Automated NFC-Based System for Management and Tracking of Assets in sharing Economy

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ABSTRACT

Physical Assets management is a critical issue for any business or organization and tracking those assets can be one of the most time-consuming tasks of the entire workday. Asset management and tracking tools can simplify the work and make it more efficient and more productive. In this paper, we present a smart way to manage and track the keys of assets by developing an automated system that combines hardware with software. It is customary to have a dedicated person within the institution to manage borrowing process of assets. The problems related to borrowing could be losses, destruction or theft. Such problems might cause disturbance for the institution and this issue motivated us to find a solution by developing a system that aims for asset protection and tracking. Using near field communication technology (NFC), our solution answers the question whether the asset is available or someone borrowed it. For an asset, the system informs us whether it has been returned back on time or not. We designed an electronic circuit combined with NFC tags to discover the presence of keys of assets. The system is not restricted to educational institutions or hospitals rather, this solution is suitable for business owners. An example could be the hotel industry where it can be used to facilitate the process of giving the guest the room's key in a safe and simple way. Another example is in the field of car rental, which needs to be tracked and protected periodically. In general, it has a potential in sharing economy resources.

1 INTRODUCTION

Student Management System is software which is helpful for students as well as the school authorities. In the current system all the activities are done manually. It is very time consuming and costly. Our Student Management System deals with the various activities related to the students.

There are mainly 3 modules in this software

- User module
- Student Module
- Mark management Module.

In the Software we can register as a user and user has of two types, student and administrator. Administrator has the power to add new user and can edit and delete a user. A student can register as user and can add edit and delete his profile. The administrator can add edit and delete marks for the student. All the users can see the marks.

2 LITREATURE SURVEY

2.1 ANDREAS PAPADAKIS, PROFILLIN STUDENTS PERFORMANCE AND MESURINGTHEIR PROGRESS IN THE ARE OF MULTIMEDIA

A study by Ahmed and Omar (2018) revealed that CMS significantly reduces the time and effort required for these activities, thereby enabling administrators to focus on more important tasks such as improving the quality of education.

CMS also provides a platform for effective communication between students, teachers, and administrative staff over the years, CMS has gained significant attention in the field of education, and a considerable amount of research has been conducted to explore its potential benefits. According to the literature, the primary objective of CMS is to improve the efficiency of college operations and provide better services to students, teachers, and administrative staff. One of the primary benefits of CMS is that it simplifies complexadministrative tasks.

DRAWBACKS

Its manual process for earlier system. Its more time consume for all process.Need for more resources.
Its chance to lose our record or data.

2.2 KATASAROS, GREGORY, A HOLISTIC VIEW OF INFORMATION IN CLOUD ENVIRONMENT

Student Management Systems (SMS) play a crucial role in modern educational institutions, aiding in the efficient administration and organization of student data, academic records, and related processes. This literature review aims to provide an overview of key findings and trends in the field of Student Management Systems, focusing on their evolution, features, benefits, and challenges.

Evaluating the effectiveness of SMS is an ongoing research area. Studies have examined their impact on student performance, administrative efficiency, and institutional outcomes. The results are mixed, suggesting that the effectiveness of SMS depends on various factors, including system design,

implementation strategy, and institutional context.

The literature suggests several emerging trends in SMS development, such as the use of artificial intelligence for predictive analytics, block chain for secure data management, and mobile applications for increased accessibility. Future research should focus on assessing the long-term impact of these innovations.

In conclusion, the literature review reveals that Student Management Systems have evolvedsignificantly and offer numerous benefits for educational institutions. However, challenges and concerns remain, highlighting the importance of careful planning, user engagement, and ongoing research to maximize the effectiveness of these systems. Future developments in technology and educational practices will continue to shape the landscape of SMS.

3 SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

System Analysis is a detailed study of the various operations performed by a system and their relationships within and outside of the system. Here the key question is- what all problems exist in the present system? What must be done to solve the problem? Analysis begins when a user or manager begins a study of the program using existing system.

During analysis, data collected on the various files, decision points and transactions handled by the present system. The commonly used tools in the system are Data Flow Diagram, interviews, etc. Training, experience and common sense are required for collection of relevant information needed to develop the system. The success of the system depends largely on how clearly the problem is defined, thoroughly investigated and properly carried out through the choice of solution. A good analysis model should provide not only the mechanisms of problem understanding but also the frame work of the solution. Thus it should be studied thoroughly by collecting data about the system. Then the proposed system should be analyzed thoroughly in accordance with the needs.

