Intelligent Software Project Management (ISPM)

Software Requirement Specification

Project ID: 16_098

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Table of Contents

List of figures

List of tables

1. Introduction

1.1 Purpose

This document illustrate the requirements of automate software project management system. The area which is described in this document is developing a knowledge based system to finalize the unambiguous user requirements for automated software management system. The document gives the detailed description of the both functional and non-functional requirements proposed for the system. It explains the high level architecture of the system , purpose and features of the system , interfaces of the system , user requirements, what the system will do, the constraints under which it must operate in order to obtain optimal results and how the system will react to the receive things.

On the whole this document is written with the purpose of providing a complete description on the behavior of the knowledge based system will be provided in this document for better understanding about the system including its features such as grab the receiving requirements , identifying the similarities of each requirements , avoiding the duplications of each requirements and finalize the requirements. The intended audience of this document is the project supervisor and the research team.

This document will also benefits the former researchers, developers who will be engaged in developing and maintaining the application in the future and any person, who is interested to implementing this kind of application.

1.2 Scope

This document covers the requirements for the first release of project ‘Automated software project management system . The initial release will focus on enhancing reliability, more accuracy of any software project. In this case main goal of this scenario is to build up a automated software project management system. This will help to manage all responsibilities of a software project manager in any organization. The major advantage of this system is all of mentioned responsibilities are controlled in without having any project manager.to manage that kind of system we decided to develop knowledge based information extraction system.it represent an area of knowledge. This knowledge based system totally based on a particular domain. The reason of this domain knowledge system becoming famous is that particular domain can be communicated between human and application system. Because ontology aims for a domain knowledge[1].

According to this case main purpose of building a knowledge base system is to finalize the unambiguous use requirements and providing those unique requirements for developers to build up the project. Each and every user requirements are stored as XML file in a particular database.it will be extracted by the knowledge based system and analyze the XML file to grab the suitable requirements. Then it will identify each and every words which are relevant to the user requirements and identify the similar requirements. Finally knowledge base system try to avoid duplicated requirements and finalize the unambiguous unique requirements. Those finalize requirements are gathered by developers to build the software.

According to this case there are three key areas can be identified. Knowledge acquisition tool is used to extract the appropriate data together with suitable XML document. And knowledge acquisition tool is the first key area. As the second key area separated details are send to knowledge based system with metadata derived from the vocabulary of the knowledge base system. Finalize the unambiguous unique requirements is the final key area.

To having all these steps in successful manner we have to define set of rules for relations. OWL language is not going to express each and every relations. As the example ,we can’t make the relation ‘child of married parents’ ,because there is no any method in OWL to provide that relation between individuals with which an individual has relations. To avoid that issue OWL supposed to use SWRL rules in this knowledge based environment. SPARQL will be help to extract the data which is in the knowledge based system.

1.3 Definitions, Acronyms, and Abbreviations

Acronyms

XML	Extensible Markup Language
SRS	Software Requirement Specification
OWL	Ontology Web Language
JDK	Java Development Kit
ISPM	Intelligent Software Project Manager
SWRL	Semantic Web Rule Language
SPARQL	Simple Protocol and RDF Query Language

Table 1-Acronyms

1.4 Overview

1.4.1 Main Goal of the software

Software project manager is the root of any software project management system. In previous different types of software projects were managed in manually. As the result of that it gained lots of issues in software project management system. To avoid that we decided to automate that whole processes which are responsible for software project manager. Developing a automated software project management system helps users to handle software projects in a convenient way without the help of any software project manager. Automated project management system represent a fast growing technology in IT field.

1.4.2 Tasks

In this case knowledge base environment try to identify duplicated user requirements , avoiding those duplicated requirements, similarity of each requirements and finalize those requirements in to a unambiguous unique requirement. There are three major key areas. Extracting information form the received requirements can be taken as the fist key area. As the second key area, separated details are send to knowledge based system with meta data derived from the vocabulary of the knowledge bases system. Finally we can finalize the unique unambiguous requirements in suitable manner.

1.4.3 Organization of the SRS

In section 1,the purpose of the preparing the document is explained, the aspects of the application the document tends to cover , the scope of the software, Glossary and an overview of the software , it's main goals, tasks and users are described.

Section 2 describes Overall description of software is explained in a non-technical manner, It includes product perspective, product functions , user characteristics , constraints , assumptions , dependencies of requirements.

Section 3 describes the technical requirements of the software and contains functional requirements , non-functional requirements and design constraints.

Section 4 describes contains supporting information for the readers of this document.

