

# **SMART BOT – A VIRTUAL HELP DESK**

## **CHAT BOT**

Submitted in the partial fulfillment of the requirements  
of the degree of

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UNIVERSITY OF MUMBAI  
2013 – 2014



## **SMART BOT – A VIRTUAL HELP DESK CHAT BOT**

**A PROJECT-II (SEM VIII) REPORT SUBMITED  
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## CERTIFICATE

This is to certify that the following students have satisfactorily completed the Project-II on  
**“SMART BOT – A VIRTUAL HELP DESK CHAT BOT”**

In partial fulfillment of Bachelor's degree in  
Information Technology Engineering course conducted by University of  
Mumbai  
(YEAR 2013-2014)

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Internal Project Guide

Examiner: 1 \_\_\_\_\_

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External Project Guide

2 \_\_\_\_\_

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Head of Department

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Principal

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We would also thank all the faculty members who have been a constant source and encouragement during the entire course of my study in this college.

## **DECLARATION**

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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## **ABSTRACT**

FAQ section on websites is mostly used by users to clarify their queries and doubts, but this section does not provide high level interaction and does not cover all the queries, as a result of this, user's queries and doubts remain unsolved. A chat bot with high level interaction can be used as alternative to FAQ section. A proposal is carried on to explain the design of a chat bot specifically tailored as a bank information system that helps customers of RSS Bank with account related questions and policy information. In particular, the proposal investigates the implementation of chat bot system as a domain specific chatter bot named 'Smart bot', our work will show how a chat bot can work as domain specific information system and experiments on how the system's accuracy could be improved based on a specific domain. The chat robot accepts query or doubt in natural language input from users, navigates through the Information database and responds with related answers in natural language.

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## **CHAPTER 01**

# **INTRODUCTION**

# CHAPTER 1

## INTRODUCTION

The World Wide Web has grown into a rich repository of information in a distributed manner. It is a great tradeoff for the information revolution that end-users are finding it challenging to locate relevant information and services quickly and easily. The web changes from static to dynamic and provides a meaningful web. We need social aware tools and social matrix and collective intelligence <sup>[12]</sup>, so that, human and artifact collaborate meaningfully to lessen the burden of user searching and browsing in social platform.

Given a specific domain of interest and its audience pool, there are two important aspects of a networked knowledge transfer platform and in human computer interaction <sup>[11] [13]</sup>. We have question answering system <sup>[1]</sup> as a knowledge delivery platform in which the expert delivers knowledge for the solicitation of the user. Another is knowledge acquisition in the form of online forum and social web platform in which different dialogues form a knowledge repository are mentioned.

There is a growing interest in Chat Bot interface that takes into account Chat bot discourse design and knowledge delivery. One platform for knowledge delivery is a lightweight dialog system Chat bot that will hold the user's attention with human like responses. Chat Bots are computer programs that interact with users in natural language although different names are adopted like virtual agent, dialogue system, chatter bot in different programming architecture.

A chat bot is software that is used to interact between a computer and a human in natural language. Naturally, it can extend daily life, such as help desk tools, automatic telephone answering systems, to aid in education, business and e-commerce. In our thesis we tried to implement a chat bot system as a domain specific chatter bot named ‘Smart bot’.

## 1.1 Scope of the project

Smart bot specifically tailored as a bank information system that helps customers of RSS Bank with account related questions and policy information. Irrelevant questions if asked by the user is handled by the bot by providing some random advertisements about the bank like credit card facilities etc. Slang language can also be interpreted by the bot. Bot covers wide range of queries but domain specific.

## 1.2 Definition, Acronyms and Abbreviation

### Definitions:

**Artificial Intelligence** is the branch of computer science concerned with making computers behave like humans [14]. The term was coined in 1956 by John McCarthy at the Massachusetts Institute of Technology. Artificial intelligence includes the following areas of specialization: Games playing, Expert Systems, Natural language, Neural networks and Robotics.

**Natural Language Processing** is a branch of artificial intelligence that deals with analyzing, understanding and generating the languages that humans use naturally in order to interface with computers in both written and spoken contexts using natural human languages instead of computer languages [14].

**Regular Expressions** is a sequence of characters that forms a search pattern, mainly for use in pattern matching with strings, or string matching, i.e. "find and replace"-like operations.

**Chat bot** is a computer program that simulates human conversation, or chat, through artificial intelligence. Typically, a chat bot will communicate with a real person,

but applications are being developed in which two chat bots can communicate with each other [14]. Chat bots are used in applications such as ecommerce customer service, call centers and Internet gaming. Chat bots used for these purposes are typically limited to conversations regarding a specialized purpose and not for the entire range of human communication.

**Slang Language Dictionary** is a reference book containing an alphabetical list of slang, vernacular vocabulary not generally acceptable in formal usage, usually including information given for each word, including meaning and pronunciation [16].

### 1.3 Literature Review

Chatter bot development is reasonably well studied ever since the Turing Imitation Game (TIG) [7] was first proposed. Eliza [6] was the first famous chat bot, and ALICE [5] was another milestone. The Loebner Prize [8] and The Chatterbox Challenge [9] are both annual competitions which have their roots in TIG. However, these are typically text only experiments, although some limited visual components are often added. This focus is on, however, whether with the text exchange alone, we can replicate human “behavior”. The purpose of a chat bot system is to simulate a human conversation; the chat bot architecture integrates a language model and computational algorithm to emulate information chat communication between a human user and a computer using natural language.

With the improvement of data-mining and machine-learning techniques, better decision-making capabilities, availability of corpora, robust linguistic annotations/processing tools standards like XML and its applications, chat bots have become more practical in daily life applications such as help desk tools, information retrieval tools, automatic telephone answering systems, advertising, tools to aid in education, business and E-commerce. In E-commerce, chat bot helps in information retrieval tasks, such as for searching and browsing, as menu based navigation poses difficulties in locating the appropriate information. The dialogue system provides additional information on products and simplify decision making process to find a product that satisfy customer’s requirements [1][2]. According to Dr. Wallace, perhaps, the

biggest market of chat bot is Entertainment Markets, in which, we can imagine that chat bots can act as a talking book for children and provide foreign language instruction or can be a tutor in Intelligent Tutoring system. One such study used an ALICE system to help Chinese university students practice their conversational English skills. The study was qualitative in nature and used pre-existing conversational English skills <sup>[3]</sup>.

The study focused more on user attitudes rather than on chatter bot efficiency. It was discovered that 62% of users chatted for 10 lines or less, and that 8.5% of the time ALICE bot has no specific pattern to match the given input and had to rely on root-level generic responses. In all of these conversational entities, one thing is common; and that is, they are having the difficulty of maintaining dialogue for sustainable period of time. Another tutoring study focused on using ALICE as a course enhancement tools with Social and Political Theory knowledge <sup>[4]</sup>.

This study found that most subjects used the system as a search engine rather than as a conversation partner. It was further concluded that their system was unable to function as a stand-alone tutor. Dialog system can adequately carry out the conversations with the user and can log the conversations which can be good source for knowledge acquisition for domain specific topic. Therefore, techniques of knowledge acquisition were rightly used in <sup>[11] [13]</sup> with their system AZ-ALICE chat bot that is an extension in ALICE chat bot. They tested their system.

## 1.4 Overview of Document

This document contains the overview of the efficient virtual helpdesk and describes its scope in brief. It describes it's the system's architecture, structure and relationship between its modules and components. It also contains features with which it can be enhanced in future and its details of its maintenance.

### System Architecture and Description

This section describes the architecture of our project in detail with block diagram.

## **Overview of Modules/Subsystem**

This sub-section describes various components and sub-systems. It contains various modules such as Natural Language Processing, Slang language Dictionary and Text to Speech Converter and Database etc.

## **Structures and Relationships**

It gives the diagrammatic and simple understanding of the working of the project.

## **Detailed Description of Components**

It provides detailed description of components involved in our project.

## **Implementation Details**

This section gives the output of our entire project in terms of snapshots that we have implemented. It also gives an in-depth knowledge of the testing process in terms of testing details, test plan, kinds of testing implemented for our project, and the testing procedures implemented.

## **Software Maintenance**

This section gives all the information about how the maintenance of our system will be implemented. It also provides the standards and guidelines, resources required for maintenance and a maintenance guide that should be followed.

## **Conclusion**

This section gives the scope for the future work that can be done to enhance and increase the usability of our entire project.

