EXPLORATION PROJECT MANAGEMENT SYSTEM (EPMS)

By

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CERTIFICATE

Certified that the contents and form of thesis entitled "**Exploration Project Management System**" submitted by M Khurshid Alam have been found satisfactory for the requirement of the degree.

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DEDICATION

In the name of ALLAH, the Most Gracious, the Most Merciful.

To my dear Family especially to my Parents.

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I am extremely grateful to Dr. Hafiz Farooq for his helpful direction and support to perform such a valuable research work and studies in the field of wireless communication technologies. I truly admire his dedication to my project and for all the help and suggestions and guidance that he has offered. A great deal of my project has been possible because of him. I would like to express my gratitude to Shaji Alam my co-advisor, Dr. Amir Shafi and Mr. Syed Ali Haider (Faculty member) for their valuable implications and comments to improve the dissertation. I am highly thankful to all of my teachers whom had been guiding me through out my course work. Their knowledge, guidance and training enabled me to carry out this research work.

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ABSTRACT

Project management has become one of the most challenging and demanding aspect of managerial sciences all around the world. Success and failure of any underlying project mainly depends upon the maximum resource utilization, management of its different phases and finally their integration into the final product. EPMS is one such project that focuses on different tasks and phases involved in projects that exploration department of Oil and Gas Development Corporation Limited (OGDCL) undertakes for exploring the natural resources i-e gas and oil reserves in Pakistan. So far all the work and management of tasks is dealt manually and is paper based which makes every procedure redundant and cumbersome and it overstretches the budgets off the limits and it is hard to keep track of whether the tasks assigned are accomplished on time or not. For this project we shall have to understand the project management and related procedures adopted by OGDC Company in detail. The core objective is to optimize resource utilization and reduce communication time and costs which in turn will increase the synergy between the undertaken project and its progress. The major areas of work include Project estimation, Project Management, Human Resource Management, Resource Scheduling, Quality assurance, Communication and data acquisition.

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Chapter 1

INTRODUCTION

1.1 PURPOSE

This project intends to automate the project management in the Exploration Department of one of the leading Corporations of Pakistan i.e. OGDCL. Project management activities are performed manually which requires a lot of paperwork and wastage of time and cost. Another drawback of manual project management is wastage of time in communication with Client especially in case of offshore clients. And above all, because of this manual operation after project reviews, lesson learned from the project and very important information related to team capabilities and weaknesses are lost. This project EPMS will provide Project managers and clients with an interface to access and monitor the project work and the performance of the developers. We intended to provide a generic solution for all Software Development Institutes. The core objective is to optimize resource utilization and reduce communication time and costs which in turn will increase the synergy between client and progress of the project. The major areas of work include Project estimation, Project Management, Human Resource Management, Resource Scheduling, Quality assurance and Reporting through web based front end. The end deliverables will include an identification and implementation of processes necessary for a successful project in OGDCL. The implementation will be done to develop a tool which will help

project managers to manage related projects effectively and efficiently, an interface for client to analyze the performance of the concerned project.

1.1.1 Problems with Current System

The management activities that are being performed at the Exploration department at OGDCL are quite hectic in a way that project manager has to do all the work manually and he has to ask his sub-ordinates or the staff under him about a particular task that is of some priority to the ongoing project. The manger will call the relevant personal and tell him that what is it that he wants him to do. This may involve or introduce delays and inconsistencies since there are no standards defined or the employee that is being assigned the task may get it totally wrong and in return the task does not fulfill the original requirement that was supposed to be expected out of it.

Secondly the track has to be recorded or files have to be maintained about whatever steps or procedures are being adopted or acquired during an ongoing project. These files or records so far are being recorded in hard format that is for the information, the text files of unlimited length are being stored and the seismic analysis related information are stored on cartages or in the form of tapes, which kept on accumulating and the size of this manual database kept on increasing. This data is prone to the changing times as some of data is very old and the document related to that old data are so delicate that they require special dedication or care so that such data could not be lost or damaged. This collection of data needs to be stored in some place and therefore as it is not in soft format the huge data repository requires some personal to take care of it. This need is fulfilled by hiring extra staff that is responsible

only for taking care of that repository or that pile of files. Hiring new staff would definitely require some staff to be trained so that they can keep up with the trends and norms of the OGDCL and they have to be paid at the end of the month as well so this is going to cost the corporation as well when they can save on this account by implementing or automating the whole system. Project that are been done in OGDCL are of such kind that they are divided into different phases and tasks and the priority of each phase or task is such that the some of next tasks or phases depend upon their successful and in time completion. As some of the task or phases are done at the fields e.g. the drilling phases or the seismic analysis phase, the importance of the communication between the field manager and the project manger who is sitting in the head office. The communication channel in this regard is very critical and should be reliable so that the decisions that have to be made are without any delays and the critical time is consumed to its maximum capacity and any flaw in this channel will result in a delay which will not only delay the next task that are queued in the pipe line but as well will increase the time and the budget the two most important factors of any project which will increase the turnover period for that project and hence will affect its productivity.

The data library that OGDCL is using is located in F.8 Markaz and is isolated from the main head office. It is called Technical Data Library (TDL). TDL contains every type of information that is required by any of the department in OGDCL. Land Mark Resources has designed a database for that library which has certain flaws.

First of all the solution provided by LMKR is database designed in ORACLE and it has scanned all the text files into .pdf format so that they could be tracked by anyone in the time of need and they can get any information they want from those document they just search the database and get it from there. So far it runs smooth but what about the fact that a person who only requiring a particular amount of date say 5% of the whole document has to go through the entire document and then get his required information. This way it becomes quite cumbersome and the person requiring some information would not go in unnecessary details to get his part, rather he wants a solution where he can get only that part which he wants. These are some of the major problems that exists in the current system working for the relevant department and the project undergoing that department and we have tried our best to come up with a solution that not only solves the above but can prove to be helpful in any upgrades that the systems requires at certain point in time and will be more then willing to accommodate those changes.

1.2 PROBLEM STATEMENT

"Exploration department of OGDCL gets all its work and project management dealt manually and is paper based which makes every procedure redundant and cumbersome and it overstretches the budgets off the limits and it is hard to keep track of whether the tasks assigned are accomplished on time or not."

1.3 MOTIVATION

The aim behind this project is that we basically wanted to provide the automation to the whole project management process of the exploration department of

the OGDCL and to remove all the flaws that exist in the current system. Secondly we as students were totally unaware of the projects that such energy sector corporate undertakes and what are the procedures they accomplish to complete their procedures successfully. This whole new domain was very encouraging for us students to delve into it and explore the managerial tasks that need to be automated in order to achieve their goals within the estimates cost and time as these two factors are of the utmost importance for any project that OGDCL's exploration department undertakes.

So this was not just a project but an opportunity for us students to explore the new horizons and make our progress with what ever expertise we have for that domain, this will not only make the whole point clear to us about the project management and its different aspect but will give us a chance to work us with industry which will prove to be very fruit full in our future if we have to manage any projects all by ourselves. The biggest motivation was that from the day one we wanted to do a project in collaboration with some present industry and we surveyed many public limited companies and they all were somehow completely or some part of them was automated and the procedures were not that hectic and out dated as those of OGDCL which is the highest revenue generating company of Pakistan and the services they are getting from different companies are not helping them just because they have lack of tech Savoy personal and technology oriented staff so they have to spend even more on training their staff for those solutions that some of the companies provide them and as they no very less about the latest technology so such service providers take advantage of that and charge them with even higher prices. So if we cut the story short the crux

would be that the energy sector of Pakistan holds a potential for us fresh graduates to explore the new ways and methodologies for project management this way as well as we are familiar with the management of software related projects so this was the entirely new domain.

1.4 PROPOSED SOLUTION

This system is the replacement for the current manual system used by the organization. This is one large system that will consist of different modules as specified earlier in this document. *Project Manager* will be able to initiate the project. He is also responsible for Time sheets and Project Closeout. *Project Manager* will be able to prepare SRS, WBS, Select *Team Lead,* Review Project and time log, estimate time, cost and resources needed, and request resource allocation. QA team member will be responsible for controlling and time extensions related to a particular task in a phase, Test cases creation based on existing Use cases using pre-designed templates, and generate Reports. Thus different interfaces and privileges are given to different users depending on their use and requirements. Project Manager will be able to view Project status, all ongoing activities and give feedback. Supervisor will be able to update his/her status on different activities, technical and management issues using his/her specific Interface.

EPMS provides the central based data repository. Different Interfaces are designed for different usage based on their roles and privileges. Project Manager initiates the project by using certain Interfaces in which he/she initiate and defines the project. He will be able Create Work Packages and WBS, review time log and request

for resources allocation. Supervisor will be able to use his Interface to update his status and issues. QA module will be responsible for quality control and generate Reports and reviews and feedback. Project Manager will be given with the Interface to submit his/her feedback on project, list changed requirements, express views on developer's performance and view current status of Project and its activities. So the proposed solution could be divided into sub-modules where each module has a separate functionality and can be considered as a separate entity. The following sub-modules can be extracted from the over all business process:

1.4.1 Role Assignment/Administrative View

This role is responsible for the whole system to run smoothly no matter what. He has the complete view of all the activities that are going on.

He can add, update or delete any role i-e. managerial, supervisory or employee into the system. He/she is held responsible for any flaw and technical fault that any of the users finds during the usage of this very software. He/ she is responsible for any of the maintenance and upgrading of the system when ever required and is also responsible for giving certain amount of help to the users of the system.

The roles I am responsible for are:

1.4.2 Employee View of EPMS

- View tasks that have been assigned to him by the supervisor
- Time log filling about the task being assigned
- Task submission upon completion
- View Feed Back

- Give feed back on any point

1.4.3 Human resource Management

- The human resource manager is responsible to assign the human resource to the department.
- This module is also responsible to keep track of the data of all the human resource
- Assign the salaries
- Set the working hours for the employees.
- He/she can add, delete or update the records of any of the personal in the department as the requirement maybe.