2. Overall Descriptions

2.1 Product perspective

Different types of software companies use various types of software project management systems to increase the efficiency and accuracy of the their software product. Most of the software project management systems are working in manual way. As the example '**Redbooth**'[3] , '**Mavenlink**'[4] , '**Huddle**'[5] , '**GoPlan**'[6] are the main software project management systems. Most of these are provide manual operation of software project management system. In a particular company run a set of software projects at a time and needs inputs from teams or group of individuals for a multilevel development plan. Hence a good automated project management system is needed. This automated software project management system will enter a major role in a large number of companies. Therefore automated software project management system gives high quality application for customers and it will helps ensure the durability too. Developing a web based automated project management system helps users to handle projects in a convenient way without the help of any project manager. That is the main goal of this research.

As we discuss earlier ,there are lot of software project management systems which are handle in manually. As the result of that we have do lots of data entries, project manger have to learn how to use those program features and ensure that team members learn to use those components they needs to manage their works, have to define milestone ,enter everything to the system, allocate tasks to each and every team members and developers, cost handling and risk management ,tracking budget are done by in manually .not only that project manager have to maintain effective communication with sponsors, consumers, other stakeholders to manage each and every task. A software project manager is act as the head of a project who is willing to track , control and oversee the operations with the project.it means he is the responsible for the control of the each project and he has to conduct an active role in coordinating and organizing the team members, project resources and other processes which are involved in a software development project.

Most of the time software project manager has to organize meetings, read emails , inform each and every team members and developers ,gather the proper requirements, determine the review the progress reports, meet and brief the sponsors and having better communication with the customers. Managing these each and every task manually can be cumbersome and those result flaws in communication and operation of a project.

Intelligent software project management system is some kind of a tool of assistance which is very useful for organizations and companies to perform the responsibilities of the software project manager. No need any software project manager. .Automated software project management system offers lots of advantages to the users who willing to use our product. Our system will perform a variety of task like documentation, provide better communication, finalize unambiguous user requirements, arranging each tasks lists, sending email notifications, arrange to-dos, highlight the milestones, risk

managements, make better predictions for each and every software project. This tool will become extremely useful tools in managing software projects without having a software project manager. .This automated software project management system has been developed which highly meets the standard and requirements set by the user. In here customer needs are basically the most important to understand, how analyze the requirements produce a design and go about development and testing so that the system you deliver is a high and does what client wants it to do. In this case we grab the user requirements or user can easily add the requirements what they need.at the knowledge base system those requirements will be finalize in to unique an unambiguous way.