# **CHAPTER 02**

# **SYSTEM ARCHITECTURE DESCRIPTION**

## CHAPTER 2

### SYSTEM ARCHITECTURE DESCRIPTION

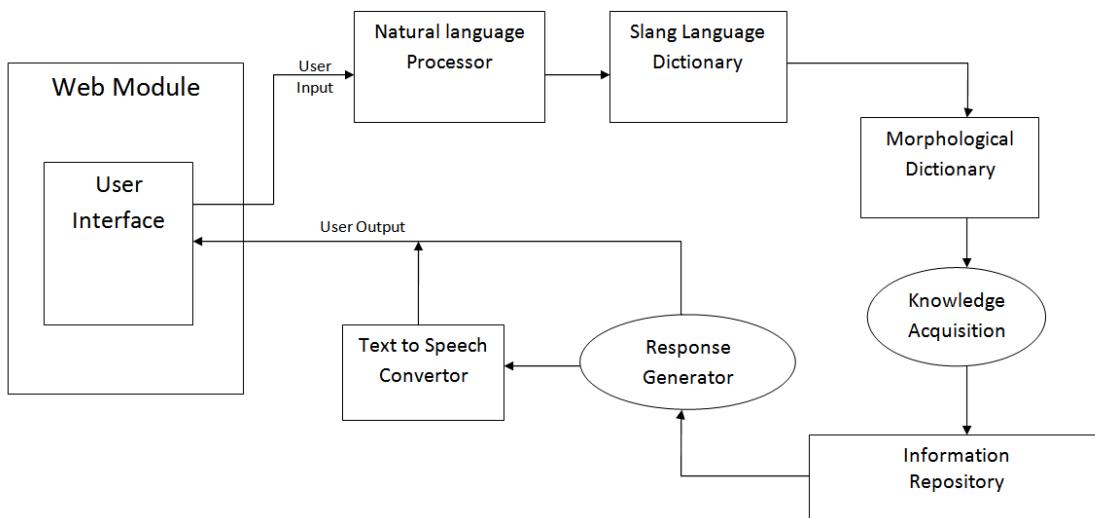
#### 2.1 Overview of Modules/Subsystem:

The System architecture of the Smart Bot is as shown in figure 1.

The following modules will be included in this project

- User Interface
- Natural Language Processing
- Slang Language Dictionary
- Pattern Matching
- Text to speech converter

The user query from web module is passed on to the Natural language processing unit which parses the input and separates the keywords. To find out meaning and type of those keywords morphological dictionary is used and to understand slang queries, slang language dictionary is used. These keywords are mapped with the keywords stored in knowledge database. After mapping, response is generated in both text and audio format. For audio response, Microsoft's SAPI packages are used to convert text to speech.



*Fig.2.1 System Architecture of Smart Bot*

### Basic Description:

- a) **User Interface:** User interface is the first look for the project. As soon as the user opens the bank website he needs to be logged in to access further pages of the website else he will have to register as a new user. There out of several options he has one through which he can ask any query to a bot. The Smart bot page includes a text box for the user to enter his query, two command buttons one for the response in text format and the other in audio format. There is also a spell checker command which helps the user to correct his typing errors. After getting the response the user can also give his feedback on a Google form sheet.



*Fig.2.2 Login Webpage*

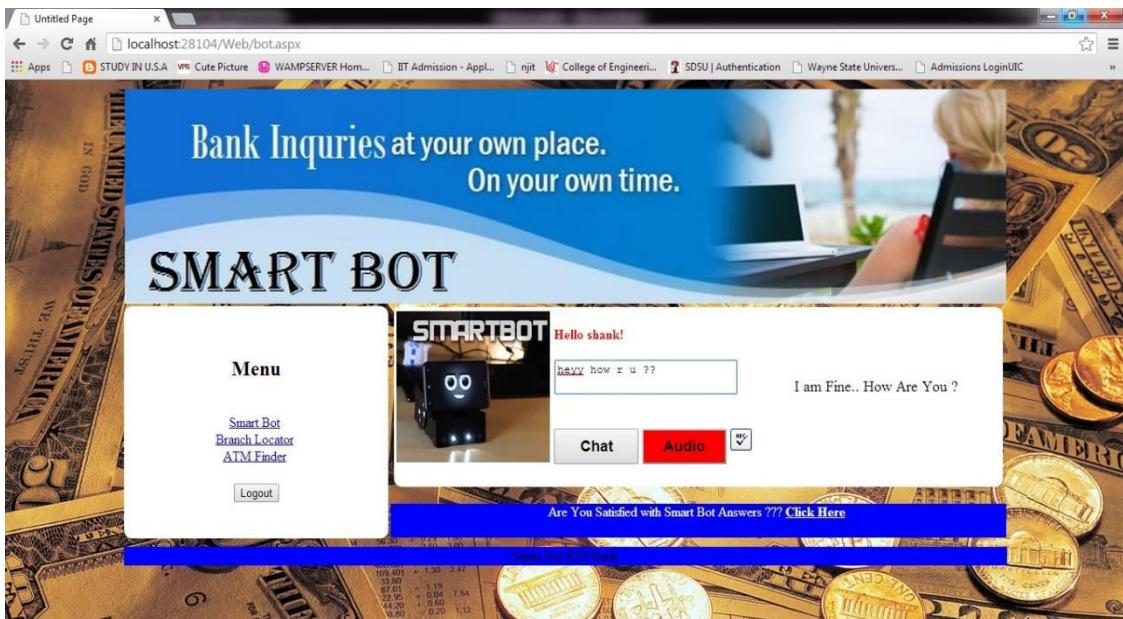


Fig.2.3.Smart Bot Webpage

- b) Slang Language Dictionary:** To provide more convenience to the user he also has a provision to enter his query in the form of slang words. The slang language dictionary is a database which includes a set of slang words and their corresponding information.

 A screenshot of Microsoft SQL Server Management Studio (SSMS). The Object Explorer on the left shows a database named '(SQL Server 10.50.1600 - sa)' containing 'master', 'branch', 'chatbot', and 'Tables' (with 'System Tables' and various system and user-defined tables like 'dbo.Acc', 'dbo.addqueries', etc.). The central Results pane displays a table titled 'Results' with the following data:
 

	slangword	meaning
1	@	at
2	hw	how
3	r	are
4	fyn	fine
5	u	you
6	2	to
7	2dae	today
8	4	for
9	4ever	forever
10	abt	about
11	ack	acknowledgement
12	asap	as soon as possible
13	ty	thanks yaar
14	lol	laughing out loud
15	atb	all the best
16	b	be
17	bcoz	because
18	b4u	before you
19	brb	be right back
20	c	see
21	cya	see you tomorrow
22	d	the
23	dat	that
24	der	there
25	thr	there
26	skin	

Fig.2.4 Slang Language Database

- c) Pattern Matching:** The query entered by the user is mapped with the database using two engines. The special engine takes in the full sentence and maps it with the database. The matrix engine segregates the input<sup>[15]</sup> and maps corresponding keywords with the database.

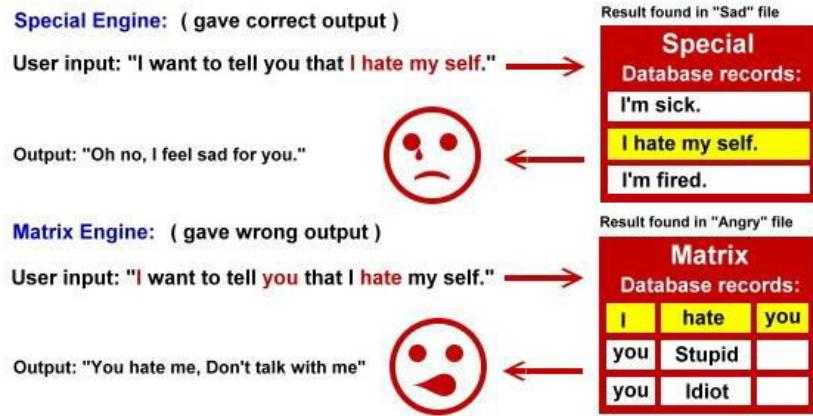


Fig.2.5 Advantages of Special Engine

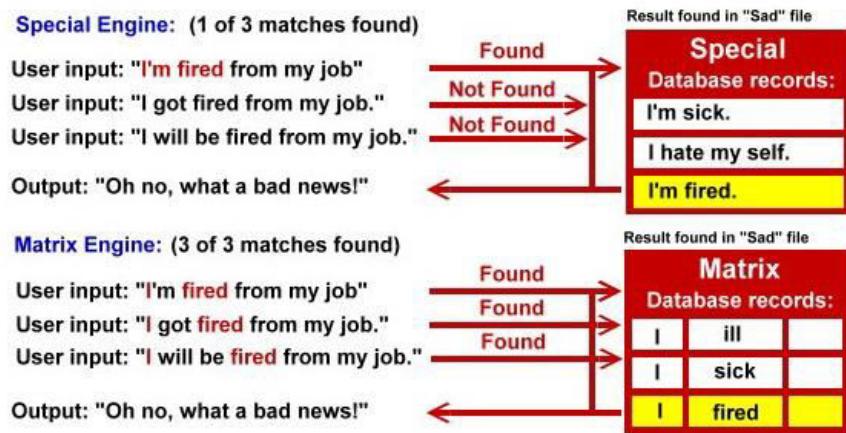


Fig.2.6 Advantages of Matrix Engine

**d) Text to Speech Converter:** The bot also provides its response in audio format. After getting the response in text format if the user clicks on the ‘Audio’ command button he will be able to listen to the same answer.

