. For example The Gellish ontology.

Ontologies can be expressed using following methods. [3]

Frame based Models: A *frame* is a primitive object that represents an entity in the domain of discourse. A frame is called *class frame* when it represents a class, and is called *individual frame* when it represents an individual

Conceptual Graphs: A logical formalism includes classes, relations, individuals and quantifiers. This formalism is based on semantic networks, but it has direct translation to the language of first order predicate logic, from which it takes its semantics.

1. **Semantic Networks**: Semantic network (also called concept network) is a graph, where vertices represent concepts and where edges represent relations between concepts. Semantic network at the level of ontology expresses vocabulary that is helpful especially for human, but that still can be usable for machine processing. A typical example is WordNet.

2. **Knowledge Interchange Format**: Knowledge Interchange Format (KIF) is a language designed to be used for exchange of knowledge between different systems. It is based semantically on predicate logic and syntactically on LISP. It allows representing arbitrary sentences in the first order predicate logic.

How ontology is used to share common understanding in ontology, the focus is given on classes. Classes describe concepts in domain. In addition, the property, attributes of each class is defined. Thus creating a knowledge base for user. The relationships between these concepts are then used for further details.

RATIONALE BEHIND DOMAIN ONTOLOGY

For the above said work, we have preferred domain ontology. Domain ontology represents the concepts related to a part of world. A particular set of words belonging to a particular domain constitute domain ontology. They represent the concepts in a very specific way.

Wordnet is comprehensive and generic database. The weights assigned in wordnet treets each word neutrally and without priority. The context of different word is different in different context.

The Wordnet ontology is a general ontology. Our method for finding the semantic similarity between the candidates 'submitted answer and stored model answer is related the subject of computer science. Hence, the terms, which are used in Wordnet, may not imply the intended meaning of it. For example, let us consider a question "What is a class?" This question is related to computer science domain. However, the "class" word has different meaning and interpretation in other fields of study including the computer science. Wordnet gives following search results for "Class" [6]

The noun class has 8 senses (first 7 from tagged texts)

1. (214) {07865822} <noun.group> class1#1, social class#1, socio-economic class#1 -- (people having the same social or economic status; "the working class"; "an emerging professional class")

2. (192) {08124983} <noun.group> class3#2, form#13, grade#1 -- (a body of students who are taught together; "early morning classes are always sleepy")

3. (190) {00872060} <noun.act> course1#1, course of study#2, course of instruction#1, class#3 -- (education imparted in a series of lessons or meetings; "he took a course in basket weaving"; "flirting is not unknown in college classes")

4. (178) {07889030} <noun.group> class#4, category#1, family4#4 -- (a collection of things sharing a common attribute; "there are two classes of detergents")

5. (50) {08125440} <noun.group> class4#5, year#4 -- (a body of students who graduate together; "the class of '97"; "she was in my year at Hoehandle High")

6. (31) {08126871} <noun.group> class5#6, division6#7 -- (a league ranked by quality; "he played baseball in class D for two years"; "Princeton is in the NCAA Division 1-AA")

7. (6) {04759768} <noun.attribute> class#7 -- (elegance in dress or behavior; "she has a lot of class")

8. {07993799} <noun.group> class2#8 -- ((biology) a taxonomic group containing one or more orders) [8]

Wordnet also displays sensed and location of the particular sense in the database. In above result, we are interested in 4th results and in some other cases; we may be interested in more than one sense but with different priorities. Hence, we come up with an approach where a separate collection of domain specific interpretation are weighed together and matched with model answer.

We have created simple domain ontology for the purpose of assessment of answer sheets of candidates. Once the questions and respective model answers are set by the examiner, automatically these words are added to the database file and creating a domain specific ontology on the top of WordNet. We can set the weight for each sense of word manually to give appropriateness in assessment.

Wordnet

WordNet is a lexical database for the English language. It groups English words into sets of synonyms called *synset.* WordNet is also called ontology [9]. WordNet is most commonly used for word Sense disambiguation i.e. to find the appropriate sense or context of a word in a text. Database Organization in WordNet is around logical groupings called synsets. Each synset consists of a list of synonymous words or collocations, and pointers that describe the relations between this synset and other synsets. A word or collocation may appear in more than one synset, and in more than one part of speech. The words in a synset are grouped such that they are interchangeable in some context. Pointers represent two kinds of relations: lexical and semantic. Lexical relations hold between semantically related word forms; semantic relations hold between word meanings. These relations include (but are not limited to) hypernym / hyponym (superordinate/subordinate), antonym, entailment, and meronym / holonym.

Proposed Method for Assessment of Subjective Answer Papers

Ontology can be used in a way to compare the contents of the two documents even if they are lexically different. Here, we propose an approach for calculation of similarity index between two sentences and its experimental evaluation for subjective answer papers. We have devised domain ontology for evaluation of subjective answer sheets. The proposed methodology will compare the ontologies of the two answers and will give the percentage of matching between the two.

The student is supposed to input the answer through keyboard. The aim is to compare this answer with the model Answer that is stored in the system. There may be lexical differences between the two answers, but if the meaning of the two is same, then the system should allot the marks to student. Here instead of keyword matching, the focus is given on semantic matching of the two answers. The given system accepts answers of questions as input from keyboard. The objective is to compare the current paper with the paper in the repository and display a measure of the similarity between them. These values are displayed in terms of marks obtained.

One question has one model answer. It is converted into XML. XML is composed of three parts. 1) Question, 2) Model Answer, and 3) Logical Answer. Here, question term is referred from the perspective of the examiner. He sets the question along with the model answer. The model answer is then stored for comparison purpose and also converted into ontological form for comparison with the candidates" entered answer. Once the set of question is ready, it can be given to candidate for solving the answer. Candidates' answer is keyboard input for the question set prepared by examiner.

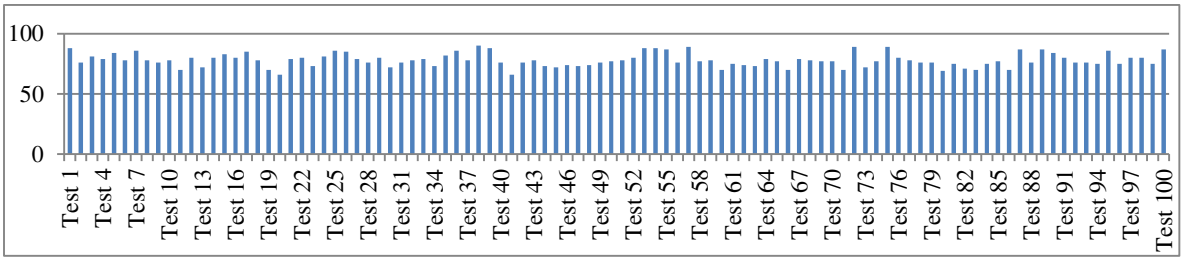
These answers are then preprocessed. The preprocessing involves the steps of tokenizing the words, finding the appropriate sense of word with respect to the context (preparation of domain ontology) and removing the morphological extensions from the word. This is the logical answer.

In order to achieve the above objective we need to represent the answer by student in the form of an XML document such that it is feasible to extract knowledge from it. Each sentence in the paper is represented as an XML tag. The contents of the subtitles are further divided into XML sub-tags to obtain in depth knowledge representation for ease of syntax and semantic analysis. This is the first step called ontology creation. The reason for choosing xml is that XML Schema is a base for defining constraints on well-formed XML documents. It provides basic vocabulary and structuring mechanisms for providing information in XML. [7]

We then perform a tag-by-tag semantic comparison of the two papers. This is accomplished with the help of WordNet lexicon. We compare the meanings of the tags rather than just a simple letter-by-letter word comparison. WordNet also helps us to determine the relationship between the tags-whether they are synonyms, hypernyms, hyponyms, etc. This comparison returns the depth of the relationship between the two words by constructing a relationship tree. This depth is used by our algorithm to computer the measure of similarity between the two documents.

This procedure is repeated for all the XML tags. A count is maintained of the number of tags. We use a form of weighted average to compute the final similarity measure. The tags, which are higher in the hierarchy, are assigned higher values for the weight as compared to the tags, which are lower in the hierarchy. The similarity measure is in percentage form and is the final output of the system. We have implemented the system with the platform of VB.NET and we conducted the test of 40 questions on 100 candidates. After performing several tests, the following results are obtained and are shown with the help of graph. The overall average (success rate) comes out to be 78%.

Graph-1: Result of Test conducted vs. Marks Obtained.



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WEB PORTALS: A GATEWAY FOR KNOWLEDGE SHARING ACROSS DIFFERENT ACADEMIC INSTITUTIONS

Dipali P. Meher[16] Dr. Nilesh Mahajan[17]

ABSTRACT

Every system in day today life uses computers to store data. The stored data can be accessed everywhere using web such as communication, searching for jobs, social activities and sharing of knowledge. The web portals act as gateway for data, information, knowledge sharing. Education systems are generating knowledge in their various activities. The generated knowledge must be passed from one generation to other generation. For these purpose different systems exists such as email, content management systems and Document management systems. Still there is lack of proper management of this data. Therefore, there is need for sharing generated Knowledge across different departments of different institutions. The web portal provides a rich space for sharing knowledge. We aim to analyze systemic view of web portals and propose the development of a web portal as knowledge sharing tool across different Academic institutions, which will help them to get required information in fastest available time.

KEYWORDS

Explicit Knowledge, Tacit Knowledge, Education Systems, Knowledge, Knowledge Management, Web Portal etc.

INTRODUCTION

Every education system is a knowledge-based organization. The generated knowledge in one department may be useful to other departments. However many teachers are not aware of many activities going on in the other departments for generating knowledge of the same or different college. There is may be a possibility of repetition of such activity. The knowledge generating process may be equally useful to other departments. Currently there is not any platform to share a knowledge generated across different departments of different academic institutions.

Research aims sharing of generated knowledge across various departments, which may be, useful for growth, productivity of the departments. Many departments are not aware of expertise, resources available in other departments, which may be useful for them. For example one of the practical at microbiology department tells HB level of a person, But a teacher in history department do not aware of such kind of practical's. Another example preparing a cleaning solution in chemistry departments in simple steps is not aware by person in computer department where dust is to be cleaned every day.

Networking is now a part of any activity in education field. Only sending documents by email are not the purpose of networking. The research allows sharing knowledge generated in every department using a web portal through networking. All the academic institutions are connected to each other with the help of this web portal and can able to share knowledge at any movement.

This paper explores web based knowledge portal system to connect all teachers from it or other various institutions and their individual as well as departmental activities using knowledge management methodologies. A team of postgraduate students and assistant professor of computer science department followed a systems analysis and design process to understand the need of knowledge sharing across departments.

REVIEW OF LITERATURE

Knowledge has many forms such as:

- Concepts, methodologies,
- Facts, beliefs, truths & laws,
- Judgments & expectations, insights,
- Relationships, leverage points,
- Intuition & feelings,
- Meaning and sense making.

In general, there are two types of knowledge:

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Tacit Knowledge

The identifying attributes of tacit knowledge can be summarized as follows [Wikipedia]

- Subjective, cognitive, experiential learning,
- Hard to document,
- Hard to transfer / teach / learn,
- Involves a lot of human interpretation,
- Individual Expertise, Memories, Values, Beliefs and Viewpoints.

Explicit Knowledge

Explicit knowledge is represented by some artifact, such as a document or a video, which has typically been created with the goal of communicating with another person [1].

The identifying attributes of tacit knowledge can be summarized as follows [Wikipedia]

- Subjective, cognitive, experiential learning,
- Hard to document,
- Hard to transfer / teach / learn,
- Involves a lot of human interpretation,
- Individual Expertise, Memories, Values, Beliefs, and Viewpoints.

The term knowledge management was first introduced in a 1986 keynote address to a European management conference [2].

KM is aimed at achieving organizational goals as stated below. Knowledge management is a process for optimizing the effective application of intellectual capital to achieve objectives [3].

KM is a multi-disciplined approach to achieving organizational objectives by making best use of knowledge. It involves the design, review and implementation of both social and technological processes to improve the application of knowledge, in the collective interest of stakeholders [4].

Knowledge Management System (KM System) refers to a (generally IT based) system for managing knowledge in organizations, supporting creation, capture, storage and dissemination of information. It can comprise a part (neither necessary nor sufficient) of a Knowledge Management initiative.

KNOWLEDGE MANAGEMENT SYSTEM IN EDUCATION

Effective practices of sharing knowledge are essential for bringing new faculty members to the desired level of competency. Effective teaching styles, assessment techniques, do have and don'ts shared by senior teachers essentially transform a new faculty into a responsible teacher. Teachers are the pillars of the organization, but when a teacher leaves for a new position; his or her expertise also disappears. The contribution made by people when they were with the organization need to remains as a knowledge asset of the organization. Long-serving staff has a depth of knowledge that is relied upon by other staff. Knowledge management can assist by putting in place a structured mechanism for capturing or transferring this knowledge when staff retires. High staff turnover is a common problem faced by all organizations and more in educational and research institutes due to their typical pay structure. There is always a need of bringing new people into projects and get them up to the speed so they can contribute quickly. The knowledge generated in one academic institution is may be a guideline for other academic institutions of the same department or different department.

The Knowledge Management in Education Summit, held in December 2002 in San Francisco, California, was the first professional gathering in the United States focusing on the role of knowledge management in education. It brought together 40 professionals from k-12 schools, colleges, universities and business. The Summit addressed opportunities and challenges faced by organization's peoples to improve the use and sharing information in education through practices [15]

Web Portals

It is nothing but general KMS technology for storing, sharing accessing, creating, exchanging and reusing knowledge. Pickett and Harmre stated a portal is a gateway to resources in accessible networks such as internet or intranet [5]. Bajec stated that portal is a connection, content, commerce and community [6] [7]. Aragones and Hart stated that a portal provided a starting point for used to access and explore information on the WWW.[17] Dias stated that using web portals everyone shares common interests. [8]

Powell stated that a portal is a network service that collects information from different resources into a personalized and single point of access using searching technology such as cross searching, harvesting, harvesting and alerting to help users[9][10].

Types of Web Portals

Portals care distinguished based on their content and usability. Murray classified portals into four types. [11]

- Information portals- provides information to users
- Collaboration portals- connect users and provide facilities for them to collaborate in activities.
- Expertise portals-allow users to communicate with each other and share their experiences and interests.
- Knowledge portals- provide users a combination of all above mentioned.

Portals are divided into 6 categories based on their contents by Dane Phillip:

- Vertical Portals-concentrate on industry domain. It acts as a gateway to present the products as services of a specific industry to users.
- Horizontal portals-portals are single entry point of a web surfer to provide a variety of resources and information on different topics to general users eg.Yahoo.com, msn.com
- Intranet Portals-used by members in enterprise network or intranet of organization, institutions.
- Knowledge Portals- provides services to users to useful information and resources.
- Enterprise Portals- they are corporate portals. Support enterprise members by providing accessing to suitable resources of certain company or organization.
- Market search portals- support business to business and business to customer ecommerce [14].

OBJECTIVES OF STUDY

- To identify need of knowledge sharing across different academic institutions.
- To develop a portal for sharing a knowledge across different academic institutions.

RESEARCH GAP

Through lecture, practical's, Different lab assignments, case studies, different institutional educational and cultural activities, preparing different documentation formats for different committees and record keeping knowledge is generated every day in the organization. The documents regarding experiment, lectures, case studies, practical's, books, articles, documents should be stored and shared. While storing and sharing the generated knowledge faculties are facing so many difficulties and there is no proper method is available for storing knowledge. Sometimes it is stored with CDs or DVDs, hard disk, printed documents in a file, or in internet. The location of storing knowledge is not fixed. As there is no common format for storing data, it is not available on demand.

Different actions like those that if data is stored in computer hard disks then regularly backups will be taken. If backups are not there then documents are searched on hard disks, internet, search engines, portals. Though data is not available then problem can resolved. Many faculties do not share their experiences and cannot guide new ones. As the CD/Hard disk is damaged due to certain problems like electricity then there is no recovery technique. So many a time print out can be taken and hard copies are stored in a file. Then if the file is misplaced, the data is lost. Due to many reasons either data is not used properly, stored properly, shred properly; there is need for knowledge management in the education [16].

- Requirement of finding out obstacles for knowledge sharing.
- Requirement of institutional repository as number of institutions are growing rapidly.
- Need to establish system in education field, which is benefit to knowledge producing, sharing and application.
- Need to pay attention to manage tacit knowledge.
- Produce an environment for knowledge producing and sharing which strengthen the generation of new knowledge.
- It is necessary to develop new models and insights, tools for content and process of KM in the organization and management of scientific research projects.
- No proper technical method for knowledge sharing.
- Need of successfully development and implementation of portals in education field for knowledge sharing.
- Need of Study of Problems faced by KM initiatives based in actual case studies in education.
- Need of interdisciplinary research initiatives through knowledge sharing.
- Reuse of knowledge saves work reduces communications costs give birth to new research ideas.

BENEFITS OF KM PORTALS

- To support working, learning, teaching, research and development.
- To store and retrieve tacit and explicit knowledge of individuals.
- It improves decision making through accurate information.
- It enhances to develop harmony and relation that save the time and money.
- Improves knowledge management and offers experience of individuals or group of individuals that is the key assets for the future generations.
- Portal allows to sharing all the internal documents, best practices, policies and procedures, expertise and experience of individual and external documents.
- Portal improves the security of the contents.
- It allows content Management, which consist documentation, capturing, storing and managing contents.
- It creates a content browsing and searching structure, which facilitate easy access of information.
- Single point of entry through a common interface with information, resources, and business processes based on the end-user's needs and specifications.
- It gives delivery of customized data.
- Elimination of redundancy in data creation and publishing.
- Promotes standardized data-collection methodology.
- Facilitates timely feedback and approval.[12]

DRAWBACK OF KM PORTALS

- Portals are conceived mainly as IT tools and during the development phase an organizations cultural issues are not taken into consideration
- There is a lack of a common IT platform .and consistency amongst business systems.
- There is low trust in portal security and access control.
- There are too many switches to new technologies.
- Inadequate training is provided in portal usage and benefits are not properly explained.
- There is lack of user participation in the design of the portal.
- There is low performance and inflexibility.
- Lack of maintenance and updating of the portal.
- Lack of alignment between portal related work and company workflow system. [13]

CURRENTLY AVAILABLE KNOWLEDGE MANAGEMENT PORTALS

There are many knowledge management portals but some of them are:

- RKMP (Rice Knowledge Management Portal): RKMP serves as information highway for sharing rich knowledge through latest ICT tools including mobile telephony. It will also help agricultural departments' ongoing activities in reaching out to the farmers through extension advisory services, in most effective way. This portal caters to location specific information needs of many stakeholders through IP based customization on 24X7 bases. This portals also provides information in local languages.[7]

- MPKVPortal (Mahatma Phule Krishi Vidyapeeth Portal): It is the agricultural university in Maharashtra that provides services to farmers through education, research and extension education. To coordinate the education, research and extension education activities for augmentation of agricultural production is the main aim of MPKV portal.

CONCLUSION

Knowledge sharing is important process in the knowledge management. Education systems are the key source of knowledge; here knowledge should be managed effectively. There are many theories and concepts for knowledge management. There are many ways for managing knowledge in educational organizations. For knowledge management in organization, lots of knowledge, which is being created needs to be saved and accessed whenever, required. If proper methods of knowledge sharing are not applied then knowledge may be lost and cannot be passed further.

FUTURE ENHANCEMENT

All the education institutes and universities have their web site, which shows up to date information of them. Though information related current research going on is not shared. Therefore, web portals can be used to communicate the current research related

information. To enhance the research quality all the universities can be connected to a unique research web portal is our aim for the future.

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RE-ENGINEERING EDUCATION WITH THE STUDENT AT THE EPI CENTRE: THE STRATEGY OF CHOICE BASED CREDIT SYSTEM

Muktha Kumar[18] Nirmala Joseph[19]

ABSTRACT

The most important radical change that was triggered in the field of Higher Education, by the recommendations of the Kothari commission was Autonomy. Autonomy advocates a system of self-governance and more importantly Academic freedom. This academic freedom granted by the system of autonomy has undoubtedly helped several colleges to initiate and innovate new curricula, design relevant courses, frame new syllabi and introduce new and relevant evaluation techniques. With Autonomy, it has become increasingly possible to initiate practices that can enhance quality in Higher Education. The system of Choice Based Credit System (CBCS) is definitely a step in this direction. CBCS is more participative and interactive in nature as it involves both the teacher and the student in designing the curriculum and the syllabi. It perpetuates a system that gives the required flexibility for the students to have a greater choice of courses appropriate to their interests, needs and long-term goals rather than a rigid and compartmentalized system. CBCS, if implemented in the spirit in which it has been conceived is set to equip students with a wide spectrum of skills not limited to one's discipline alone, thereby enhancing the much-coveted Quality in Higher Education.

KEYWORDS

Autonomy, Higher Education, CBCS etc.