1.5 THE ARCHITECTURAL DIAGRAM

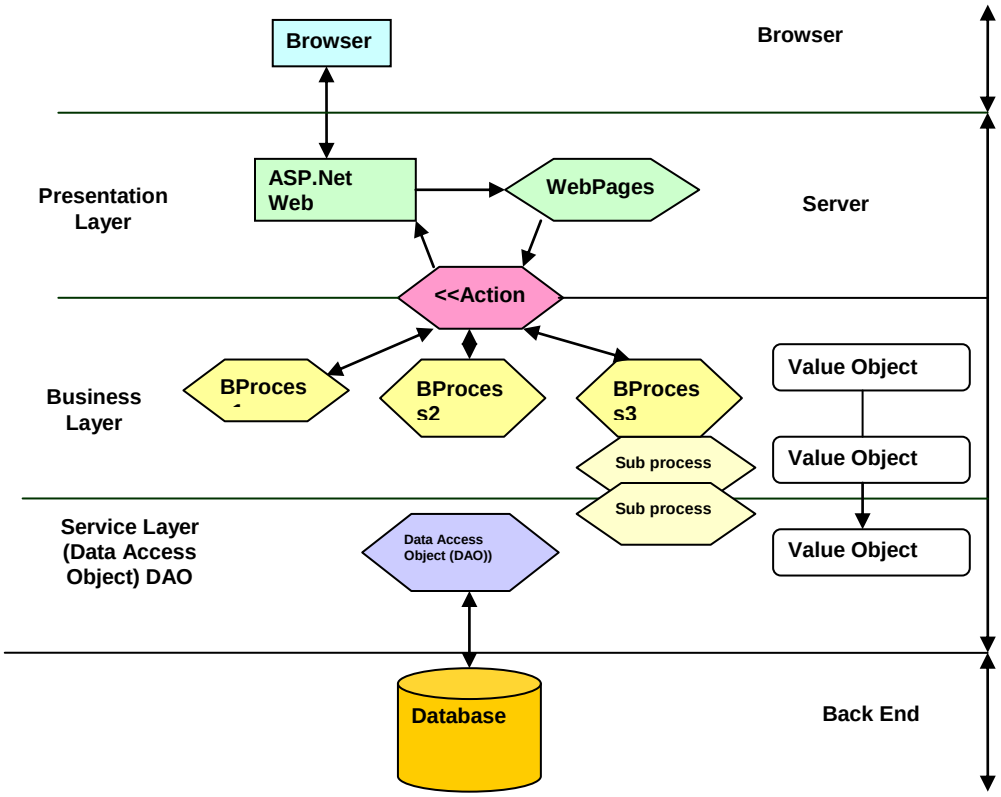

Figure 1: Architecture Diagram of EPMS

1.6 KEY OBJECTIVES

The key objective of this very project is that we should be able to develop a system that can be implemented with ease and is very easy to use and has the potential to give benefit or be fruitful to the industry in terms of reducing its cost and in becoming time efficient and its interface to its users is so simple that the learning

curve of the users about this product is minimized to its maximum. Some of the other key objectives that we have tried to achieve are:

1.6.1 Reliability

Reliability is one of the major players in the success of any project that is to be developed and deployed, if it is not reliable and prone to errors or crashes every now and then , than there is no need to build up such a system and an organization where its all about reliability and efficiency both in terms of cost and time, we are left with no choice but to develop a system that is of such a status and repute that is barely crashes and hangs over other then an operating system or network error. This is essential as the managerial process should be robust and fast enough so that every phase and each task related to that phase is completed in time and in the required specified budget with the required human and technical resources required. Other than that the system is not supposed to produce more then a few inconsistencies within fist couple of months of its deployment and that is due to the fact that the new systems when implemented and deployed face some problems at first but with the passage of time every thing goes smoothly once the operating environment cope up with the newly built system. The number of discrepancies is expected to be null after few weeks of its deployment.

1.6.2 Availability

Communication whether inter-organization or intra organization of any form be it information retrieval or information giving is very critical factor for a system that any organization is going to deploy because they want best results out of it and if a

system is so used to crash down or shutting down or produce any kind of inconsistency, it may give the user a hard time who is always in a hurry to get things done in time and of high quality stature. So keeping in view all these aspects we have tried our level best to come up with a solution that gives the maximum availability to its users whenever and wherever they require it and it never disappoints them regarding the availability of the information just because of the fact the system is down so we cannot proceed further. Our system is never going to become the trouble maker rather it should be the trouble shooter.

1.6.3 Security

Security is as well once of the most important objective of the proposed and implemented system which makes sure that no one gets anything more then he is authorized to take and it is made clear and sure that any form of security breach is not accommodated by the very system. So for this very system we have allotted each user profile with a pair of username and password which he or she chooses for him/herself so that he/she can have the access to only his/her accounts and the level of access he/she has been authorized to view and other then that their rights have been restricted.

1.6.4 Efficiency

The main reason to design and develop this system is that we wanted to make the project management process of the organization fast enough so that every phase and every task related to a particular phase are complete on time with the specified budget so that we can decrease the break even point of the projects that OGDCL under takes and as a result the productivity can be achieved in minimum time expected. So

efficiency both in terms of time and financially is necessary and this system helps the management to achieve both by facilitating the observation and the decision making process of the projects that they are dealing with at a particular point in time.

1.6.5 Maintainability

After a project is completed successfully this very system will be responsible to maintain its status and if there is any change required or any update necessary for that project the system is easy to be updated and maintained. We will have system administrator responsible for the system maintenance who keep upgrading the system by getting the constant reviews from the users of the systems and higher management as the need may be. And we will also be available for any queries during the first few months of its deployment so that the smooth running of the system is made possible no matter what and it should serve its root cause.

Chapter 2

LITERATURE REVIEW

In this chapter I will mainly discuss the related and important literature that I have been through during the review phase of this project. The technique that I used for my surveys was “Divide and Conquer” such that I have divided my tasks into subtasks and the research was conducted for each task. I searched and read the work that has been done already in the relevant field and what are the procedures that the related industry does adopt to complete its tasks and projects. I have studied some reports and tried to understand that what are the basic steps that are required to be done in order to complete the oil and gas projects that OGDCL undertakes. Then there are different tools ant techniques that were required for the completion of this final year project and there brief details are provided in this chapter as well. I have as well discussed the feasibility of each technique that has been used in this regard.

2.1 PROJECT MANAGEMENT IN OGDCL

Oil and Gas Development Corporation of Pakistan is basically an energy sector company which is responsible for the oil and gas needs of the country. Different projects that are being taken by OGDCL require few specific predefined tasks that are necessary for accomplishment for acquiring the organizational goals and objectives. Following is the stepwise explanation of a project that is undertaken by the exploration department of the OGDCL:

- Each project is divided into various phases that are required to be completed in order to get the objective out of the project. Some of the phases are:

- Post drilling Phase where the information about the area where the drilling is to be done is obtained so that they can understand the geological information of the area and it could help them in the drilling phase:
- Seismic analysis is carried out and in this phase different types of seismic rays are passed through a particular area so that when they strike the surface and comeback related information from the retrieval of those rays could be used to further clarify their assumptions based upon the post well surveys and now through seismic analysis.
- The data acquisition is similar to the post drilling phase the difference being in this case, the information may be bought from another company which has got the relevant information in case it is not there with the OGDCL's TDL.
- Similarly each phase can be distributed into different tasks and the accomplishment of each task is highly responsible for the successful completion of the phase to which that particular task belongs to.
- When ever the exploration department undertakes a project first of all it is calculated that whether the project would be feasible for the organization.
- Its productivity is calculated so that to know how long is it going to take for that project to be profit ale for the organization.
- How much are they going to spend on that particular project and is that project worth it.
- What would be the time duration of that project and what is the time cushions for each task or phase in that particular project.

- The management is then responsible for the responsibilities that are to be assigned to the particular roles e.g. supervisors and employees so that they work upon the particular task or phase that has been assigned to them so that they try their best to complete their duties related to a particular phase or task in the assigned to them.

2.1.1 Key Success Factors in Energy Sector

Key success factors are those elements which are necessary for any business or company to focus upon so that they should looks at them before starting a project or a business and if they completely neglect those points, they will not only suffer financially but their losses their method of delving into any particular project or a business is also questionable. Following are the key success factors for a company that is related to energy sector e.g. oil and gas.

2.2 FEASIBILITY ANALYSIS

The feasibility analysis of the project should be such that before starting off with a project they should know about the feasibility and their estimation should be accurate to the max so that they come to know that whether the project is going to generate revenues or its is going to be a loss game for them. So feasibility analysis is the most important and crucial element upon which the success and failure of any project falls heavily.

2.2.1 Time and Cost

The projects being undertaken by the energy sector companies are of such kind that they require huge amount of money and they should be completed in time so that

they can estimate the productivity of the project and the turn over or the break even point should be minimized. If the undertaken project is not completed in time it is not only going to cost them more but will increase the time for the project to be productive and this way the company will face heavy losses, and when the company completes the project, it would in order to compensate for the losses charge more for the oil or gas that they would produce eventually.

2.2.2 Communication

Communication is another factor that is the focal point for the success or failure of any project. If the communication link between the top management and their subordinates is such that it introduces delays and affects the decision making process then this is certainly going to affect the project and the effect will definitely increase the cost and time for a particular project. So the communication medium should be strong enough so that the procedures are not delayed because of the poor or delays in the decision making process.

2.2.3 Reliability

It is another important factor for the successful completion of the project such that every method that a company takes should be reliable enough that the projects that the exploration department undertakes are run smoothly without any delays and they are completed in time. The key success factors are the means by which a company can achieve a certain amount of success in what ever it does. As there is no hard and fast rules for the success of any business but if a particular pattern or step wise procedures are adopted then at least the percentage of the success could exceed a

certain limit. No company can do any wonders in the market without knowing its key success factors.

If the business operates on cutting edge and latest up to date technology and stays there as the technology changes but it should be always remembered that the fundamentals of any project management task should always remains the same the methodologies are prone to changes.

2.3 TOOLS AND TECHNIQUES USED

This portion includes the tools and techniques that I have used to implement my project and the review of which is necessary for the better understanding of the project being undertaken by me and its details. The tools as well that have been used are described in this portion of this chapter:

Microsoft Visual Studio 2005 has been used as tool for system development. ASPX is used for developing web pages and the language used for code implementation is C#. As the data stored in the database is not of very large size, so, in order to reduce the processing and memory overheads of computer systems, Microsoft access has been used as a database. In order to generate reports, Crystal Reports feature has been used.

Chapter 3

SOFTWARE REQUIREMENT SPECIFICATION

3.1 INTRODUCTION

3.1.1 Purpose

This project intends to automate the project management in the Exploration Department of one of the leading Corporations of Pakistan i-e OGDCL, Project management activities are performed manually which requires a lot of paperwork and wastage of time and cost. Another drawback of manual project management is wastage of time in communication with Client especially in case of offshore clients. And above all, because of this manual operation after project reviews, lesson learned from the project and very important information related to team capabilities and weaknesses are lost. This project EPMS will provide Project managers and clients with an interface to access and monitor the project work and the performance of the developers. We intended to provide a generic solution for all Software Development Institutes. The core objective is to optimize resource utilization and reduce communication time and costs which in turn will increase the synergy between client and progress of the project. The major areas of work include Project estimation, Project Management, Human Resource Management, Resource Scheduling, Quality assurance and Reporting through web based front end.

The end deliverables will include an identification and implementation of processes necessary for a successful project in OGDCL. The implementation will be done to develop a tool which will help project managers to manage related projects

effectively and efficiently, an interface for client to analyze the performance of the concerned project.

3.1.2 Document Conventions

Main headings used in this document are bold having Times New Romans font with size of 18. The sub headings are also bold, but with font size of 14. Different users and product name is identified with italic font so that their roles can be understood easily and with out any ambiguity.

- The term ‘Project Manager’ means the user having an account with all privileges.
- The term ‘Employee’ means the user having an account with limited privileges.
- The term ‘User’ includes both ‘Manger’ and ‘Employee’.