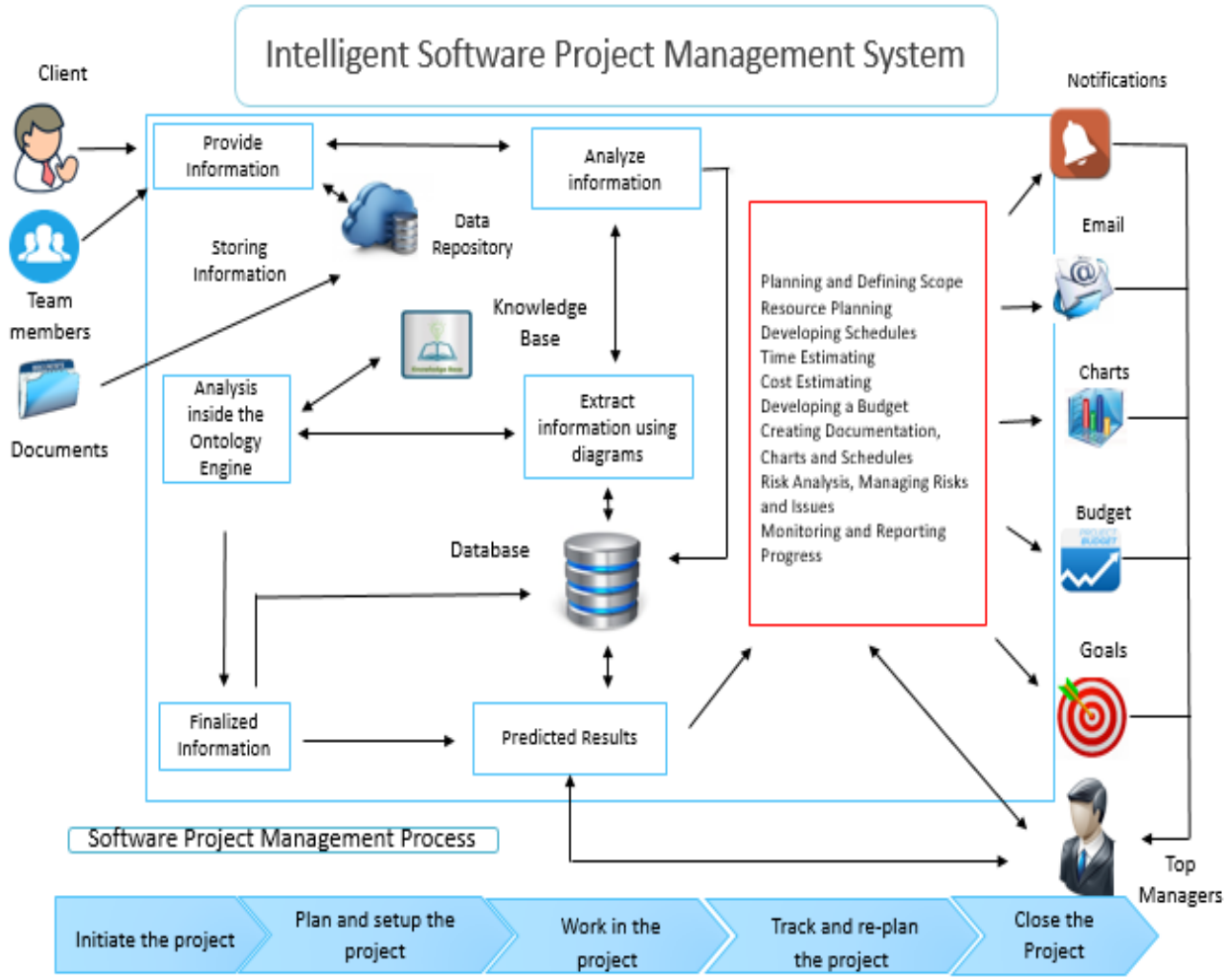


Figure 1-Structure of the entire system

Features		Current Applications	Our application
I.	System runs without having a software project manager	**X**	✓
II.	User can provide the requirements to the system easily.	**X**	✓
III.	Scanning and extract user requirements.	**X**	✓
IV.	Maintain the knowledge based system for extracting appropriate data.	**X**	✓
V.	Identify and avoiding the similar user requirements. Finalize the unambiguous user requirements.	**X**	✓
VI.	Estimate budget, risk analysis, duration to complete, success rate of the project.	**X**	✓
VII.	Defining the milestones for each and every tasks and visualize the progress of each and every tasks.	**X**	✓
VIII.	Sending emails, notifications to the users. Provide user friendly and attractive environment.	✓	✓
IX.	Users (sponsors, client, developers) can access to the system and gain the progress of the each and every tasks.	✓	✓

Table 2-different between current application and our application

2.2 Individual perspective

How does the ontology works ?
In this case Knowledge based information extraction system act as intelligent system. Because this ontology environment aims for a domain knowledge[1].according to this scenario we are willing to build up a knowledge based to identify and finalize the unique unambiguous user requirements.as we described earlier, user requirements are the main inputs into this system.

Main object of this system is extract each and every use requirements from a XML files. Extracted user requirements are convert into a XML format and store in a suitable database. Knowledge based system try to catch those XML file from the database and try to extract each and every user requirements from the XML file. Knowledge base system try to identify similar and duplicated user requirements through those XML files .This process is called as knowledge acquisition. Then send those data into knowledge extraction area.as the result of that each and every duplicated user requirements will be avoided and finalize unique unambiguous user requirements.in this case we can identify three major key areas which is used to extracted appropriate outcome through this system. Extracted the suitable data from the XML file. As the second key area separated details are send to the knowledge base system with meta data extracted from the vocabulary of the knowledge base system. Finalize each and every unique unambiguous user requirements is the final key area.to get the better outcome we have to define SWRL rules. OWL language is not supposed to extend each and every relations. Some relationships are really hard to represent in the OWL environment.as the solution for that OWL can be existed by adding SWRL rules to an ontology. Protégé OWL supports SWRL rules and the reasoners Pellet and hermit also really support to SWRL rules. To extract knowledge from the vocabulary we have to use SPARQL.

This represent the SWRL rules which are defined in the protégé environment.

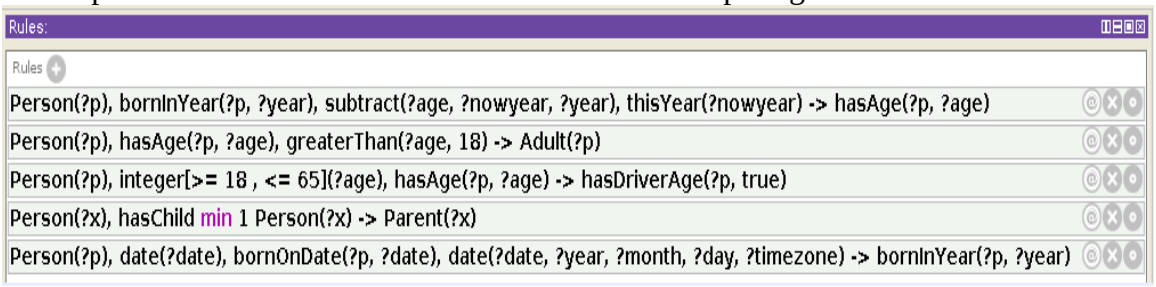


Figure 2-SWRL rules defining.