INTRODUCTION

Higher Education in India has undergone radical changes in the last several decades. Primarily based on a colonial legacy it has gradually lent itself to transformation. The first and the most important radical change that was triggered by the recommendations of the Kothari commission was Autonomy. Autonomy advocates a system of self-governance and more importantly Academic freedom. This academic freedom granted by the system of autonomy has undoubtedly helped several colleges to initiate and innovate new curricula, design relevant courses, frame new syllabi and introduce new and relevant evaluation techniques. With Autonomy, it has become increasingly possible to initiate practices that can enhance quality in Higher Education. CBCS is more participative and interactive in nature as it involves both the teacher and the student in designing the curriculum and the syllabi. It demands more participation from the student to be aware of his interests and likings, places greater obligation on the students to choose subjects of their interest and teaches them to be responsible for their choices.

RATIONALE OF STUDY

Taking cognizance of several benefits of a CBCS and the fact that a student today should be motivated to make responsible choices towards his education, especially at the higher education level, the UGC has recommended that all universities move towards CBCS. It is in this context, that this paper on CBCS assumes relevance and importance.

OBJECTIVES OF STUDY

This paper has a twofold objective: 1) to study the emerging need for incorporating CBCS into the curriculum design and 2) to critically analyze the issues and challenges associated with a CBCS system.

METHODOLOGY USED

This paper is descriptive in nature and is purely based on secondary data, which, was collected from various research articles, journals, magazines and websites especially from the Ministry of Human Resource Development, department of higher education, the University Grants Commission and the Government of India. Further latest contributions of various experts on the subject have also been referred.

CHOICE BASED CREDIT SYSTEM: NEED AND RELEVANCE

CBCS is undoubtedly an innovative move towards the design of new curriculum introduced to ensure academic flexibility to the students. This section of the paper studies the need and relevance of a CBCS in today's Educational Environment.

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- ***Constrictive Current System***: the current system of education is constrictive in nature. It creates a sense of 'isolation' in the minds of the students as they are strictly exposed to only one discipline of study depriving them of the need to understand and view the world from a prism of interrelated disciplines.

- ***Dictated System of Education:*** the current system is highly dictated in nature. Students are expected to study what a few top academicians decide are important for them. There is very less involvement of students in the process of curriculum formation.

- ***Discipline and Complementary Skills:*** Understanding a particular discipline and applying its concepts in the real world is generally the aim of higher education. However, integrating this major discipline with several other subjects, which are not only relevant but also complementary and pursuant to the interests of the students is advocated by the system of CBCS.

- ***Learner Diversity:*** CBCS is highly relevant in reckoning with learner diversity in a classroom environment. It provides ample scope for the 'enthusiastic student' to choose subjects of interest, study across disciplines and acquire more credits. It also caters to the other students to choose from an array of subjects that may interest and suit his acumen and not necessarily be pushed to do the dictated subjects.

- ***Greater Choice for Students:*** CBCS perpetuates a system that gives the required flexibility for the students to have a greater choice of courses appropriate to their interests, needs and long-term goals rather than a rigid and compartmentalized system. The CBCS system provides greater scope to expand the horizon of the students with a plethora of subjects made available to a student to choose.

- ***Responsible Choices:*** the CBCS system trusts the learner's ability to choose from a surfeit of subjects made available to him and navigates a labyrinth of choices, which he is expected to make.

- ***Intellectual Enrichment:*** CBCS advocates a system where, in addition to ones specialized discipline, there is an option to choose from varied subjects. It perpetuates a system of deepening the core skills of students while they also experience insights from other disciplines. This varied portfolio of skills that a student can acquire in this system is bound to create greater intellectual enrichment and enhanced employability.

- ***Student Mobility:*** One of the important characteristics of CBCS is that it aims at creating a standardized system of credits and grading across universities, which in turn would make it easy for the student to migrate from one to another in case of need without any barriers.

- ***Greater Student Exposure:*** It is not only possible for students under this system to be exposed to many subjects and disciplines but also to a multi-campus exposure. CBCS if implemented in the right spirit provides scope for students to complete one year in one campus; another year may be, in any campus of his choice across the country thus creating an enriching experience for the learner.

- ***Credit Accumulation:*** This system provides ample scope for learners to acquire credit from a variety of curricular, co-curricular and extracurricular activities. CBCS as a system advocates 'no ceiling on maximum credits' that a student could acquire during the course of his study.

- ***Pace in Course Completion:*** CBCS believes in the diversity existing among students in terms of their learning potential and provides for students finishing their courses at their own pace. A system where they could discontinue if need be and rejoin without much difficulty at a later stage to finish the course.

- ***Means to Quality Enhancement:*** Creating quality and imparting relevant education in the current education scenario, calls for deep introspection of the current system. Several important and inevitable steps such as regular revision and upgrading of the curriculum and being conscious and vigilant in eliminating obsolete curriculum are prerequisites for implementing CBCS thereby inherently advocating quality in Higher Education.

CHOICE BASED CREDIT SYSTEM: ISSUES AND CHALLENGES

The 11th plan of the UGC, under the new initiative of academic reforms in Higher Educational institutions, opined that, universities are autonomous institutions and have the necessary freedom to experiment new ideas and adopt practices, which they consider appropriate for promoting relevance, quality and excellence within the broad framework of national policy. CBCS is touted as the way forward in this direction of quality and excellence. However, CBCS has to tide over several issues to live up to the true spirit behind its formulation and implementation.

- ***Practical Applicability:*** The practicality of providing several choices across disciplines to the students remains a challenge. CBCS calls for providing unconditional choice for students across disciplines, which cannot be provided in its true meaning. In reality, both the choices as well as the number of students opting for the subjects have to be limited.

- ***Infrastructural Impact:*** Implementation of a CBCS system would require enhanced infrastructure. When increased number of students makes choice of subjects across disciplines, it places a heavy load on the existing infrastructure of the institution. The number of students in a class may be reduced from the standardized number in lieu of the subject choices they make but the infrastructure – teaching aids, teaching gadgets, laboratories and equipment's - required for delivering the program may still be the same hence placing increased load on infrastructure.

- ***Human Resource Impact:*** When students move away from a set curriculum and choose from a wide spectrum of subjects, cutting across disciplines it is bound to trigger human resource issues. CBCS demands for increased faculty strength to handle the choices of students, which poses a challenge in the context of dearth of quality personnel in universities today.

- ***Administrative Impact:*** Coordinating interdisciplinary study opted by students entails meticulous planning, several man-hours of blue print, detailed timetable for all the courses and increased use of technology to objectively register students under each batch of their choice. Initiating such a tedious process would have increased administrative impact on the existing system.

- ***Financial Impact:*** As explained above, CBCS entails an impact on Infrastructure, Human resources and Administration. An impact on these important areas definitely create a huge impact financially also making it difficult for most institutions to offer CBCS in its true form and spirit.

- ***Credit Standardization and Transfer:*** In circumstances when the college is unable, to provide the choice of study of the student, several pertinent issues arise such as; can the student take up a similar course in a different institution? Can such a course be undertaken from any other private institute? Can students depend on MOOCs for studying the subjects of their interest? If such avenues were available to the student, then what would be the modalities of evaluating the performance of the student in that other institute? Can the marks obtained by him elsewhere be converted into credits in the parent institution? Can such credits be transferred back to the parent institution? Several such issues pose a challenge.

- ***Awareness and Exposure of Students:*** The true essence of CBCS lies in equipping students in making intelligent choices pursuant to their interest and likings. If the students were not adequately educated about the system and the variety that it could bring into their curriculum, then the whole system would be a failure. Creating this awareness to the students much ahead as they embark into their graduation would be a prerequisite and nevertheless poses a challenge.

- ***Student Mobility:*** CBCS advocates ease in student mobility; however, unless several issues such, as standardization of credits among all universities and colleges is resolved, student mobility would remain a distant dream. The government has suggested college cluster system for students to take advantage of choices offered by neighboring colleges; however, several administrative and financial issues need to be resolved to get the system working.

- ***Universal Implementation:*** Universal Implementation of the CBCS system would be unsuccessful owing to several pertinent reasons. Introduction and success of CBCS in rural colleges especially in women's colleges would be contentious. This is because, in most of these college students are first generation learners and their level of exposure and awareness is limited. They are confined to limited freedom and juggle between several chores in addition to their academics. Under such circumstances, CBCS expecting students to make choice of subjects, earn additional credits, self-study, extension activities etc., would be a definite challenge.

- ***Employability:*** Under CBCS, there may be a clash of interest between a student's choice of subject and its relevance to employment opportunities. This may hamper the interest of preference. A student may opt for a subject who may provide him job opportunity rather than his area of interest thereby defeating the purpose of providing an inter-disciplinary approach.

CONCLUSION

The last two decades have witnessed impressive transformation in the Higher Education terrain. Several initiatives of the government and the private sector have yielded encouraging results in terms of equity in Higher Education and slow but steady progress is being made in creating excellence through enhanced quality. Several new verticals such as research, partnerships etc., have emerged as new pillars supporting the Higher Education architecture. However, Curriculum and pedagogy remains the mainstay in imparting Quality Education. CBCS, if implemented in the spirit in which it has been conceived is set to equip

students with a wide spectrum of skills not limited to one's discipline alone, thereby enhancing the much-coveted Quality in Higher Education.

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AN OVERVIEW OF MANAGING THE DIGITAL DISASTER

Dinesh E.[20] Dr. T. Vetrivel[21]

ABSTRACT

Usage of computers and incorporating system interface in various organizations and companies are becoming mandatory for the ease of data storage and retrieval, for further reference. Thus, the credibility of the maintenance of the data is mandatory. This paper has analyzed the procedure of digital disaster management for the maintenance. The various systematic ways of losing the data, followed by the present preventive methods with its risk assessments, to figure out the other important procedures to maintain them from being corrupted, is comprehensively analyzed and revealed. Further, this paper has also given the various ways of recovery methods, ensuring safety measures for effective data management.

KEYWORDS

Digital Disaster, Disaster Management, Disaster Planning, Data, Data Recovery etc.

INTRODUCTION

A disaster is a serious disruption of the functioning of a society, causing widespread human, material or environmental loss, which exceeds the ability of the affected society to cope using only its own resources. Disasters may be sudden or slow or they could be natural or man-made. Disaster is a sudden, catastrophic event bringing great damage, loss, and destruction and devastation to life and property. [1]

Buildings can be rebuilt; furniture and equipment's can be easily replaced within a short period. Even, computers and digital equipment's can be purchased and replaced within the single click of a mouse button. However, the data stored in the computer and digital equipment is not easy to replace. This stored data may be accounting file, credit card details, bank details, client lists, important business activities, etc. This digital data loss is common for the company as well as individual. One who derived new formulae or invention, which is stored in the computer system, if the digital data disaster may be occurring; it is very difficult to replace this intellectual property. Data loss is an intangible digital disaster in the information technology world.

There are two types of digital disaster to the computer infrastructure that supports the data properties. The first disaster is physical loss due to system failure or a disaster in the area and the second disaster is logical loss due to application error or user error. Physical loss disaster includes natural disaster, flood or fire accident, hard disk or network crashed, etc. It accounts approximately 20 percent of the all disasters affecting information technology resources. In stand out against, logical loss disaster includes application errors, user errors, security errors, system files crashed, etc. It accounts approximately 80 percent of the all disaster. Logical data loss can be recovered, but it takes more time. [2]

DIGITAL DISASTER

Two types may cause digital Disasters: One is natural disasters (such as floods and earthquakes); second, one is manmade disasters (such as cyber terrorism). In addition, it causes many ways like, failures of infrastructure (such as power failures) or simply human error (such as accidental deletion of data).

A. Digital Disaster Management

Emergency management, which is also known as disaster management, can be defined as dealing with and avoiding both natural and man-made disasters. Disaster management involves preparedness before the disaster, rebuilding and supporting society after natural disasters and supporting after man-made disasters [3]. Nowadays, information technology has developed in global level. In addition, technology oriented disaster, which is digital disaster challenges to both the government and business organizations also individuals work in the field of information technology. [3]

Disaster Management Act of India, 2005 [4] defines that, disaster management means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for: a) Prevention, b) Mitigation, c) Capacity-building, d) Preparedness, e) Response, f) Assessing the severity, g) Evacuation, rescue and relief, and h) Rehabilitation and reconstruction.

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As the same, digital disaster management also dealing with the continuous and integrated process of planning, organizing, coordinating and implementing measures. Digital disaster management is a process or strategy that is implemented before, during or after any type of catastrophic event takes place. This process can be initiated whenever anything threatens to disrupt normal operations or puts digital data loss.

There are four essential parts of digital disaster management. That is, Risk Assessment, Prevention, Preparation and Recovery. Risk Assessment is for the data can be susceptible to loss or crash from many sources. Not all catastrophes can be prevented, but many types can be avoided, and the effects of others can be mitigated. Preparation might include long-term plans for readiness as well as processes. Recovery includes repairing, rebuilding, restoring or replacing whatever the data was damaged, crashed, or lost because of the disaster. [5]

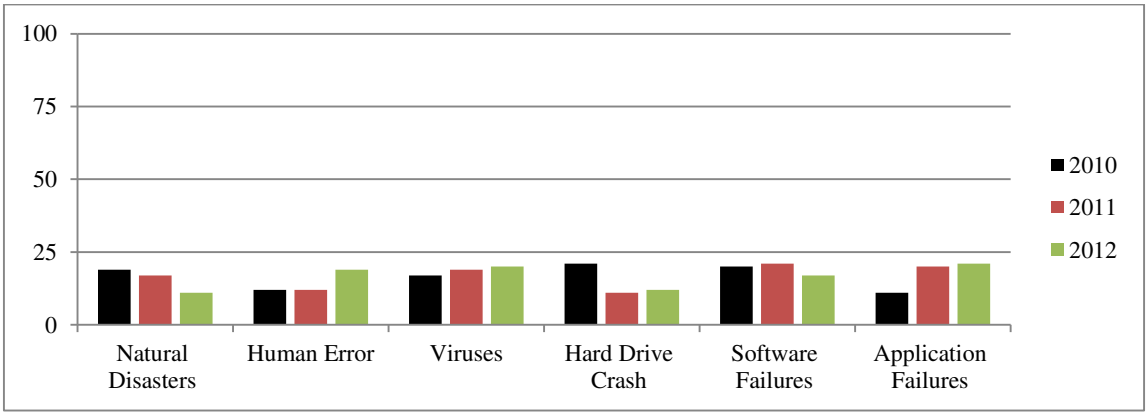
B. Digital Disaster Risk Assessment

Data are susceptible to loss, damage, or both from various sources. Some of the sources of data loss:

Category	Description
Natural Disasters	It may be fire or flood or cyclone or tsunami and it can all cause physical damage to systems and digital equipment's. It makes the data unavailable or unreadable.
Viruses	These malicious programs can get into the computer system at any time and strike it to steal data or crashing the program or files. Once the system infected, the virus can spread from system to system, destroying data along the way.
Hard Drive Crash	Viruses may affect a hard drive crash or circuit damage or connection failure or deletion of operating system supported files.
Software Failures	Operating systems and storage area network software can fail, corrupting existing data. It leads to data loss.
Application Failures	Applications are not guaranteed to be bug free; a bug in an application can cause incomplete or incorrectly formatted or calculated data to be written into the files in the computer system.

Approximately 20% of application downtime is attributed to a "disaster". 40% is caused by application code failures. 40% is caused by operator error. 20% is caused by system / environmental failure or other disasters. [6]

Figure-1: Shows the Year Wise and Various Categories of Data Losses



Sources: Authors Compilation

C. Digital Disaster Prevention

Identify the data, which is most important, and minimize the risks of software, plug-in, harmful sites, etc.:

- Carry out a website inspection and other factors, which make the browser with firewall.
- Establish routine anti-virus scanner and maintenance measures to withstand data disaster in hard disk and other drives.
- Take special safety measures during unusual periods of increased risk, such as malware found or run time error.
- Create unique arrangements to ensure the safety of important data or archival material when exhibited.
- Provide security software of vital records such as collection of data, and store these off-site.
- Protect computers and data through provision of uninterrupted power supply.

- Have comprehensive insurance for the data or archives, its contents, the cost of salvage operations, and potential replacement, re-binding and restoration of damaged materials.
- Install automatic fire detection and extinguishing systems, and water-sensing alarms.

D. Digital Disaster Preparation

- Develop a written preparedness, response and recovery plan for digital data loss from disaster and keep the plan up-to-date, and test it.
- Maintain together supplies and equipment required to store the data or devices in a disaster and maintains them.
- Establish and train an internal disaster response team. Training the team in:
    - Disaster reaction techniques
    - Recognition and marking of data-plans and enclosures of irreplaceable and important data for priority salvage.
    - Set up and keep an up-to-date set of data documentations for the digital disaster prevention.
    - Salvage procedures for data losses in disaster.
- Share out the data plan and data documentations to appropriate locations on- and off-site.

E. Digital Disaster Recovery

The following ways getting back to normal from digital disaster and data loss:

- Set up a program to restore both the disaster site and the damaged data to a stable and usable condition.
- Find out priorities for restoration work and seek the advice of a conservator as to the best methods and options, and obtain cost estimates.
- Develop a phased conservation program where large quantities of data are involved.
- Discard items not worth retaining, and replace or re-bind items not justifying special conservation treatment.
- Restores recovered data at the refurbished location.
- Analyze the disaster and improve the plan in the light of experience.

REFINED MODEL FOR DIGITAL DISASTER RECOVERY

Digital disaster recovery is defined as all activities designed to restore critical data, their supporting systems, and other digital services after a disaster. The purpose of this recovery section is to detail the steps the organizations will undertake to restore its digital assets, their supporting systems, and other digital services to full functionality after an emergency or disaster scenario. [7]

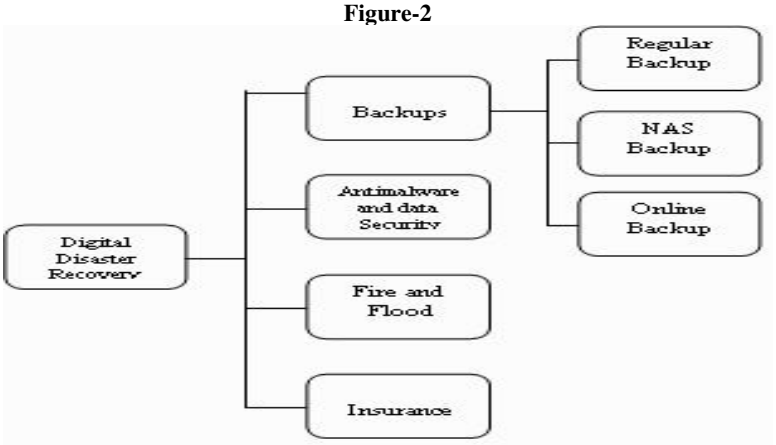
Backups

Figure-2 shows the various methods of data storage and recovery from digital disaster. Different types of data and different time of data requirements will require different backup processes and media. Types of backups include:

Regular Backup

This is the simplest way to perform backups, but it is suitable for people with just one or two computers. Plug a high-capacity USB hard drive / Blu-ray disc / DVD / External Hard Disk into computer, and set up a backup program.

Figure-2



Sources: Authors Compilation

NAS Backup

A Network-Attached Storage (NAS) environment is a common storage area for multiple servers. NAS environments are useful for storage or file server applications, such as mail and Web services. When multiple computers need backing up, a NAS system makes excellent sense. A NAS device is attached to the router, then use included software or own backup program to back up to the NAS periodically. It has one drawback: Often, the backup software included with these drives is limited, and backup traffic can be so heavy that it floods the network.