System analysis can be categorized into four parts.

- ✓ System planning and initial investigation
- ✓ Information Gathering
- ✓ Applying analysis tools for structured analysis
- ✓ Feasibility study
- ✓ Cost/ Benefit analysis.

In the current system we need to keep a number of records related to the student and wantto enter the details of the student and the marks manually. In this system only the teacher or the school authority views the mark of the student and they want to enter the details of the student. This is time consuming and has much cost.

3.2 PROPOSED SYSTEM

In our proposed system we have the provision for adding the details of the students by themselves. So the overhead of the school authorities and theteachers is become less. Another advantage of the system is that it is very easy to edit the details of the student and delete a student when it found unnecessary. The marks of the student are added in the database and so students can also view the marks whenever they want.

Our proposed system has several advantages

- ✓ User friendly interface
- ✓ Fast access to database
- ✓ Less error
- ✓ More Storage Capacity
- ✓ Search facility
- ✓ Look and Feel Environment
- ✓ Quick transaction

All the manual difficulties in managing the student details in a school or college have been rectified by implementing computerization.

3.3 FEASIBILITY ANALYSIS

Whatever we think need not be feasible .It is wise to think about the feasibility of any problem we undertake. Feasibility is the study of impact, whichhappens in the organization by the development of a system. The impact can be either positive or negative. When the positives nominate the negatives, then the system is considered feasible. Here the feasibility study can be performed in two ways such as technical feasibility and Economical Feasibility.

Technical Feasibility:

We can strongly says that it is technically feasible, since there will not be much difficulty in getting required resources for the development and maintaining the system as well. All the resources needed for the development of the software as well as the maintenance of the same is available in the organization

here we are utilizing the resources which are available already.

Economical Feasibility

Development of this application is highly economically feasible .The organization needed not spend much money for the development of the systemalready available. The only thing is to be done is making an environment for the development with an effective supervision. If we are doing so, we can attain the maximum usability of the corresponding resources .Even after the development, the organization will not be in condition to invest more in the organization. Therefore, the system is economically feasible.

3.4 FUNCTIONAL REQUIREMENTS

The functional requirements of the system are to the implement the solution for finding the train details and route information in the large existingrail system.

1. **Input / Output:**

The user select the type of train and enter the source and destination codeswith which finds the trains details and route information.

2. **Processing:**

The information regarding train details are retrieved from the database.

3. **Storage Requirements:**

The information will be retrieved from the database.

4. **Control Requirements:**

Alerts when any errors are there and when any of the field is not selected.

4 SYSTEM DESIGN

4.1 Introduction

System design is a process through which requirements are translated into arepresentation of software. Initially the representation depicts a holistic view of software. Subsequent refinement leads to a design representation that is very close to source code. Design is a place where quality fostered in software development. Design provides us with representation of software that can be assessed for quality; this is the only way that can accurately translate the customer requirements into finished software product or system. System design serves as the foundation for all software engineering and software maintenance steps that follow.

We look the design process from three distinct perspectives:

- ✓ Conceptual Design
- ✓ Logical Design
- ✓ Physical Design

The higher view is the conceptual view, followed by the logical view and finally the physical view. In designing an application, we generally begin and end each phase in a sequentially order, although they may overlap oneanother along the way.

Conceptual Design:

Conceptual Design is the process of acquiring and evaluating, documenting and then validating what the user envisions to be the business relation. It identifies the user and business requirements of the application and leads to a business solution as seen by the user.

All applications are built to solve business problems, and it is important to pay close attention to principle that the business need drives application development. At any point in the design process, the current state of the design should be directly traceable to a business problem and requirements.

To achieve this conceptual design is driven by developing usage scenarios. These scenarios are a direct representation of the user's view of the solution to a specific business problem. A conceptual view places the emphasizeon solving a business problem and deriving a solution that corresponds to the needs and requirements of the users. It is based on deriving the behavior of the solution with a primary emphasizes on the user. Beginning with a emphasis on the activities of the business rather than aspects of software development, underscores the fact that systems exists to serve the business. A strong focus on the user in the beginning of the project will help in maintaining a proper perspective throughput the development life cycle. The conceptual design results in the first description of what the system does to solve the business problem articulated in the vision/scope document.