This represent how does the SPARQL define in the protégé environment.

```
PREFIX rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
PREFIX owl: http://www.w3.org/2002/07/owl#
PREFIX xsd: http://www.w3.org/2001/XMLSchema#
PREFIX rdfs: http://www.w3.org/2000/01/rdf-schema#
SELECT ?subject ?object
WHERE { ?subject rdfs:subClassOf ?object }
```

2.2.1 System interfaces

The proposed system will be run on java environment and it will connect with MySQL database. System uses python language for the text mining part and information extraction from different diagrams and prediction will be implemented by using java language. Developing ontology use protégé platform which run on the java environment. Java EE provide an advanced API for developing the system. This system has static database to improve the accuracy of the system which is developed using MySQL 2012.MySQL work bench will be used to do the modification in the above database.

2.2.2 User interfaces

Intelligent automated software project management system will provide attractive interfaces for each users. Because It is web based application and client, employees and top manager are the users of this system. Those are the main roles who are involving with this system considerable amount of time. To interact with this system tightly system interfaces should be easy to use , very simple and more user friendly. This interface must have to responsiveness for tablets, desktops and phones. This is the dashboard for users.

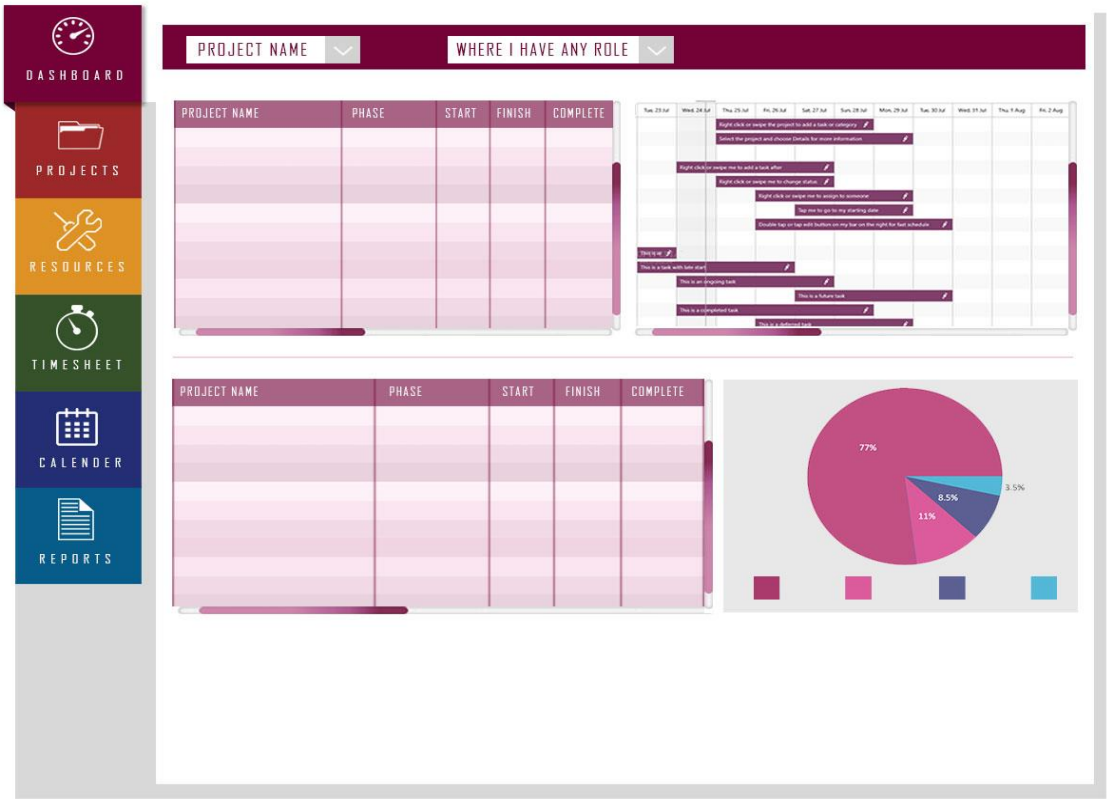


Figure 3-Dashboard for the users

Following thing represent how does the ontology environment looks like.

in here we suppose to use protégé environment. OWL ontology is combination of set of axioms, which is provide three types of things- classes, individuals and properties. There are two types of properties in OWL ontologies. Data properties represent the binary relationship and object properties represent the binary relationship which is link an individual to an individual. Following diagram shows how do the each and every classes subclasses and individuals are going to be arrange.