3.1.3 Intended Audience and Reading Suggestions

Project managers, System Developers, Technical writers, System Analysts, and QA Team Members can use this document. This document describes the project scope, system details and requirements as well. Users are categorized as Program Manager, Project Manager, Supervisors, Technical/Team Lead, and HR Manager and QA Team each having different priorities and privileges to use the system. This system is to be run on any window-based operating system by Microsoft with no hardware and special software constraints. Any user can see the User Documentation section to get help regarding the use of the system or other basic issues. Managers must study this document in detail to become familiar with the system and its

specifications so that any failure can be overcome easily. System requirements, Hardware and software interface section must be studied in detail and then analysis models, to understand the technical issues involved in the development of this system.

3.2 PROJECT SCOPE

EPMS is intended to supply the users with facilities such as cost and time estimation, Work Package creation, Resource allocation, Task assignment, Performance Review, Statistical Reports, and Quality Assurance, . This system will replace the existing manual system used by the company. There are many problems in the current system including increasing requirement for manpower, increased manual work, decentralization of data, lack of communication and difficult integration. The new system will resolve all these issues. The company's main objective is to enhance its performance and efficiency by providing a complete visual solution for internal users and external customer to manage and track any individual project. Also, the company's major concern is its customers. This system will allow Manager to directly assess the project progress and interact with the concerned Supervisors. This online system will not only allow Managers to view these records but may also add his/her comments, suggestions, state changed requirements, and rank concerned Supervisors. This online system will provide the Managers with web-browser bases application so that they can know about the latest status on Project work. This will assist company in evaluating its internal resources, effectiveness in Project completion and user's involvement during the project.

This will introduce the concept of customer satisfaction in the company. This may be the trend in future for all the Exploration Projects in the country. This system will solve many issues in the current system and will help in achieving the goals and objectives of the organization in many ways.

3.3 OVERALL DESCRIPTION

3.3.1 Product Perspective

This system is the replacement for the current manual system used by the organization. This is one large system that will consist of different modules as specified earlier in this document. *Project Manager* will be able to initiate the project. He is also responsible for Time sheets and Project Closeout. *Project Manager* will be able to prepare SRS, WBS, Select *Team Lead*, Review Project and time log, estimate time, cost and resources needed, and request resource allocation. QA team member will be responsible for controlling and time extensions related to a particular task in a phase, Test cases creation based on existing Use cases using pre-designed templates, and generate Reports. Thus different interfaces and privileges are given to different users depending on their use and requirements. Project Manager will be able to view Project status, all ongoing activities and give feedback. Supervisor will be able to update his/her status on different activities, technical and management issues using his/her specific Interface.

3.3.2 Product Features

EPMS provides the central based data repository. Different Interfaces are designed for different usage based on their roles and privileges. Project Manager

initiates the project by using certain Interfaces in which he/she initiate and defines the project. He will be able Create Work Packages and WBS, review time log and request for resources allocation. Supervisor will be able to use his Interface to update his status and issues. QA module will be responsible for quality control and generate Reports and reviews and feedback. Project Manager will be given with the Interface to submit his/her feedback on project, list changed requirements, express views on developer's performance and view current status of Project and its activities.

3.3.3 Operating Environment

The project is to be developed using the Microsoft's .Net frame work 2.0 and the database is implemented in Microsoft access. For reports we have used the crystal reports and the programming language used is C# and for web controls we have used the ASP.NET. PDF API's are used as well for the searching operations that we have provided our users with. For further information see chapter 2.

3.3.4 Design and Implementation Constraints

The system must be developed using technologies that are easy to understand by the company's employees who will be using this system. Hardware dependant protocols or standards must not be used. This system must be completed in 2 month time to satisfy the client's requirements. Easy interface must be developed for the Internal and External User. Only Managers must be allowed to view the Project Cost Information, Company Policies and Customer Personal Information. Developers may update their status and view Customer feedback. But customers have no right to view or change structural/technical information of the proposed project. No external user

must access the company's central database repository and thus no internal record may be changed by any unauthorized user.

3.3.5 User Documentation

User documents must be provided along with the delivery of the working system. System documentation must be provided to Managers, Analysts, QA Team Members and Supervisors. User Documentation must be established for the use of Managers and Supervisors. The flow of system functions, different components, constraints, technologies used must be discussed in the User Documentation. Separate tutorials on the technologies used for the development of this system and web links might be given to user as well.

3.3.6 Assumptions and Dependencies

Different modules interact among themselves. Each Module may be dependant on the inputs of other module and will be producing outputs for different modules. In accurate or incomplete module will result in inconsistency, and less effective generic product, and will result in Customer dissatisfaction.

3.4 SYSTEM FEATURES

The Features I am working on for EPMS includes:

3.4.1 Employee's Interaction

If the person logging in is an "Employee" he can click on following options that should be present on his profile:

Only options that he has to interact with EPMS are:

- View tasks that have been assigned to him by the manger

- Upon clicking any task a dialog opens up having information about the phase.
- The employee has the option to fill in the time log telling about the current status of the task
- Submitting that time log will update the database regarding.
- Its progress in terms of cost and time and the time lines are updated as well so that if the supervisor wants to see the progress of any phase he can view the progress and give his feedback.
- Upon completion of the task an employee can submit a status report about 100% completion of the phase.
- All the submitted tasks are visible to Q&C so that any unsuccessful phase can be reassigned the time and cost and successful ones should be closed out.

3.4.1.1 Report Generation

Stimulus/Response Sequence

- User selects ‘Generate Reports’ option from the menu bar or tools bar.
- The employee will generate the report when all the tasks are completed 100% by populating a form that includes:
    - A description of the phase
    - Description of task
    - Specified end date
    - Actual end date
    - Specified budget
    - Actual cost incurred

- Success
- Submit.
- On submission of the report the database is updated specifying the phase to be completed.
- Feed back is generated to the supervisor regarding completion of the project
- The phase is populated on the employee's profile and he can view the phase information anytime he likes to.

Functional Requirements

REQ-1: Database connection must be established.

REQ-2: Proper Data must be selected.

REQ-3: Valid Date must be selected for scheduling a Report.

User Feedback:

Description and Priority

This feature will allow the customer to give feedback about the product. The user will logon to the website and open the feedback form from a link.

Stimulus/Response Sequence

- User fills the form having fields related to the project and comments.
- User submits the form.
- If submitted, customer is given the acknowledgement.

Functional Requirements

REQ-1: Database should be ready to accept the form.

Analyze User Feedback

Description and Priority

This feature will allow the User to view the feedbacks submitted by concerned Users. This feature will help the management team of the company.

Stimulus/Response Sequence

- The User opens the feedback window.
- System checks the database and returns the list of feedbacks.
- User selects a feedback to see its detail.
- A new window is opened and the detail is shown to the User.

Functional Requirements

REQ-1: Dialog will be properly validated before submission. It includes validation for empty fields and proper entry for each field.

REQ-2: If the form can not be shown due to some error, the application should not crash but user should return to its previous position.

REQ-3: The database should be available for use by the application. If it is not, user will be returned to previous stage after an error message prompt.

REQ-4: System Requirements should be clear.

3.5 REPORT GENERATION

Description and Priority

It's the most prominent feature of the *EPMS*. QA Team Members will be able to generate different reports both for external and internal users based on existing data. It is a high priority function.

Stimulus/Response Sequence

- User selects ‘Generate Reports’ option from the menu bar or tools bar.
- The user selects data for which Report is to be generated.
- A report is shown to the User and other Users as specified by the current User. Reports can also be scheduled.

Functional Requirements

REQ-1: Database connection must be established.

REQ-2: Proper Data must be selected.

REQ-3: Valid Date must be selected for scheduling a Report.

3.6 TIME LOG MAINTENANCE

Description and Priority

This function will allow different users to fill Time log. It is a high Priority function as this time log is used to evaluate performance of the project and is useful in ensuring the timely completion of the project and finally, to show the current status to the customer.

Stimulus/Response Sequence

- User selects ‘Time Log’ option from the Menu Bar or Tool Bar.
- User fills the time log
- System displays time log.

Functional Requirements

REQ-1: Time Log templates must be available to user in a compatible format.

User Feedback

Description and Priority

This feature will allow the customer to give feedback about the product. The user will logon to the website and open the feedback form from a link.

Stimulus/Response Sequence

- User fills the form having fields related to the project and comments.
- User submits the form.
- If submitted, customer is given the acknowledgement.

Functional Requirements

REQ-1: Database should be ready to accept the form.

Analyze User Feedback

Description and Priority

This feature will allow the User to view the feedbacks submitted by concerned Users. This feature will help the management team of the company.

Stimulus/Response Sequence

- The User opens the feedback window.
- System checks the database and returns the list of feedbacks.
- User selects a feedback to see its detail.
- A new window is opened and the detail is shown to the User.

Functional Requirements

REQ-1: Database connection must be established.

3.6.1 Human Resource Manager Interaction:

There is a separate module for human resource management. There will be a human resource manager that will be handling and managing the entire employee. Following work is done by the HR manger:

- He can create new jobs on the behalf of the company through a create job page.
- He can select and short list the applicants for any particular job. For this purpose there will be page which after loading, will separate the short listed candidates according to the job requirement.
- He will manage the history records of the employee and has the rights to delete or update any record. There will be a page for updating and deleting the employee records.
- There will be an attendance form, used for daily attendance for an employee. Any employee wants leave, he will first fill the application form, and then the request will be forwarded to the HR manager. When he will logon to the system, the request will be displayed to him and then he will decide the status of Leave.
- If any employee will come late, then he has to tell the reason by writing into a text area.
- If leave of an employee is approved, then that particular employee will not be shown the attendance page.
- He can send the employees for the training for particular period.

- He will be handling the salaries of the employees as well.

3.6.1.1 Report Generation

Stimulus/Response Sequence

- HR manger can generate report in order to find the absentees, or late comers.
- He can generate report of the history of all the employees or any particular employee.
- He can generate the report for comparison of total leaves allowed to the employee with the number of leaves that employee has made.

Functional Requirements

REQ-1: Database connection must be established.

REQ-2: Proper Data must be selected.

REQ-3: Valid Date must be selected for scheduling a Report.

REQ-4: Error handling will be done properly in order to prevent the system from being crashed.

REQ-5: values entered in the database should be correct so that no consistency or wrong results could be avoided.

3.7 EXTERNAL INTERFACE REQUIREMENTS

3.7.1 User Interfaces

EPMS uses a very simple and user friendly GUI. All the functions can be accessed through the menu bar and tool bar. Proper pop-up help is available for each tool. User will have the option to change the font settings. Standard font will be 12pt. Times new roman.

3.7.2 Hardware Interfaces

The standard hardware is used for input and output. A standard printer is required for printing purposes. No special networking equipment is necessarily required; a network of any type/topology should be available if required. The system must have the access to internet through any mean.

3.7.3 Software Interfaces

The interfaces are implemented using ASP.Net and crystal reports where ever needed and the interfaces are designed such that they are very easy to use and user friendly.

3.7.4 Communications Interfaces

Standard network protocols like HTTP will be used to communicate if the application and the database server will reside on different machines. No special protocols are defined to be used server itself will resolve that.

3.8 OTHER NONFUNCTIONAL REQUIREMENTS

3.8.1 Performance Requirements

Each stakeholder of this project must complete his/her work on time. Estimation module should be completed efficiently and properly because it is the main module and whole working of project depends on that module. Client should provide his/her feedback on timely basis this will help in change management and correction if required.