Logical Design

Logical Design derives business objects and their related services directly from these usage scenarios. The logical view of the solution provides a basis for evaluating different physical options. It also formalizes the solution for the project team.

The idea of the application is that the system first emerges in logical design. Its boundaries and business objects and it contain the system definition. Logical design specifies the interfaces between the system and external entities, such as users and other systems. Within a system there may be a number of sub-systems, and these boundaries are also specified. Logical System Design consists of the following steps:

- Input / Output Specifications
- File Specifications
- Processing Specifications

Logical design should be technologically independent as possible, in order to separate system behavior issues from system implementation issues.

Physical Design

The purpose of Physical Design is to translate the logical design intoa solution that can be implemented effectively, according to performance, administration and development process requirements. This physical view should correctly implement the desired system behavior while meeting the constraints imposed by the technology.

In Physical Design, the perspective shifts from an abstraction of system behavior to an implementation of the behavior. Whereas the logical design is largely technology independent, physical design is necessarily tied to chosen set of technologies, these being the hardware and software on which the applicationwill run.

The aim of physical design is to specify how to build portioned applications from software components. The interaction of these components through defined interfaces results in the desired behavior of the system as a whole. The rules for communicating between components are defined by interaction standards: what a component does and how it communicates are major considerations in physical design.

Physical design consists of the following steps:

1. Design the physical media

- Specify input/output media.
- Design the database and specify backup procedures.
- Design physical information flow through the system.

2. Plan the system implementation

- Prepare a conversion schedule target date.
- Determine training procedure, courses and timetable.

3. Device a test and implementation plan. 4.Specify any new Hardware/Software usage.

5. Update benefits, costs, conversion date and system constraints.

4.2 UML Diagrams

Introduction

Design is the first step in the development phase for an engineered product or system. Design is the place where quality is fostered in software development. Design is the only way that we can accurately translate a user'srequirements into a finished software product or system. Software design serves as the foundation for all software engineers and software maintenance steps that follow. Without design we

risk building an unstable design -one that will fail when small changes are made, one that may be difficult to test, and one whose quantity cannot be accessed until late in the software engineering process.

Taking software requirements specification document of analysis phase as input to the design phase we have drawn Unified Modeling Language (UML) diagrams. UML depends on the visual modeling of the system. Visual modeling is the process of taking the information from the model and displaying it graphically using some sort of standards set of graphical elements.

UML Diagrams are drawn using the Pace Star UML Diagrammed Software. We seem to able to understand complexity better when it is displayed to us visually as opposed to written textually. By producing visual models of a system, we can show how system works on several levels. We can model and the interactions between the users and the system.

Types of UML Diagrams

Each UML diagram is designed to let developers and customers view a software system from a different perspective and in varying degrees of abstraction. UML diagrams commonly created in visual modeling tools include

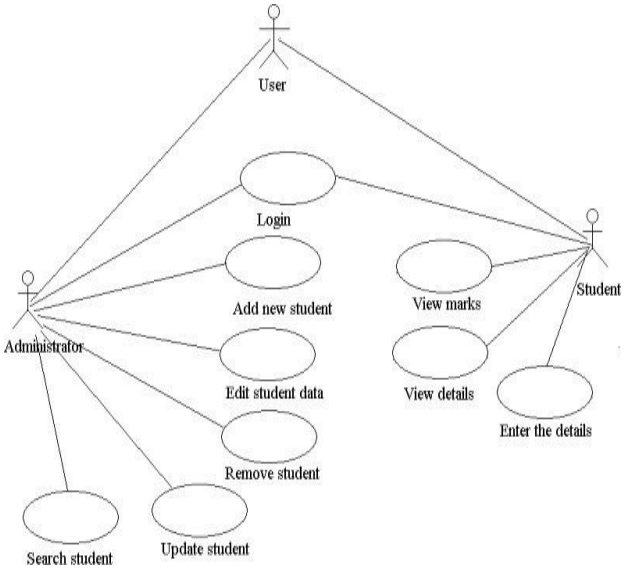


Fig 1

Class Diagram models class structure and contents using design elements such as classes, packages and objects. It also displays relationships such as containment, inheritance, associations and others.