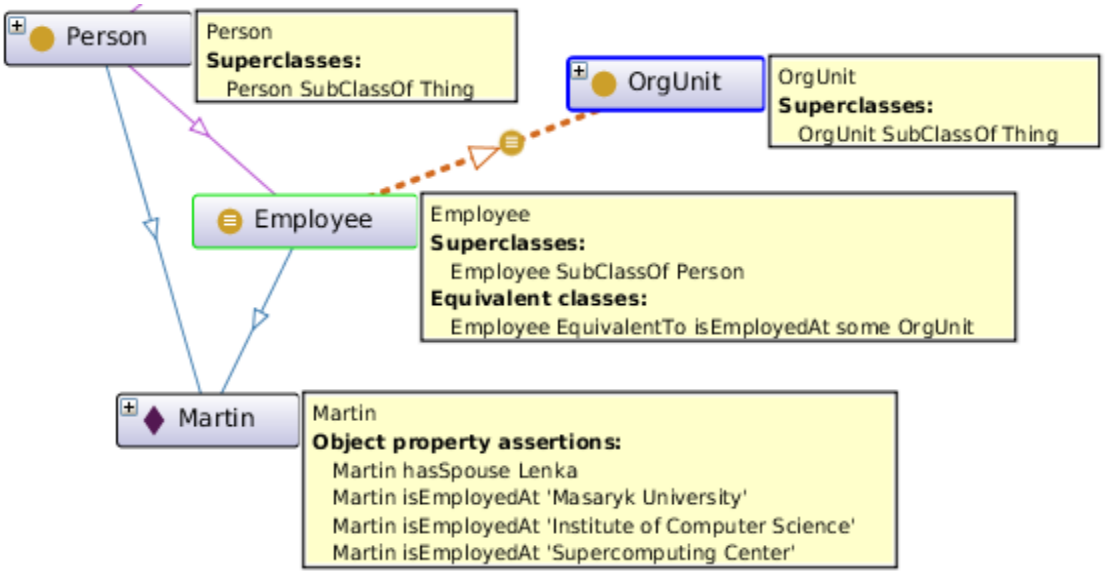
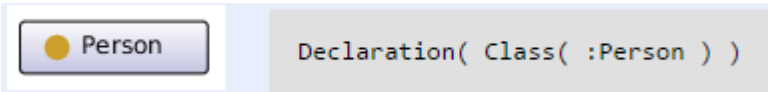


Figure 4-knowledge based tree structure

Person class



Individual

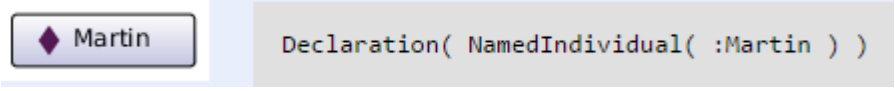


Figure 5-class hierarchy

2.2.3 Hardware interfaces

We will build ISPM system as a web application. In order to use this web application, a computer is needed.

2.2.4 Software interfaces

There are several software interfaces are needed for implement the ISPM system. For the development of the Extract Mentioned Requirement, Visual Studio 2016 and Opencv will be used. To create the Ontology engine, Protégé 4.3.0 version will be used. For the creation of the database, SQL server 2012 will be used.

2.2.5 Memory constraints

For the centralized server which will store the knowledge base and web application, 10GB will be required.

2.2.6 Operations

there are some operations needs to perform by the system to use the knowledge based information extraction system. These operations are required for the better performance of the component. It will useful to provide better communication between knowledge based system and the user.as the result of that we can get more accurate and more successful result from this knowledge based system.

It can be divided in two main category.

1. Operations which are belongings before accessing to the knowledge based system.
2. Operations which are belongings inside the knowledge based system.

Before accessing to the knowledge based system,

- Each and every extracted user requirements which are from the different types of diagrams should be converted into the XML format.

- Those XML files should be stored in a suitable database.

After accessing to the knowledge based system,

- Knowledge acquisition – in this case we have to extract the correct suitable user requirements from the XML file. Then move those selected items to the knowledge extraction area.
- Knowledge extraction – identify similar user requirements and avoid duplicated requirements. Finalize the unambiguous unique user requirements.

To develop the knowledge base system there are different editor are available. We use Protégé editors our ontology creation tool.it is free and open source ontology editor and a knowledge based system[1].this protégé use OWL ontology language. It is a language which is defining ontology on the web[2].OWL ontology supposes to describes a particular domain in terms of classes, properties and individuals and have rich description of the characteristics of that object[2].OWL ontology language is, open and extensible can distribute among many systems and matching with web standards. When we create the knowledge based system we define classes and subclasses and matching with web standards.