Online Backup

High bandwidth internet connection available, backing up online can be the most secure way to protect the data against disasters. Online backup sends the files to a far-off location, removing any risk of loss from physical theft, fire, or flood at the organization / home. On the other hand, some online, cloud-based services have been victimized by security breaches. Online data storage is becoming popular as Software as a Service (SaaS) is being used more and more to provide services to end users. Online data storage provides the following benefits for disaster recovery:

- The most obvious benefit is that the data is automatically stored in another location. Backups done to be automatically started or managed.
- Data can be protected in online storage with secured encryption mode. It can be accessed anywhere in the world at any time via internet connection.
- Remote offices and road warriors can back up their data without requiring separate hardware or complex VPN solutions.
- There are lower upfront costs to implement an online backup solution. Online storage service is normally provided on a subscription basis to store and secure the data.
- No special in-house technical skills are required. The service provider's responsibility to maintain and secure the data.

a. Antimalware and Data Security

Malicious software (Malware) is used or created by hackers to disrupt computer operation, gather sensitive information or data or gain access to private computer systems. It can appear in the form of code, scripts, active content, and other software [8]. It can provide real time protection against the installation of malware software on a computer. Anti-malware software programs can be used solely for detection and removal of malware software that has already been installed onto a computer.

b. Fire and Floods

The general preparedness for off-site backups will help mitigate damage due to natural disasters, but a few devices can do even more in fire or flood. For digital storage, external hard drives designed to resist both fire (at up to 1550 degrees Fahrenheit) and water (a water column of up to 10 feet). Keep analog essentials such as paper documents (and printouts of essential data) either off-site in a safe deposit box or in a strong fire safe on the premises. These inexpensive safeguards are well worth the investment. It includes high-quality surge protectors or UPSs on all high-tech equipment for protection against power surges and lightning strikes.

c. Insurance

Generally, insurance is the best safeguard against financial ruin. Insurance will cover the loss of hardware or data, which is loose in disaster. [9]

AVOID A DIGITAL DISASTER

- Do store the data files in more than one location. Maybe one backup at the organization or at home.
- Use high quality storage devices, preferably with built in redundancy. Some devices use two hard drives; if one drive should fail, an exact duplicate is available so no data is lost.
- Quality CD should be used to store data. Not all CD-Rs are created equal. The stability of the recordable dye layer as well as the protective clear coat affects the longevity of CD-Rs. It is better to use Platinum, scratch resistant CD-Rs.
- CD-Rs have a greater expected lifespan than DVD-R. Obviously, the DVD is necessary for preserving movies because of the large file sizes involved in recording video.
- Do make prints if possible. Photographic prints have been around for over 100 years. The jury is still out on the JPEG. Better to store the digital photographs in secured online storage. It is also easy to retrieve at anytime and anywhere in the world. [10]

CONCLUSION

Thus, this article has explored the concept of digital disaster and the consequences of it, very elaborately and accurately. Further, the importance of maintaining the data on any basis is unique and vital, as it is the very basic function of computer system module. Hence, this paper has also investigated the ways of preserving the data and other systematic ways to prevent being destroyed or being corrupted, by any means.

The various ways by which the data have undergone damaged or corrupted is systematically analyzed and studied for effective and efficient ways of maintaining them. The various usages and ease of maintenance is also revealed. Additionally, this paper has stated the various ways to avoid a digital disaster, for any network of computer system, maintain records and data.

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BUILDING GLOBAL BRANDS ON WEB

R. Vasudevan[22]

ABSTRACT

Emergence of web as a strong medium of strategic communication has given rise to a new platform to advertise and establish the brands making it necessary to formulate appropriate branding strategies. Branding weather online or offline are strategic decisions that need a different mindset. It is found that in brand building maximum focus is to be given on enhancing the benefits to the customer. Branding on web with given suggestion will facilitate value addition to the services and help in creating brand loyalty that resulting in a win situation for the organization and the customer both. Present paper focuses on some of the issues involved in brand building on the web. Another of this paper has studied these issues in detail and has suggested models for branding in the digital age.

KEYWORDS

Branding, Advertisement, Buying Decision, Awareness etc.

INTRODUCTION

The World Wide Web is poised to become a standard medium for advertisers around the world. Internet advertising revenues currently remain small relative to traditional media, but with astronomical annual growth rates reported. That they are projected to reach overtaking magazine, cable, yellow pages and radio advertising spending. A comparison of traditional media and the internet reveals that the internet has now been accepted as an important stand-alone advertising medium. The important elements in its favour are the growth in usage, the demographics of users, the higher effectiveness and the competitive efficiency of the internet. Though the strengths of the internet are many, there are specific weaknesses like the lack of consistent standards of measurement, inadequate sophistication of pricing and placement standards\ Paucity.

With the growth of number of users, the internet is increasingly seen as a commercial medium with immense potential for information sharing, market transactions, advertising and promotions. Many internet service providers (ISP) now offer internet-connectivity to the masses, and this is changing the profile of users on the internet. For some advertisers, the internet has proved valuable and for some others, an expensive failure. Why will they fail? & how might they have succeeded? This paper seeks to address some insights for different advertising options on the internet for building & managing global brands, an e-community, and location aspects on the internet.

ADVERTISING ON INTERNET MEDIA

Internet media for advertising consist of e-mail, Usenet, and the World Wide Web. Internet advertising tactics differ in the degree to which the advertisement is "pushed" onto or requested ("pulled") by the consumer. Internet advertising that uses a push strategy is akin to traditional advertising: the marketer delivers the communication to the consumer at the marketer's choosing retaining control over when, where, and how the advertising message delivered.

Advertising delivered via e-mail and Usenet typically involves push strategies. As will be discussed if such strategies are done improperly, it can lead to considerable backlash. With pull tactics, consumers have control over advertising exposure. That is consumers seek most common on the World Wide Web. By using software such as Netscape, consumers can simply input the addresses of websites they wish to visit and directly access the information available there.

THE INTERNET AS MEDIUM PRESENTS GREAT ADVERTISING OPPORTUNITIES FOR MARKETERS MAINLY DUE TO SIX IMPORTANT REASONS

Target Market Selectivity - The web offers marketers a new and precise way to target market segments [demographics, geographic, and psychographics].

Tracking - Internet allows marketers to track how users interact with their brands and to learn.

Deliverability and Flexibility - Online advertising id delivered twenty-four hours a day seven days a week for the convenience of the receiver. Whenever the receiver is logged an active, advertising is there and ready to greet them.

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Interactivity - A lofty and often unattainable goal for a marketer is to engage a prospective customer with the brand and the firm.

Cost - While the cost-per thousand numbers on reaching audiences through the web are still relatively high compared to radio or television, the cost for producing a web ad is relatively low. This includes both banner ads and websites.

Integration - Web advertising is easily integrated with other forms of promotion. In the most basic sense, all traditional media advertising being used by a marketer can carry the web site URL.

DIFFERENT ADVERTISING OPTIONS ON THE INTERNET FOR BUILDING AND MANAGING GLOBAL BRANDS

Banner Ads: Banner ads are paid placements of advertising on other sites that contain editorial material. With banner ads, consumers not only see the ad but also can make a quick trip to marketer's home page by clicking on the ad (called "click-through"). Thus, the challenge of creating and placing banner ads is not only to catch people attention but also to entice them to visit the marketer's home page and stay for a while. The reason for the popularity of the banner advertising has been mainly that advertisers believe that they understand them. To regular media advertisers the banner advertisements look deceptively like 'real-world' magazine advertisements. This superficial similarity seemingly makes it acceptable to the web users as legitimate in context.

Pop-up-ads: It is an advertisement that appears as a web page is loading or after a page has loaded. A surfer wants to go to a certain site but has to wade through an as page first, just a television viewer must watch a commercial before seeing a favorite show. It is often not merely a word from a sponsor, but invitations to link to another related site. A pop-up as opens a separate window. The more times people click on these ads, the more money can be charged for the privilege of advertising.

E-mail Communication: E-mail communication may be the internet's most advantageous application. Through e-mail, the internet is the only "mass" medium capable of customizing a message for thousands or even millions of receivers. The message is delivered in a unique way, one at a time, which no other medium is capable of doing, E-mail advertising is expected to grow from about 3 percent of total advertising in 1999 to about 15 percent of the total in 2003. The attitude toward e-mail varies, of course, depending on whether people for e-mail to be delivered. When web users agree to receive e-mails from organizations, it can be called permission marketing. E-mail and listservs marketers can encourage viral marketing. Viral marketing is the process of consumers marketing to consumers over the internet through word of mouth transmitted via e-mails and listservs.

Corporate Home Pages: it is a web site where a marketer provides current and potential customers detailed information about the firm. The best corporate home pages not only provide corporate and product information, but also offer other content of interest to site visitors. A variation on the corporate web site is setting up a site and placing it inside a virtual mall. A virtual mall is a gateway to a group of internet storefronts that provide access to mall sites by simply clicking on a category of store.

MANAGING THE BRAND IN AN E-COMMUNITY

The internet, in addition to providing a new means for marketers to communicate to consumers, also provides consumers a new and efficient way to communicate with one another. In fact, the social aspect of the internet is one of the most important reasons for its success. One of the reasons, members of the communities, like to get together is to share their experiences in using the brand. They can share what they like about the brand and what it means to them, or suggest places to go to buy replacement parts or have the product serviced.

However, marketers need to be careful not to alienate members or turn them off the brand. These consumers can also share their dislikes about recent changes in the brand and its advertising, rejecting them if sever enough. Since the internet makes it easier for members of these communities to interact, brand communities are likely to proliferate in coming years. Consequently, dealing effectively with these communities will be one of the challenges facing marketers. Of course, this creates new management issues as well. One of the most intriguing ideas for marketers has been how to access and use consumer world of mouth. The internet has made the collection and management of this data much easier.

We also need to realize that using the web, as a brand builder is not reserved just for consumer brands. Business products marketers are discovering the power of the web for brand building as well. In addition, from a corporate perspective, the web is an ideal global medium, as Arthur Andersen, the global consulting firm, discovered when it set out to revamp its brand image.

BENEFITS OF E-BRANDING

According to global internet marketing Inc., the off-line market is saturated. Daily we are exposed to around 10,000 brands while less than 5 percent of new brand launches survive 5 years. Online global brand building means addressing 154 million internet users spread across 242 internet national domain locations. Another impressive fact to consider. It took more than 50 years for Coca-Cola to become a worldwide market leader, but only five years for online search engine yahoo! To gain market dominance. The role of the brand has changed dramatically and has created a vacuum between offline and online brands. That is because

offline brands lack interactivity. They are passive. Offline brands can only communicate one way via television, print and radio. Online brands "listen" to the consumer, learn from them, and react based on the consumer's needs. This new skill- this interactivity – is an online brands strongest asset. It enables the brand owner to form a one-to-one relationship with the consumer.

PROBLEMS IN E-BRANDING

Plentiful product information may not alleviate all the problems of consumer search for two reasons. First, despite the increased availability of product information, it is still not costless to obtain. On the internet, search for information may involve a non-trivial navigation of hyperlinks between web sites and an intelligent usage of the search engines and directories. For many users, especially those inexperienced to the internet, finding product information may be frustrating. Second even with the information available, some uncertainly about product quality is likely to linger.

Although some product characteristics can be easily illustrated or described on a web site, other product characteristics require consumption before their quality are known. For example, firms that sell food products from their web sites could state the price, ingredients, and availability of its product, but it would have difficulty in both verifying the truthfulness of this objective information and describing subjective information, such as flavor or feel. As a result, some residual uncertainty about the product features is likely to remain. The costs of search and the unverifiable nature of some product characteristics pose challenges to consumers. Both problems limit the amount of confidence a consumer may have about a product's quality.

BRAND BUILDING IN THE DIGITAL ECONOMY

Branding on web needs even more attention and proper strategy formulation. There is a need for building revenue producing online brand by developing a campaign that sells the value of goods or services. Because of an in depth observations of well-established brands and through structured interviews of personals directly related to brand development on the web, we could develop certain "Guidelines" for development of effective brands on the web.

- Competitor's analysis: one cannot build a unique brand without knowing the layout of the digital and real world. The beauty of the web is that it is an instant/ready to use, any time resource for analysis and one can find out quite a lot from competitor's web sites about his/her strengths/weakness and plan own strategies.

- The definition of SWOT needs to be changed: one should not over emphasize own strengths. Rather one should try to have competitor's insight, strengths, and weaknesses. Opportunities should be identified on right time, rather before time, as they do not exist for all but for fast strategic movers and the threats are disguised opportunities. Instead of learning from the own experiences and failures, it is always wise to learn from others experiences.

- In fact, success of business is determined by six simple words "FIND A NEED AND FILL IT" or better "CREATE A NEED AND FILL IT": Accordingly, it is necessary to properly and timely identify the target customer, as everything flows from this. It is difficult to conceptualize one's creative, graphical imagery content, or what type of online media should be deployed, until the size and characteristics of target audience is known.

- Revenue producing brands should be created this translates to marketing campaigns that deliver sales. This refers to developing messages that speak to the audience.

- In case of a new entrant one needs to develop some branding with other complimentary partners. Who have established names in market? This can include joint announcements. Co-branded pages, Direct marketing, or opt-in e-mail pieces etc.

- Value our customer: treat your customer as Atithi - who visits without any pre-notice & as a good host we should make every moment enjoyable for him, no matter for how much time he is with us. This will facilitate his revisit that can always be capitalized.

ESSENTIALS FOR A GOOD WEB BRANDS

If the brands are to survive on the internet, brand owners need to develop conversations with markets. Firms need to communicate directly with the customers to continuously develop additional customer relevant values.

Fate of a brand on the web is decided much by its domain name. It should be self-explanatory about the product, easy to remember and understand. As we see in case of Bisleri, a generic name for mineral water, its domain name is www.bisleri.com that is self –explanatory about the product.

An effective web brand should represent an entire customer experience. Starting from the home page, website design, page navigation and online support, all play an important role in making a web brand successful. Customer's expectations and desires need to be fulfilled. The immediate customer experience is significant for online branding. Hence, the look and feel of the website and the quality of the interface is the most important way to communicate its brand.

TRANSFORMING "ONLINE BILLBOARD" INTO AN ACTUAL DESTINATION FOR ONLINE "SURFER"

The best way to convert a stranger into a potential customer is to actually get him or her to sample the product first. Therefore, in the world of internet, there is no better way to build awareness than to drive a qualified user to a site, to see it and explore the features. When a customer visits a site, he should be provided with proper facilities. To top the list, proper provision for online transaction, attractive pricing, proper product exhibit with three dimensional picture, product specification in the simple language, contact information such as online fax, phone and email addresses etc. are some of the essential items to be put on website.

- Online buyers should get extra advantage that can be in the form of proper customer services, guarantee, after sales services, money back offer and interactive facility etc. Automated email follow-ups may be used that keep reinforcing the brand name one is selling. A bulletin board helps consumers interact with each other.

- A site should display in such a way that the transaction is smooth and does not take much time. SHOPPER'S STOP, has reduced its buying process from 8 to 3 clicks, resulting in increased number of customers.

- Earning and retaining a loyal customer is most significant. So every effort should be made in order to get proper feedback that can be helpful in establishing credibility of the product and the organization.

- All online campaigns can only be successful if they are backed by proper offline advertisings. As we have seen in the case of epatra.com, the first e-mail portal of the world was promoted through both the online as well as offline advertising.

- Reaching specific customer is one such highly customized factor which none of other communication medium provides. Due to this proper targeting of the customer is possible.

THE 12-POINT VIJETA MODEL FOR EFFECTIVE WEB BRANDING

To develop a brand building & managing model, an in depth study of various websites and analysis of their presence was carried out by a limited survey of 2650 regular web surfers. The questionnaire aimed at finding out the views of respondents on their web visiting behavior depending up on the web characteristics. Based upon the analysis of results the Vijeta model as given below has been developed:

- Displaying products compellingly,
- Designing a Site that Builds Trust,
- Creating Special Offers to Boost Sales,
- Improving the Product Description Copy,
- Overcoming Barriers to Order Completion,
- Using HTML E-Mail to sell your products,
- Improving Store Navigation to Increase Sales,
- Fine-tune Ordering System to Encourage Sales,
- Employing Color and Graphics to Stimulate Sales,
- Increasing Sales through Cross-Selling and Up-Selling,
- Structuring Shipping Charges,
- Redesigning On line Store's Display.

CONCLUSION

Succeeding on the web can be made easier if we know the strengths of the product. The key is to offer the customer something extra without additional cost. Present consumer's consciousness and awareness has made the companies awake from their long sleep. As consumer surfs the site, he should be made to feel confident to get an added advantage. The most important part is that customer should feel satisfied by his act. This is all possible if proper branding strategy is formulated and acted upon. Web world is full of information but everything should not be poured on the customer at one go. Rather adequate information on right time in right format should be supplied.

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IMPLEMENTING AES ALGORITHM IN CLOUD FOR DATA SECURITY

Satish Ambike[23] Smita Dhongade[24]

ABSTRACT

Data security in cloud computing using AES algorithm is objective of this paper Cloud computing manages and schedules the computing resources through network, and constitutes a large computing resources pool, which can provide service to users on their demand. It delivers a service through the internet based on user demand, such as network, operating system, storage, hardware, software etc. These services are classified into three types: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). The Advanced Encryption Standard (AES) is formal encryption method adopted by the National Institute of Standards and Technology of the US Government, and is accepted worldwide. The AES encryption algorithm is a block cipher that uses an encryption key and a several rounds of encryption. AES encryption uses a single key as a part of the encryption process. [2] The key can be 128 bits (16 bytes), 192 bits (24 bytes), or 256 bits (32 bytes) in length. The term 128-bit encryption refers to the use of a 128-bit encryption key. With AES, both the encryption and the decryption are performed using the same key. This is called a symmetric encryption algorithm.

KEYWORDS

Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Advanced Encryption Standard (AES) etc.

INTRODUCTION

The Advanced Encryption Standard (AES) was distributed by NIST (National Institute of Standards and Technology) in 2001[1]. AES is a symmetric piece figure that is proposed to supplant DES as the affirmed standard for an extensive variety of uses. The AES figure (& different applicants) structure the most recent era of peace figures, and now we see a critical increment in the square size - from the old standard of 64-bits up to 128-bits; and keys from 128 to 256-bits. Partially people have determined this in general shows of thorough key pursuits of DES. Whilst triple-DES is viewed as secure and well comprehended, it is moderate, particularly in s/w. In a first round of assessment, 15 proposed calculations were acknowledged. A second round limited the field to 5 calculations. NIST finished its assessment transform and distributed a last standard (FIPS PUB 197) in November of 2001. NIST chose Rijndael as the proposed AES calculation. The two specialists who created and submitted Rijndael for the AES are both cryptographers from Belgium: Dr. Joan Daemen and Dr. Vincent Rijmen.

The Rijndael proposal for AES defined a cipher in which the block length and the key length can be independently specified to be 128, 192, or 256 bits. The AES specification uses the same three key size alternatives but limits the block length to 128 bits. Rijndael is an academic submission, based on the earlier Square cipher, from Belgium academics Dr. Joan Daemen and Dr. Vincent Rijmen. It is an iterative cipher (operates on entire data block in every round) rather than feistel (operate on halves at a time), and was designed to have characteristics of: Resistance against all known attacks, Speed and code compactness on a wide range of platforms, & Design simplicity.

Related Work

[3] Bryan Weeks, Mark Bean, Tom Rozylowicz. "Hardware performance simulations of Round 2 Advanced Encryption Standard algorithms". This paper presents a technical overview of the methods and approaches used to analyze the Round 2 candidate algorithms (MARS, RC6, RIJNDAEL, SERPENT and TWOFISH) in CMOS-based hardware. Both design procedures and architectures will be presented to provide an overview of each of the algorithms and the methods used. [4] Chi-Wu H., Chi-Jeng C., Mao-Yuan L., Hung-Yun T., "The FPGA Implementation of 128-bits AES Algorithm Based on Four 32-bits Parallel Operation". Conventional symmetric cryptographic algorithms such as DES, IDEA, RC6, Blowfish and AES are developed before the year 2000 when computers were built around single 32, 16 or even 8 bits processors. Now, Cryptographic algorithms are executed much faster on modern computers. The present day computing systems and that of future are not that of single core 32-bits desktops, but of multi-cored chips and multiprocessor machines whose processing capacities are 64 or 128 or more bits. Parallelizing the cryptographic algorithms is the only means to utilize these systems productively.

[5] Swankoski E. J., Brooks R. R., Narayanan V., Kandemir M., and Irwin M. J., "A Parallel Architecture for Secure FPGA Symmetric Encryption", proceedings of the 18th International Parallel and Distributed Processing Symposium, Cryptographic algorithms are at the heart of secure systems worldwide, providing encryption for millions of sensitive financial, government, and private transactions daily. Reconfigurable computing platforms like FPGAs provide a relatively low-cost, high- performance

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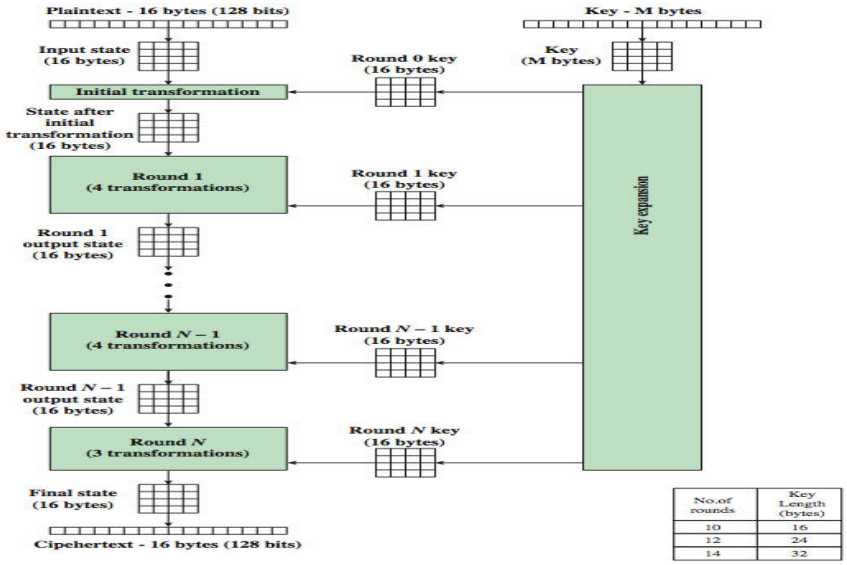
method of implementing cryptographic primitives. Several standard algorithms are used: the Data Encryption Standard (DES), its cipher block chained counterpart (3DES), and the Advanced Encryption Standard (AES), and Conventional high-performance.