## 2.2. Structure and Relationship

A structure and relationship can be best explained with flowcharts. A flowchart is a diagrammatic representation of a step-by-step solution to a given problem. It is a common type of diagram that represents an algorithm or process showing the steps as boxes of various kinds, and their order by connecting these with arrows. Data is represented in these boxes, and arrows connecting them represent flow / direction of flow of data. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

The advantage of the flow chart is, it depends on visualization and as it is in the form of diagram, anyone can understand the flow of code very easily. The better is the flowchart, the better is the software product made and if any error occurs then it is very easy to understand the vulnerable point or the cause of the threat.

This technique allows the author to locate the responsibility for performing an action or making a decision correctly, showing the responsibility of each organizational unit for different parts of a single process.

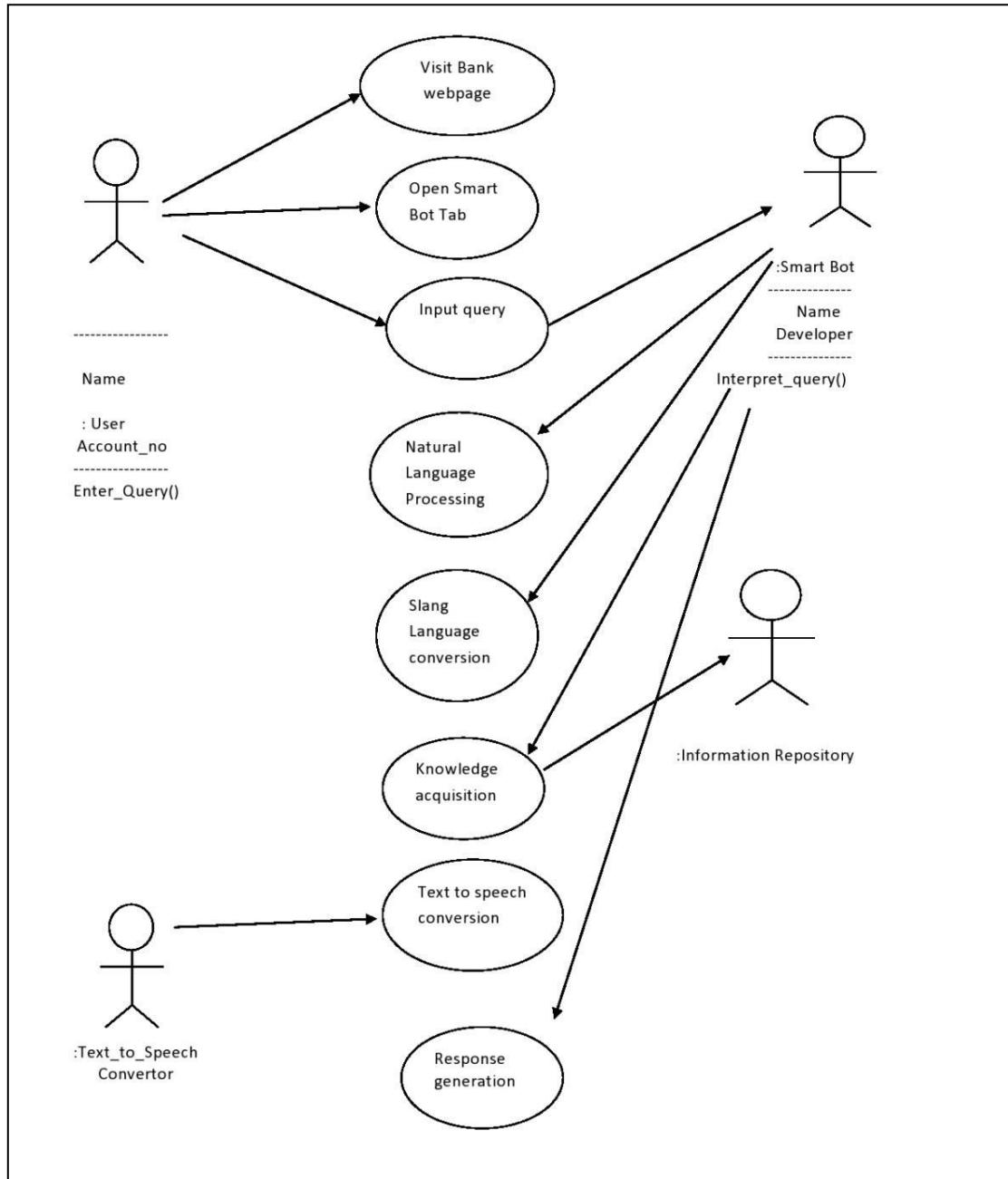


Fig.2.7 Use Case Diagram

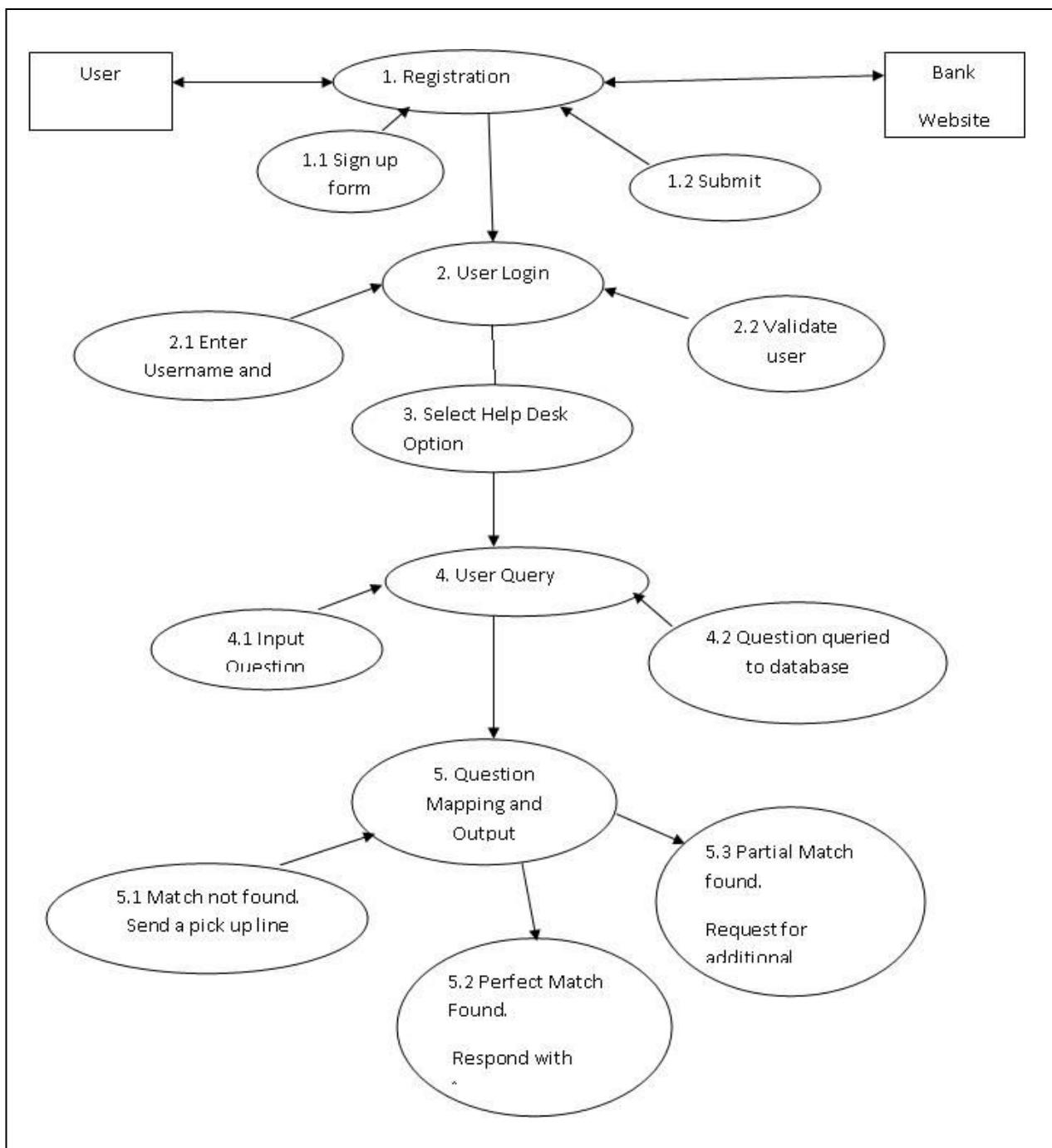


Fig.2.8 Level-1 DFD

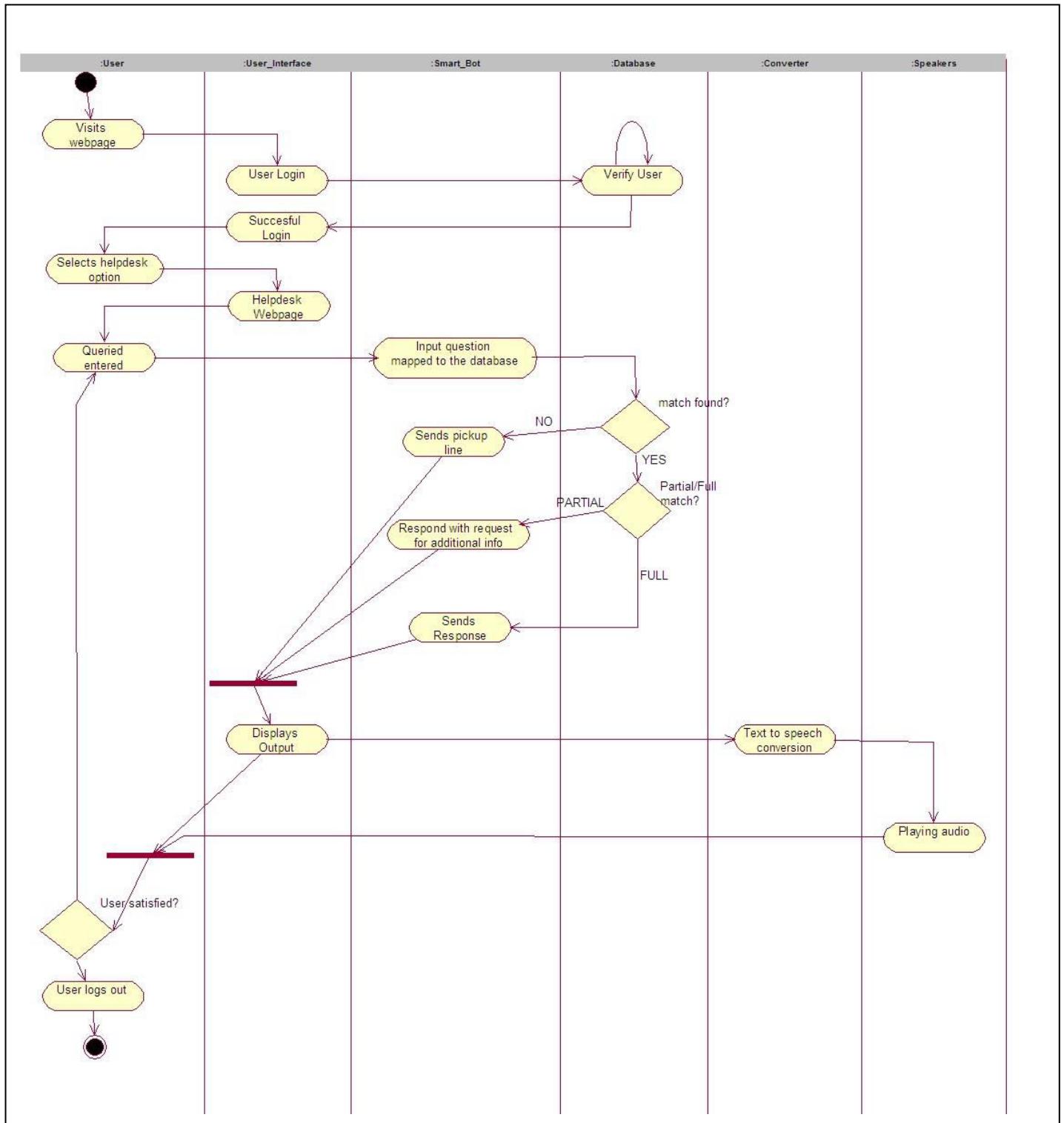


Fig. 2.9 Activity Diagram

## **CHAPTER 03**

# **DETAILED DESCRIPTION OF COMPONENTS**

## CHAPTER 3

### DETAILED DESCRIPTION OF COMPONENTS

#### **Microsoft Visual Studio 2010**

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows super family of operating systems, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a forms designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that enhance the functionality at almost every level—including adding support for source-control systems (like Subversion and Visual SourceSafe) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Team Foundation Server client: Team Explorer).

Visual Studio supports different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. Built-in languages include C, C++ and C++/CLI (via Visual C++), VB.NET (via Visual Basic .NET), C# (via Visual C#), and F# (as of Visual Studio 2010). Support for other languages such as M, Python, and Ruby among others is available via language services installed separately. It also

supports XML/XSLT, HTML/XHTML, JavaScript and CSS. Individual language-specific versions of Visual Studio also exist which provide more limited language services to the user: Microsoft Visual Basic, Visual J#, Visual C#, and Visual C++.

### **Web designer/development**

Visual Studio also includes a web-site editor and designer that allows web pages to be authored by dragging and dropping widgets. It is used for developing ASP.NET applications and supports HTML, CSS and JavaScript. It uses a code-behind model to link with ASP.NET code. From Visual Studio 2008 onwards, the layout engine used by the web designer is shared with Microsoft Expression Web. There is also ASP.NET MVC support for MVC technology as a separate download and ASP.NET Dynamic Data project available from Microsoft.