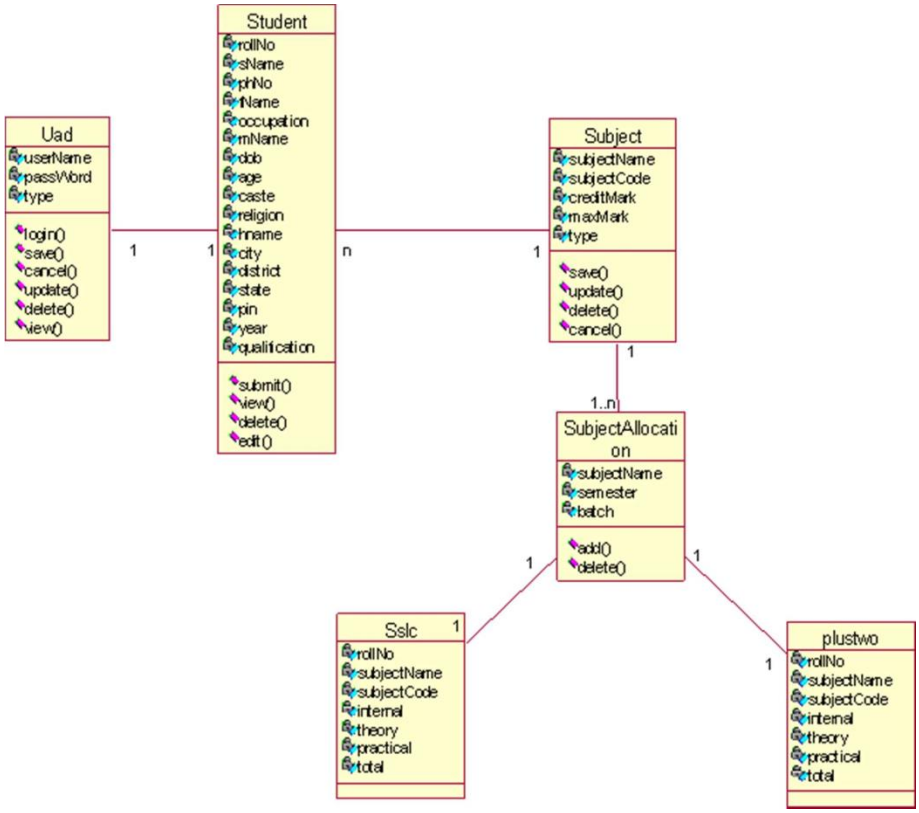


Fig 2

Interaction Diagrams:

Sequence Diagram displays the time sequence of the objects participating in the interaction. This consists of the vertical dimension (time) and horizontal dimension (different objects).