3.8.2 Safety Requirements

The database must be safe. No unrelated person should be allowed to access the database.

3.8.3 Security Requirements

Every user of this software will be given a user name and password and access to different modules will be role based. No unauthorized user will be able to access this software. Hence, such identification mechanism will enhance the security of the system.

3.8.4 Quality Attributes

This software will be generic software which will be used by any related organization. Software will be platform independent and Interoperable. Software will be flexible and will be easy to modify in later stages according to changed requirements. The system is made flexible so that any need or changing requirements of the company can be meat at any time with ease and minor changes. The system is reliable and robust. It has no failure in normal circumstances. There is no special issue of shut down or software failure.

3.9 OTHER REQUIREMENTS

Software should be flexible so that it may be expanded according to changed requirements. Database design should not be very complex but it should be flexible and database access should be efficient.

Chapter 4

SYSTEM DESIGN

The design of any system or application possesses a vital concern to its functionality and efficiency at the same time. A well designed application or system will function in accordance with its design; a poorly designed application is as good as none at all. The design of the system must be conceived such that it facilitates the tools that are been used along with its contents. It must also provide a user friendly interface for its users to interact with it. This section gives the detailed explanation of the system design, the required model, the entity relationship diagrams, use cases and sequence diagrams. The professional approach adopted in such application is a speedy execution and reliability and user interfaces as well play an important role. Yet another consideration that is vital to the design of such an application is the support available in tools that have been in use so that they can be incorporated in the system keeping in view the system requirements in terms of hardware as well as software.

4.1 DATABASE DESIGN

A database has been designed for the system so that the information should be available and it can be updates, inserted or deleted at the time of requirement.

4.1.1 DBMS Functions

4.1.1.1 Data Definition

This includes describing:

- Files
- Record Structures

- Field Names, Types and Sizes
- Relationship between records of different types
- Options/information to make search fast

4.1.1.2 Data Entry and Validation

Validation may include:

- Type checking
- Range checking
- Consistency checking

4.1.1.3 Updating

Updating involves:

- Record insertion
- Record modifications
- Record deletions

4.1.2 Data retrieval on the basis of Selection Criteria

The data retrieval on the basis of some criteria is facilitated by the query language and with which the characteristics of the specified required records may be specified. Query language differs enormously in power and sophistication but the standard which is becoming increasingly common is based upon the relational operations and some of them are:

- Selection on the basis of some field value
- Selection of particular fields from records to be displayed

- Linking records together from two different files on the basis of matching field values.

Arbitrary combination of those operators makes the DBMS to answer a particular query with a very large no of records.

4.1.2.1 Record Definitions

Most systems describe or provide the facility for describing that how summary reports from the database is to be created and laid out on the page.

These may include obtaining:

- Counts
- Totals
- Averages
- Maximum and minimum values

ERD

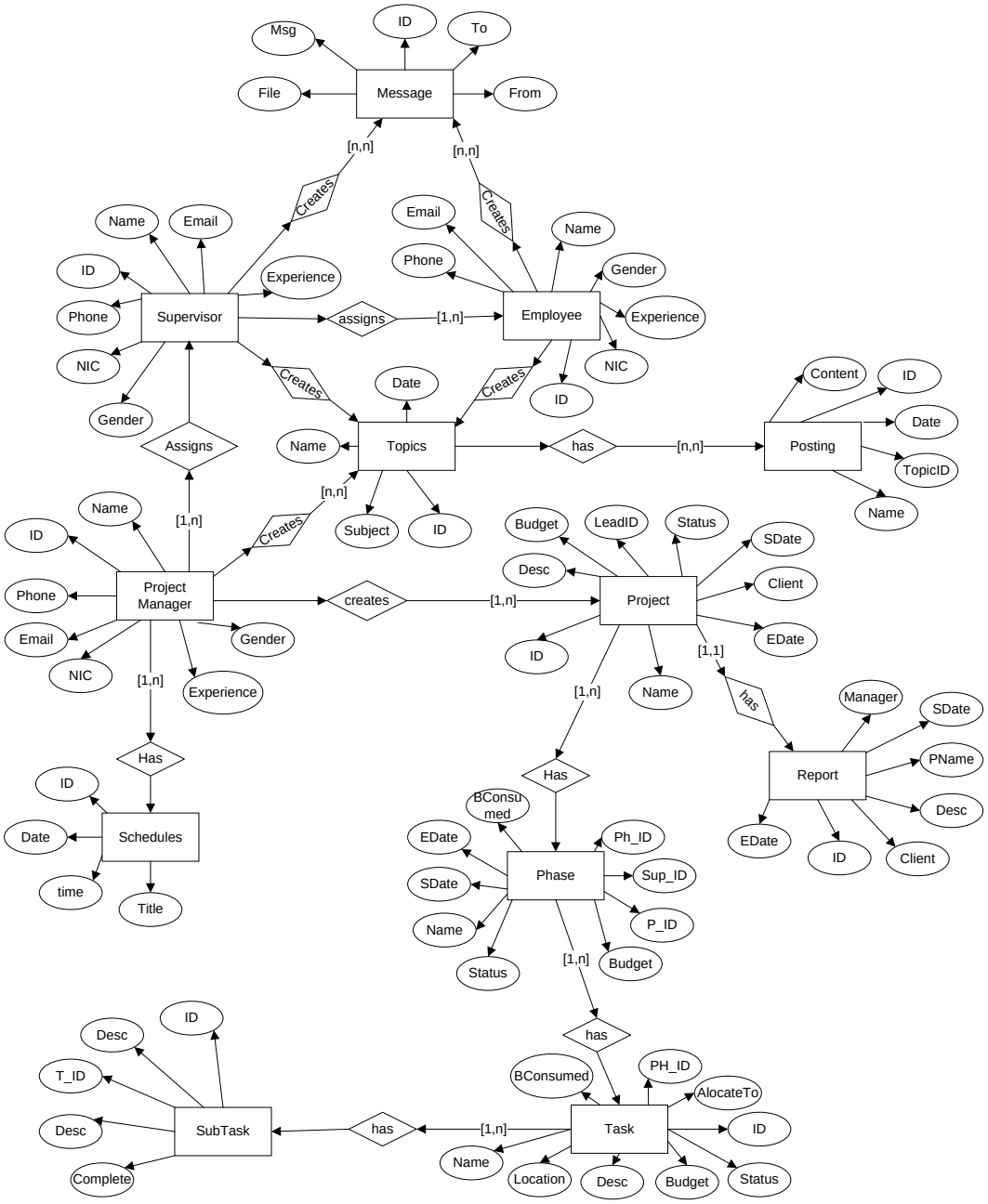

Figure 2: Figure showing ERD of EPMS

ERD for HR

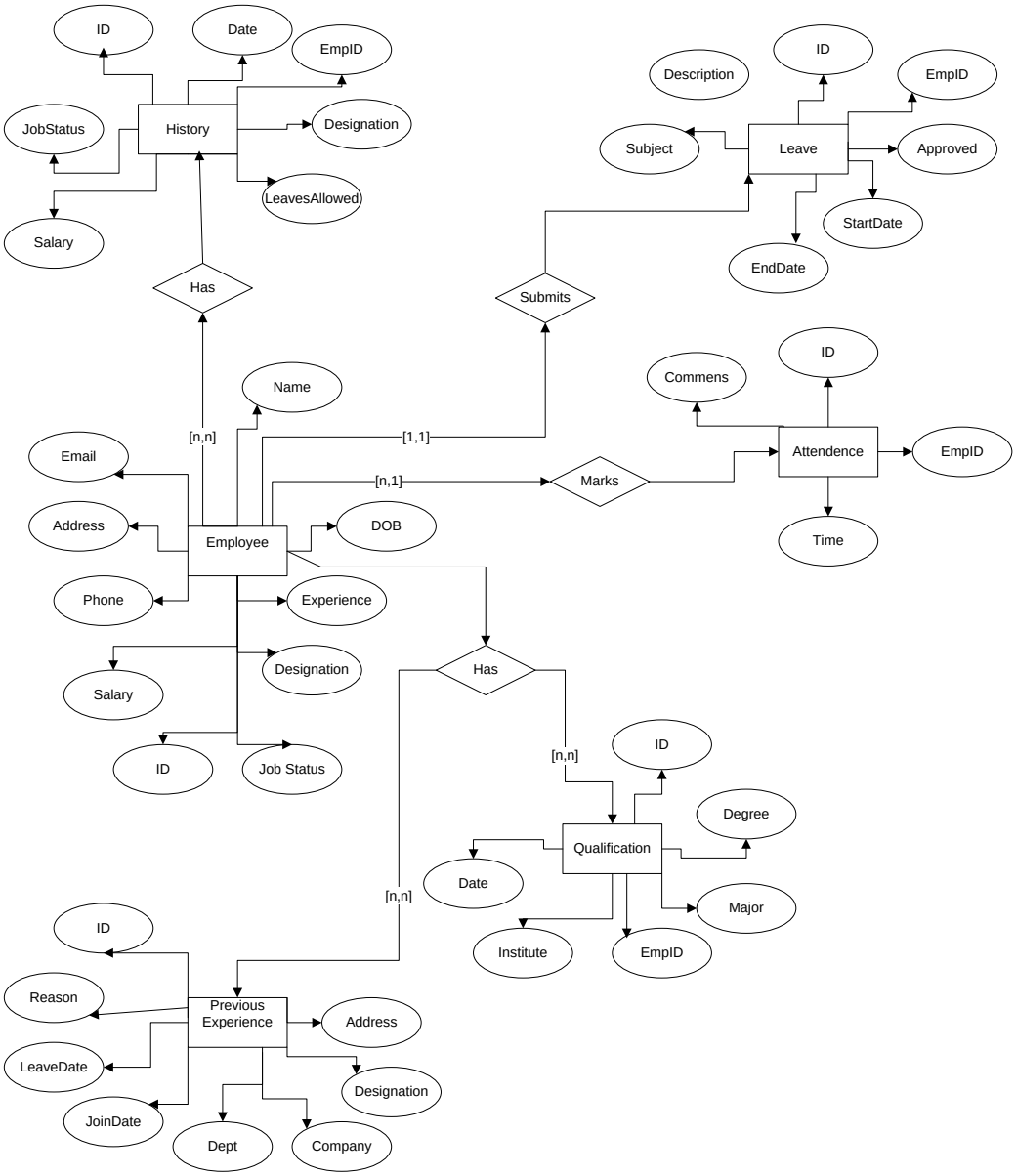

Figure 3: ERD of Human Resource Module

RELATIONAL DESIGN

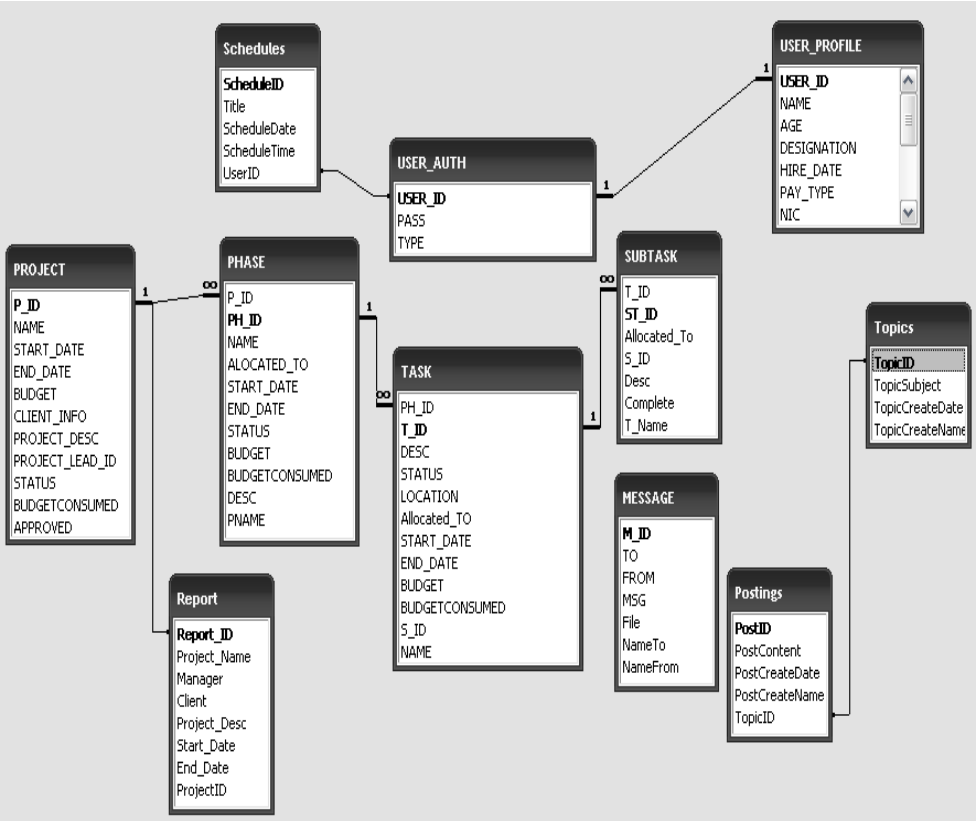

Figure 4: Relational design of EPMS

Relational Model for HR

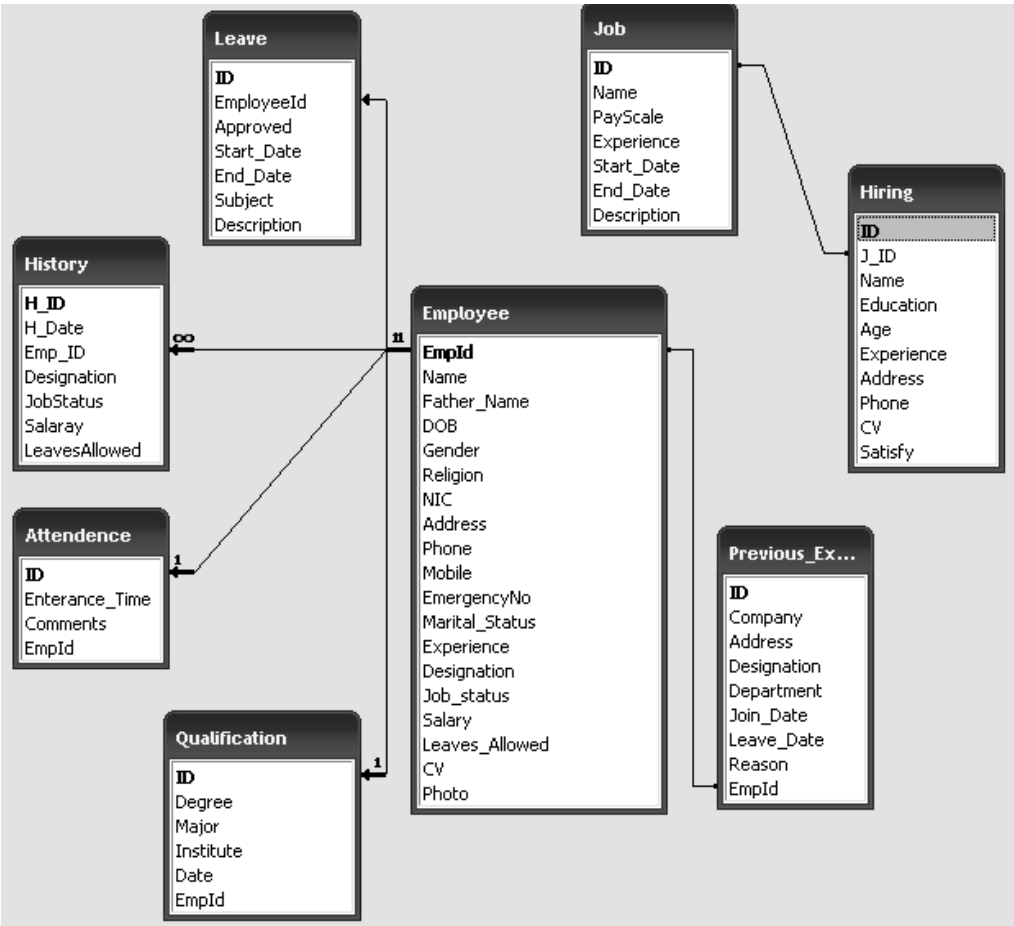

Figure 5: ERD of Human Resource Module

4.2 USE CASE MODELS

4.2.1 Activities of Workers

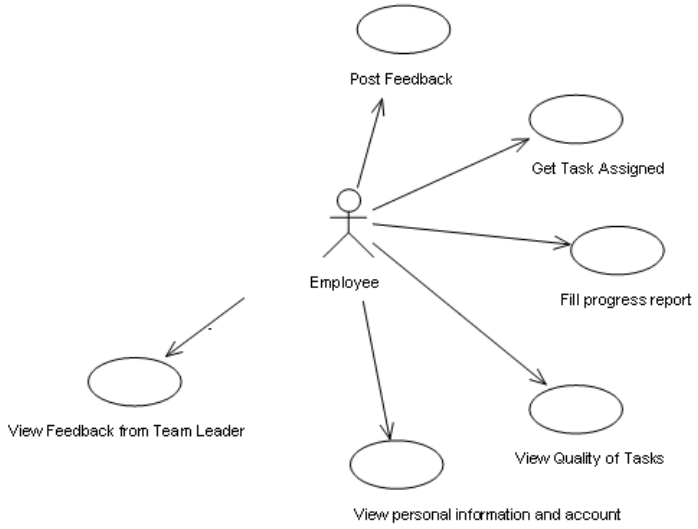

Figure 6: Activities of Employee

Use Case Number: 1 **Use Case Name:** Activities of Employee
Summary: Employee will take tasks either from supervisor and will complete tasks according to schedule.
Alternative Paths: Not Applied
Exception Paths: Tasks will not be implemented on time.
Assumptions: Supervisor owner will give task to developer.
Preconditions: Tasks from Supervisor
Post conditions: On time implementation of project or tasks.

4.2.2 Login in HR

Following activities will be done in the human resource module.

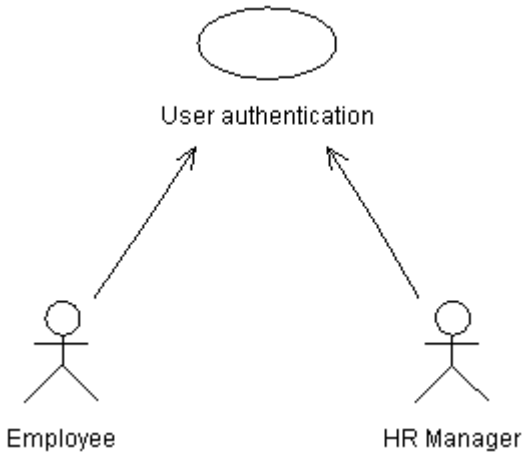

Figure 7: Login in HR

Use Case Number: 2 **Use Case Name:** Activities in Human Resource
Summary: HR Manager and Employee will Login first in order to interact with the system.
Alternative Paths: Not Applied
Assumptions: Both employee and HR manager must have account.
Post conditions: Successful authentication will lead both the users to the system interaction.

4.2.3 Activities of Employee in HR

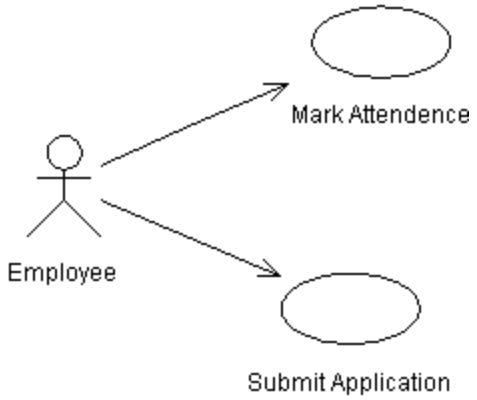

Figure 8: Activities of Employee in HR

Use Case Number: 3 **Use Case Name:** Activities in Human Resource
Summary: Employee will mark his attendance as well as submit any leave application.
Alternative Paths: Not Applied
Assumptions: Employee must have account.
Post conditions: User will be marked present for that day. If he wants to submit application, he can easily do the job as well.

4.2.4 Activities of Applicant

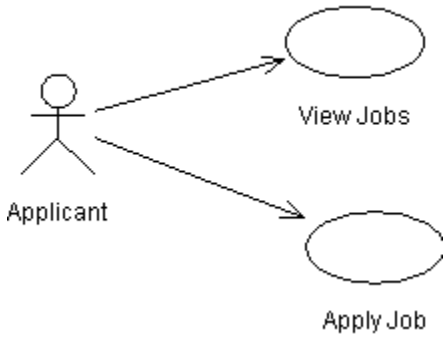

Figure 9: Activities of Applicant in HR

Use Case Number: 4 **Use Case Name:** Activities in Human Resource
Summary: Applicant will be able to view the jobs available in the company as well as apply for the particular job.
Alternative Paths: Not Applied
Assumptions: Applicant must fulfill the criteria for applying the post.
Post conditions: Applicant will be able to apply for the desired job.

4.2.5 Activities of HR Manager

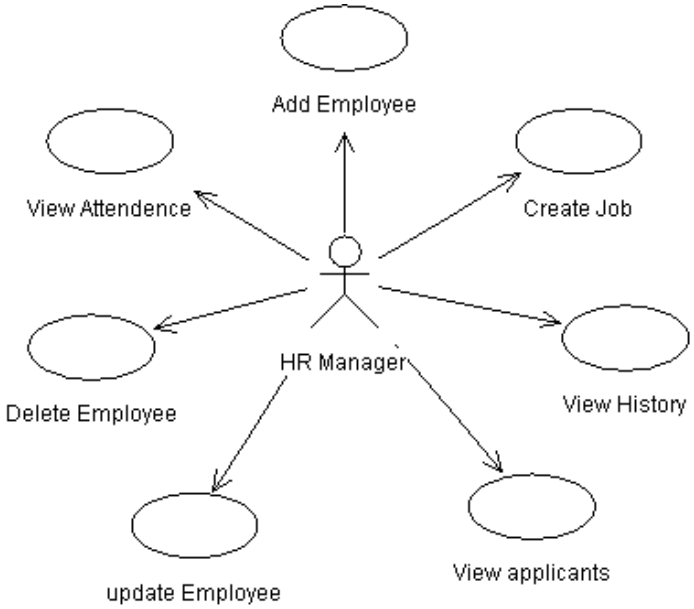

Figure 10: Activities of HR Manager

Use Case Number: 5 **Use Case Names:** Activities of HR Manager.
Summary: Manager can add employee, delete or update employee's record, view the history of the employee, his attendance sheet and finally create a new job in the company.
Alternative Paths: Not Applied
Assumptions: Manager must have a login account in order to perform all above mentioned functions.
Post conditions: Manager will be able manage complete database of employees.