## **SQL Server Management Studio**

**SQL Server Management Studio (SSMS)** is a software application first launched with the Microsoft SQL Server 2005 that is used for configuring, managing, and administering all components within Microsoft SQL Server. The tool includes both script editors and graphical tools which work with objects and features of the server.

A central feature of SQL Server Management Studio is the Object Explorer, which allows the user to browse, select, and act upon any of the objects within the server. It also has an "express" version that can be freely downloaded.

Starting from version 11, the application has been rewritten in WPF that is similar to Visual Studio 2010.

## **Microsoft Sound API**

**SAPI** is the speech API that gives applications access to speech recognition and text-to-speech (TTS) engines. This article focuses on TTS. For TTS, SAPI takes text as input and uses the TTS engine to output that text as spoken audio. This is the same technology used by the Windows accessibility tool, Narrator. Every version of Windows since XP has shipped with SAPI and an English TTS engine.

TTS puts user's ears to work. It allows applications to send information to the user without requiring the user's eyes or hands. This is a very powerful output option that isn't often utilized on PCs.

## AspNetSpell

AspNetSpell is the Spell Checker for ASP.Net Web Applications. The AspNetSpell component provides international spell checking for your ASP.Net web forms. It can be installed and integrated into most applications in a few minutes. AspNetSpell behaves very similarly to MS Word's own spellchecker, making this software familiar to users. In addition ASPNetSpell users have access to a library of free international dictionaries.

AspNetSpell is compatible with ASP.Net 1, 2, 3, 3.5 and 4. The code it delivers is W3C HTML and XHTML compliant, and has a good degree of accessibility.

# **CHAPTER 04**

# **PROJECT SCHEDULING AND TRACKING**

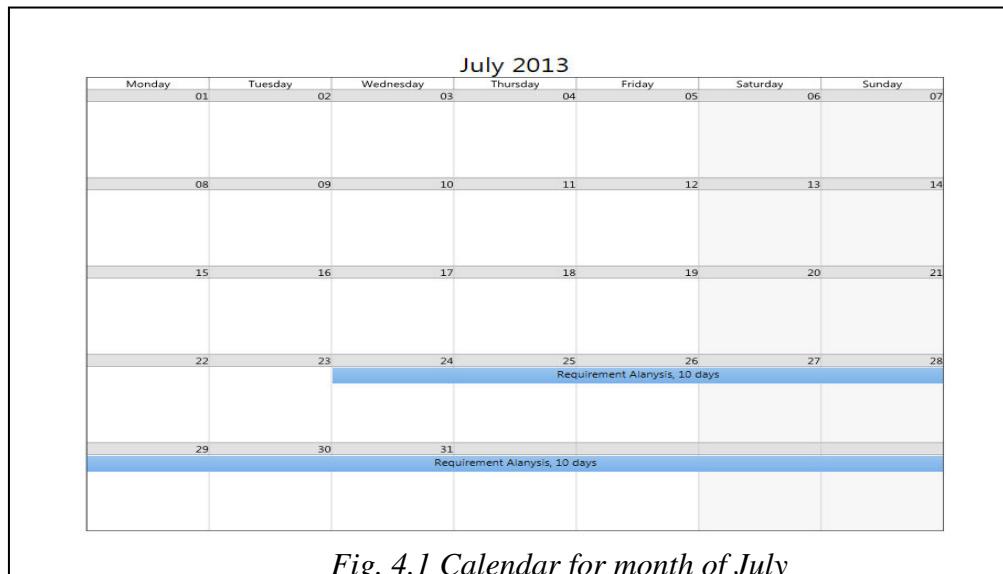
# CHAPTER 4

## PROJECT SCHEDULING AND TRACKING

Project Scheduling and Tracking describes the process of building and monitoring schedules for software development projects. To build complex software systems, many engineering tasks need to occur in parallel with one another to complete the project on time. The output from one task often determines when another may begin. It is difficult to ensure that a team is working on the most appropriate tasks without building a detailed schedule and sticking to it.

### 4.1 Calendar

The Calendar view shows tasks as boxes that fall across the blocks that represent days in a calendar.