2.2.7 Site adaptation requirements

Pre requirements packages will provide better result to the ISPM (intelligent software project management system).therefore it contains PROTÉGÉ,OWL, SWRL, JAVA JDK,MYSQL sever. This will help to provide successful outcome of the system.

NetBeans IDE for java EE Developers

- Open the URL https://netbeans.org/downloads/
- Select java EE
- Select windows 32|64
- Download it
- Then install it in the PC

To download and install the protégé

- Open the following URL http://protege.stanford.edu/
- Click Download it.
- Click download for windows
- After downloaded complete install it

2.3 Product functions

Flow of the Knowledge based information extraction system

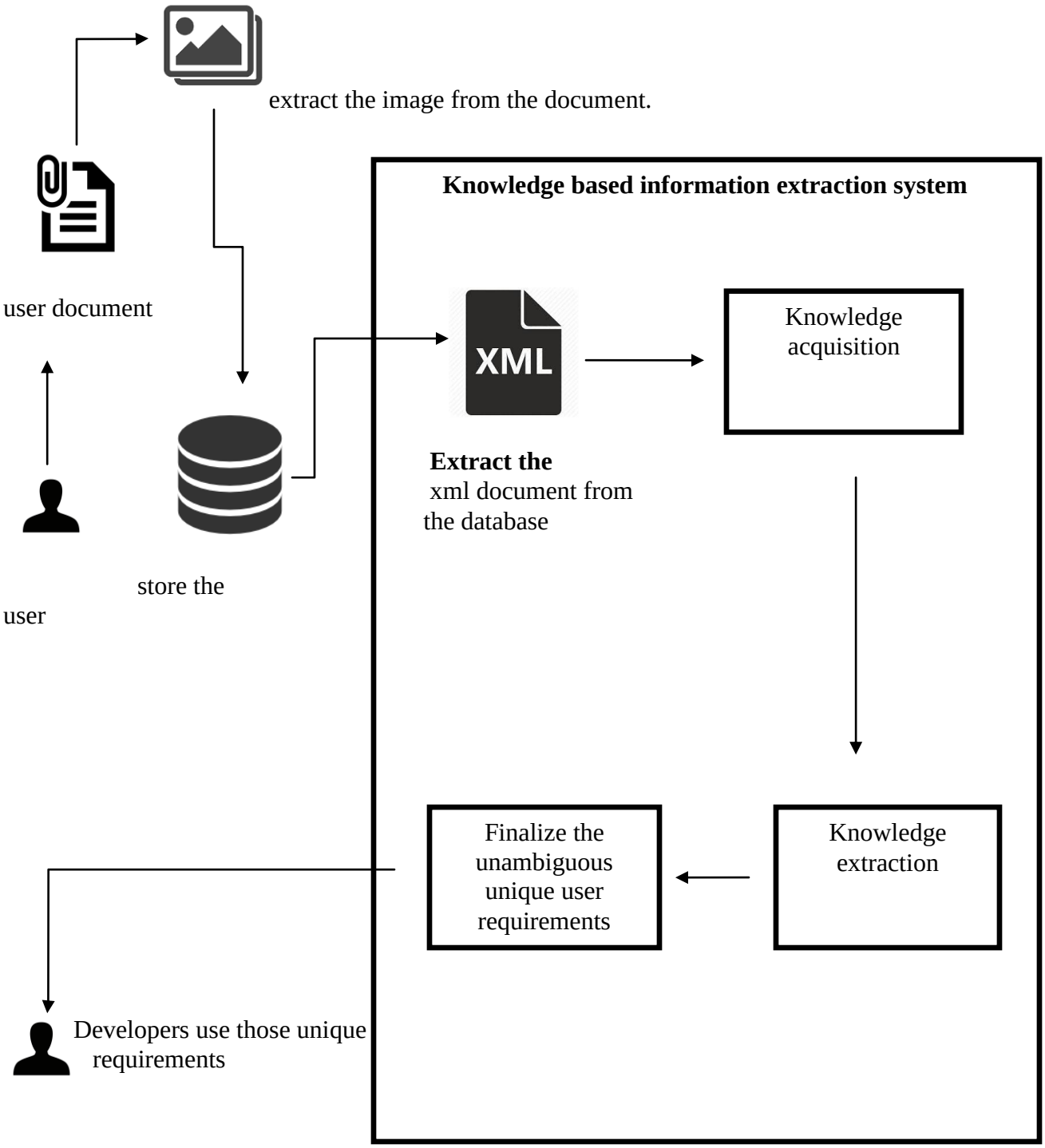


Figure 6-Inside of Ontology working

Use Case diagram for the knowledge base information extraction

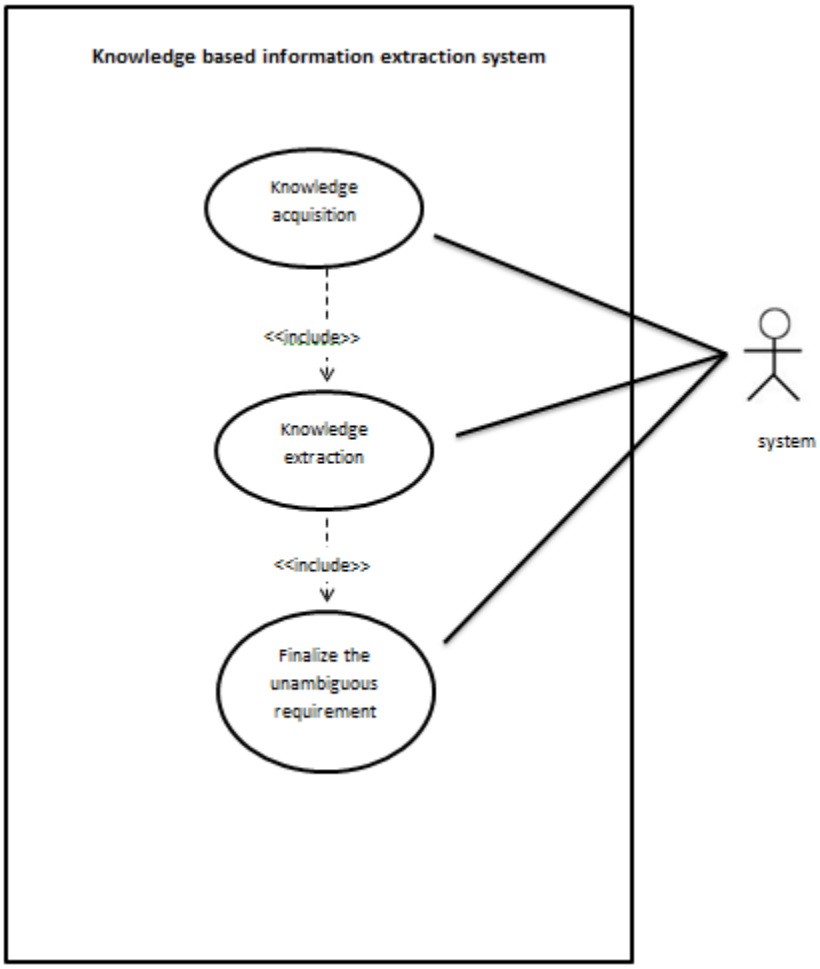


Figure 7-use case diagram for the knowledge based system

Knowledge acquisition:

Use case Name	Knowledge acquisition
ID	UC01
Description	Grab the XML document
Scope	Catch the XML document from the receiving end. Filtering those receiving data and send it to the knowledge extraction area.
Primary Actor	Developer
Pre-Condition	Receiving the requirements to the knowledge base system.
Success End Condition	Move to the knowledge extraction area.
Failed End Condition	Show the error message.
Main success scenario	1.In this case ,received XML document will be grab by the system. 2.then extract the each words from the XML document. 3. send those extracted words thing into knowledge extraction system.
Extensions	If XML format isn't combine with the system ,it will be show as a error message.

Table 3-Use case scenario knowledge acquisition

Knowledge extraction:

Use case Name	Knowledge extraction