PROPOSED INTERNAL WORKING STEPS TAKEN FOR DATA SECURITY WITH AES ALGORITHM

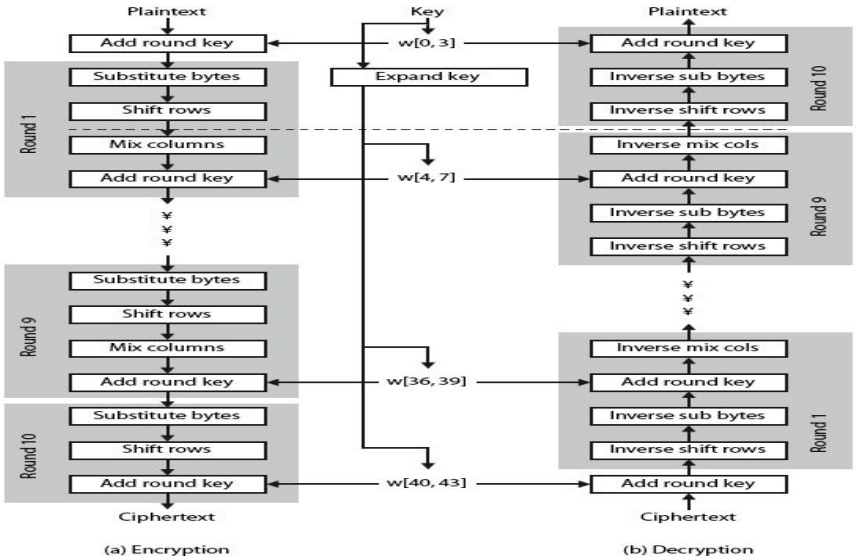
Figure-1: Shows AES Encryption Process



Sources: Authors Compilation

[8][9]The input to the AES encryption algorithms is a single 128-bit block, depicted in FIPS PUB 197, as a square matrix of bytes. This block is copied into the State array, which is modified at each stage of encryption or decryption. After the final stage, State is copied to an output. The key is expanded into 44/52/60 lots of 32-bit words (see later), with 4 used in each round. Note that the ordering of bytes within a matrix is by column. So, for example, the first four bytes of a 128-bit plaintext input to the encryption cipher occupy the first column of the in matrix, the second four bytes occupy the second column, and so on. Similarly, the first four bytes of the expanded key, which form a word, occupy the first column of the w matrix. The data computation then consists of an "add round key" step, then 9/11/13 rounds with all 4 steps, and a final $10^{th}/12^{th}/14^{th}$ step of byte subs + mix cols + add round key. This can be viewed as alternating XOR key & scramble data bytes operations. All of the steps are easily reversed, and can be efficiently implemented using XOR's & table lookups.

Figure-2: AES Structure



Sources: Authors Compilation

The cipher consists of N rounds, where the number of rounds depends on the key length: 10 rounds for a 16-byte key; 12 rounds for 24-byte key; and 14 rounds for a 32-byte key. The first N–1 rounds consist of four distinct transformation functions: SubBytes, ShiftRows, Mix Columns, and AddRoundKey, which are described subsequently. The final round contains only 3 transformation, and there is an initial single transformation (AddRoundKey) before the first round, which can be considered Round 0. Each transformation takes one or more 4 x 4 matrices as input and produces a 4 x 4 matrix as output. Figure shows that the output of each round is a 4 x 4 matrix, with the output of the final round being the ciphertext. In addition, the key expansion function generates N + 1 round keys, each of which is a distinct 4x4 matrix. Each round key serve as one of the inputs to the AddRoundKey transformation in each round.

Some Comments on AES

1. An **iterative** rather than **Feistel** cipher,
2. key expanded into array of 32-bit words,
3. four words form round key in each round,
4. 4 different stages are used as shown,
5. Has a simple structure,
6. Only AddRoundKey uses key,
7. AddRoundKey a form of Vernam cipher,
8. Each stage is easily reversible,
9. Decryption uses keys in reverse order,
10. Decryption does recover plaintext,
11. Final round has only 3 stages.

Before delving into details, can make several comments about the overall AES structure.

Substitute Bytes

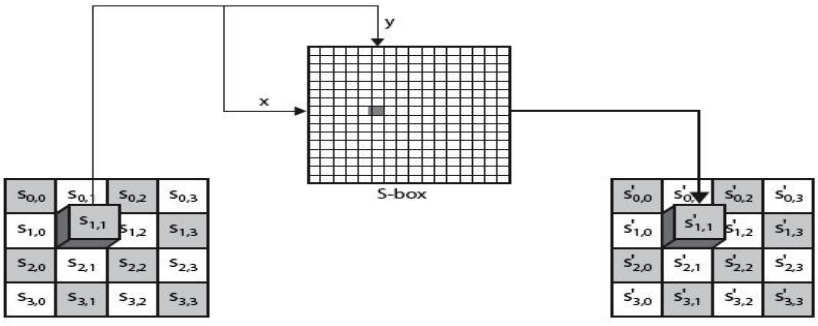
- A simple substitution of each byte
- Uses one table of 16x16 bytes containing a permutation of all 256 8-bit values
- Each byte of state is replaced by byte indexed by row (left 4-bits) & column (right 4-bits)
    - e.g. byte {95} is replaced by byte in row 9 column 5
    - which has value {2A}
- S-box constructed using defined transformation of values in GF (2^8) designed to be resistant to all known attacks.

We now turn to a discussion of each of the four transformations used in AES. For each stage, we mention the forward (encryption) algorithm, the inverse (decryption) algorithm, and the rationale for the design of that stage.

The Substitute bytes stage uses an S-box to perform a byte-by-byte substitution of the block. There is a single 8-bit wide S-box used on every byte. This S-box is a permutation of all 256 8-bit values, constructed using a transformation which treats the values as polynomials in GF (2^8) – however it is fixed, so really only need to know the table when implementing. Decryption requires the inverse of the table.

The table was designed to be resistant to known cryptanalytic attacks. Specifically, the Rijndael developers sought a design that has a low correlation between input bits and output bits, with the property that the output cannot be described as a simple mathematical function of the input, with no fixed points and no "opposite fixed points".

Figure-3



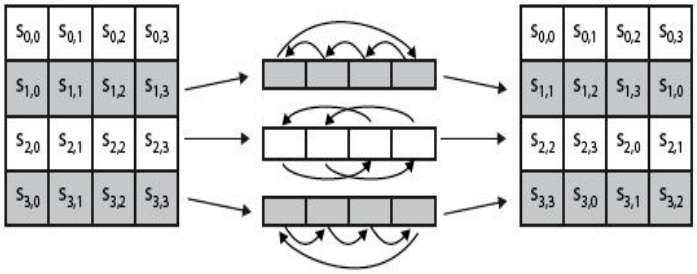
Sources: Authors Compilation

As this diagram shows, the Byte Substitution operates on each byte of state independently, with the input byte used to index a row/col in the table to retrieve the substituted value.

Shift Rows

The Shift Rows stage provides a simple "permutation" of the data, whereas the other steps involve substitutions. Further, since the state is treated as a block of columns, it is this step, which provides for diffusion of values between columns. It performs a circular rotate on each row of 0, 1, 2 & 3 places for respective rows. When decrypting it performs the circular shifts in the opposite direction for each row. This row shift moves an individual byte from one column to another, which is a linear distance of a multiple of 4 bytes, and ensures that the 4 bytes of one column are spread out to four different columns.

Figure-4



Sources: Authors Compilation

CONCLUSION AND FUTURE SCOPE

From above work, it is concluded that security is an important issue at present time. In cryptography we use key called public key and private key. In these paper security algorithms, AES is implemented with selection process, details of Rijndael, key expansion and implementation aspects that shows the performance of algorithms. AES is more secure as compare to DES. In future, more enhance in the AES algorithm to increase the performance.

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Details for Demand Drafts

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TEACHING MANAGEMENT PROGRAMME THROUGH NEW MEDIA TECHNOLOGIES IN INDIA: AN EXPLORATORY STUDY

Mahesh Jampala[25]

ABSTRACT

Education means a process of receiving or giving an instruction in the systematic manner within proper time duration. Educating the students plays a vital role in India. Government is taking many major steps for increasing the quality of education. These steps include recruiting the quality of teachers for teaching the students, implementing new strategies at both school and higher education level. Technology is one of such major strategy in Higher Education. As we know that technologies are gradually changing the ways of the teaching and understanding among teachers and students. This conceptual research paper mainly deals with different new media technologies used in teaching the management programmes in the Higher Education in India. Teaching with technology helps to give more focus on the student centric. Technology also helps in blending the traditional teaching methods and new methods. The new media technologies includes flipped classrooms, tablet computing, games, simulated software, near field communication, web 2.0 technologies, badges and tele-presence. These technologies help to increase the cognitive and collaborative skills among the management students.

KEYWORDS

Technology, Higher Education, Emerging New Media Technologies, Management Programmes etc.

INTRODUCTION

Providing quality education is one of the first prior among the institutions in India. Education means a process of receiving or giving an instruction in the systematic manner within proper time duration. Universities in India play a vital role to provide the quality education to the students. For this, universities are adopting different strategies for providing the quality education to the students. Adapting technology is one of the key strategy in which the universities and different colleges are fostering. The teachers to teach students in the classroom implement different digital strategies. These technologies increase the collaborative learning among the teachers and students and increase the development between the teacher and student learning centric aspects.

Many universities are facing the challenge to teach the management students. As per the statistics, management education is facing the decline and it is facing a challenge to provide the quality education. Many states in India are facing a tremendous set back in the management education due to this decline. As many students are technology savvy, teachers are also facing the challenge for the adaptation of the technologies. This conceptual paper mainly deals with different new media technologies used for teaching the management students. The new media technologies include flipped classroom, tablet computing, games and gratification, stimulated programme, near field communication, web 2.0 technologies, badges tele-presence.

New Media Technologies in Management Education

According to the dictionary meaning, media is the medium, which is mainly used for bridging the gap between the sender and receiver in the communication process. In order to bridge the gap between students and teachers, different traditional mediums are used. However, after the invention of internet and computer, technology plays an important role between students and teachers. As we know, the developing countries like India are taking necessary steps to convert their teaching pedagogy using new media technologies. Many universities are slowly developing the concept of teaching through new media technologies. In the olden days, majority of the teaching is done with the blackboards. As the technology has evolved, the teaching pedagogy has gradually changed. Even in many management universities, the change is taking place and started implementing these technologies into the classroom.

According to Mapping Digital Media Report, in the technological sector, there are around 900 million users and out of the 900 million there are about 40% of users are mainly teachers and students. The internet connections are also progressively raised to the 60% among the mobile phone users. Every teacher who teaches in school, university or other institution is using different technologies either professionally or personally.

FLIPPED CLASSROOM CONCEPT IN MANAGEMENT TEACHING

Flipped classroom is just the inverse of the traditional classroom. In traditional classroom teachers, generally go to the classroom and start teaching to the students. Students take the notes and homework was given to the students. This concept is more monotonous. However, in the flipped classroom concept, before coming to the class students listen to the lectures online provided

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by the teachers on their convenience. Then the teacher discusses about different content with the students in the form of the activities. The main advantage of the flipped classroom it increases collaborative skills among the teachers and students. It also increases logical skill improvement among the management students. This practice is mainly used in the western countries, slowly the developing countries like India are also adapting to this change. For Example, many Business Schools in India are adopting this teaching strategy. Indian School of Business, Hyderabad is one such example. It is one of the first management institutes in India to introduce this concept to teach their students. The study found that the student participation is progressively increased in the classroom and thinking has developing among the students.

TABLET COMPUTING IN MANAGEMENT TEACHING

After the implementation of the smartphone in the education, tablet computing is the next foremost step used in the educational sector. Many institutions and universities are slowly and gradually implementing their teaching pedagogy using the tablet computing. By using tablet personal computer, teachers and students can develop good integration among themselves and it helps to foster the good learning environments. The major benefits of using the tablet computing are it can be carried anywhere and anytime. Students can access the content anytime and repeatedly. Students can take the digital notes using the tablet computing which is easy to store and download the content. The advantage for the faculty member is that they can create their own digital material and they can use the tablet as the interactive whiteboard for teaching. Many management universities are slowly adopting this technology as one of the major source.

USING GAMES AND SIMULATIONS IN THE TEACHING

Game in defined learning format that involves competition and guidelines. There are different types of games for example, adventure games, simulation games, competition games, co-operation games, programming games, business and management games. Business and management games are designed in such a way that to teach the decision-making among the students through experimentation, evaluation and modification. Teachers can include these gaming strategies into their syllabus. Games develop to solve a particular problem among the students. By using games and simulations, teachers can develop different activities in the classroom. Some of examples of games and simulations used in management education are Capstone, Tango simulation, Virtual U and MARKSTRAT3. In India, the major set is that the teachers are not aware about the different simulations. Some games and simulations are very costly for the universities to purchase.

NEAR FIELD COMMUNICATION

Near field communication is one of the emerging technologies used in the education. Near field communication is a wireless connectivity technology convenient short-range communication between electronic devices. The Main advantages of the Near Field Communication are: firstly, it provides a more natural method for connecting consumer devices, broadening the scope of networking applications. By using near field communication, secrete data among is shared among teachers and students. Secondly, teachers and students can share the data as it delivers effortless interconnection of consumer devices, such as mobile phones, AV (Audio Visual) equipment, digital cameras, PDAs, set-top boxes and computers. Thirdly, the devices, like mobile phone or PDA, act as an electronic attendance for the teachers. The teachers can note that which student is present in the classroom. Mobile eCommerce or mCommerce is a vast area of activity, covering any transactions involving monetary value conducted via an electronic device such as a mobile phone or PDA. The uses of Near Field Communication in universities are for marking attendance, monitoring the student activities, access university buildings (such as the gym and the library), check bus times, hire bicycle, access campus parking lots, and make payments using a stored-credit system, with users loading funds onto their phones via a network of payment points. E-wallet also helps students to pay for food, stationary, printing, and other university services, for entry and exit in the laboratories and borrowing books from libraries. Hence, this technology is one of the major new media technology used in higher education in India.

USE OF BADGES IN EDUCATION

Badges are digital tokens that appear as icons or logos on a web page or other online websites. Badges signify accomplishments such as completion of a project, mastery of a skill, or marks of experience. They are the alternative of the traditional teaching methods, which can be replaced by multiple knowledge streams, internet based learning and project based learning. It was found that numerous groups, organizations, community projects, and web entities currently issue badges. Badges act as certificates of completion. The advantages of the open badges are: firstly, Open Badges would make it possible for the student to build a public profile to highlight the specific skills he acquired during the module. Secondly, it becomes possible to check whether a student has completed the necessary training before allowing them on the equipment. Thirdly, the badges would automatically expire each year and so encourage the student to maintain their knowledge. Fourthly, Open badges also helps to choose the specialization course and develop on the specialization course. Fifthly, this may also provide boost to students' employability by enabling them to highlight sets of skills that are applicable to specific employers and roles. In management education, badges helps students to advance by demonstrating that they have attained certain competencies rather than by showing that they have spent a certain amount of time in class and it also helps students who need remedial courses to access additional learning opportunities.

TELEPRESENCE CONCEPT IN MANAGEMENT EDUCATION

Telepresence was initially known as the video telephony, which was first tested in 1964 by AT&T Company. Initially it was not successful because of high costs and lack of bandwidth. The major applications are outsourcing, enhancing customer relationships, education, training, and telemedicine. Distance learning offers access to increased educational resources to students, regardless of their location. The major problem with telepresence technology is that the bandwidth required is more. For better visibility among teachers and students, high definition cameras are used in telepresence. Telepresence will help to enhance the degree of interactivity and collaboration between students and educators.

HD video communication will enhance interactivity and productivity in business, as well as in applications in the fields of education and medicine. A telepresence system can be a suitable alternative for providing synchronous to remote distance education. Remote courses can benefit from teleconferencing to compensate for the instructor's absence. Internet teleconferencing is already possible even for geographically distant regions.

CONCLUSIONS AND RECOMMENDATIONS

The developing countries like India are facing a challenge for provide a quality education to the students. Hence, technology plays a vital role to enhance the quality education in management among the students and teachers. A proper strategic model has to be developed for the effective use of these new media technologies in the management education in higher education in India.

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A NEW STEGANOGRAPHY PROTOCOL FOR IMPROVING SECURITY OF CLOUD STORAGE SERVICES

A. Mahesh Babu[26] Dr. G. A. Ramachandra[27] Dr. M. Suresh Babu[28]

ABSTRACT

In recent years, distributed and cloud computing administrations have turned into an unquestionable requirement in our day-by-day lives. Albeit extraordinary security advancements are utilized for framework assurance and information insurance, the security of existing administration frameworks is a long way from enough. The fundamental issue is that current frameworks and/or programs typically have some obscure issues or vulnerabilities, and can be assaulted by some unapproved persons in some startling ways. To take care of the issue, at any rate somewhat, we have proposed another steganography convention for enhancing data security in cloud storage administrations. The key point in this convention is to orchestrate a picture that can be utilized as the encryption/unscrambling key, the stego-key, and in addition the spread information. Starting investigation demonstrates that the new convention is exceptionally secure. This paper plans the convention in a more formal manner, so that in light of the detailing, we can discover conceivable powerless focuses even more effortlessly, and make the convention more essentially valuable.

KEYWORDS

Steganography, Cloud Computing, Encryption etc.

INTRODUCTION

As of late, Cloud computing services (CCS) is turning into a standout amongst the most vital considers our everyday lives. With CCS, we can utilize countless through versatile figuring portable computing devices (PCDs) or PCs. Cloud storage services (CSS) is an exceptional manifestation of CCS. With CSS, we can store different information in the CSS servers for nothing through open systems, and access the information any place and at whatever time. To ensure the framework and in addition the information, CSS frameworks must utilize some extraordinary security techniques. On the other hand, the security of existing frameworks is a long way from enough. The primary issue is that current frameworks, projects, and even security systems, may have some obscure issues or vulnerabilities, and can be assaulted by some unapproved persons in some sudden ways. To tackle this issue is a basic errand. The primary decision to ensure the framework/information security is encryption. Encryption, for example, AES (Advanced Encryption Standard) changes over information into unnatural ones, and makes the information un-discernable. Notwithstanding, due to the unnaturalness, some outsider can be mindful of the presence of the encoded information. This implies, the framework may give a chance to the outsider to get the needed information. The encoded information, in spite of the fact that un-decipherable straightforwardly, can be decoded through pinpoint assault. One system for enhancing security is to utilize steganography, which tries to disguise the presence of mystery information. On the other hand, once the presence of the information is distinguished, routine steganography advancements are not secure to such a degree as to ensure the information in light of the fact that the information are ensured by the stego-key just. In our study, we have proposed another steganography innovation in light of picture changing. In the proposed innovation, a picture is orchestrated by means of picture changing, and is then utilized as the encryption key, the stego-key, and in addition the spread information. With proposed innovation, upgrades in encryption quality and instinctive nature of scrambled information could be normal. In this paper, we concentrate on the likelihood of utilizing the proposed innovation to enhancing the security of CSS frameworks.

METHODOLOGY USED

Current cloud computing systems usually use well-known or well-proved methods to achieve system security and data security. Security methods, including algorithms, protocols, and so on, are useful both on the transmission channel and inside the server. Well-known methods are commonly employed because they have been proved more secure than others. Among others, advanced encryption standard (AES) and secure socket layer (SSL) are two security methods frequently used in many situations.

AES is one of the most popular encryption methods standardized by National Institute of Standards and Technology (NIST), and this method is based on an encryption algorithm named Rijndael developed by Joan Daemen and Vincent Rijmen. AES supports

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three key lengths, namely 128, 192, and 256 (in bits), and the key is shared by encryption and decryption. In a lot of systems or applications, AES is used to protect the data.

Fortunately, big security issues have not been reported so far, and it has been proved numerically that AES is tolerant of any attacks. Recently, it is known that even quantum computer based brute force attack algorithms may require a long time for decryption. However, improved quantum algorithm may appear in the future, and this may weaken the security of AES. Secure sockets layer, known as SSL, is one of the protocols. The main purpose of this protocol is to encrypt the information to be transferred. In the transfer step, SSL provides a functionality to encrypt the communication on transport layer and to detect illegal manipulations. Usually, this protocol is used with HyperText Transfer Protocol (HTTP) as HTTPs for secure communication between client and servers. SSL is used in a number of systems for secure communication between computers. However, some critical issues were indicated for SSL. In 2014, a vulnerability of OpenSSL, named as Heartbleed, was reported as CVE-2014-0160. With this vulnerability, a third party can read the information on the memory of a computing system. This vulnerability has already been fixed with updated library, but this case indicates that libraries that are considered reliable may contain unknown or left issues. Thus, not only the administrators, but also the users, should think information security more carefully.