4.3 SEQUENCE DIAGRAMS

4.3.1 Adding Employee Data

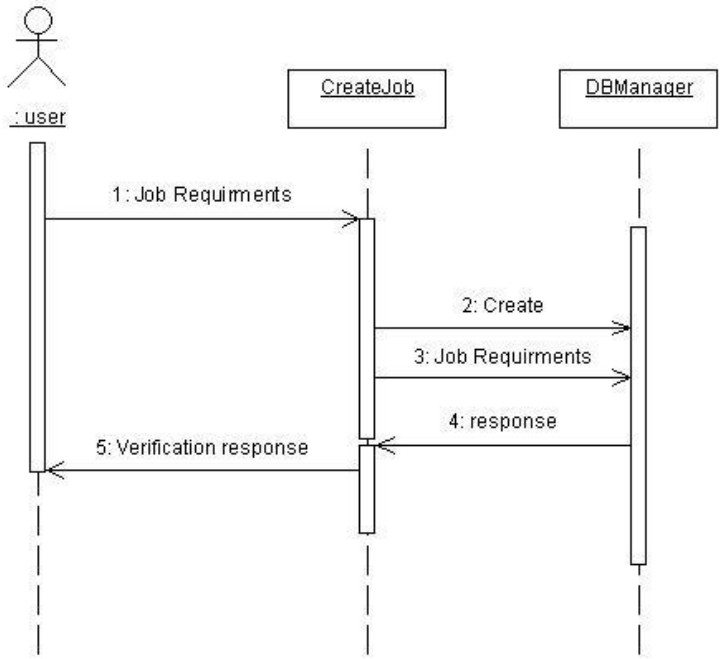

Figure 11: Sequence of adding employee record.

4.3.2 Creating Job

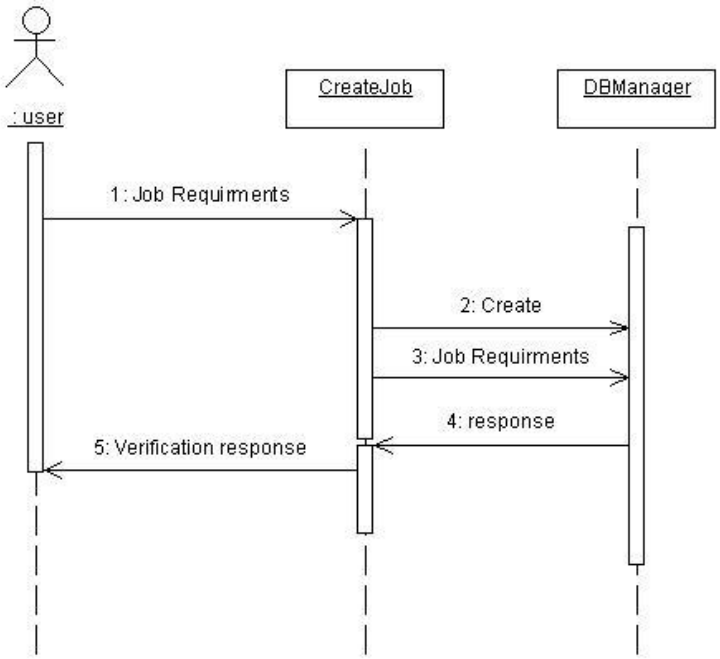

Figure 12: Sequence of creating new job

4.3.3 Viewing Employee history

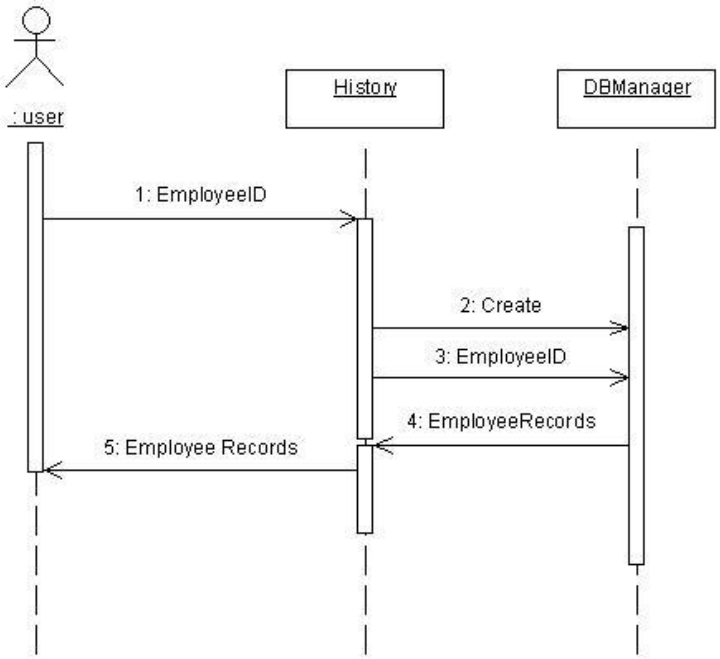

Figure 13: Sequence of viewing history

4.3.4 Viewing Applicants details

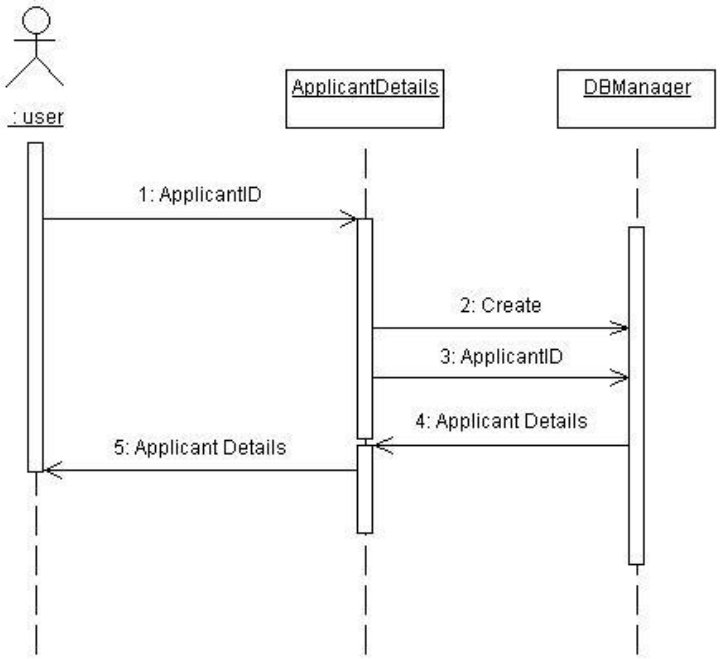

Figure 14: Sequence of viewing details

4.3.5 Managing Employee Data

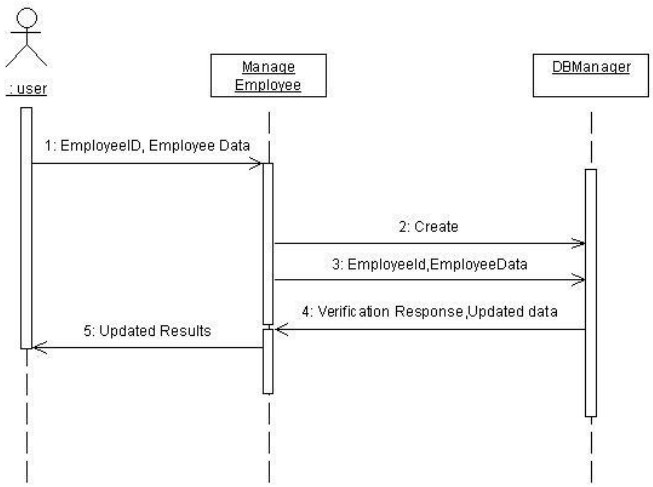

Figure 15: Sequence of managing employee data.

4.3.6 Maintaining Leave application

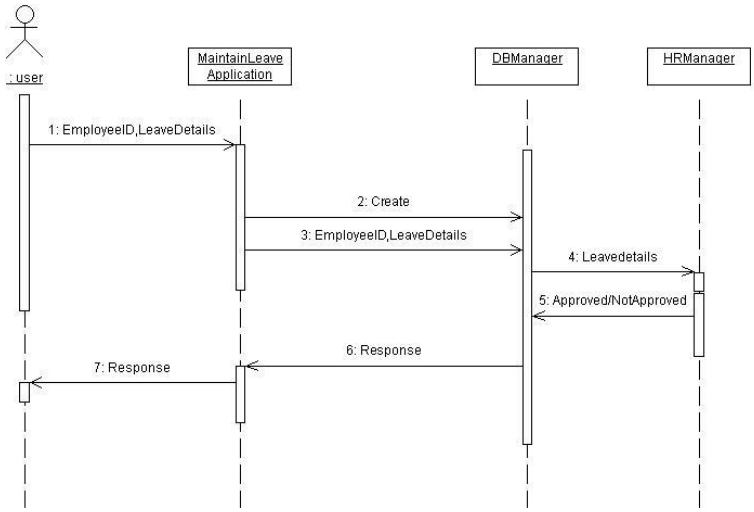

Figure 16: Sequence of approving/rejecting leave application.

