

Project II

"Chatting Bot Service Provider"

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Engineering

by

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This is to certify that the project entitled "*Chatting Bot Service Provider*" is a bonafide work of **Ghatte Saqib Nisar Parvin** (Roll No.: 14DCO56) and **Kazi Faizan Farook Farida** (Roll No.: 12CO35) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering in Department of Computer Engineering.**

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Project II Approval for Bachelor of Engineering

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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

Chatting Bot Service Provider

This project deals with the development of chat bots hosting website. An individual user can host multiple chat bots using any of the available AIML templates on the website which may reassemble a personality or act as consumer care for any business, organization or institutions. Moreover, Hosting Website also provide API's for Weather, News, Dictionary, Wikipedia, Mathematical Calculations and much more and a global file to keep all bots updated that are hosted on the website. Users can also embed chat on their personal website or integrate it with social networking sites such as twitter.

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Keywords And Glossary

Keywords : AIML, PHP, HTML, CSS, NLP, Javascript, JSON, jQuery, AJAX, Xampp, Web Browser, Chatbot, Social Networking, Global bot, Chat Engine, Pattern Matching, Database, XML, API.

Glossary :

A:

AIML: AIML (Artificial Intelligence Markup Language) is an XML-compliant language that's easy to learn, and makes it possible for you to begin customizing an Alicebot or creating one from scratch within minutes.

API: An application programming interface (API) is a set of subroutine definitions, protocols, and tools for building software and applications.

Artificial Intelligence(AI): The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Abundant: Existing or available in large quantities.

Algorithm: An algorithm is a procedure or formula for solving a problem, based on conducting a sequence of specified actions.

AJAX: Ajax (also Asynchronous Javascript) is a set of Web development techniques using many Web technologies on the client side to create asynchronous Web applications.

B:

Blog: A blog is a discussion or informational website published on the World Wide Web consisting of discrete, often informal diary-style text entries.

C:

Chatbot: A computer program designed to simulate conversation with human users, especially over the Internet.

CSS: Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language.

E:

Explicate: Analyse and develop (an idea or principle) in detail.

H:

HTML: HyperText Markup Language (HTML) is the standard markup language for creating web pages and web applications.

Hindering: Hindering: Make it difficult for (someone) to do something or for (something) to happen.

J:

Javascript: JavaScript ("JS" for short) is a full-fledged dynamic programming language that, when applied to an HTML document, can provide dynamic interactivity on websites.

JSON: JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate.

jQuery: jQuery is a fast, small, and feature-rich JavaScript library. It makes things like HTML document traversal and manipulation, event handling, animation, and Ajax much simpler with an easy-to-use API that works across a multitude of browsers.

N:

NLP: Natural language processing is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human (natural) languages.

P:

PHP: PHP is a server-side scripting language designed primarily for web development but is also used as a general-purpose programming language.

Q:

Queries: A question, especially one expressing doubt or requesting information.

R:

Reluctance: Unwillingness or Disinclination to do something.

Robotics: Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing.

S:

System Architecture: A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system.

Social Networking: A social networking service (also social networking site, SNS or social media) is an online platform that is used by people to build social networks or social relations with other people who share similar personal or career interests, activities, backgrounds or real-life connections.

W:

Web Browser: A web browser is a software application for retrieving, presenting, and traversing information resources on the World Wide Web.

Web Server: A Web server is a program that uses HTTP (Hypertext Transfer Protocol) to serve the files that form Web pages to users, in response to their requests, which are forwarded by their computers' HTTP clients.

X:

XAMPP: XAMPP is a free and open source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages.

XML: Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

Chapter 1

Project Overview

1.1 Introduction

The evaluation of robots had made a drastic change to the human life. One of the most emerging trend in the development of robotics is Chatting robot. Abundant number of researches have been performed in order to develop chat bots which can prove to be realistic or to mimic human communication skills.

There are numerous websites available on World Wide Web which helps to host our personalized chat bot that can respond intelligently to human queries. These services are used by many industries, organizations or institutions to service their consumers. One of the most widely used language for the development of bot is AIML (Artificial Intelligence Markup Language). This proves to be a deterministic language in terms of development of chat bots. Almost all bots are developed using AIML in which all the possible queries are enclosed in `<pattern>` and `<template>` tags which contains question and answer respectively.

E.g. `<pattern>HOW ARE YOU</pattern>`
`<template>Yeah! am fine. How are you?</template>`

The patterns and template tags are further enclosed in `<category>` tags. Thousands of categories tags are used to develop chatting bots. The free A.L.I.C.E. AIML includes a knowledge base of approximately 41,000 categories.[1] These categories are saved in database when the bot is compiled or published. When a user sends a message the query pattern is matched with the pattern's stored in database and the corresponding template is sent as a response to the user. AIML is explained in more detail in section 1.1.2.