This paper focus on a prototype system designed especially for cloud storage services (CSS). The purpose of this paper is to propose a self-protection way for each user, so that people can be more confident when they use CSS.

ESSENTIAL KNOWLEDGE

To make this paper relatively self-contained, this section provides a very brief review of some of fundamental knowledge related to this research.

A. Cloud Storage Service

CSS is one utility form of cloud computing service. The main purpose of CSS is to store user data in the cloud servers. In our daily lives, there are many public CSS systems. Dropbox and Google Drive are just two examples. CSS providers often open the security technologies employed in their systems to make their users more confident. For example, in Dropbox, the security methods for protecting data can be found in.

B. Steganography

Steganography is a technology for data hiding. The main purpose of steganography is to hide information in some cover data, and to conceal the existence of data. In steganography, multimedia data like images and speeches are often used as the cover data. This is mainly because multimedia data often have redundancy, and replacing the redundant part with some secret data usually does not attract other people's attention.

The main purpose of this research is to integrate image-based steganography to CSS. However, we do not use conventional steganography as is. The basic idea of our proposed method is to synthesize an image, and use it as the encryption key, the stego-key, as well as the cover image. Using this method, each user can protect his / her own data more effectively, even if the data are stored in public CSS servers.

C. Image Morphing

Image morphing is one of the methods for synthesizing new images from given ones. Conventionally, image morphing has been used widely as a tool for generating moving pictures. It can generate many different images from 2 or more reference images, based on different contribution rates. Usually, image morphing uses some feature points (or lines), so that the reference images, after warping, can be linearly combined to generate natural images. In this study, we use image morphing to generate cover images for steganography. In this research, the cover images synthesized via morphing image are also used to generate the encryption key and the stego-key. For the former, we may find a bit-string using some one-way hash function from the synthesized image, and then use this string as the encryption key. For the latter, we can, for example, determine the positions for hiding data based on the pixel values of the synthesized image, or based on the neighborhood complexity of each pixel.

IMPLEMENTATION

In this section, we first explain the structure of the implemented prototype system, and then describe the protocols for data hiding and data extraction.

A. System Structure

The proposed system (Fig. 1) mainly consists of three elements namely a cover image-generating server Sc, the storage server(s) Ss, and the client(s) C. In the current prototype system, Ss is considered as a virtual storage server (III-A) that can be any existing

CSS (e.g. Dropbox), and the relation between Ss and C is the same as common systems. For the implementation given here, Ss permit C to do the following tasks: authentication, and document up-load and download. Sc provides a cover image to the client C upon receiving a request. Sc works only as a key-provider, but this role contains two important tasks for the current implementation, namely reference image capsulation and mobile device optimization.

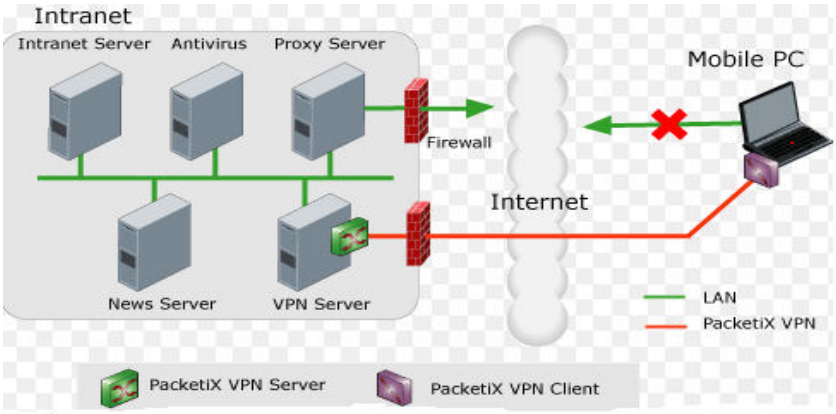
The following two paragraphs explain these tasks and the importance of independency of Sc:

- Computational cost: In the proposed system, the terminal system possessed by each client is supposed to be a portable computing device (PCD) like iPad or iPhone. Generally, a PCD has very limited computing power. It is reasonable to generate the cover images in a separate server.

- Protection of reference images: As introduced in section III-C, image morphing requires reference images for synthesizing the cover images. If the reference images are stored locally in the client side (which is a PCD as mentioned above), they might be accessed by some illegal third party because a PCD is usually relatively weak in data protection. Note that in the proposed system, the synthesized image is important because it is used not only as the cover image but also as the encryption key and the stego-key (III-B). If the reference images are stolen, the security strength of the system will be reduced significantly. In addition, if the cover image is synthesized locally using reference images stored in the same PCD, the third party may easily attack the whole system. To guarantee the security of the system, it is necessary to protect the reference images, so that malicious third party cannot synthesize! the same images.

As for the client system, an application program is implemented on the iPad as a native application. This application provides a user interface (Figure-2) which handles stego image generation (III-B) and communication between C and the servers. In the current system, we suppose that the communication channel between C and Sc is secret. Here, secret means communication between C and Sc cannot be read nor write by any third party. To guarantee the security of the communication channel, Sc should be located in a private network or data transmitted via this channel must be encrypted using a strong enough method. In the following discussion, we just assume that these conditions are satisfied.

Figure-1: Example Structure with VPN Connection



Sources: Authors Compilation

Figure-2: Implemented User Interface

Sources: Authors Compilation

This research mainly focuses on data hiding on the Ss side. Therefore, some security issues, e.g. methods for server protection, authentication between servers and the clients, are not discussed in this paper. These issues should be considered deeply in the future version of our system. Currently, we just employ methods commonly used by many other CSS systems.

B. Features

To optimize the collaboration between Sc and C, Sc has an application-programming interface (API). In the current implementation, Sc provides the following API:

Generate cover image (/cover): This API returns a generated cover image for an authorized client. On the server side, operations for generating the cover image are executed based on two arguments, namely image ID Iid and user ID Cid. When a cover image is first generated, Iid is generated by the server and is sent to the client. When a cover image is requested again to extract the secret data, Iid is provided by the client. After generating the cover image, information used for generating the image is stored in a database on the server side, and the cover image is sent to the client. In the cover image data transmission phase, the cover image is usually sent after the encryption based on the SSL protocol.

On the client side, the terminal system has some functionality for data encryption, data hiding, image download, image upload, etc. The main functionalities are as follows:

Authentication

This is a user authentication interface. That is, only the right owner of the terminal can use the system (e.g. to request a cover image from Sc or to request a stego-image from the cloud storage server Ss).

Image upload / download

This functionality provides a way for the client to communicate with Sc and Ss to download or upload an image.

• Encryption and Embedding of Secret Data

This is the main purpose of this system. The client system supports AES based encryption, and some steganography techniques. The client can select the algorithms according to the desired data-embedding rate (i.e. data amount of the secret message divided by that of the cover image).

• User interface

The client system also provides a user interface for the client to input the secret message to hide.

C. Flows for Embedding and Extraction

Now, let us explain the flows for message embedding and extraction using the proposed system. To make the discussions more understandable, we first summarize the abbreviations as follows:

- S_c: Cover image-generating server.
- S_s: External storage server.
- C: The client (system).
- C_{id}: Client id (user id).
- Ω: A set of reference images.
- $I_r(k)$: A reference image in Ω.
- i_k: Index (position) of $I_r(k)$ $(0 < i_k \leq |\Omega|)$.
- I_c: The cover image.
- I_s: The stego image.
- w_k: The weight value (or contribution rate) of $I_r(k)$ (used for morphing).
- M: The secret message.
- M_d,M'_d: Brief description of M and its encrypted version.
- I_{id}: ID of the synthesized cover image I_c.
- n: The number of reference images used for morphing $(n \leq |\Omega|)$

1) Flow for embedding: Embedding is the first step for using the system, and the overview is shown in Figure-3. The main purpose of embedding is to make a stego image, and save it to some external storage server Ss.

The main steps for embedding are as follows:

Step 1: The client C sends a request to Sc: $C^{[Cid]} \rightarrow S_c$.

Step 2: S_c generates the following parameters for image morphing:
$I = [i_1, \ldots, i_n]$ = RandomInt (n),
$W = [w_1, \ldots, w_n]$ = RandomFloat(n)
where I and W are the index set and the weight set, respectively.

Step 3: Sc synthesizes an image using image morphing, and saves related information to a cover image table:
$\omega = [I_r^{(1)}, \ldots, I_r^{(n)}]$ = SelectReference(Ω, I),
I_c = SynthesizeImage(ω,W),
$I_{id} = h_1(I_c)$,
Save(I,W, I_{id}),
where h_1 is a one-way hash function for generating the ID of an image.

Step 4: S_c sends the synthesized image and the hash value to C:
S_c [I_{id} and I_c] → C.

Step 5: C creates a stego image and related information:
M = GetMessage( )
$M_d = h_2(M)$
M'_d = Encryption(M_d, p_k)
D_m = Encryption(M,$f_1(I_c, C_{id})$),
I_s = Embedding(I_c,D_m, f2(I_c, C_{id})),
where h_2 is a one-way function for generating a short description of a given message; pk is a private key of C; and f_1 and f_2 are two client-dependent functions for generating the encryption key and the stego-key.

Step 6: C uploads the data to Ss:
C [Is and Iid] → S_s
C [M'_d and I_{id}] → S_c

Note that in the last step, M'_d and I_s are sent to S_s and S_c, respectively. The main concern here is to cut the direct connection between Is and M'_d, so that the third party cannot estimate the meaning of I_s from M_d, even if M_d is decrypted illegally.

2) Flow for Extraction: When the client needs to recover a message M, he/she first finds the position of the correct Is, download it, and then extract M. The basic steps are as follows (see also Fig. 4):

• Step 1: The client sends a request to Ss: C [C_{id}] → S_s.

• Step 2: Ss sends image IDs to the client: Ss [All I_{id}] → C.

• Step 3: For each Iid, the client sends a request to Sc: C [C_{id}& Iid] → Sc.

• Step 4: Sc sends back the message description to C: Sc [M_d] → C.

• Step 5: C checks if Md is the short description of the wanted message: Md = Decryption(M'_d, pk);
If Md is NOT related to the message C wants to access, return to Step 3.

• Step 6: C requests the stego image: Iid = SelectID(M'_d); C [C_{id}& I_{id}] → Ss.

• Step 7: Ss sends the stego image to C: Ss[Is] → C.

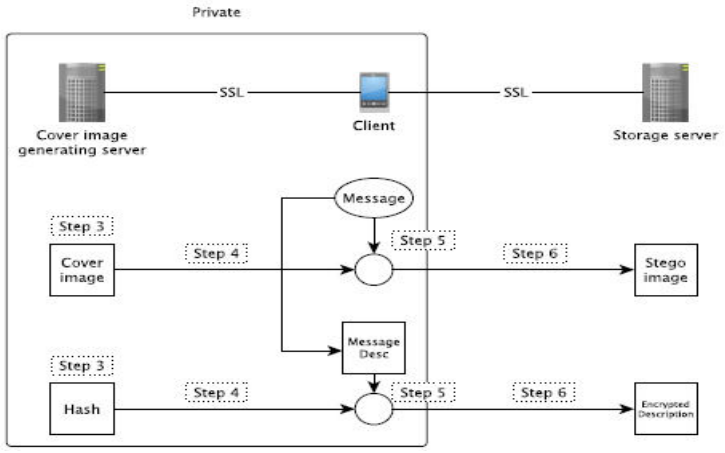
• Step 8: C sends a request to Sc: C [Cid& I_{id}] → Sc.

• Step 9: Sc synthesizes the cover image: [I,W] = LookupT able(Iid), $\omega = [I_r^{(1)}, \ldots, I_r^{(n)}]$ = SelectReference(Ω, I), Ic = Synthesize Image(ω,W).

• Step 10: Sc sends the cover image to C: Sc [Ic] → C.

• Step 11: C extracts the message: Dm = Extraction (I_s, I_c, $f_2(I_c, C_{id})$), M = Decryption (D_m, $f_1(I_c, C_{id})$).

Figure-3: Structure and Flow for Embedding Step



Sources: Authors Compilation

DISCUSSION

The proposed system has two features worthwhile for further discussion. One is the system structure, and the other is information distribution. First, the system has a structure similar to conventional client-server model, and this model has been adopted in many computing systems, especially for web-based applications. A large number of web services provide APIs in a similar way as our system. In this sense, the proposed system is not a grand new system, and thus can be integrated easily with existing systems. As other existing systems, the proposed system can also be extended easily in the future. On the transmission channel side, the proposed system uses also conventional way to protect the transmitted data. Again, our proposal is not trying to change everything in existing systems, but to cover some un-predictable issues in conventional systems. As for the second feature, information distribution is crucial to make the whole system more secure. In the proposed system, the information is distributed as follows:

• On the Sc side:
– C_{id} : The client IDs;
– I_{id} : ID of cover images;
– I andW : Key information for synthesizing the cover image;
– M'_d : Encrypted short descriptions of messages.
Note that in order to cut the connection between M_d and I_c, M'_d can be saved in another public Ss. In addition, although the reference image set Ω is also stored in Sc, to guarantee the security of the whole system, it is better to store Ω in a special security module.

• On the Client side:
– p_k : The private key;
– h_2 : A function for generating short descriptions of given messages;
– f_1 : A function for generating a client dependent encryption key;
– f_2 : A function for generating a client dependent stego key.

• On the public storage server side:
– C_{id} : The client IDs;
– I_{id} : ID of cover images;
– I_s : Stego images.
Of course, the above information distribution may not be the best way. For example, in the current system, we put all information for synthesizing the cover images in the same server S_c. This may not be secure enough. In future, we will try to improve this part and others.

CONCLUSION

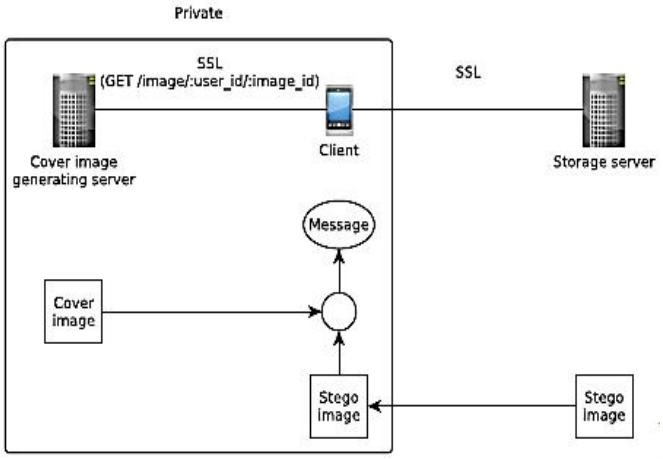
In this paper, we have introduced in detail the structure and feature of a system for improving security of cloud storage services (CSS). From the implementation, the proposed system can work together with existing cloud computing service systems, and it could be treated as a plug-in in the conventional systems.

There are some issues related to information distribution, transmission channel protection, user authentication, and so on. For instance, in the proposed system, the synthesized image is used not only as the cover image, but also used to generate the encryption key and the stego key. Thus, it is a very important information, and should be protected very strictly. There are at least two factors that affect the security of the synthesized image. The first one is the security of the transmission channel, and the second one is the authentication between the client C and the cover image-generating server Sc.

Currently, the transmission channel between C and Sc is assumed to be placed in a private network environment. Based on this assumption, we say data protection is enough. However, we cannot say the same thing if the assumption is not true. In fact, due to rapid development of hacking technologies, it is difficult to build a real "private network". Thus, it is necessary to study the security strength of the proposed system if we use public transmission channels.

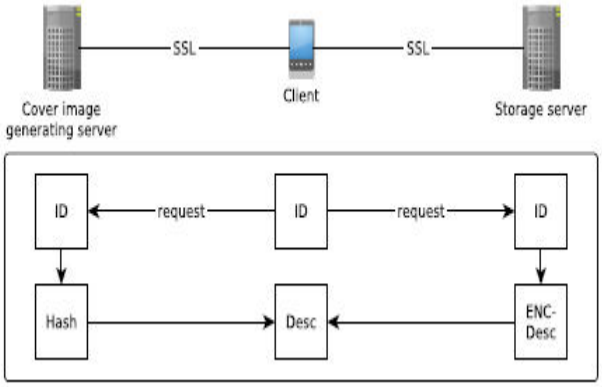
As for user authentication between C and Sc, we are using conventional one-factor (password only) authentication now. However, some illeague third party can easily break this. In this case, the third party may obtain the synthesized images, and can obtain any information from the public storage server Ss. In the future, we would like to introduce 3-factor or even stronger authentication method. Of course, there can be other security issues related to the proposed system. We will try to analyze and validate the system based on the protocol given in this paper more deeply and will report further result in the future.

Figure-4: Structure and Flow for Extracting Step



Sources: Authors Compilation

Figure-5: Structure and Flow for Extracting Step



Sources: Authors Compilation

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SEGMENTATION METHODS AND COMPARISON STUDY FOR IMAGING: A SURVEY

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ABSTRACT

Image segmentation is an important technique of image processing. In the segmentation process, image is segmented into different parts or objects and selects only those objects from the image, which we want to analysis and visualize. In this survey paper, we revise the important general classification of image segmentation and some important characteristics of different segmentation approaches. We concluded that various different segmentation methods have been developed and these methods are used in different areas and in different application. Selection of segmentation method generally depends upon the requirement.

KEYWORDS

Image Processing (IP), Image Segmentation, Gray level, Line, Threshold etc.

INTRODUCTION

Image processing (IP) refers to processing of 2D and 3D image by a computer. It is the form of signal processing for which the input is an image and the output is a set of characteristics of relevant parameters of the image. In other words, it is a method to convert an image into digital form and perform various operations in order to get an enhanced image or to extract useful information. Image processing is a repeatedly growing technology, which has wide applications in various aspects of business. It also has core research area in computer field.

Segmentation is a technique, which is used in IP. Digital image is divided into different segments, which are known as sets of pixels or super pixels. Segmentation process is used to simplify and change the representation of digital image in order to make the image more meaningful and easier to analyze.

Image segmentation plays a crucial role in many medical imaging applications by automating or facilitating the delineation of anatomical structures and other regions of interest. Diagnostic imaging is an invaluable tool in medicine today. Magnetic resonance imaging (MRI), CT, digital mammography, and other imaging modalities provide an effective means for noninvasively mapping the anatomy of a subject. These technologies have greatly increased knowledge of normal and diseased anatomy for medical research and are a critical component in diagnosis and treatment planning. With the increasing size and number of medical images, the use of computers in facilitating their processing and analysis has become necessary. In particular, computer algorithms for the delineation of anatomical structures and other regions of interest are a key component in assisting and automating specific radiological tasks. These algorithms, called image segmentation algorithms, play a vital role in numerous biomedical imaging applications such as the quantification of tissue volumes, diagnosis, localization of pathology, study of anatomical structure, treatment planning, partial volume correction of functional imaging data, and computer-integrated surgery.

Methods for performing segmentations vary widely depending on the specific application, imaging modality, and other factors. For example, the segmentation of brain tissue has different requirements from the segmentation of the liver. General imaging artifacts such as noise, partial volume effects, and motion can also have significant consequences on the performance of segmentation algorithms. There is currently no single segmentation method that yields acceptable results for every medical image.

We briefly describe several common approaches that have appeared in the recent literature on medical image segmentation as same as other IP applications. We define each method, provide an overview of each method and discuss its some important merits and demerits.

CLASSIFICATION OF SEGMENTATION

Different types of segmentation methods have proposed by different authors or researchers in the past. Segmentation method generally based on certain characteristics of objects in the image. Characteristics may be based on gray level, spectral values, contrast, or textural.

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Pham *et al.*[1] have divided the segmentation methods into eight categories which are thresholding approaches, region growing approach, classifiers, clustering approach, Markov random field approach, artificial neural networks, deformable approach and atlas-guided approaches.

Zhnag *et al.*[2] have proposed unsupervised classification of image segmentation. According to them, segmentation evaluation methods classified into two categories, which are subjective, Evaluation and Objective Evaluation. They have classified objective evaluation methods into two categories: System-level evaluation and direct evaluation. Direct objective evaluation again classified into two different categories: Analytical methods and Empirical methods. Empirical methods also classified into further categories: Unsupervised and Supervised methods. Author's classification emphasis on unsupervised evaluation. Unsupervised evaluation have categorized metrics based on color error, metrics based on squared color error, metrics based on texture and metrics based on entropy. IS methods have largely divided into three different categories which are Pixel-based methods, region-based methods and boundary-based methods.

Yu Jin Zhang[3] has proposed a paper in which describe progress evaluation of IS. He described analysis and measurable comparison between previously published five-year papers and finally concludes some important points such as image analysis, different performance of different algorithm, advantages object boundary etc.

C. Kirbas and F. K. H. Qiek[4] have proposed a survey paper. Their classification was mainly based on Vessel extraction techniques and Segmentation algorithms. They have classified into six main categories, which were pattern recognition techniques, model-based approaches, tracking-based approaches, neural network-based approaches, miscellaneous tube-like object detection approaches and artificial intelligence-based approaches.