4.4 CLASS DIAGRAMS

4.4.1 Employee Classes

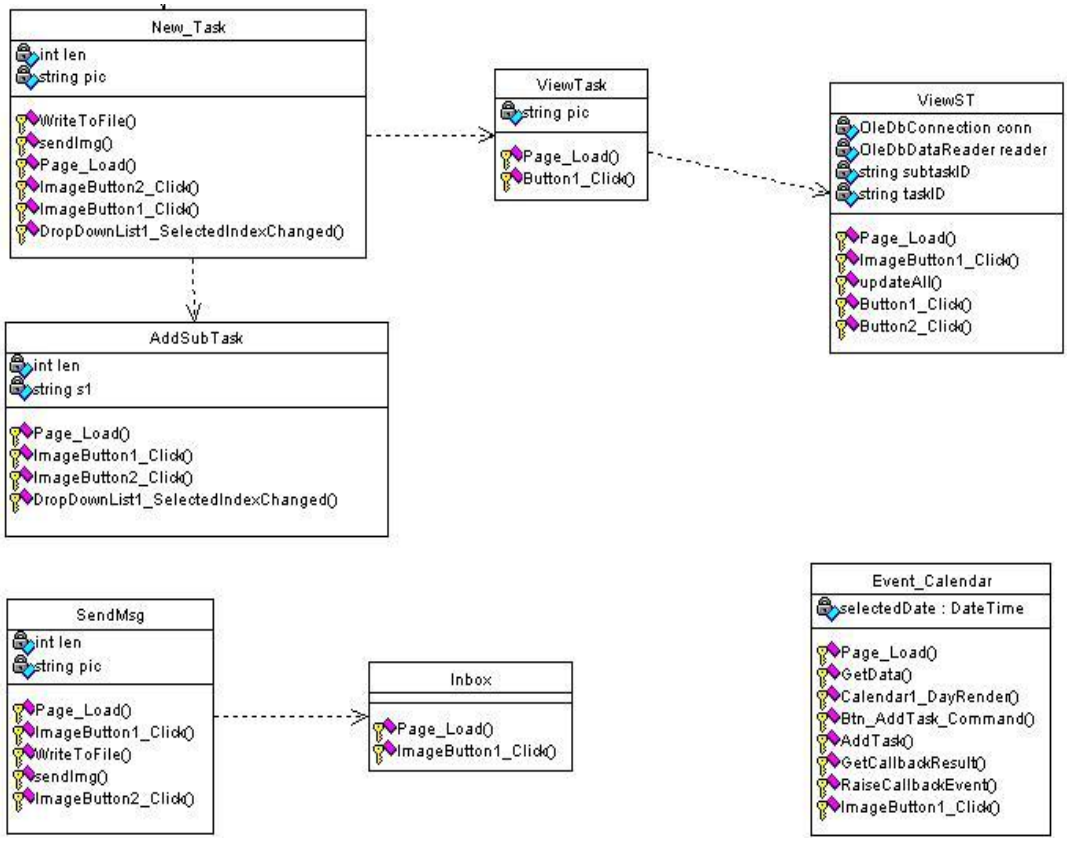

Figure 17: Class diagram of Employee

4.4.2 Administrative Classes

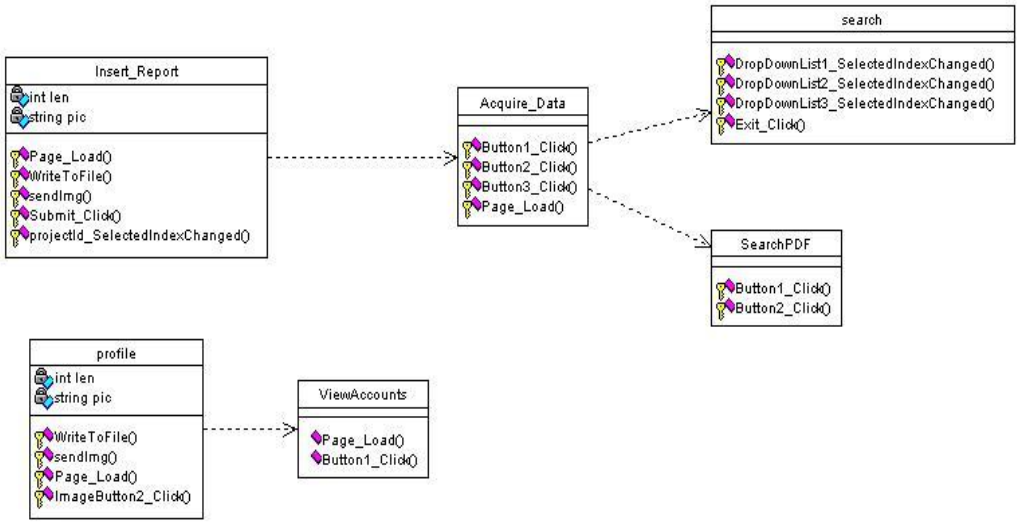

Figure 18: Class diagram of Admin

4.4.3 Audio/Video Conferencing Class

Figure 19: Class diagram of Audio/Video Module

4.4.4 HR Managerial Classes

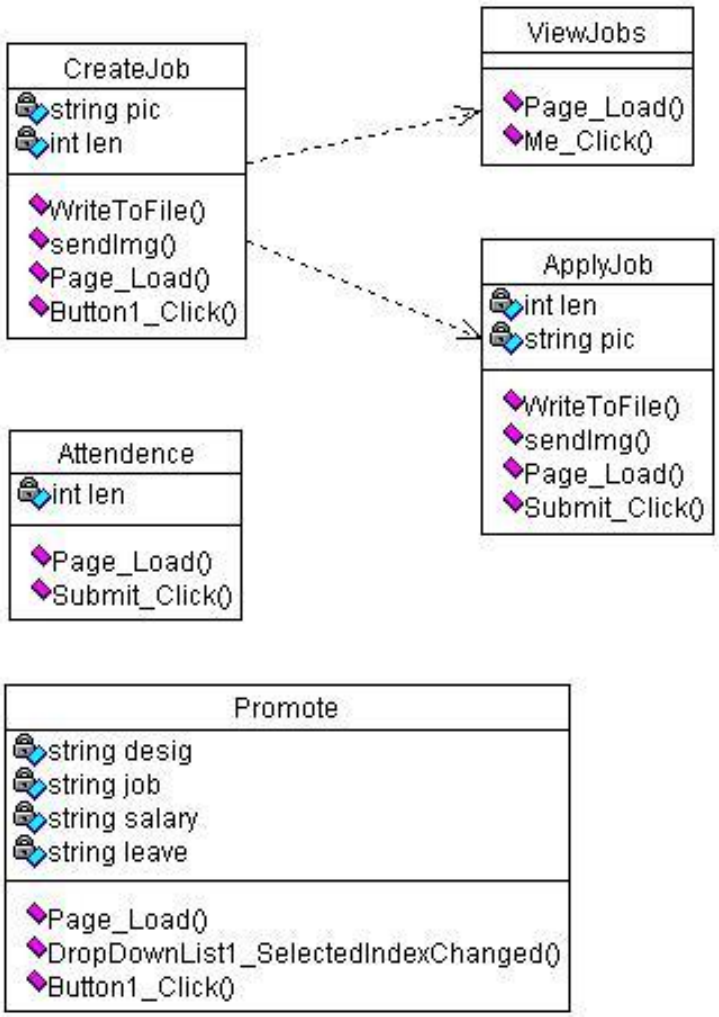

Figure 20: Class diagram of HR module

Chapter 5

SYSTEM IMPLEMENTATION

5.1 PROCESS MODEL

For the development of the EPMS the approach I followed is the modular approach where by the system is divided into different modules and each module acts as a separate entity. On completion of the project all of those modules are integrated so that we get the overall complete picture. the most difficult phase of the system development was the requirement gathering as no body was clear about what they wanted out of the system and how is the system going to work secondly the personal at the OGDCL is not very computer literate so we have to make them understand most of the things which was very time consuming. So understanding the requirement was really very demanding and then devising a solution over those requirement specifications was a hectic job as well. The software engineering techniques were used in order to follow a specific pattern so that we can achieve our aim following the standards and well established procedures which are adopted all over the world.

5.2 SCREEN SHOTS

5.2.1 Login Page

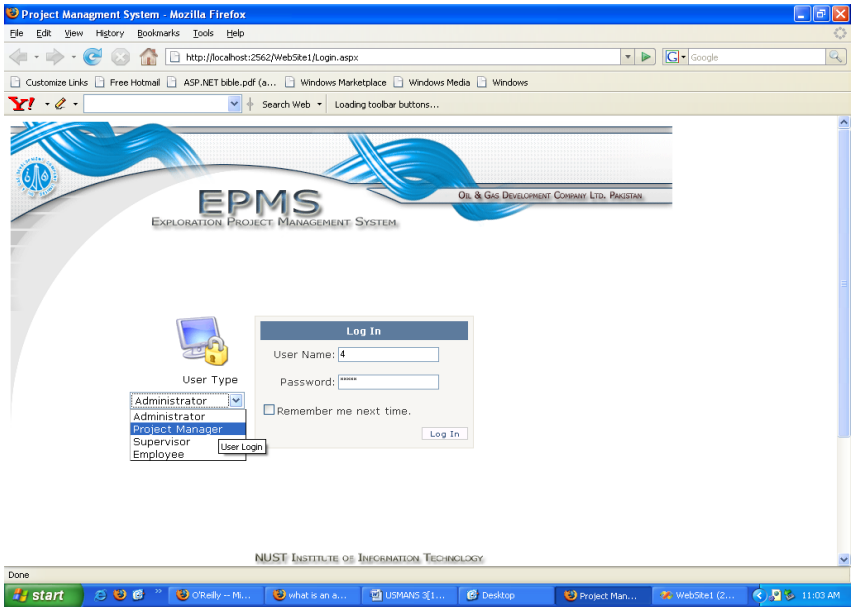

Figure 21: Login snapshot

5.2.2 “pdf” Document Search Page

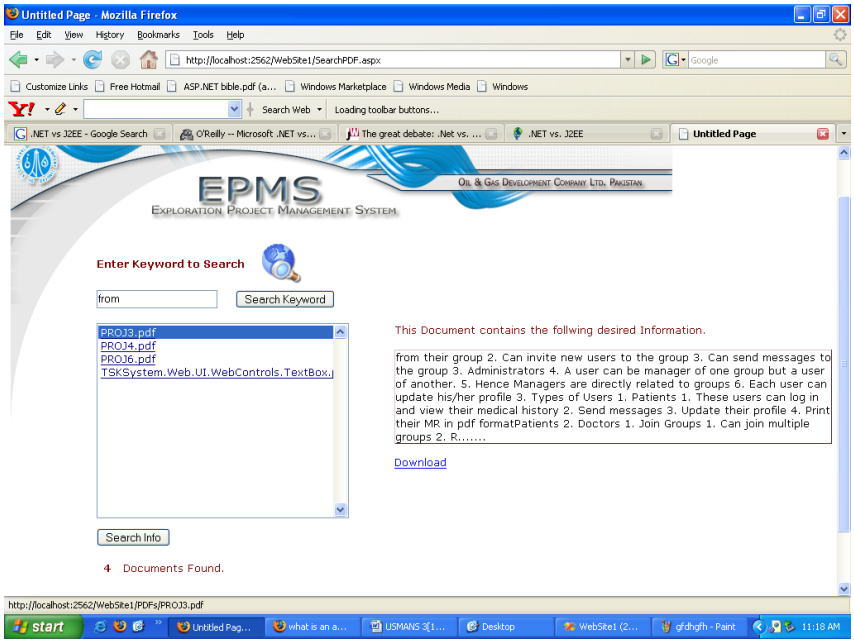

Figure 22: Pdf Search snapshot

Description

This is the most important and exciting part of the system where we will utilize the database that is implemented by LMKR for the OGDCL and we will provide this functionality over that Database such that the document that is to be searched for a particular part of information and not the whole document could be visible to the user only and rest information is not to be seen by the seeker.