ID	UC02
Description	Extract the suitable information .
Scope	Identify the unique user requirements and extract the suitable information for that .
Primary Actor	Developer
Pre-Condition	1.XML file must be received to the system. 2.suitable words should be extracted.
Success End Condition	Finalize the unambiguous user requirements.
Failed End Condition	Show the error message.
Main success scenario	1. Identify the similar user requirements. 2. Avoiding duplicated requirements. 3. Extract the knowledge and identify the suitable requirement. 4. Finalize those requirements.

Table 4-User case scenario of knowledge extraction

2.4 User characteristics

This final product is really intended for the software development companies which is willing develop and manage a software project without having a project manager. That is the main task of this product. Client and other employees can access to this system. Client can visualize each and every tasks which is completed by developers , milestones , time periods which is allocated for each and every task, notifications and emails. Not only that client and employees can visualize the progress of the development. Employees which are in the development team can identifies each and every tasks that they have to complete and allocated time duration.

2.5 Constraints

To work the system properly should install Protégé , MySQL.

For now system can detect user requirements which is typed by user and which are visualized from the diagrams.

2.6 Assumptions and dependencies

the user is assumed to have a sufficient knowledge at using computers and also a sufficient knowledge in using common internet services such as email.

User is assumed to have knowledge of English, since the software is configured to recognize commands given in English.