K. K. Singh and A. Singh[5] have classified segmentation algorithms for different types of images. Their classification was on Pixel-based or point-based segmentation, Edge-based segmentation, Region-based and Model-based segmentation.

APPROACHES OF SEGMENTATION

In General classification of Segmentation of an image is based on two approaches. The first approach is Discontinuity based approach and second is Similarity based approach.

Discontinuity based approach is basis of gray level or intensity level of the image. According to changes of intensity level or changes of gray level in an image, do partition of an image. The Connected set of pixels of an image in manner of discontinuity of pixels. Major interest in this category is detection of lines, point and edge in an image.

In the context of second approach, try to do use or group those pixels, which are similar in some sense or characteristics in the image. In this category according, the pixels describe the region in the image. General techniques fall under this category are thresholding, region growing, region spitting and merging, clustering, graph theoretic approach and rule-based or knowledge-driven approach.

Discontinuity Based Approach

Discontinuity based approach generally based on boundary value. Discontinuity means variation at boundary in the pixel intensity in the image. Point, Edge and Line methods are considered under these categories. All three methods carry more information about specific various regions in the image.

Point Method: It is also known as Pixel-based methods. It is simplest method under discontinuity-based approach. It is embedded inside a uniformly uniform region and its gray value is dissimilar from the average gray value of the region in which it is embedded. We can detect isolated point in the image by mask processing. If we have mask 3*3, then it is represent by this equation

$$R=\sum_{i=1}^{1}\sum_{j=1}^{1} Wi,j \quad f(x+i,y+j)$$

If the value of R computed at location x, y, where mask is centered is absolute value of R is greater than T, where T is a nonnegative threshold. Than we say that an isolated point is detected at the corresponding location x, y.

$$|R| > T$$

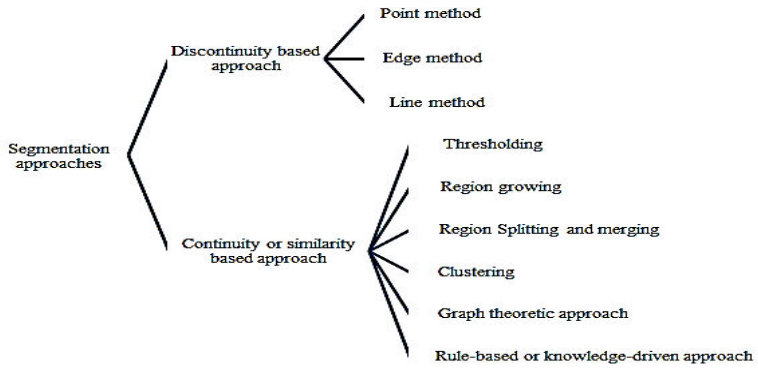
where T is nonnegative threshold

Edge Method: Edges is detected from abrupt change in the gray level in the image. This is based on position of an edge is given by an extreme of the first-order derivative or a zero crossing in the second-order derivative. Derivative is used for image

enhancement. It means to enhance the details in the image. Derivative is also used to detect of edge in the image. Edge is a boundary between two dissimilar regions in the image and both regions have distinct intensity level. J. Canny[6] has applied this method in his paper.

Line Method: Lines are also detected from the abrupt changes in the picture or image. Line detection may be horizontal, vertical or may be any angle in the image. A line may be embedded within a single uniformly identical region.

Figure-1: Classification of Segmentation Approaches



Sources: Authors Compilation

Continuity Based Approaches

Similarity or Continuity based approaches, in which choose those regions which have similar pixel intensity in the image. In this scenario, based methods are as follows:

Thresholding: This is the first technique under similarity base approach. Thresholding is one of the most vital and famous segmentation approaches. This approach based on assumption of gray levels. According to gray level, objects are distinguished each other.

Sahoo *et. al*[7] have presented a survey paper on the thresholding techniques. Otsu[8] also has proposed a thresholding approach.

Bi-level thresholding, Multilevel thresholding, Entropy-based thresholding are types of thresholding.

Bi-level Thresholding is in a job on images, which have bimodal histograms. In this thresholding technique, object and background have different gray levels. We can take example of alphanumeric characters and other images in a book are darker than the background white paper. Paper may have different color.

According to threshold values, image is divided into different segments. If partition of image by using threshold value than is called multilevel thresholding. When we draw a histogram of different objects of an image, in such case are multi-model, with valleys in between. If segments are disjoint and gray levels are dissimilar from image background, then the histogram is multi-model with each peak definitely separate from other.

Entropy-based thresholding technique is used in bi-level thresholding. Background and foreground of objects in the image are used for optimal selection of thresholds. Entropy is a measure of information in an image, which is defined by Shannon and Weaver[9]**.** C. Yan *et. al*[10], have presented a paper based on this technique. The paper title was *Local entropy transition region extraction and thresholding*. Thresholding technique has also used by W. Oh and W. B. Lindquist[11].

Region growing: Region growing is used to analysis and visualization tasks of an image objects. It is a procedure to group of pixels into larger regions. Therefore, we can say that the procedure that sub-regions into bigger regions is called region growing. In region growing method the regions are grown from seed point by including to each seed point those neighboring pixels that have similar property attributes such as gray level texture, color, intensity etc. This method follows integrative process in nature. Region growing is grown interactively until each seed point processed and finally boundaries of different regions are defined by closed polygons. In this method, some important issues are consider such as selection of initial seeds point, growing of pixels based on certain properties, similarity between different regions in the gray level and define minimum smallest area of region. Seeded Region growing has used by R. Adams and L. Bischof[12].

Region Adjacency Graph (RAG) can be used for representing adjacency relation among the regions in an image. Efficient graph-based image segmentation has been used by Felzenszwalb and Huttenlocher[13]. Region growing approach has introduced by S. A. Hojjatoleslami and J. Kittler[14] in his paper. This technique has also applied by Y. Altunbasak *et. al*[15] in his paper *Region-based parametric Motion Segmentation using color information.*

Region splitting and merging: By segmentation process, image is split into many small regions. These small regions need to be combine accordingly similar properties of smaller regions. This task can produce by segmentation algorithm. Another way for merging is based on the intensity of the edge between two regions. In this method, merging between neighboring regions is based on the edge intensity along the length of the demarcating boundary between two regions. When the edge intensity is small that is edge points are weak, then the two regions can be merged.

Clustering Based Segmentation: Data driven techniques may be histogram-oriented or may be clustered-oriented.

Histogram-oriented method produces an individual segmentation for each feature of the multi-feature data, and then overlaps the segmentation results from each feature to produce regions that are more disjointed.

Clustered oriented method uses multi-dimensional data to division the image pixels into clusters. In this method, each pixel has several attributes. A vector represents it. Cluster technique has been applied in different fields like as remote sensing, Optical Character Recognition (OCR), biological image segmentation, fingerprint identification etc. Clustered oriented methods mainly classified into three different techniques, which are cost minimization clustering, K-means and iterative moving techniques.

CONCLUSION

Image segmentation is played very essential role in imaging. Images have detailed information on particular region. In the medical imaging are used image such as CT, MRI images that played crucial role to analysis and planning for treatment of patient. So we can say that IS has become a very important job in modern age. Image segmentation is using in different areas such as remote sensing, medical, electronics and so on.

Image segmentation method generally based on particular application and the type of inputted image. Inputted image may be like color image, gray scale image or may be text image. According to our requirement, we can select appropriate method for our task from described above methods.

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MAPPING OF FOREST AREA IN MORNI BLOCK OF PANCHKULA DISTRICT, HARYANA, USING SPACE TECHNOLOGY

Vikas Sihag[32] Dr. Sandeep Arya[33] R. S. Hooda[34] V. S. Arya[35] Mohit Kumar[36]

ABSTRACT

Current study of "Crown Density Mapping of Forest cover and Tree Outside Forest" in Morni Block of Panchkula district was carried out to map the forest cover and analyze crown density of forests sites. IRS Cartosat-I panchromatic data was used and based upon the standard image characteristics, the visual interpretation of satellite data was carried out.

The study area covering an area of 228 sq. km lies between latitudes 30 o21' to 30 o56' north and 76 o48' to 77 010' East longitudes. Where tropical dry deciduous forests and sub-tropical forests exist. Pine trees were also found in the Morni Hills. Total forest area of Morni block is 200.56 sq.km, which covers 87.95% of total geographical area. As per National Remote Sensing Centre (NRSC) guidelines forest area was classified into six categories <10, 10-20, 20-40, 40-60, 60-80 and above 80%, based on density of trees and the forest area marked under these six categories was 24.12, 53.77, 55.16, 44.74, 12.88, 9.89 sq.km respectively. The area under Tree outside Forest (TOF) is 10.75sq.km.

KEYWORDS

Forest Cover, Tree outside Forest (TOF), Cartosat-1 etc.

INTRODUCTION

Forest is the dominant natural land use everywhere from the geological past. It therefore, preserves the major land soil features. Unfortunately, forests now are dwindling natural resources throughout the world due to anthropogenic pressure. Forest is the second largest land use in India next to agriculture. The forest cover of India is assessed as 69.79 million hectares, which constitute 21.23 per cent of the country's geographical area, ranging from the Himalayan Temperate to Dry Zone forests. Tree cover of the country is estimated to be 9.13 million hectares, which constitute 2.78 per cent of the country's geographical area.

Haryana is an agriculture-based state with a total geographical area of 44,212 sq. km out of which 1,586 sq. km is under permanent forest cover, which is only 3.59 % of total geographical area (Statistical Abstract of Haryana 2013). Forest resources, both major and minor cater to multiple basic needs to the community and contribute more to ecological stability. Thus, it is obvious that preservation and protection of this green gold is essential to the national interest.

Forest Survey of India, Dehradun (FSI), an organization under the Ministry of Environment and Forests (Government of India), is mandated to carry out fresh assessment of forest cover in the country every two years (FSI, 2013). This is done using satellite based remote sensing data. Remote Sensing technology has provided users the means to create numerous maps quickly and efficiently. However, the biennial forest survey is done by FSI for entire country on 1:250,000 or 1:50,000 scale. At this scale, it is difficult to pick up tree cover areas, Haryana has least block forest areas in the country due to intensive cultivation but tree cover has been created along the roads, canals, drains, railway line and in wasteland .These tree cover areas can be picked up at higher resolution and scale. The present studies cover the mapping of existing forest resources of Panchkula district using remote sensing approach at 1:10000 Scales.

Trees outside the forest (TOF) are a highly heterogeneous natural resource and because of that, generally no coherent or regional planning is done to manage it. In India, most of the TOF resource is on agricultural lands. Apart from those planted under farm forestry, horticulture or under social forestry plantations, TOF are not major object of management. The term Trees outside forests, a neologism coined in 1995, is framed in the forest context, defining the concept by default with reference to forested areas. Therefore, Trees outside forests refers to trees on land not defined as forest and other wooded land. This may include agricultural land, including meadows and pasture, built-on land (including settlements and infrastructure), and barren land

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(including sand dunes and rocky outcroppings) (*Kleinn, 2000)*.Trees outside the forest are located on other lands mostly on farmlands and built-up areas, both in rural and urban areas. A large number of TOF consist of planted or domesticated trees. They may grow in meadows, pastoral areas and on farms, or along rivers, canals and roadsides, or in towns, gardens and parks (*Kleinn, 2000*). The area is less than 0.5 ha., the trees are able to reach a height of at least 5 m at maturity *in situ* but where the stocking level is below 5 percent and Trees not able to reach a height of 5 m at maturity *in situ* where the stocking level is below 10 percent. In industrialized countries, farmers list shade, shelter, soil protection and improvement of the landscape and rural environment as their main reasons for growing trees (*Auclair et al.* 2000). In the tropics, farmers grow woody species for food security and subsistence. Trees outside the forest are a major source of food (*Belouard, 2002*). Livestock fodder produced by TOF can be a matter of life and death in semi-arid or mountainous areas. Trees outside forests (TOF) make critical contribution to sustainable agriculture, food security and diversification of household economies, they supply many products (including wood for fuel and construction, fruits, barks and food products) and services (e.g. biodiversity, habitat for wildlife, microclimate stabilization) and they protect crops and the soil against water and wind erosion, thus combating drought and desertification and protecting water resources (*Glen, 2002*).

Role of Geo-Informatics Technology

Interpretation of forest cover area is quite easier while using Geo-informatics technology. Remote sensing technology provides a synoptic view of forest cover area; depend upon the spectral reflectance. The following information can be derived through remote sensing technique:

- Forest covers area demarcation by spectral reflectance of image.
- Less investment and more information generation.
- Monitoring in the increase or decrease of the forest cover.
- Provide comprehensive knowledge about the density of forest cover.
- High resolution data, help in identification of particular species of the forest in study area.

OBJECTIVE OF STUDY

The main objectives of the present study were to demarcate existing forest and TOF cover and to classify based on crown density in Morni Block, Panchkula district, Haryana.

STUDY AREA

The Panchkula (area extent 893 sq. km.) form the northern most districts of Haryana bounded by States of Punjab in the west, Himachal Pradesh in north and Uttar Pradesh in east. The district lies within longitude $76^0$33' to $77^0$36'(N) and latitude $29^0$55' to $30^0$50'(E) covering an area of about 4145sq. km. They are covered under topographical sheet No. 53/B, 53/F and 53 G of Survey of India (1:250,000).

Panchkula district is a planned city in Haryana**.** There are four blocks in the Panchkula district, Pinjore, Barwala, Morni and Raipur Rani. Morni is the only Hill station in Haryana. The total area of district under forests is 42.54 %, which is highest in the state. The total area of Morni blocks is 228sq.km. It lies between north latitudes 30^o21' to 30^o56' and 76^o48' to $77^0$10' East longitudes. Fig.1 indicates the location map of the study area. Most of the forests in the district are in the Morni-Pinjore belt. Tropical dry deciduous forests and sub-tropical forests are found here. Pine trees are found in the Morni Hills. This hilly-forested tract covers Morni. Morni block has a favorable climate for the growth of rich and abundant vegetation due to reasonably good rainfall and elevation. Shisham (Dalbergia Sissoo), Kikar (Acacia nilotica) and Mango (Mangifera indica) are the important tree species found in this region.

Physical Descriptions of Study Area

The Panchkula district comprises of four district physiographic units, which are roughly parallel to each other. The districts form a part of the Indo-Gangetic plane and the Himalayan ranges. These physiographic units are: Siwalik Hills, Kandi Belt, Intermontane Valley and Alluvial plain (*Chaudhary.B.S, et.al, 2002*).

The geological milieu in the district represents the litho logical formation belonging to the Indo-Genetic plain and Extra-Peninsular regions. The district can be divided in two different geological units as: Tertiary rocks of Laser Himalayas and Siwalik and Quaternary deposits of Indo-Genetic plains. The average rainfall of Panchkula district is about 1037.66 m. About 80% of its annual rainfall is received in months of June to September. The average rainfall of five years (2003-07) was taken due to the 2008 cartosat data, which was used for the study (Statistical Abstract of Haryana, 2011).

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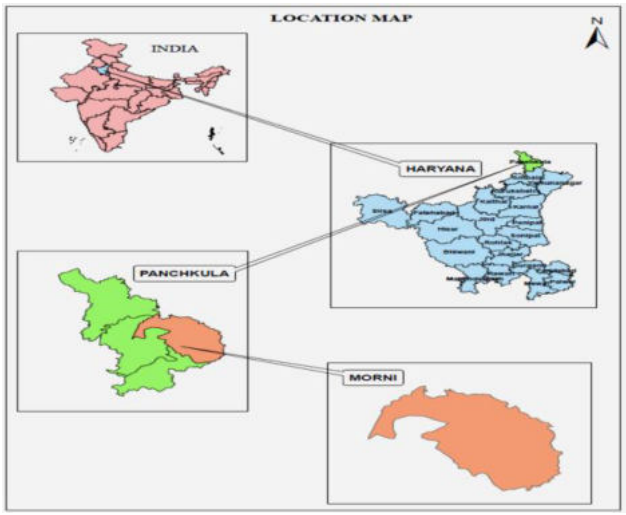
MATERIALS AND METHODOLOGY

Materials

Cartosat-I (Panchromatic) digital data of October 2009 were used for the present study. These were procured from National Remote Sensing Centre (NRSC), Department of Space shown in Table-1. The details of Satellite data used are given in. Primary and secondary data were also used for the study. Primary data include satellite image (Cartosat-1) and Toposheets 53B/13, 53F/01 and 53F/02 (Scale 1:50000) from Survey of India and Secondary data include district and block boundary maps from Haryana Space Applications Centre.

Figure-1



Sources: Authors Compilation

Table-1: Details of Satellite Data Used and its Characteristics

Satellite	Sensor	Spatial Resolution (m)	Swath	Format	Date
Cartosat– 1	Panchromatic (B/W)	2.5m	Fore: 29.4Km. Aft. 26.2 Km.	Geo-tiff	October 2009

Sources: Authors Compilation

Software's Used

- Erdas Imagin 9.1: This software was used for geo-referencing and rectification of satellite data.
- ARC/ MAP 9.3: This software was used for digitization, composition and generation of maps.
- MS-Office 2007: This software was used for report writing, making tables and database preparation.

Collateral Data

Available information such as latest published reports, papers and maps were used for the reference purposes. Surveys of India, topographical maps were also used for identifying village location, major transport network, cultural features and annotation of major towns and cities.

Primary and Secondary Data details for the Study Area

Primary data such as Toposheet and Satellite imagery (Cartosat-1) and secondary data such as District and Block boundary maps were used.

METHODOLOGY USED

Satellite data used for the study was geo-referenced using Erdas Imagine 9.1. The methodology adopted in this project forms the basis for deriving statistics of Forest cover and Tree outside Forest (TOF) dynamics. Methodology flow chart is provided in Figure-2.

Interpretation of Satellite Data

Based on the standard image characteristics such as tone, texture, pattern, shape, size, location and association etc. on screen visual interpretation of remotely sensed data was carried out at 1:10,000. Different Forest and Tree outside Forest (TOF) categories were delineated by following a standard legend prepared by Department of Space. These maps were put in GIS format upload in the geo- database.

Classification of Forest and Tree Outside Forest

As per National Remote Sensing Centre (NRSC), the forest area was classified into six categories based on crown density of trees 0-10, 10-20, 20-40, 40-60, 60-80 and above 80%. To develop a classification system for TOF simple classification applied to the associated land use, and the basic distinction between TOF in natural environments and in utilized landscapes. TOF classified to their density and spatial arrangement (scattered trees, trees in groups).

Attribute Data

After completion of on screen vectorization, the various delineated features assigned their attributes.

Thematic Layers

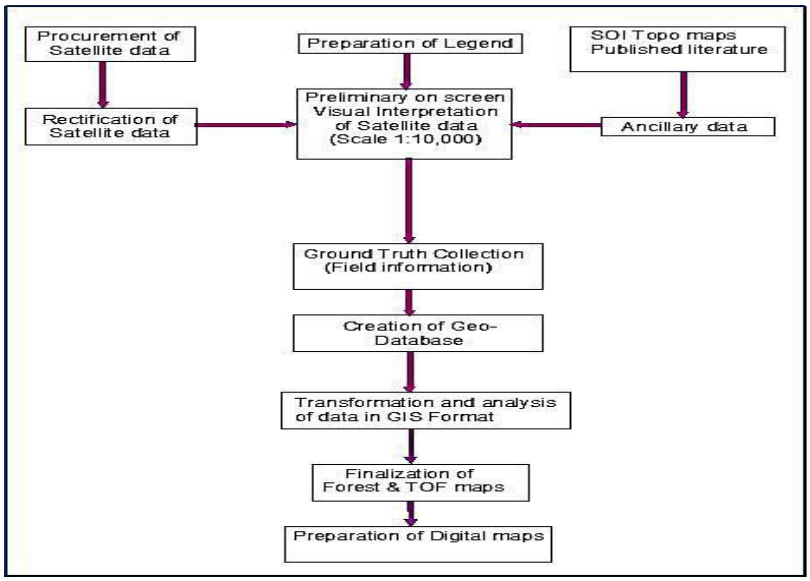
With the help of map templates, symbols, final maps are prepared by using Carotosat 1 data. A category describes a set of features with the same attribute value. For example, given point value data with an attribute describing location of TOF, demarcation of TOF type of classification, different types of trees. Preparations of thematic map of forests cover of Morni block.

Ground Truth Collection

Ground truth data are collected in different area and GPS point are transferred on the image. These points give the exact location of the existing feature over the part of study area. Due to variability of forest and terrain characteristics in the study area, ground truth in Morni Block was collected separately.

Interpretation "keys" were developed for various TOF and Forest categories by correlating satellite data with ground data. These interpretation "keys" formed the base for classification of the satellite data. Based on these interpretation keys, satellite data was classified into various TOF and Forest classes based on their occurrence in the concerned Block. The doubtful areas in the pre-field interpreted maps were checked during the ground truth and the pre-field maps were modified by incorporating field observations. After corrections, attributes were attached and final digital maps were prepared. Ground photos of various TOF and Forest classes were also taken during ground truth.