August 2013						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			01	02	03	04
Requirement Analysis, 10 days						
05	06	07	08	09	10	11
Requirement Analysis, 10 days	Existing System Study, 15 days					
12	13	14	15	16	17	18
Existing System Study, 15 days						
19	20	21	22	23	24	25
Existing System Study, 15 days						
26	27	28	29	30	31	
Existing System Study, 15 days	Technology Selection, 10 days					

September 2013						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			01			
Technology Selection, 10 days						
02	03	04	05	06	07	08
Technology Selection, 10 days						
09	10	11	12	13	14	15
Technology Selection, 10 days	Modular Specification, 10 days					
16	17	18	19	20	21	22
Modular Specification, 10 days						
23	24	25	26	27	28	29
Modular Specification, 10 days	Design and Modelling, 28 days					
30						
Design and Modelling, 28 days						

Fig. 4.2 Calendar for month of August and September

October 2013						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		01	02	03	04	05
Design and Modelling, 28 days						
		07	08	09	10	11
Design and Modelling, 28 days						
		14	15	16	17	18
Design and Modelling, 28 days						
		21	22	23	24	25
Design and Modelling, 28 days						
		28	29	30	31	
Design and Modelling, 28 days						

November 2013						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				01	02	03
Design and Modelling, 28 days						
		04	05	06	07	08
		11	12	13	14	15
		18	19	20	21	22
		25	26	27	28	29

Fig. 4.3 Calendar for month of October and November

### January 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
			01	02	03	04
			05			
			06	07	08	09
			10	11	12	
			13	14	15	16
			17	18	19	
			20	21	22	23
			24	25	26	
			27	28	29	30
			31			

UI Design, 10 days

UI Design, 10 days

Coding and Implementation, 46 days

Coding and Implementation, 46 days

Coding and Implementation, 46 days

### February 2014

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					01	02
03	04	05	06	07	08	09
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

Coding and Implementation, 46 days

*Fig. 4.4 Calendar for month of January and February*

March 2014						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					01	02
Coding and Implementation, 46 days						
03	04	05	06	07	08	09
Coding and Implementation, 46 days						
10	11	12	13	14	15	16
Coding and Implementation, 46 days						
17	18	19	20	21	22	23
Coding and Implementation, 46 days				Testing, 10 days		
24	25	26	27	28	29	30
Testing, 10 days						
31	Testing, 10 days					
April 2014						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					04	05
01	02	03				06
Testing, 10 days						
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

*Fig. 4.5 Calendar for month of March and April*

## 4.2 Gantt Chart:

Gantt charts are a project planning tool that can be used to represent the timing of tasks required to complete a project. Because Gantt charts are simple to understand and easy to construct, they are used by most project managers for all but the most complex projects. In a Gantt chart, each task takes up one row. Dates run along the top in increments of days, weeks or months, depending on the total length of the project. The expected time for each task is represented by a horizontal bar whose left end marks the expected beginning of the task and whose right end marks the expected completion date. Tasks may run sequentially, in parallel or overlapping.

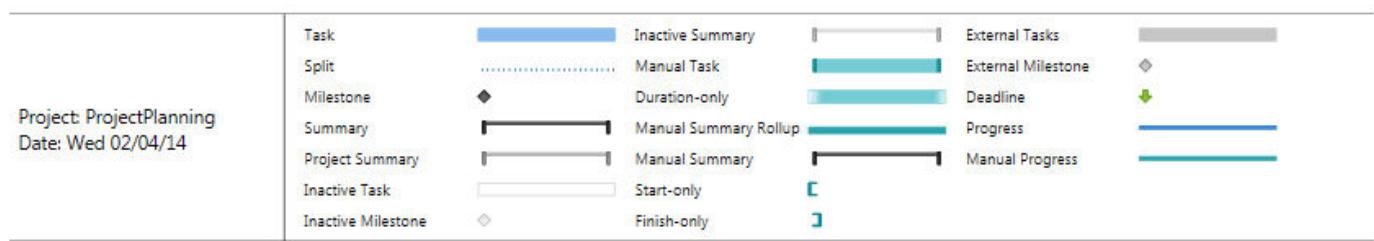
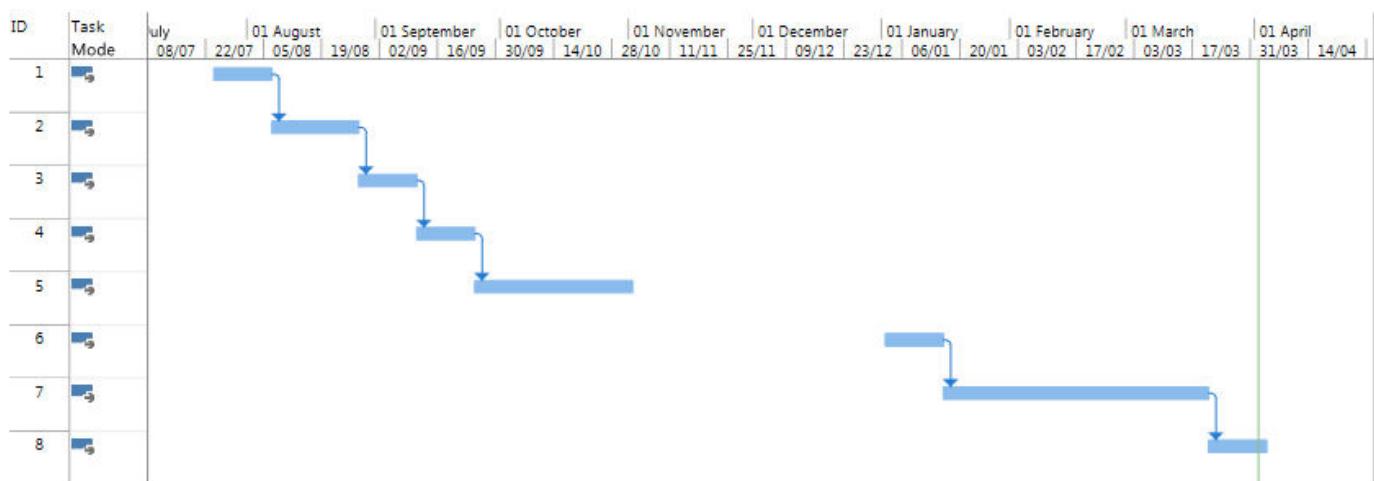
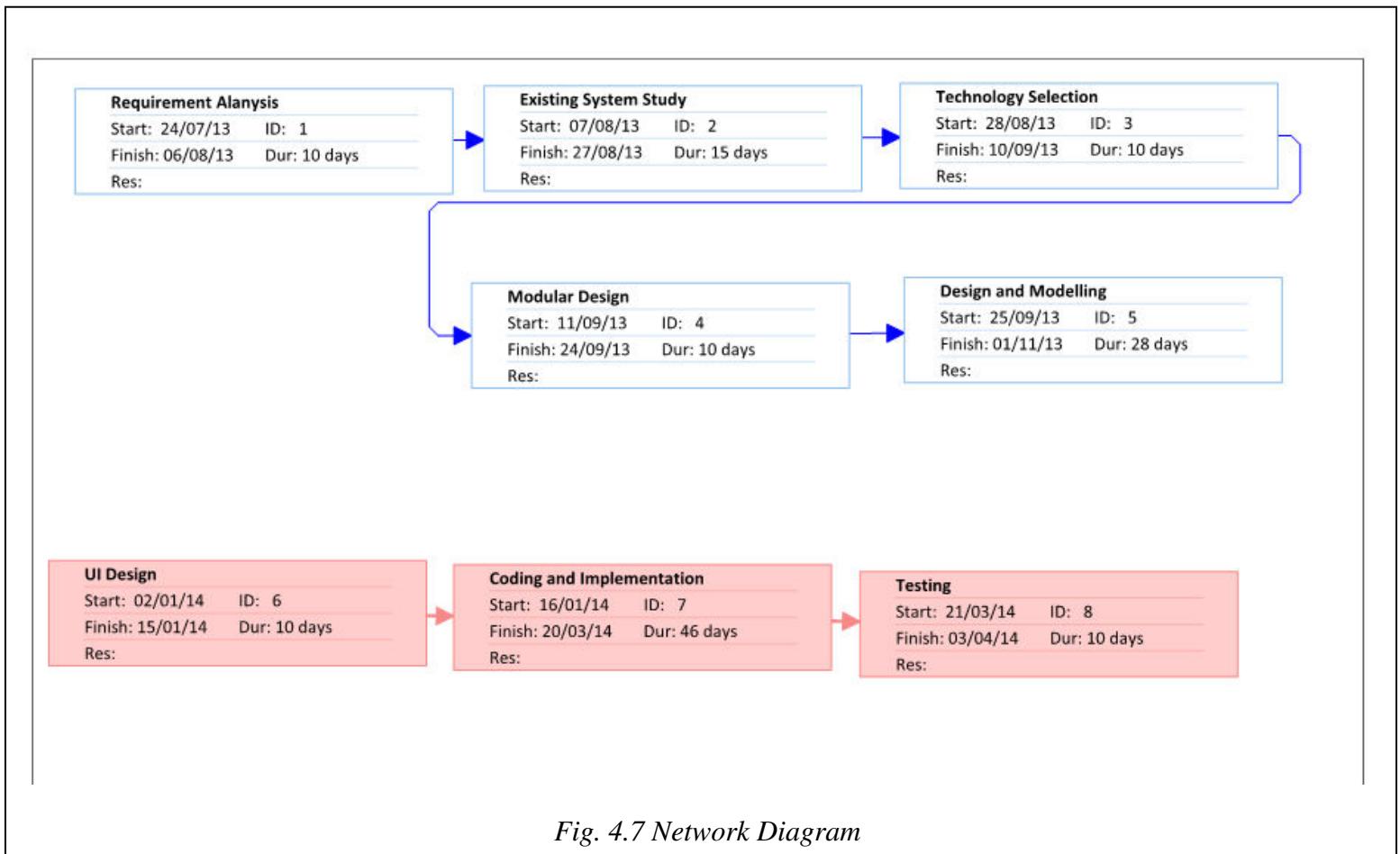