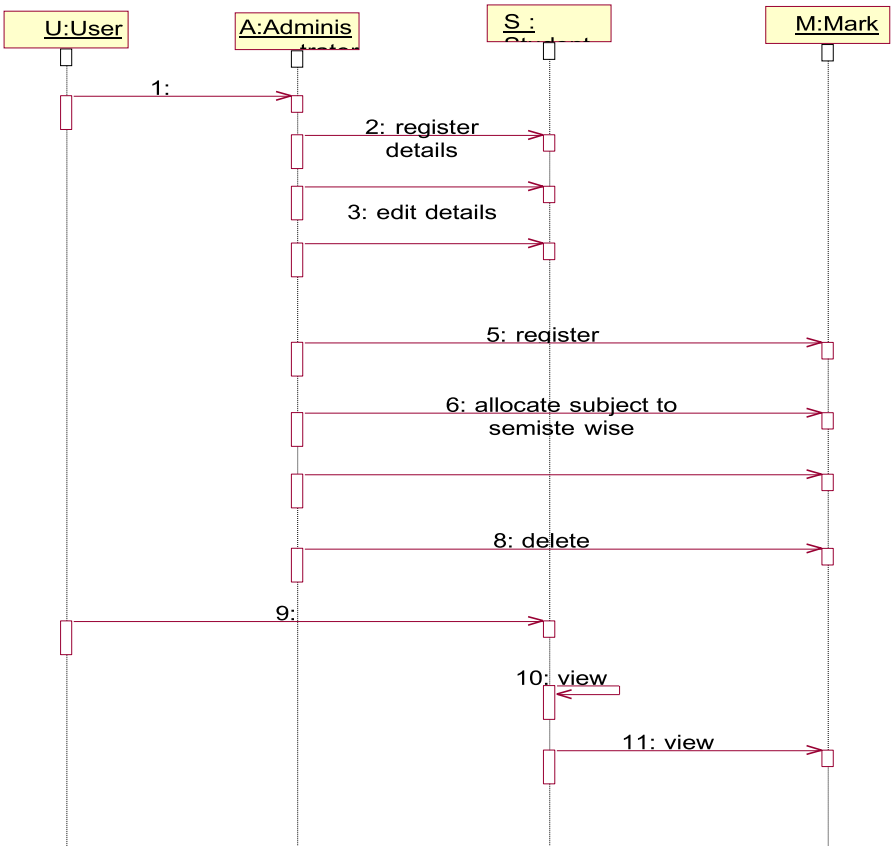
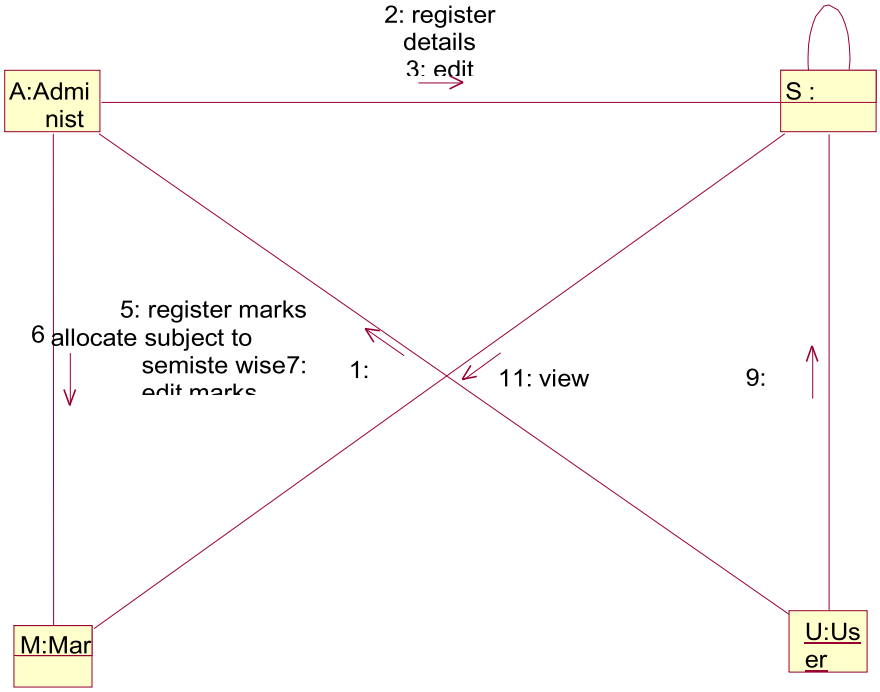


Fig 5.3

Collaboration Diagram

Displays an interaction organized around the objects and their links to oneanother. Numbers are used to show the sequence of messages.

10: view details



Fig

Activity Diagram displays a special state diagram where most of the states are action states and most of the transitions are triggered by completion of the actions in the source states. This diagram focuses on flows driven by internal processing.

Physical Diagrams:

Component Diagram displays the high level packaged structure of the code itself. Dependencies among components are shown; include source code components, binary code components, and executable components. Some components exist at compile time, at link time, at run times well as at more thanone time.

Deployment Diagram displays the configuration of run-time processing elements and the software components, processes, and objects that live on them. Software component instances represent run-time manifestations of code units.

4.3 DATABASE DESIGN

The general theme behind a database is to handle information as an integrated whole. A database is a collection of interrelated data stored with minimum redundancy to serve many users quickly and efficiently. The general objective is to make information access easy quick and flexible for user. In database design

several objectives are considered.

Control Redundancy:

Redundant occupies space and therefore, is wasteful. If versions of the data are in different phases of updating the system often gives conflicting information. A unique aspect of database design is storing only once, which controls redundancy and improves system performance.

5 SYSTEM IMPLEMENTATION

Introduction

Implementation is the stage in the project where the theoretical design is turned into a working system. The implementation phase constructs, installs and operates the new system. The most crucial stage in achieving a new successful system is that it will work efficiently and effectively.

There are several activities involved while implementing a new project. They are

- End user training
- End user Education
- Training on the application software
- System Design
- Parallel Run and To New System
- Post implementation Review

End user Training:

The successful implementation of the new system will purely upon the involvement of the officers working in that department. The officers will be imparted the necessary training on the new technology

End User Education:

The education of the end user start after the implementation and testing is over. When the system is found to be more difficult to understand and complex, more effort is put to educate the end used to make them aware of the system, giving them lectures about the new system and providing them necessary documents and materials about how the system can do this.