Figure-2: Methodology Flow Chart



Sources: Authors Compilation

RESULTS AND DISCUSSION

Forest Classification of Morni Block

Panchkula district having the dominance of forest cover and TOF in the state, Morni block is the major part of the district. There is variety of trees found in the block, which have been mapped on 1:10,000 scale and the results are describe in the chapter.

The total geographical area of the Morni block is 228 sq. km. As per the results of the study total forest cover in Morni Block is 200.56 sq. km. Total forest covers area out of total geographical area; occupy 200.56 sq.km which is almost 88% of the total geographical area. Area of Tree Outside Forests (TOF) is 10.75 sq.km, which is 4.71 % of the total geographical area. Other land use is 6.04, which is 2.64 of the total geographical area as shown in table-2. TOF is further divided into different sub categories like small trees, large trees and cluster of trees.

Table-2: Forests Classification of Morni Block

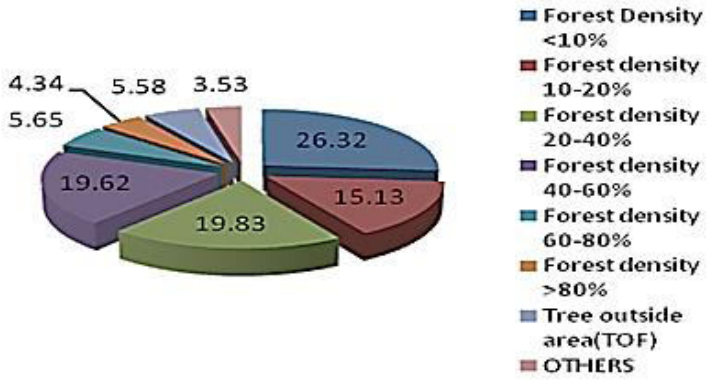
S. No.		Category	Area (Sq. Km.)	%age of TGA*
1.0	Forest cover (Based on density)	<10%	24.12	10.57
3.1		10-20%	53.77	23.58
1.2		20-40%	55.16	24.19
1.3		40-60%	44.74	19.62
1.4		60-80%	12.88	5.65
1.5.		>80%	9.89	4.34
2.0	**Total**		200.56	87.95
3.0	Tree outside Forest (TOF)	Large Trees	4.32	1.89
3.1		Small Trees	4.18	1.83
3.2.		Cluster of Trees	2.25	0.98
4.0	**Total Tree outside Forest (TOF)**		10.75	4.71
	Other Land uses		6.04	2.64
	TOTAL		**228**	**100**

Note: *TGA-Total Geographical Area
Sources: Authors Compilation

As indicated in table-2 although the area under forest cover is almost 88% but the condition of the forest cover in the district is not very good. About half of the forest cover in the block has a density between 10-40%, 10.57% area has less than 10%,about 20% area with 40-60% and only 10% of area has forest density above 60%.The area with <10% forest density are mostly scrub lands. The density range of 20-40% also expressed the degraded forests. Thus, the good forest cover is limited is only 30% of area of the block. Fig. 4 indicates the forest map of Morni block with different crown density classes. Also describe with part of the area has high or low density.

Shisham (*Dalbergia sissoo*), Kikar (*Acacia nilotica*) and Mango (*Mangifera indica*), Safeda (*Eucalyptus hybrid*), Katha (*Acacia catechu*), Sal (*Shorea robusta*), Peepal (*F.Religiosa*), Gular (*F.Glomerata*), Neem (*Azadirachta indica*), Pine (*Pinus*), Arjun Tree (*Termilia arjuna*), Amastas (*Cassia fistula*), Dhak (*Butea monosperma*) and Poplar (*Liriodendron*) are the important tree species grown in this region.

Figure-3: Distribution of Different Forest Categories



Sources: Authors Compilation

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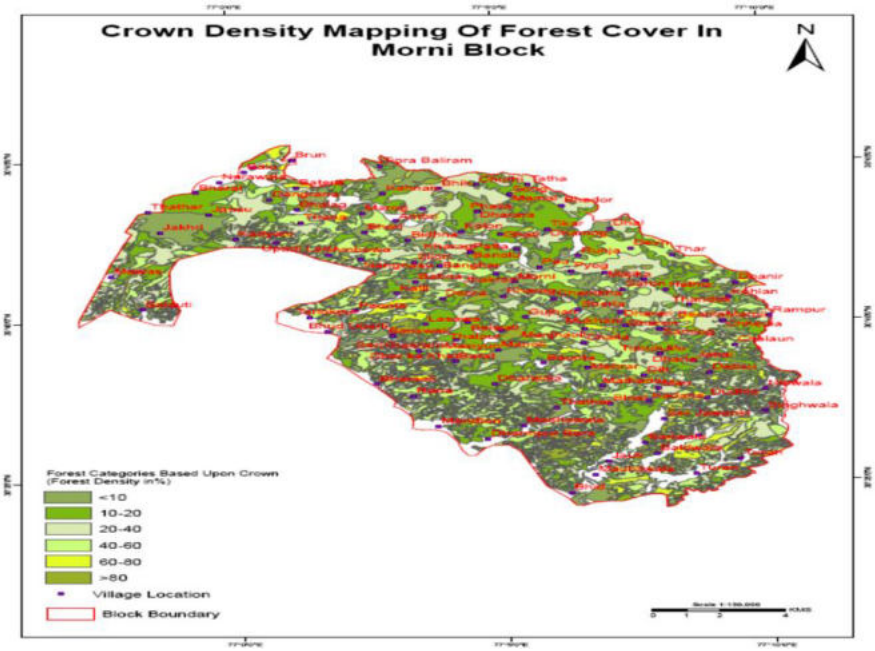
Figure-4: Forest Covers Distribution of Morni Block of Panchkula District



Sources: Authors Compilation

Classification of Tree Outside Forest

TOF are those areas wherever trees can be individually identified and their demarcation done on their identity. Such type of trees found in places like near to house, parks, public place, along the roads, canals, bunds, channels etc. Scattered trees are identified by their size and their appearance on the image. Scattered tree classes included small trees, large trees and clustered trees. Cluster of trees are the areas where trees are in compact form having less gap between the where these are compacted forms having less gap between the trees.

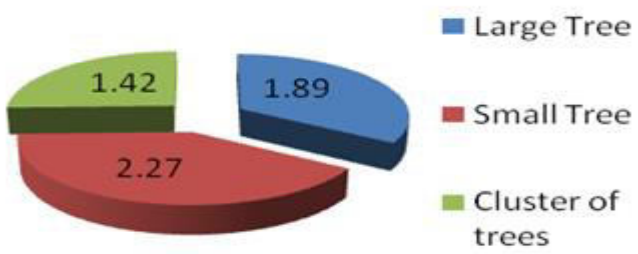
Table-3: Area under Tree outside Forest (TOF) Categories

S. No.	TOF Category	Area (sq. km)	% age of TGA*
1.	Large Tree	4.32	1.89
2.	Small Tree	4.18	1.83
3.	Cluster of trees	2.25	0.98
	Total	10.75	4.71

Note: *Total Geographical Area
Sources: Authors Compilation

Table-3 provides area under TOF in the Morni Block and (also describing the location, tree types etc.) the map is provided in figure-4.

Figure-5: Area under Tree outside Forest Categories



Sources: Authors Compilation

CONCLUSION

The study shows the utility of satellite remote sensing technique for preparation of more consistent and accurate information of different forest categories. Its provides a synoptic view of forest cover area; depend upon the spectral reflectance.Interpretation of Cartosat-1 (Panchromatic) data supported by ground truth information revealed that there are six types of forest categories in the study area and identified the three tree outside forest categories.

Interpretation of forest cover area is quite easier while using Geo-informatics technology. Satellite remote sensing data have been used to identify forest cover and their density. The visual interpretation technique is subjective and depends on the field knowledge and aptitude of the interpreter. Pine is the major species of trees in study area. In addition to forest cover mapping, remote sensing technology has been extensively used of late to prepare classified Tree outside Forest (TOF) maps.

The forest covers density from the categories of <10% to 80%. The maximum area covered in the categories of 20-40, which is about 55.16 sq. km of the total forest covers in the block. The total area covered by the forest is 200.56 Sq. km. The study helped in preparing latest crown density maps of the forest area in digital form, which can be used for forest management. Inventories and assessments of TOF resources based on reliable and accessible methods are essential to effective land use planning. However, lately a lot of interest has been generated worldwide on TOF. Besides providing support to rural economy, these trees are now a source of substantial forest produce in every country.

As Tree outside Forest (TOF) contributes significantly in the forest area in agriculturally dominant states like Haryana, its inventories and assessments based on reliable and accessible methods are essential to effective land use planning. This study shows the utility of satellite remote sensing technique for preparation of more consistent and accurate information of different forest categories and Tree outside Forest (TOF). The spatial information generated on forests cover, TOF on 1:10,000 can be utilized for various reclamation measures, and other uses for the district level planning.

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BANKS & ACCOUNT DETAILS

Bank Details for Online Transactions

Important Instructions to remember in case of:

NEFT Transfers / Online payments:

Please forward us the 'Automatic Receipt / Acknowledgement Receipt**' generated, soon after you make online (NEFT) transfer in any of below mentioned banks. Forward the slip on callandinvitation@pezzottaitejournals.net, callandinvitations@pezzottaitejournals.net, callforpapers@pezzottaitejournals.net**

- Cash Deposit:
  Please forward us the scanned copy of bank's deposit slip, received after depositing the cash in our account / or send us the photocopy of the same along with Declaration & Copyright Form;

- Demand Draft:
  Please forward us the scanned copy of demand draft. You are directed to keep a photocopy of the Demand Draft with you for future references and to liaison with us.

Note: We don not accepts 'Cheques' in any conditions from researchers and paper submitters.

The said information is needed to complete formalities against your submission.

Name of Bank: UCO Bank
Title of Account: Pezzottaite Journals,
Current Account Number: 07540210000878,
District: Jammu**,**
State: Jammu & Kashmir [India],
Branch: Talab Tillo,
IFSC Code: UCBA0002502 (used for RTGS & NEFT transactions),
Contact: +91-(0191)-2100737.

Name of Bank: Oriental Bank of Commerce
Title of Account: Pezzottaite Journals,
Current Account Number: 12821011000033,
District: Jammu,
State: Jammu & Kashmir [India],
Branch: Trikuta Nagar,
IFSC Code: ORBC0100681 (used for RTGS & NEFT transactions),
Contact: +91-(0191)-2472173.

Details for Demand Drafts

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EMERGING TREND IN TRAINING FROM E-TRAINING TO MOBILE TRAINING

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ABSTRACT

E-Training involves the use of computer or any other electronic device to provide training or educational material. The continuous efforts of technology giants in the world over have brought in user-friendly training or learning technologies at affordable prices, which were unheard in the past. The business and product life cycle have compressed substantially in the over changing world of business. Organization, which fails to accommodate the changing demand of this generation and market, fails to find its place in the race. Emerging trends in training has created new areas of advanced learning to go in hand with day-to-day work life and personal life. Easy accessibility of knowledge through web, tab, i-pads and mobile phones has made it a convenient learning procedure.

KEYWORDS

E-training, Product Life Cycle, Technology, Mobile Training etc.

INTRODUCTION

Organizations have always been keen to find means to increase their employee skills and knowledge. There is always continued need for individual and organizational development, which can be traced, to numerous demands, including maintaining superiority in the marketplace, enhancing employee skills and knowledge, and increasing productivity. Training is one of the most pervasive methods for enhancing the productivity of individuals and communicating organizational goals to new workforce or existing workforce. Considering the importance and potential impact of training on organizations and the costs associated with the development and implementation of training programmes to match the changing needs, it is important that both researchers and practitioners have a better understanding of the relationship between effectiveness of training and development efforts. Present day to manage the cost in long run E-training can be rescue for every human resource persons concerned and to all kinds of organization be it large, medium or small organizations.

Virtual Organizations are increasing in demand and creating new form of business. Business barriers (geographical, physical) are reduced with the intervention of technology. New methods of management and training have been developed and formed to cope the changes in environment .E- training methods like web based and mobile training are few among them.

"Online learning will rapidly become one of the most cost-effective ways to educate the world's expanding workforce." Mark Bonner, PricewaterhouseCoopers (1999).

E-Training refers to delivering of learning or training program by electronic means. E-Training involves the use of computer or any other electronic device to provide training or educational material. The continuous efforts of technology giants in the world over have brought in user-friendly training or learning technologies at affordable prices, which were unheard in the past. The business and product life cycle have compressed substantially in the over changing world of business. When business cycles are shortened, organizations cannot afford to send their employees away from work for several weeks or months to undergo classroom training. Under these conditions, organizations can deploy the E-training solutions, which can help employees to learn and perform simultaneously. Training employee is most vital responsibility of the organization, which can equip them to have a competitive advantage. One of the emerging trends in training is E training. E-training has developed into a revolutionary way of learning.

REVIEW OF LITERATURE

Training can be traditional following the face-to-face lecturing or modern method using electronic media for taking the class and keeping records of the knowledge data. The latest among the methods are offline and online training followed by organizations. The increased user-friendly training programmes have given new horizons for training methods. Offline methods or online methods can help in getting proper training and learning data, which can be retrieved according to the needs of the learner. Every organization make hard-core research to find perfect solution to their training problems faced during implementation stage and acceptance stage. The training should be in such a way that employees must be in a position to accept it and use it in their job.

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Studies made on training and importance of keeping track with changing needs:

Rama Devi V, Nagurvali Shaik: (V Devi Rama, 2012), in their study (evaluating training and development effectiveness) they explain their opinion on Training and development can contribute in such a way that employees can enhance their dexterity. There is a casual relation between training and employee performance. Training helps organization in achieving their strategic objectives and gives organization a competitive edge. Organizations train and develop their employees to the fullest advantage in order to enhance their effectiveness. Organizations should evaluate whether training and development programs are effective and producing desired results. Proper evaluation is the base to effective training.

Kevin Young (Kevin, 2001) in his study "The effective deployment of e-learning" he tries to consider the issues faced by training and HR managers wanting to use electronic distribution of training courses and materials. It provides strategies that will embrace the disparate technologies that will exist throughout an organization and be ready to accept new technologies as they appear. In his study, he cites example of a training deployment strategy that allows flexibility for both technology and user needs and preferences.

Max Zornada: (Zornada, 2005) As much as ERP is critical to a manufacturing supply chain environment, e-learning is critical in a knowledge dependent organizational environment. It would appear that e-learning has not only arrived, but is here to stay as a permanent feature of the corporate learning landscape in today's organizations, playing a role together with more traditional approaches to employee training and development. It appears that e-learning offers organizations the opportunity to exploit 'Virtuous Circles' in the way they implement training and development activities (Hallowell 2002). That is, an opportunity where the enablement of what was previously an offline activity allows organizations to achieve improved outcomes at lower costs. In today's increasingly competitive and globalized business environment E-learning is something organizations cannot afford to ignore in present day.

Anna Mazenod: (Mazenod, 2013) In Engaging employers in workplace training lessons from the English Train to Gain programme explains that Despite the ambition of an employer-led vocational education and training system, a lack of employer engagement in workplace training continues to be reported in England. This paper presents findings from insider research on employer engagement in Train to Gain, the recent UK government flagship workplace-training programme. The study draws on interviews with training providers and government contract managers in one local area to examine the impact of programme structures and funding arrangements on employer engagement and to identify lessons to be learnt. In their interview accounts, training providers identified rigidity and instability in government funding and management system structures as having constrained employer engagement in Train to Gain at the local level. The findings have implications for workplace training policy by suggesting that programmes with stable funding and local flexibility enable more effective employer engagement.

Dan S. Chiaburu, Jason L. Huang, Holly M. Hutchins and Richard G. Gardner: (Dan S. Chiaburu, 2013) Trainees' perceived knowledge gain unrelated to the training domain: the joint action of impression management and motives. Trainee's knowledge gains represent an important outcome in human resource development. In this research, we tested a model examining the joint influence of social desirability (impression management, self-deception) and motives (need for power, need for approval) on trainees' self-reported knowledge gain. We conducted a study with respondents who reported information related to individual differences and took a training program and reported their knowledge gain in domains that were both related and unrelated to the training program. Trainee unrelated knowledge gain was a function of the joint influence of individual predispositions (to impression manage or engage in self-deception) and motives (need for power, approval). Our findings suggest that impression management and self-deception are insufficient to influence respondent's reports of unrelated knowledge but do yield predictable patterns when examined with respondents' motives.

Rebecca Vivian, Katrina Falkner and Nickolas Falkner: (Rebecca Vivian, 2014) in their research they analyses England and Australia have introduced new learning areas, teaching computer science to children from the first year of school. This is a significant milestone that also raises a number of big challenges: the preparation of teachers and the development of resources at a national scale. Curriculum change is not easy for teachers, in any context, and to ensure teachers are supported, scaled solutions are required. One educational approach that has gained traction for delivering content to large-scale audiences are massively open online courses (MOOCs); however, little is known about what constitutes effective MOOC design, particularly within professional development contexts. To prepare teachers in Australia, we decided to ride the wave of MOOCs, developing a MOOC to deliver free computing content and pedagogy to teachers with the integration of social media to support knowledge exchange and resource building. The MOOC was designed to meet teacher needs, allowing for flexibility, ad-hoc interactions, support and the open sharing of resources. In this paper, we describe the process of developing our initiative, participant engagement and experiences, so that others encountering similar changes and reforms may learn from our experience.

Cathy Ellis, Alec Dyer and Dominic Thompson (Cathy Ellis, 2014): In their research riding tandem: an organic and collaborative approach to research in vocational education and training explains to explore the use of the Internet in peer-to-peer learning environments within vocational education and training and to investigate whether this approach could replace traditional teaching and learning. A mixed methods design, including classroom observations, design experiments, interviews and questionnaires was adopted. Although this study represents a mid-term report on work in progress only, a number of observations

can nevertheless be made about the process of conducting research within Further Education (FE) colleges. Whilst, traditionally, the pursuit of research is not a priority within FE colleges, this study has encouraged lecturers in Highbury College, Portsmouth, United Kingdom to trial a research-based approach to curriculum development. They have worked as co-researchers in the study from the conceptual phase to implementation. This paper outlines the process of conducting research in partnership with Business lecturers at Highbury College. It presents preliminary findings based on the researcher and lecturers' reflections on the research methodology and process followed.

E-TRAINING AND TRAINING THROUGH MOBILE

Mobile Learning: From 2010, many large organizations started implementing mobile learning initiatives, while others were experimenting with the medium in their own ways. We saw a lot of research and prototyping, and there were some inspiring success stories too. The year also witnessed Enterprise Mobile store (from Qualcomm) - an innovative and inspiring concept that could encourage adoption of mobile learning across enterprises around the world. We believe that mobile learning is going to be the most disruptive game changer in coming years. Here are a few developments we think we'll witness in coming years:

- Wider adoption of mobile learning in workplaces to improve productivity,
- Richer and more dynamic learning experiences due to the evolution of mobile phones and tablets,
- Integration of mobile learning with e-learning, and with other emerging technologies such as Learning Analytics,
- Capabilities such as Mobile Augmented Reality, Near Field Communication (NFC), and QR Codes powering up 'contextual mobile learning',
- Adoption of Business App Stores within organizations to help employees work smarter.

As the role of mobile training in business continues to increase, five key trends are emerging. Some trends are directly tied to the learning experience; while others are representations of how changes in the broader field of enterprise, IT affects workplace-learning initiatives. Regardless of their genesis, all five trends present opportunities for your company to provide better mobile training experiences for its workers, reduce costs or to do both.

Performance Enhancement Anywhere

The invention and acceptance of the smartphone has changed the way that people access information. Given that a smartphone puts Google in everyone's pocket, the concept of "I don't know" has largely become obsolete. While your team has access to the whole of the Internet, without mobile training, they run into a brick wall when they want to learn to get better at their jobs from a far. Organizations that embrace "anytime, anywhere" training gain multiple benefits. Their workforces are happier, because the support usually comes along with liberalized access to mobile data in general. Workers also get the information they need to do their jobs right on the spot. This leads to higher productivity that can directly affect the bottom line.

Locational Awareness

Some training systems are starting to become aware of where they are being used. For companies that span multiple locations, this opens up a range of different training opportunities. Some examples of how this technology can be used include:

- Directing a worker with a question to an expert located within the office.
- Showing an employee how to connect their smartphone or computer's VPN connection to the correct, local datacenter instead of providing generic instructions that require them to guess.
- Providing training on completing transaction paperwork that complies with the appropriate local laws.

Mobile Training Platforms

It is possible to take just about any existing training platform and shoehorn it onto a mobile platform, especially if your users have tablets and large-screen phablet devices. However, the best training systems are not only mobile-aware but are also optimized for mobile. Mobile devices are rapidly becoming the go-to device for learning, so instead of taking a desktop platform and adapting it, a more appropriate direction for mobile training systems is to build a mobile-first system that can also work on the desktop. Leveraging responsive design principles to create a site that can automatically reconfigure itself for the device on which it is used is the best and most flexible option.