Fig. 4.6 Gantt chart for project

### 4.3 Network Diagram

The Network Diagram view was called the PERT Chart in earlier versions of Project. This view shows the dependencies between tasks in a graphical manner. Gantt chart is primarily meant to view the schedule time line, whereas Network diagram to view the all type of dependencies in the project. Each task shown in the box called node and a line connecting two boxes represents the dependency between those tasks



*Fig. 4.7 Network Diagram*

## 4.4 Task Usage

The task usage view displays useful information about all the tasks in a project. Through this view you can see how much time and money any task will take. Once you have assigned an hourly rate to the different resources in your project you can get an estimate to how much the project is going to take. The Task Usage view can be modified to display a number of different pieces of information.

ID	Task Mode	Task Name	Work	Details	12 Aug '13						
					T	W	T	F	S	S	M
1		Requirement Alanysis	17 hrs Work		1.7h						
2		Existing System Study	15 hrs Work			1h	1h	1h			1h
3		Technology Selection	8 hrs Work								
4		Modular Design	23 hrs Work								
5		Design and Modelling	65 hrs Work								
6		UI Design	20 hrs Work								
7		Coding and Implementation	180 hrs Work								
8		Testing	25 hrs Work								
9		Documentation	15 hrs Work								

ID	Task Mode	Task Name	Work	Details	26 Aug '13						
					M	T	W	T	F	S	S
1		Requirement Alanysis	17 hrs Work								
2		Existing System Study	15 hrs Work		1h	1h					
3		Technology Selection	8 hrs Work				0.8h	0.8h	0.8h		0.8h
4		Modular Design	23 hrs Work								
5		Design and Modelling	65 hrs Work								
6		UI Design	20 hrs Work								
7		Coding and Implementation	180 hrs Work								
8		Testing	25 hrs Work								
9		Documentation	15 hrs Work								

ID	Task Mode	Task Name	Work	Details	14 Oct '13 M	T	W	T	F	S	S	21 Oct '13 M
1	1	Requirement Alanysis	17 hrs	Work								
2	2	Existing System Study	15 hrs	Work								
3	3	Technology Selection	8 hrs	Work								
4	4	Modular Design	23 hrs	Work								
5	5	Design and Modelling	65 hrs	Work		2.32h	2.32h	2.32h	2.32h	2.32h		2.32h
6	6	UI Design	20 hrs	Work								
7	7	Coding and Implementation	180 hrs	Work								
8	8	Testing	25 hrs	Work								
9	9	Documentation	15 hrs	Work								

Fig. 4.8 Task usage from August to October

ID	Task Mode	Task Name	Work	Details	13 Jan '14 M	T	W	T	F	S	S	20 Jan '14 M
1	1	Requirement Alanysis	17 hrs	Work								
2	2	Existing System Study	15 hrs	Work								
3	3	Technology Selection	8 hrs	Work								
4	4	Modular Design	23 hrs	Work								
5	5	Design and Modelling	65 hrs	Work								
6	6	UI Design	20 hrs	Work		2h	2h	2h				
7	7	Coding and Implementation	180 hrs	Work					3.92h	3.92h		3.92h
8	8	Testing	25 hrs	Work								
9	9	Documentation	15 hrs	Work								

ID	Task Mode	Task Name	Work	Details	24 Feb '14 M	T	W	T	F	S	S	03 Mar '14 M
1	1	Requirement Alanysis	17 hrs	Work								
2	2	Existing System Study	15 hrs	Work								
3	3	Technology Selection	8 hrs	Work								
4	4	Modular Design	23 hrs	Work								
5	5	Design and Modelling	65 hrs	Work								
6	6	UI Design	20 hrs	Work		3.92h	3.92h	3.92h	3.92h	3.92h		3.92h
7	7	Coding and Implementation	180 hrs	Work								
8	8	Testing	25 hrs	Work								
9	9	Documentation	15 hrs	Work								

ID	Task Mode	Task Name	Work	Details	W	T	F	S	S	17 Mar '14	M	T	W
1	Info	Requirement Alanysis	17 hrs	Work									
2	Info	Existing System Study	15 hrs	Work									
3	Info	Technology Selection	8 hrs	Work									
4	Info	Modular Design	23 hrs	Work									
5	Info	Design and Modelling	65 hrs	Work									
6	Info	UI Design	20 hrs	Work									
7	Info	Coding and Implementation	180 hrs	Work	3.92h	3.92h	3.92h				3.92h	3.92h	3.92h
8	Info	Testing	25 hrs	Work									
9	Info	Documentation	15 hrs	Work									

Fig. 4.9 Task usage from month January and February

ID	Task Mode	Task Name	Work	Details	W	T	F	S	S	17 Mar '14	M	T	W
1	Info	Requirement Alanysis	17 hrs	Work									
2	Info	Existing System Study	15 hrs	Work									
3	Info	Technology Selection	8 hrs	Work									
4	Info	Modular Design	23 hrs	Work									
5	Info	Design and Modelling	65 hrs	Work									
6	Info	UI Design	20 hrs	Work									
7	Info	Coding and Implementation	180 hrs	Work	3.92h	3.92h	3.92h				3.92h	3.92h	3.92h
8	Info	Testing	25 hrs	Work									
9	Info	Documentation	15 hrs	Work									

ID	Task Mode	Task Name	Work	Details	T	F	S	S	24 Mar '14	M	T	W	T
1	Info	Requirement Alanysis	17 hrs	Work									
2	Info	Existing System Study	15 hrs	Work									
3	Info	Technology Selection	8 hrs	Work									
4	Info	Modular Design	23 hrs	Work									
5	Info	Design and Modelling	65 hrs	Work									
6	Info	UI Design	20 hrs	Work									
7	Info	Coding and Implementation	180 hrs	Work	3.92h								
8	Info	Testing	25 hrs	Work		2.5h				2.5h	2.5h	2.5h	2.5h
9	Info	Documentation	15 hrs	Work									

ID	Task Mode	Task Name	Work	Details	F	S	S	31 Mar '14	M	T	W	T	F
1	Info	Requirement Alanysis	17 hrs	Work									
2	Info	Existing System Study	15 hrs	Work									
3	Info	Technology Selection	8 hrs	Work									
4	Info	Modular Design	23 hrs	Work									
5	Info	Design and Modelling	65 hrs	Work									
6	Info	UI Design	20 hrs	Work									
7	Info	Coding and Implementation	180 hrs	Work	2.5h				2.5h	2.5h	2.5h	2.5h	
8	Info	Testing	25 hrs	Work									
9	Info	Documentation	15 hrs	Work							5h	5h	5h

Fig. 4.10 Task usage for month of March

## **CHAPTER 05**

# **IMPLEMENTATION DETAILS**

# CHAPTER 5

## IMPLEMENTATION DETAILS

### 5.1 Output of implementation:

1. Accept the query from the user

Convert the sentence entered by the user to lowercase to avoid case sensitivity while mapping queries with database records.

2. Use of regular expressions

A regular expression is a pattern that the regular expression engine attempts to match in input text. A pattern consists of one or more character literals, operators, or constructs.

Eg. hi, hiiii and hiiiii is considered same as normal ‘hi’.

Syntax:

```
Match match = Regex.Match(s, "(hi+|he+l+o+hie+|hey+)", RegexOptions.IgnoreCase);
```

If success property of match is true then string ‘s’ follows ‘hi+|he+l+o+hie+|hey+’ this pattern in which hi, hii, hello, heellooo, hieeeee, heyyyyyy these kind of sentences are mapped.

3. Use of slang database

Split the informal sentence into keywords using the following syntax.

```
string[] words = s.Split(' ');
```

They are mapped with records in the slang words database. If mapping is found, then that slang word is replaced with corresponding formal word. After all the replacements of slang words, All these keywords are joined to form a sentence.

```
s = string.Join(" ", words);
```

#### 4. Use of Matrix and Special Engine

**Engines for pattern matching:-**

- 1) Special Engine.
- 2) Matrix Engine.