5.2.3 Current Task Status Page:

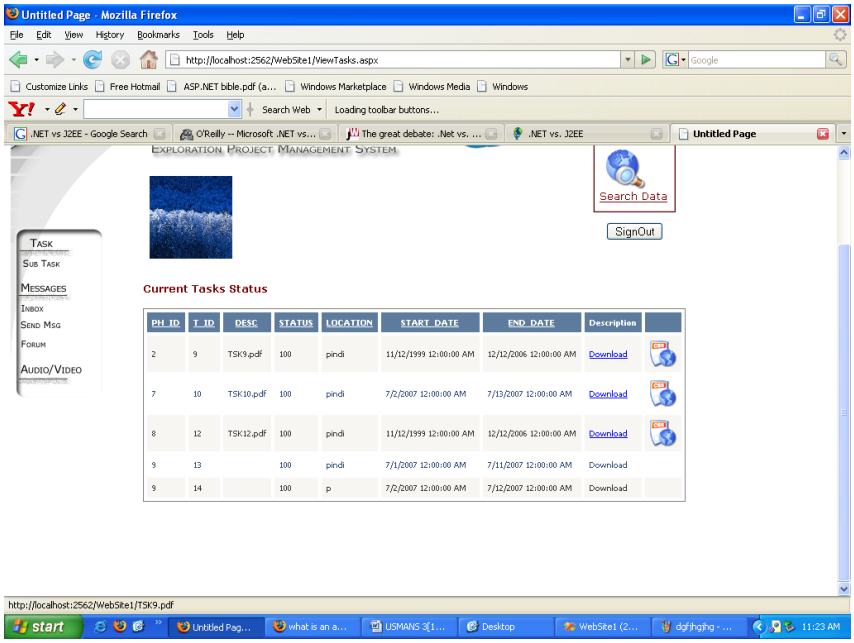

Figure 23: Current task snapshot

Description

This page gives us the status of any task belonging to a particular phase of the project to be seen by the manager or the supervisor.

5.2.4 Search Project Page

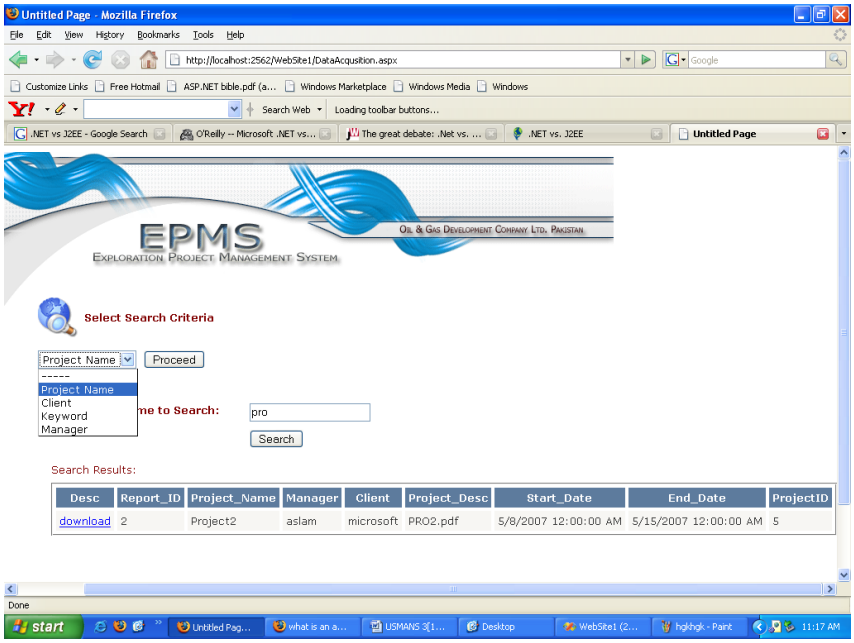

Figure 24: Search Project snapshot

Description

If a manger wants to search a particular page for some kind of information retrieval he can access the information through this page which contains a text string where the criteria for the search is to be entered and the page will bring the results accordingly.

5.2.5 Discussion Forum Page

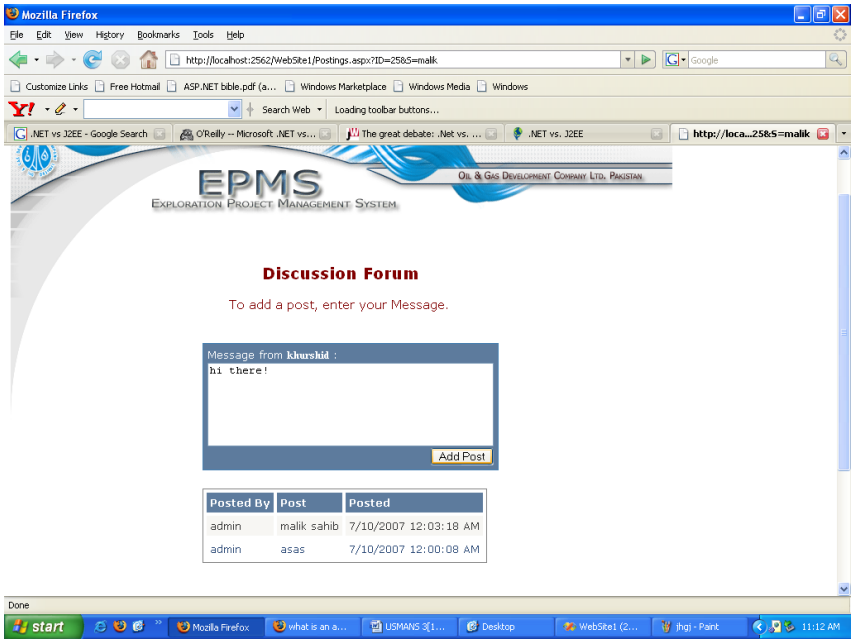

Figure 25: Forum snapshot

Description

This again is an interesting part of the system where different roles of the project can discuss issues regarding different phases and tasks of the project that they are working on so that if anyone of them is facing any difficulty they can discuss it on this facility that we are providing them with.

5.2.6 Message Inbox Page

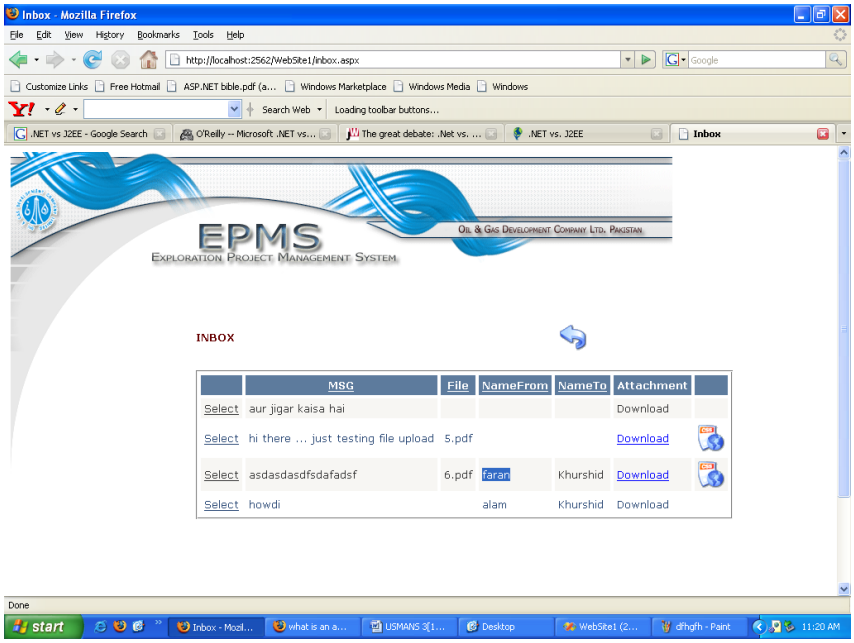

Figure 26: Message Inbox snapshot

Description

The inbox facility provides the user with an option where they can view the mails they receive from different personals during the project progress. Its more of an email facility.

5.2.7 Event Calendar Page

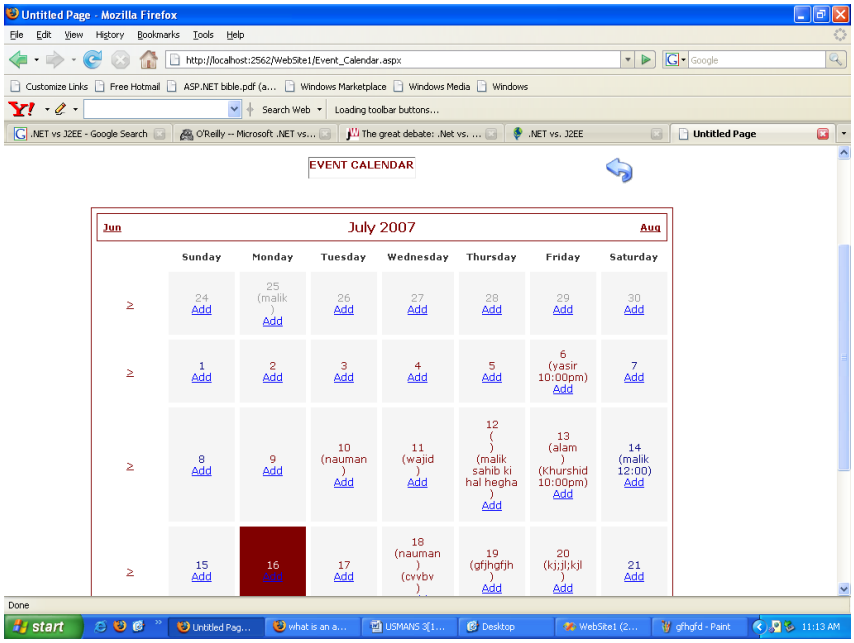

Figure 27: Event calendar snapshot

Description

This calendar provides the dates and information about important dead lines for the project e.g. the phases or the tasks that are the part of the project and new events could be added to the project as well.

Chapter 6

CONCLUSION AND FUTURE WORK

EPMS is a fully automated system which will replace the hectic manual project management. It has made the project management system more efficient and accurate in terms of calculating the timelines, status and budget. Now by using the system, managers can easily manage projects no matter how huge they are and how mush distributed they are. The scope of the project was bit limited due to the time constraints. There is always being a space to improve this project according to the upcoming user requirements and future challenges. EPMS is generic web based software which can well fit to any oil and gas organization by making little amendments. The problems that were addressed and solved were the time and budget calculations and were updated and accurately. For the offshore projects, interaction between different users of the system located at different geographical locations has been solved mainly through the audio and video communication system. Now users can have live communication with others members through this dynamic feature.

In future, the system can be made more generic enough to be accommodated in any type of oil and gas organizations. Either they are in drilling field, or processing or in exploration. As far as the technology is concerned, web ontology can make a spectacular change in this particular industry by enhancing and implementing the system using ontology. But at current moment, we have a big constraint that today web browsers don’t have any support for the ontology although this technology has opened new ways to make the product much more useful and optimal. If we talk about

the financial perspective, what I suggest is to make the whole system a web service and let the companies to use it and pay for it. This will be much useful to make the system even more efficient and purposeful by not getting just money but feedback and suggestions for improvement as well.

Chapter 7

APPENDIX A: GLOSSARY

EPMS : Exploration Project Management System

OGDCL: Oil and Gas Development Corporation Limited

TDL: Technical Data Library

LMKR: Land Mark Resources

CLI: Common Language Infrastructure

ASP: Active Server Pages

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[4] Anonymous (N.D) http://en.wikipedia.org/wiki/Crystal_reports

[5] Anonymous (N.D) http://en.wikipedia.org/wiki/Visual_Studio_.NET

[6] Anonymous (N.D) http://msdn2.microsoft.com/en-us/library/ms225260