Cloud-Based Systems

Like many other aspects of Enterprise IT, mobile training is moving to the cloud. Cloud-based systems offer low costs and high levels of ease of use. Cloud-based training and content delivery systems allow companies to build robust training programs with little more than content, since the software handles the formatting and delivery of the content.

Beyond the cost and ease-of-deployment benefits of the cloud, it also offers the ability to fully leverage mobility. Cloud-based systems are designed for remote access from day one. This makes them location independent. Whether they are transacting data with a worker on a desktop at an office location, a laptop-based worker at a client site or an employee using a smartphone at a coffee shop between sales calls, it is all the same to the cloud provider. With the cloud, the playing field for access is leveled.

Device Neutrality

In a survey of the employees of major computer hardware and networking company, 66 percent of them reported that they expected to be able to connect any device they wanted to their company's networks. While BYOD (bring your own devices) have broad impacts on IT, they also play a role in house your company deploys training. Creating content that can work on any device means that any worker in a BYOD context can access it. Given the benefits of having broad access to training resources, BYOD-friendly content becomes a business necessity.

TOP 10 E-LEARNING STATISTICS INFOGRAPHIC

Most importantly, the rise in training programmes using E-Learning's popularity isn't showing any signs of slowing. In fact, judging by the following Top 10 E-Learning statistics for 2014, the future of the training program through E-Learning Industry is brighter than ever:

- In 2011, it was estimated that about $35.6 billion was spent on self-paced training through e-Learning across the globe. Today, e-Learning is a $56.2 billion industry, and it's going to double by 2015.
- Corporations now report that E-Learning is the second most valuable training method that is being used. This is no surprise, given that E-Learning saves businesses at least 50% when they replace traditional instructor-based training with E-Learning. Not to mention that E-Learning cuts down instruction time by up to 60%.
- Today, it's estimated that about 4.6 college students are taking at least one course online. However, by 2019, roughly half of all college classes will be eLearning-based.
- E-Learning is also Eco-friendly. Recent studies conducted by Britain's Open University have found that e-Learning consumes 90% less energy than traditional courses. The amount of CO_2 emissions (per student) is also reduced by up to 85%.
- Over 41.7% percent of global Fortune 500 companies now use some form of educational technology to instruct employees during formal learning hours, and that figure is only going to steadily increase in future years. For a more in depth analysis of e-Learning in the enterprise you may find valuable the Kineo
- The world's most rapidly growing E-Learning markets are Malaysia and India. In fact, the estimated 5 year annual growth rate for the Asian E-Learning market is 17.3%. That is the highest compound annual growth rate of any global region. Here are a few more key E-Learning facts for other parts of the world:
    - Self-paced E-Learning's growth rate in the Middle East is 8.2%, and its revenues are expected to reach $560.7 million by 2016.
    - The self-paced E-Learning market growth rate in Western Europe is 5.8%, and it's estimated that their revenues will be at $8.1 billion by 2015.
    - Africa's compound annual growth rate for self-paced E-Learning is 15.4%, and their revenues are expected to reach $512.8 million by the year 2016.
- According to a report released by IBM, companies who utilize E-Learning tools and strategies for training have the potential to boost productivity by up to 50%. For every $1 that company spends, it's estimated that they can receive $30 worth of productivity.
- According to a recent study conducted by The Research Institute of America, E-Learning has the power to increase information retention rates by up to 60%. That means that, not only is E-Learning more cost efficient, but also it's also more effective (in terms of how much knowledge is truly acquired during the learning process).
- It's been estimated that nearly 25% of all employees leave their job because there simply aren't enough training or learning opportunities. On the other hand, companies who do offer E -Learning and on-the-job training generate about 26% more revenue per employee.
- 72% of companies who were included in a recent survey stated that E-Learning helps them to keep up-to-date with changes in their industry, which helps them to remain competitive within their niche. It was also found, in a study conducted by Bersin & Associates) that companies and organizations that did have a strong learning culture did better in their market than those who do not. For example, these organizations are 46% more like to be the leader in their industry, note a 34% increase in their ability to respond to the needs of the customer, and are 17% more likely to become the market share leader.

TYPES OF E-TRAINING

There is synchronous approach and asynchronous approaches in E-training.in synchronous approach both learning and teaching takes place in real time even though the trainer and learners are physically separated from each other. Main advantages of this

approach is that learner can learn from anywhere without having to travel to reach a training centre and the convenience of interacting with the trainer and other learners instantly. The defect of this approach is that learners have to find time to attend classes with the prior time allotted for the sessions.

Asynchronous approach the learning takes place with time delay. The learner and trainer are separated physically from each other. The advantage of this approach is that leaner can learn from any place of his choice .There is no time restriction the learner can learn at his pace and convenience. The only disadvantage of this approach is that there is no space for direct question answer sessions and no virtual scope for interaction between co –learners. The learner, other learners and trainer are separated so an active interaction is not feasible.

Increasing demand for E training is mainly a result of highly increasing usage of internet as a knowledge stock. Anyone can easily asses internet and get information's without any delay and with accuracy. Information's can easily be uploaded or downloaded within a fraction of second .Animated instructions and videos even live classes can be conducted with ease and comfort of the learner. Easy availability of information is biggest advantage of e training and mass storage ability of e training another advantage. Online directive and servers for mass storage makes it more attractive anyone can assess the knowledge from anywhere around the globe.

Computer-based training (CBT) services are where a student learns by executing special training programs on a computer relating to their occupation. CBT is especially effective for training people to use computer applications because the CBT program can be integrated with the applications so that students can practice using the application as they learn. Historically, the human resources to create the program have hampered CBTs growth, and hardware resources needed to run it. However, the increase in PC computing power, and especially the growing prevalence of computers equipped with CD-ROMs, is making CBT a more viable option for corporations and individuals alike. Many PC applications now come with some form of CBT, often called a tutorial. Web-based training (WBT) is a type of training that is similar to CBT; however, it is delivered over the Internet using a web browser. Web-based training frequently includes interactive methods, such as bulletin boards, chat rooms, instant messaging, video conferencing, and discussion threads. Web based training is usually a self-paced learning medium though some systems allow for online testing and evaluation at specific times. Recent years have seen an explosion in online training for educators by numerous content providers. Computer-supported collaborative learning (CSCL) is one of the most promising innovations to improve teaching and learning with the help of modern information and communication technology. Collaborative or group learning refers to instructional methods whereby students are encouraged or required to work together on learning tasks. It is widely agreed to distinguish collaborative learning from the traditional model in which the instructor is assumed the distributor of knowledge and skills. (Cousins, 2008)

Benefits of Emerging Wireless Training

- Cost Effective: Initial cost is the only investment we have to make for establishing electronic training.
- No Geographical Boundaries: One of the biggest advantages of electronic training is it can conquer bounder issues and travelling costs.
- Re Skill and Retain: Anytime accessibility of information is, the next advantage of electronic training .trainees can be re skilled and retain their knowledge.
- Rich Real Life Expertise: Information has and classes from most expertise persons around the world at your fingertips form other advantage of electronic training.
- Up-To-Date: Easy updating of current changes in knowledge according to the changing needs and time can be effectively accommodated in the training modules.

Different training programmes that have used e-training successfully are in fields like business analysis, project management, testing, estimation, quality control, simulation test etc.

CONCLUSION

There is always a need to find a means to accommodate the changing demands of the employees. Emerging technologically based training programmes give freedom to employees to have a more flexible timing to collaborate day-to-day work with the training programs in an effective means to increase the knowledge without compromising.

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A BRIEF STUDY OF ASSOCIATION RULE MINING

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ABSTRACT

Extraction of useful information from huge databases is what forms the most basic part of Data Mining. It is a multidisciplinary field, which has applications in a number of fields such as database technology, machine learning, pattern recognition, marketing, information retrieval, neural networks, knowledge-based databases, and data visualization. Patterns hidden in large data sets are to be discovered keeping in mind various parameters related to feasibility, usefulness, reliability etc. This paper begins with the introduction of data mining. It also presents methods for mining frequent patterns, market basket analysis and associations. These include the basic Apriori algorithm and its explanation with a daily life example.

KEYWORDS

Data Mining, Apriori, Association Rule Mining etc.

INTRODUCTION

With the advent of data warehousing and improvement in other data storage methodologies, big business organizations end up with enormous data. However not all of this is useful as such, but it can be made useful by various techniques of which data mining is most prominent. Now the primary goal of any organization is to maximize profits. This paves the way for continuous improvement in the field of data mining. A formal definition of data mining is given as "A process of non-trivial extraction of implicit, previously unknown and potentially useful information from the data stored in a database" [1]. Data mining is categorized into predictive mining and Descriptive mining. Showing the essential characteristics of data is termed as descriptive mining, which involves clustering, association, and sequential mining. To infer patterns from data to make predictions is predictive mining. Predictive mining involves tasks like classification, regression and deviation detection. The applications of data mining are widespread, covering areas from processing to marketing and manufacturing to management.

WHAT MOTIVATED ASSOCIATION RULE MINING

Association rule mining was first introduced in 1993 by Agarwal et al[2] to determine relationship among a set of items in database. Association rules, like clustering are a form of unsupervised learning and have been applied to many fields such as retail business, web mining and text mining. The most challenging part of association rule inference involves finding sets of items, which satisfy specific criteria and in turn are used to infer the rules themselves. The discovery of interesting relationship among huge amounts of business transaction records can help in many business decision-making processes such as catalogue design, cross marketing and customer shopping behavior analysis.

Retailing Example In an online book store there are always some tips after you purchase some books, for instance, once you bought the book Data Mining Concepts and Techniques, a list of related books such as: Database System 40%, Data Warehouse 25%, will be presented to you as recommendation for further purchasing. In the above example, the association rules are: when the book Data Mining Concepts and Techniques is brought, 40% of the time the book Database System is brought together, and 25% of the time the book Data Warehouse is brought together. Those rules discovered from the transaction database of the bookstore can be used to rearrange the way of how to place those related books, which can further make those rules more strong. Those rules can also be used to help the store to make his market strategies such as: by promotion of the book Data Mining Concepts and Techniques, it can blows up the sales of the other two books mentioned in the example [3].

MARKET BASKET ANALYSIS (MBR)

Figure-1 shows a market analyst analyzing 3 market baskets. The market basket is defined as an item set bought together by a customer on a single visit to a store. The main aim of this technique is to identify buying habits of customers by finding association between different items that they place in their shopping baskets. In a way, purchasing behavior of customers can be analyzed this way.

Let us take an example of an e-shopping website. A user views an item of his interest and there are suggestions of additional items that the user may be interested in, on the screen. Association rules predict such suggestions and help promote online shopping by increasing the sales and enhance customer satisfaction by helping him choose the products.

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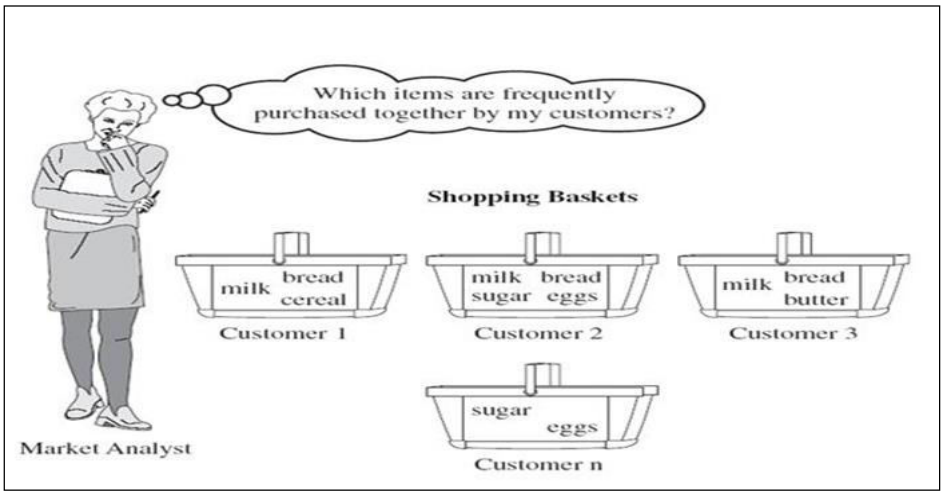
Figure-1: Market Analyst Analyzing 3 Market Baskets



Sources: Authors Compilation

ASSOCIATION RULES

Association rules imply the existence of strong relationship between the sales of two item sets. It is an expression of the form A→B, where A and B both are disjoint i.e. A∩B=ϕ. This can be explained with the help of an example as shown in table 1, which will be used further as well:

Table-1: Transactional Data

Transactions	Items
T1	Shirt, Cap, Shoes, Trouser
T2	Cap, Coat, Trouser
T3	Cap, Wallet
T4	Shirt, Cap, Coat, Trouser
T5	Shirt, Wallet, Trouser
T6	Cap, Wallet
T7	Shirt, Cap, Wallet, Shoes, Trouser
T8	Shirt, Cap, Shoes, Trouser

Sources: Authors Compilation

Let I be the set of m distinct items such that I = {I1, I2, ... Im} and T = {T1, T2, ... Tn} be the set of all transactions. Each transaction Ti contains a subset of items chosen from I. Let D be a database with different transaction records (transactional data set). A collection of one or more items is called an item set. For example, a collection of 3 items is called a 3-itemset. {Shoes, Trousers, Cap} is a 3-itemset.

Support and Confidence are the two measures of interestingness of data. Typically, association rules are considered interesting if they obey certain threshold minimal support and minimum confidence value. Support refers to the number of transactions that contain a particular item set. Support(s) of an association rule is defined as the percentage/fraction of records containing XUY to the total number of records in database. Every time an item appears in different transaction in the database, its count value is increased.

Count, also known as support count is defined by the frequency of occurrence of an item set. Confidence determines how frequently items in Y appear in transactions that contain X.

Let X is any element or a set of elements that belong to a transaction Ti that further belongs to T. Therefore, σ(X) depicts number of such transactions Ti. [4]

$$\sigma(X)=|\{Ti|X\subseteq Ti, Ti\in T\}|$$
$$\text{Support(s)} = \sigma(X\cup Y)/n$$
$$\text{Confidence(c)} = \sigma(X\cup Y)/\sigma(X)$$

Let us take an example of a store that sells Trousers, Shirt and Coats etc. Now, with the information above, the store could strive for optimum placement of these things as the sale of one of them may improve the chances of the sale of the other frequently associated items.

In this example, we considered a small set of transactions T from huge database, D (table-1). Suppose minimum support count required is 23 (i.e. min_sup = 3/10 = 30 %) Let minimum confidence required is 60%. We have to first find out the frequent item set using Apriori algorithm. Association rules will be generated using the two parameters minimum support and minimum confidence.

Assume that the dataset of 9 transactions below is selected randomly from a universe of 100000 transactions:

Therefore, we analyze these transactions to calculate support count for each item. Table 2 shows support count calculation of items in the original dataset

Table-2: Support Count Calculation

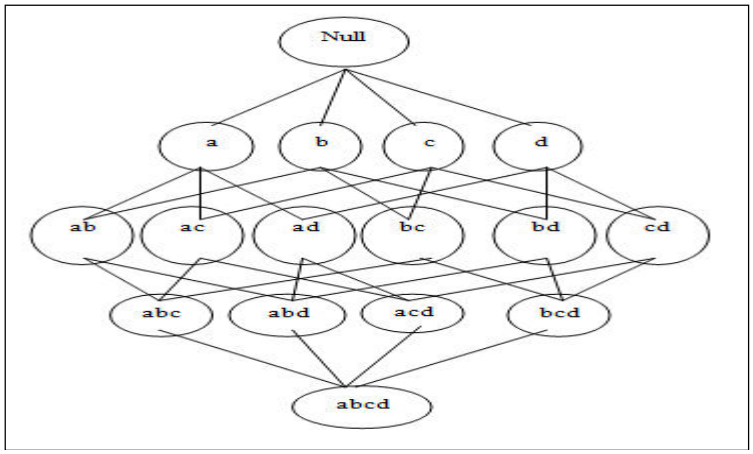
Item	Support Count
Shirt	5
Cap	7
Shoes	3
Coat	2
Wallet	4
Trouser	6

Sources: Authors Compilation

FREQUENT ITEMSET GENERATION

To represent all possible item sets, a lattice structure is used. Figure shows an item set lattice for I= {a, b, c, d}. A data set that contains k items can generate Upto 2k-1 frequent item sets. Since k can be very large, the search space of item sets that needs to be explored is exponentially large. To find frequent item sets to determine support count for every candidate item set, a brute force approach is used [5].

Figure-2: Frequent Item Generation Lattice



Sources: Authors Compilation

APRIORI ALGORITHM

It is one of the most well known association rule algorithm. Main aim of this algorithm is to find the frequent item sets. It is because any subset of a frequent item set is also frequent. It uses prior knowledge of frequent item set properties, as we shall see through our example. For example if {A, B} is a frequent item set, then both {A} and {B} must also be frequent. These frequent item sets are then used to generate association rules.

An association rule of the form A⇒B signifies if a customer bought {B, C}, he would probably buy {A}. Support (35%) for this rule means that both of these items appear together in 35% of the transactions and confidence (70%) shows that in 70% of those cases, customers will buy A and B together.

The algorithm consists of two steps:

a. **Join step:** Candidate item set of size k (Ck) is obtained by joining frequent item sets of size k-1 (Lk-1) with itself.
b. **Prune step**: Any k-1 item set that is not frequent cannot be a subset of a frequent k-item set. Hence, it is discarded. [4]

The algorithm is as following:

Pseudocode: algo()
1) k=1
2) Fk= { i | i ∈ I ∩ σ({i}) ≥ N x minsup}
3) Repeat
4) k=k+1
5) Ck= algo(Fk-1) //generate candidate itemsets
6) for each transaction t ∈ T , do
7) Ct=subset(Ck,t) //identify all candidates that belong to t
8) for each candidate itemset c ∈ Ct , do
9) σ(c)= σ(c)+1 // increment support count
10) end for
11) end for
12) Fk= { c | c ∈ Ck ∩ σ(c) ≥ N x minsup}
13) until Fk=ϕ
14) Result= ∪ Fk

The simulation of this algorithm is shown in the following example:

Table-3: Generation of 2-Itemset

2-itemsets	Support count
{Shirt, Cap}	4
{Shirt, Shoes}	3
{Shirt, Wallet}	2
{Shirt, Trouser}	5
{Cap, Shoes}	3
{Cap, Wallet}	3
{Cap, Trouser}	5
{Shoes, Wallet}	1
{Shoes, Trouser}	3
{Wallet, Trouser}	2

Sources: Authors Compilation

Table 3 shows generation of 2-itemsets along with their support count. As the misup value=three, following sets are discarded: {Shirt, Wallet}, {Shoes, Wallet}, {Wallet, Trouser}.

Table-4: Generation of 3-itemsets

3-Itemsets	Support count
{Shirt, Cap, Shoes}	3
{Shirt, Cap, Wallet}	1
{Shirt, Cap, Trouser}	4
{Cap, Shoes, Wallet}	1
{Cap, Shoes, Trouser}	3
{Cap, Wallet, Trouser}	1
{Shirt, Shoes, Trouser}	3

Sources: Authors Compilation

Table-4 shows generation of 3 item set frequent pattern, which is done with items obtained after discarding item sets not having minimum support count value. Yet again item, sets having lesser count than minsup are rejected and 4-itemsets are generated.

Table-5: Generation of 4-itemsets

4-Itemsets	Support Count
{Shirt, Cap, Shoes, Trouser}	3

Sources: Authors Compilation

Table-5 concludes the process with generation of the most frequent item set from the given data. This completes the Apriori Algorithm. The frequent item set that is obtained from given example is {Shirt, Cap, Shoes, Trouser}. All the candidate item sets generated with a support count greater than the minimum support count form a set of frequent item sets. These frequent item sets will be used to generate strong association rules (where strong association rules satisfy both minimum support and minimum confidence).

FUTURE WORK

Since we are now familiar with the basic concepts of data mining and association rule mining, we can study this concept further and look for its implementation techniques. We have studied about the Apriori algorithm and come across a number of such algorithms, which can be used to find association among data in different transactions.

Study of these algorithms and their implementation part can be considered as a future task. Apart from implementation, we can also go ahead and analyses these algorithms to study their effectiveness and conclude which is the best one as computational cost is one of the main hindrance in implementing such algorithms. Integrating these algorithms into our database can also be considered and taken up in our future work.

CONCLUSION

Association rule mining has a wide range of applications. We studied about market basket analysis and learnt how to find interesting patterns in our database. Its conventional algorithm proceeds in two steps. All frequent item sets are found in the first step and the frequent item set that is included is at least minimum support transaction. The association rules with the minimum confidence value are generated in the second step.

In this paper, we studied both of these steps using Apriori algorithm. The main motive of this paper is to understand how pattern recognition in huge database can be done and how it can benefit a large number of companies by increasing their sales. If we look at the customer point of view, it is concluded that market basket analysis helps a buyer make better choice and easily search the items of his choice in a supermarket. Thus improving customer satisfaction and profit to the companies is guaranteed through this study.

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