Training of application software:

After providing the necessary basic training on the computer awareness, the users will have to be trained upon the new system such as the screen flows and screen design type of help on the screen, type of errors while entering the data, the corresponding validation check at each entry and the way to correct the data entered. It should then cover information needed by the specific user or group to use the system.

Post Implementation View:

The department is planning a method to know the states of the past implementation process. For that regular meeting will be arranged by the concerned officers about the implementation problem and success.

Project Modules

Our application deals with three modules

- User module
- Student Module
- Mark management Module.

User Module:

In the Software we can register as a user and user has of two types, student andadministrator.

Administrator has the power to add new user and can edit and delete a user. A student can register as user and can add edit and delete his profile.

The administrator can add, edit and delete marks for the student. All the users cansee the marks.

Student Module:

In this student module Administrator will register the details of the student. Administrator can view the details of the student by giving admission number. Administrator can also edit the details of the student by giving admission number Administrator can also delete the details of the student by giving admission number

Marks Management Module

In this module Administrator register all subjects and also provide subject code to each and every subject.

Assign subjects to every branch in semester wise.

Using subject code Administrator edit and delete the subjects.

Administrator enters marks of the Student in semester wise.

Administrator can also edit and delete the marks of the student.

6 CONCLUSION

Our project is only a humble venture to satisfy the needs in an Institution. Several user friendly coding have also adopted. This package shall prove to be a powerful package in satisfying all the requirements of the organization.

The objective of software planning is to provide a frame work that enables the manger to make reasonable estimates made within a limited time frame at the beginning of the software project and should be updated regularly as the project progresses.

FUTURE ENHANCEMENT

- ✓ In Future work, This application to develop a cross platforms like IOS, etc.
- ✓ In adding the more features of college management system to develop access with user's flexibility.
- ✓ To authenticate the users based on the system users list which is maintained bythe operating system
- ✓ To restrict the usage of all files by the users based on their privileges on thesystem

REFERENCES

[1] D B Heras, D. Otero, and F. Arguello," An eco feedback system for improving the sustainability performance of universities," in Proc. 2011 IEEE International Conference on Virtual Environments Human-Computer Interfaces and Measurement Systems,
Ottawa, ON 2011, pp. 1 – 6

[2] Y Wang, B Y Sun, and F Cheng, "Electronic document–based process model for image archives in universities," in Proc. 2011 IInternational Conference on Information Technology, Computer Engineering, and Management Sciences, Nanjing, Jiangsu, pp. 57– 60

[3] X. X. Xin, R. M. Wu, and H. H. Li, "A framework model of the e-campus management system based on SOA," in Proc.2009 International Conference on Computational Intelligence and Software Engineering Wuhan, 2009, pp. 1-3[4] H. M. Weiand L. J.He, "Constructing the comprehensive academic affairs management system based on SOA," in Proc. 2009 1stInternational Conference on Information Science and Engineering, Nanjing, Jiangsu, pp. 3261-3264

[4] S. Jayalalitha, B. Vijayakumar, and G.S. Wadhwa, "Design and implementation of a web-based application for relational data maintenance in a university environment," in Proc. 2011 International Conference and Workshop on Current Trends in Information Technology, Dubai, pp. 105-112

[5] M-H.Lee, C -J.Yooand O.-B.Jang, "Embedded System Software Testing Using Mobile Service

Based On SOA", IJAST, vol. 1, (2008), pp. 55-64

[6] S.H. Al-Daajeh, R.E Al- Qutaish and Fuad Al-Qirem, "Engineering Dependability to Embedded Systems Software via Tactics", IJSEIA, vol. 5,no.4,(2011), pp. 4562

[7] Ming-Syan Chen, Jiawei Han, Philip S Yu. Data Mining: An Overview from a Database Perspective[J]. IEEE Transactions on Knowledge and Data Engineering, l996, 8(6):866-883.

[8] R Agrawal ,T 1 mielinski, A Swami. Database Mining: A Performance Perspective[J]· IEEE Transactions on Knowledge and Data Engineering, 1993,12:914- 925.

[9] Shri Vaishnav Institute of Technology and Science, IJCA: www.ijcaonline.org Baroli, Sanwer Road, Indore, India.International Journal of Information and ComputationTechnology.ISSN 09742239 Volume 3, Number 3 (2013).