Special Engine compares sentences with user inputs. Matrix Engine compares words with user inputs. Special and Matrix Engines complete each other.

The Special Engine is a part of (belongs to) the Matrix engine and so should be arranged as follows:

- **1st search in:** Special Engine. If a result is found, then give the output. Else search using the Matrix Engine.
- **2nd search in:** Matrix Engine. If a result is found, then give the output. Else query gets stored for human assistance in unanswered questions database.

#### 5. Human Assistance

If Smart Bot is unable to answer the query asked by user, query gets stored in unanswered questions database. Later these unanswered queries are answered by human expert and these records flag values are set to 1 to know which questions are answered.

#### 6. User Feedback

If user is satisfied with the answers provided by smart bot, he supposes to fill feedback form. From that user suggested information, developer can do appropriate modifications.

Following are the screenshots for system execution:

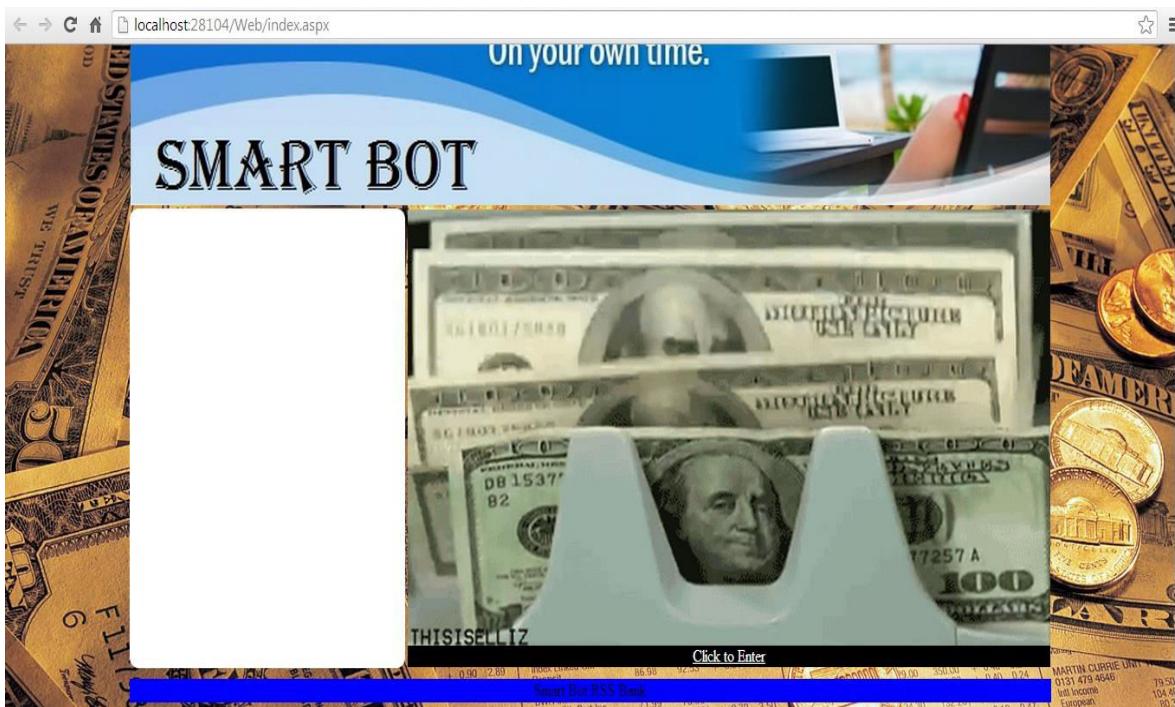


Fig.5.1 Starting Webpage of System

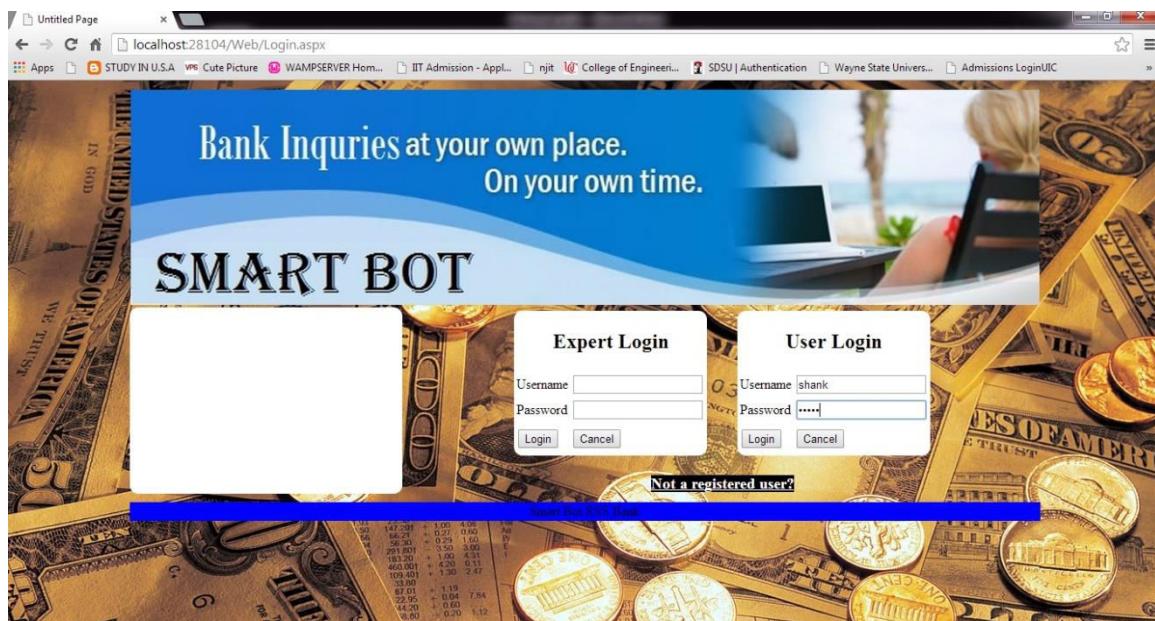


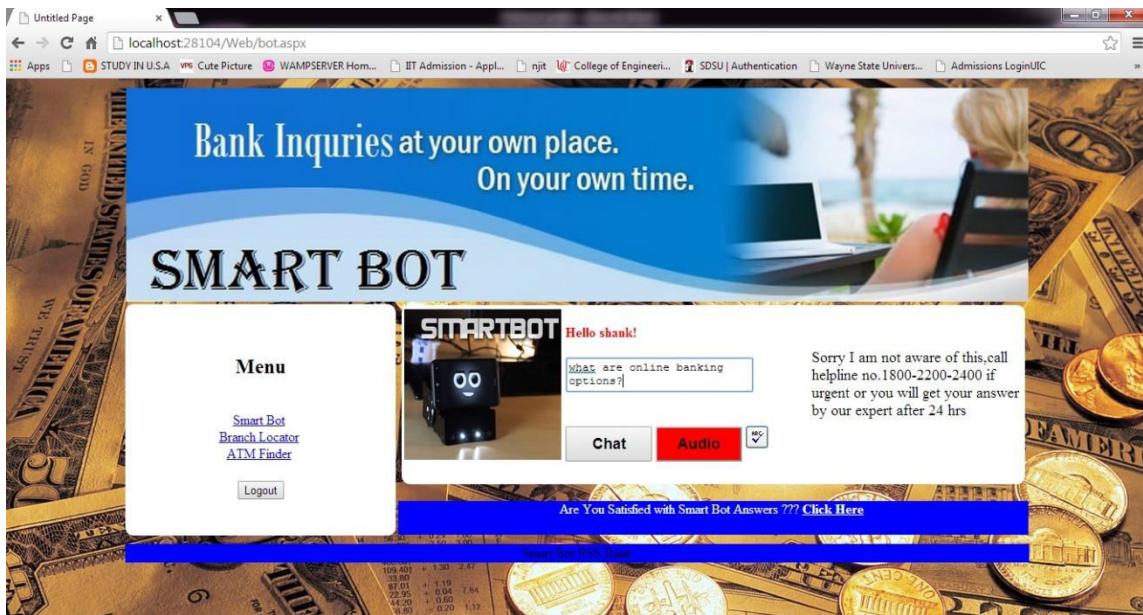
Fig.5.2 Login webpage



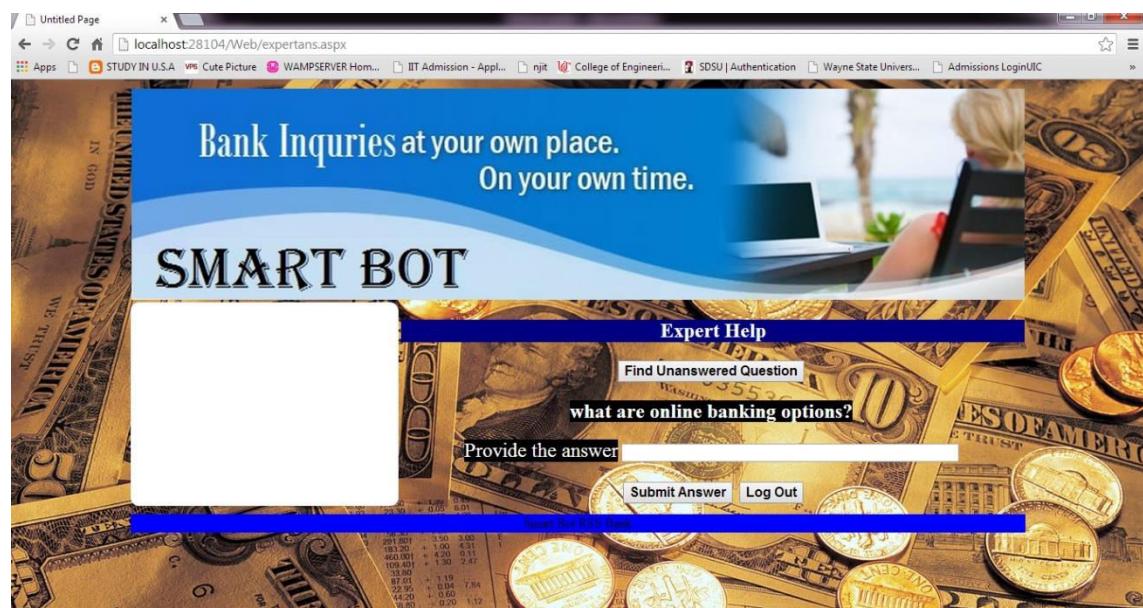
*Fig.5.3 Use of slang language and regular expressions*



*Fig.5.4 Smart bot answers for bank queries*



*Fig.5.5 Smart Bot Response for unanswered questions*



*Fig.5.6 Human Assistance for unanswered questions*

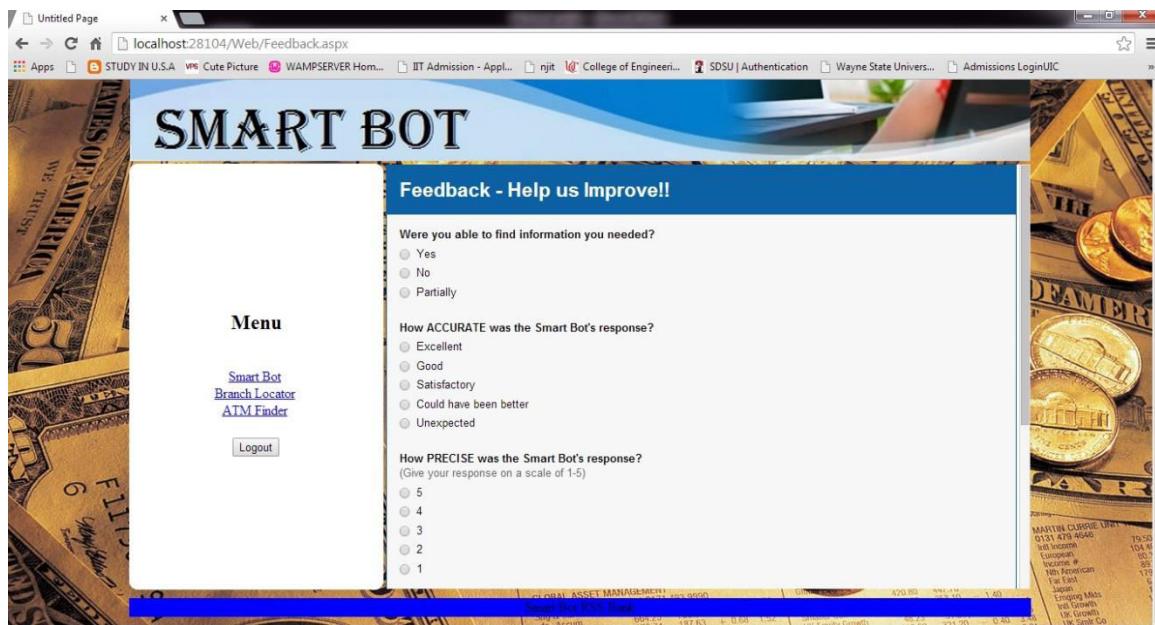


Fig.5.7 Feedback Form

## 5.2 Testing Details

Testing plays an important role in achieving and assessing the quality of the software product. The reason behind testing not only uncover that a product works properly under required conditions but can also initiate that it does not function properly under specific conditions. Scope of testing basically includes examination of code as well as execution of that code in various environments and condition and also examining all aspects of code. Testing is a verification process for quality assessment and improvement. Testing is basically done to find errors, faults in the system. The basic goal of software development process is to produce the software that has very few or no errors. In an effort to detect errors soon after they are introduced each phase ends with verification activity such as reviews. However most of these verification activities in the early phase of the software development are based on human evaluation and cannot detect all the errors. Testing plays an important role in quality assurance for the software. It is a dynamic method for the verification and validation, where the system to be tested is executed and the behaviour of the system is observed.

## **LEVELS OF TESTING:**

The programs are tested at various levels:

### **Unit testing**

The first level of testing is called unit testing. In this different modules are tested against the specifications produced during design for the modules. Unit testing is essentially for verification of code produced during the coding phase and hence the goal is to test internal logic of the modules. Each of the modules is tested independently.

#### **Unit Testing on Smart Bot User Input Module:**

For unit testing of user input module test case is generated to find the errors. In user input module, for each user query chat button is provided. User can't get the answer until he/she enters the query. If user clicks on 'chat' button without entering the query then error message will be shown saying, "Please Enter Query" as shown below.

Test case 1: Unit of program- Main query

Input- blank

Expected Output-No process is done ask user to enter the query

Actual Output- Ask the user to enter the query.

Test case 2: Unit of program- submit the answer without entering text

Input- blank

Expected Output-No process is done ask expert to enter the answers

Actual Output- Ask the expert to enter the answers.