2.2.8 Apportioning of requirements

The requirements described in sections 1 and 2 of this system requirement specification are referred to as primary specifications. Those in section 3 are referred to as functional requirement specifications. The two levels of requirements are intended to be consistent. Inconsistencies are to be logged as defects. In the event that a requirement is stated within both primary and functional specifications, the application will be built from functional specification since it is more detailed. The requirements declared in section 3 are to be implemented for this ISPM system. Desirable requirements are to be implemented in this release if possible, but are not committed to by the developers.

3. Specific Requirements

3.1 External interface requirements

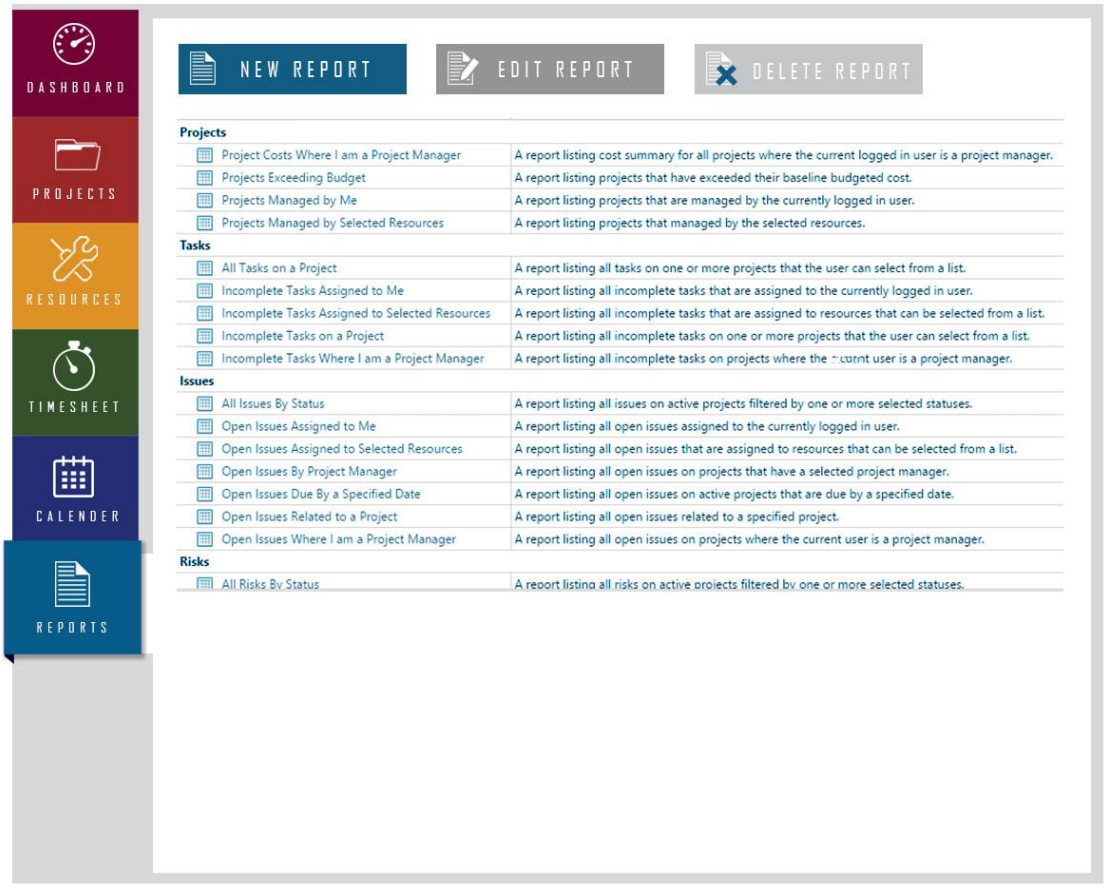


Figure 8-user interface

3.1.1 Hardware Interface

60-inch TV screen

3.1.2 Software Interfaces

NetBeans 8.0.2

Java JDK 8.1

3.2 Software System Attributes

3.2.1 Reliability

in above proposed system provide user requirements and inputs and finalize the requirements as outputs. System will analyze each and every task and makes the predictions for the future users .it will help to increase system accuracy level to 80%.

3.2.2 Availability

The system will available to users to use whenever they want. Every time will requires the continues internet connection. User can access to the system via the phone ,tablet or desktop PC.

3.2.3 Security

The system uses logging mechanism to prevent unauthorized access to the system to prevent consequential data .users are not able to access or view or manipulate the knowledge base area. Because it act as a data bank.it contain more sensitive data and if anything goes wrong , finalizing the user requirements, future predictions will be totally wrong.

3.2.4 Maintainability

This system easy to maintain because each four part are couple from each other. Future developers can add new components or remove existing components from the system. Since the system develops by using java environment, it is very easy to maintain the system. Anyone can understand and adapt to the system easily because of the system and structure of the ontology.

4. References

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