More researches in this domain resulted into usage of speech recognition and text to speech converters. So beside text chatting, voice chatting also become possible with intelligent bots. Moreover, the foreign language enhancements also came into existence. Beside English, bots can be developed in many other foreign languages such as Chinese, Nepali, Malayalam, French, Hindi etc.

But unfortunately, AIML limits the bots to perform mathematical calculations, provide information about weather, news, recent updates etc. Or it needs to be keep updating on a regular basis to provide such information. This create a tremendous problem for bot developers and eventually restricts the ability of machines to replace humans. This is the major problem addressed by this paper.

Second major problem with current system is it takes tremendous time to match the query string with pattern from huge database. So, the performance decreases and eventually the response time of bot decreases.

This bot hosting website provides a solution for both the major flaws in the existing systems. Since this website is a bot hosting site, it contains all the API to necessary provide information about weather, news, mathematical calculations, general knowledge etc. Moreover, it creates a log of frequently asked queries and stores it to the server. This increased the performance of the bot. The response time gradually decreases for the questions that are being frequently asked.

Bot skilled with ability of performing mathematical calculations and providing information about recent trends brings a great revolution in the development of chatting bots. Users does not need to constantly keep on updating their bots for general knowledge since this work is done directly at the server, it's benefit can be availed by all the bots hosted on this website.

1.1.1 Background Introduction

The idea of Chatting Bots Service Provider came to us in two steps. Once while chatting with Natasha on Hike, we were highly amazed by the technology of machine responding to the human queries, that too very realistically. Thereafter we started to Google that how can machines respond to human queries. Thereafter we came to know about a new language termed as AIML. (Artificial Intelligence Mark-up Language).

With the help of AIML, which is an XML-compliant language users can create their bots. But where to execute these bots and how to host our bots. Again, we started googling and came across a famous website www.pandorabots.com. This website helps to host bots and publish on our personalized websites. But this website demand charges for its services and also lack some of our requirements. This leded us towards second part of our project topic "Service Provider" which will overcome all the existing flaws.

Thus "Chatting Bots Service Provider" is a project that can help develop bots from various existing templates such as Software Engineer, Advocate, Doctor etc. It also contains various APIs to get latest updates about news, weather, cricket score, dictionary etc.

1.1.2 Market Potential

The global chatbot market has been experiencing growth in recent years due to rapid development in artificial intelligence software market, innovation, digitalization, technology development and availability of messaging-as-OS platform. The other additional factors contributing to the growth of global chatbot market are consumers reluctance to install apps and availability of new interactive interfacing model with online services.

However, the complexity and cost of software is hindering the market growth. Also, the lack of skilled resources, privacy and security are restraining the growth of global chatbot market. The chatbot are being trained and designed to retain and learn from past interaction and conversation between business and individuals. This is expected to provide opportunities of expanding chatbot market and its use in various applications ranging from media publications to personalized assistance.

The global chatbot market is segmented on the basis of end use adoption, by type and geography. On the basis of end use adoption, the global Chatbot market is segmented into large sized enterprises and small and medium sized enterprises (SME's). In terms of type, the global chatbot market is segmented into stand-alone chatbots and web-based chatbots.

Stand-alone chatbots enable control of the functions of user's computer such as retrieving documents or playing media files. Web-based chatbots usually run on a remote server and the control of personality, behavior and hosting is with end user. Moreover, on the basis of geography the global Chatbot market is segmented into North America, Europe, Middle East and Africa, Asia Pacific and Latin America.

1.1.3 Motivation

The motivation for doing this project was primarily an interest in undertaking a challenging project in an interesting area of Artificial Intelligence Machine Learning. The opportunity to learn about a new area of Natural Language Processing was appealing. How the machine can understand human language and respond to the human queries realistically was amazing for us.

We also presented a research paper on our project at inter-collegiate level. We also presented a paper in International Journal and secured second position. (Scanned image of Certificate is enclosed in Appendix A). This project is about development of a website which can help users to develop their own chatting bots which can prove helpful for many business / organizations / institutions to service their customers. There will be no need of hiring employees to service customers. This tremendous job can be easily done by chatting bots. These bots will be automatically updated with lot of general knowledge, news, information about weather etc.

1.2 Problem Definition

All business / organizations / companies need a customer care to solve the customer queries. This require a lot of setup such as telephone, a person to answer customer queries on computer system etc. This becomes a tremendous job for start-up companies or less budget companies.

This problem can be solved by using Chatting Bot that can be hosted on this project website by using any of the available templates. So that bot development becomes easy by just modifying the available templates. These bots can be further embedded on their personal websites / blogs or social networking website such as Twitter.

Most of the general knowledge questions, news, weather etc. will be regularly updated on the server so that all the hosted bots automatically keeps on updating themselves and reduce the pressure on organizations or companies.