### **Integration testing**

The next level of testing is often called integration testing. In this many unit tested modules are combined into sub systems which are then tested. The goal here is to see if the modules can be integrated properly. In the proposed system integration testing is performed for login Module and Smart Bot module.

Test case 3: Unit of program- Smart Bot

Input- User logs on login page.

Expected Output-User name should display on Smart Bot webpage.

Actual Output- Username displayed on Smart Bot webpage.

## System testing

This is the next levels of testing. Here the entire software is tested. The reference document for this process is the requirements document and the goal is to see if the software meets its requirements. This is essentially a validation exercise and in this situation it is the only validation activity.

System testing is done on overall system to check is there any error present in system which is not discovered during unit testing or integration testing. Whether the result produced is correct or not.

Whether the smart bot answers to the queries of user or not and if not it should provide human assistance.

# **CHAPTER 06**

# **SOFTWARE MAINTENANCE**

## CHAPTER 6

### SOFTWARE MAINTENANCE

#### 6.1 Product Enhancement

Our project can be enhanced with many features in future.

We plan to add questions related to personal accounts like account balance related questions etc.

We plan to have the smart bot with a dynamic database so that it can take help of the web for solving queries.

#### Security

In future the security algorithm can be upgraded with more complex functions for Login Page.

#### 6.2 Resources Required for Maintenance

- Internet connection to upgrade the smart bot as and when new updates for the smart bot are launched.

#### 6.3 Maintenance Guide

- The user must give the input as specified in standards and guidelines to get the proper output.
- User must response as and when required.

## 6.4 Exception Handling

Application may throw exception when the internet connection is not working. It may give exception like “server connection lost” and system will not give any output. As the system requires the internet connection this exception can't be handled.

```
protected void Button1_Click(object sender, EventArgs e)
```

This function basically used to send the user's query to Smart Bot which give the answer depending on the user's query. The query should be proper else the system will not give any output and ask user to enter the query again.

# **CHAPTER 7**

# **CONCLUSION**

## CHAPTER 7

### RESULTS AND CONCLUSION

The Design of Smart bot is aimed for implementing topic specific FAQ Bot so that it helps customers as a banking advisor. The contribution of this system is that we addressed the problem of evaluating a low level dialog system's ability to bestow domain knowledge in a very systematic way. In future, more statistical parameters on data mining and user profiling would be of use. Future research based on Smart bot should focus on specific categories of knowledge that participants are most likely to correct as well as which knowledge categories have higher Response Satisfaction scores. Finally, measuring the quality of user-suggested knowledge would be worthwhile.

#### **Advantages:**

- It can answer wide range of Queries.
- It provides human like interaction.
- It is easy to use and requires less time.
- User's doubts are cleared completely.
- Slang Language can be used by the user to ask the queries.

#### **Limitations:**

- It uses offline database.

# **APPENDICES**

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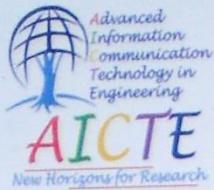


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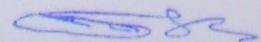
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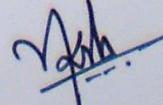
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