1.3 Current Systems

List of Chatbots:

1. Chatbot BOT
2. Chatbot Chuck Norris
3. Chatbot AskVoila
4. Chatbot Erwin
5. Chatbot Singapore Weather Bot
6. Chatbot GoSchoolWise
7. Chatbot The best constructor
8. Chatbot Marina
9. Chatbot Eva
10. Chatbot Roobot
11. Chatbot Travel bychat

12. Chatbot Book by chat
13. Chatbot Healthyotta
14. Chatbot Swelly
15. Chatbot Jaquelina
16. Chatbot The Trading Bot
17. Chatbot Annemeik
18. Chatbot Soa Seks Check

List of Hosting Service:

1. Personality Forge AI
2. Pandorabots
3. MyCyberTwin

List of AIML Interpreter:

1. PHP AIML Interpreter(Program O)
2. Python AIML Interpreter(PyAIML)
3. Java AIML Interpreter(Chatterbean)

1.4 The Problems with Current System

There are several problems with the Current Systems available in the market. Some of them are enlisted below:

- **Bots need to be created from the scratch.**

These websites need does not have any templates to develop bots. Hence all the bots need to be created from scratch. Some websites do provide an ALICE bot template which is an open-source bot developed by Google Inc. But ALICE is a specific entertainment purpose bot which cannot be used for many professional purposes. Eventually it need to be updated a lot to reuse it for professional or personal purpose.

- **Mathematical Calculations are not done.**

Mathematical Calculations are not possible directly with AIML, also hosting service does not provide any module for mathematical calculations. Even the Natasha from Hike responds very incorrectly to the mathematical questions or sometimes directly reply as "Use a calculator instead".

- **Updating Bots is too difficult.**

On a Hosting Service if many bots are developed, it becomes too tedious to update all the bots for a global change. For example, the present PM of India is Shri Narendra Modi, but if after few years the PM gets changed, all the bots need to be manually updated that the present PM of India is not Narendra Modi but so and so. This become too tedious to update regular global changes for all the bot masters.

- **No General Knowledge.**

The bots do not have any General Knowledge about the world unless and until its feed up by the bot masters using AIML and properties file. Bot Hosting Service Providers does not provide any service for automatic response of General Knowledge questions from the users.

- **No Information about Weather,News etc.**

Beside the lack of General Knowledge, providing information about Weather, News etc. with respect to specific areas is more problematic job for Bots Developers. The Bots Hosting Service Providers do not provide any specific API which can be embedded with AIML so that bots can respond with latest updates about Weather, News etc.

1.4.1 Advantages Over Current System

The flaws in the Current System can be overcome with the help of various techniques enlisted below:

- **Global.aiml Global.properties file common to all bots.**

Global.aiml file that can be used for global updating of the bots. If there is a global information change in the world, all the bots need to be manually updated in the current system. But we proposed a new idea of Global.aiml and Global.properties file. If these files are updated all the bots hosted under our service will be automatically updated.

- **Templates for developing bots for different reasons.**

We have already constructed various templates for Software Engineer, Hardware Engineer, Advocate, Doctor, Music Director, Singer etc. So, bot masters do not need to develop bots from scratch. They just need to select a template of their choice and just

change the limited things from it that too mostly just within properties file. This will highly reduce bot creating time and pressure on bot masters.

- **Maths problem solving ability.**

We have a programmed function which can solve mathematical queries posted by users. So, all the bots hosted our website will be smart enough to solve mathematical questions along with general knowledge and various bot master specific questions.

- **Dictionary, Wikipedia, Weather, Quotes, Facts etc.**

We have embedded various APIs for Dictionary, Wikipedia, Weather, Quotes, Facts etc. so all this information will be provided with latest updates to the users. The bots masters need not change all the information manually. It will be automatically updated by the means of APIs.

1.5 Goals and Objectives

This goal of this project is to digitalize the whole world with AI based technology of Chatting Bots. Industrialists who need to spend a lot of time in chatting with their customers can place this job to their bots for free which can handle this job more better way than humans. This can help save lot of time of the world which can be invested in the upliftment of the new technologies and thus the upliftment of the whole world.

This project is developed with an objective to replace humans with chatting bots that can service all customer simultaneously that too multiple times faster than humans. Thus, increasing the speed of the work of industries and organizations.

1.6 Scope and Applications

There is a heavy scope of our project in industries and organization. Bots can be created for customer service of various industries and organizations instead of humans to increase response time by multiple time.

Applications of "Chatting Bot Hosting Service" are as follows:-

1. Customer Service for various Companies, Organizations and industries.
2. Training students with various technologies or concepts.
3. Entertaining users with jokes, quotes, facts etc.

4. Represent a human realistically.
5. Getting Mathematical Word Problems solutions.

1.7 Report Organization

Black Book of our project report is arranged in a simple format so that it can be easily understandable by the readers. We have divided all the topics within various chapters which are listed below:

Chapter 1 contains a brief description of our project. There are various technologies already existing for chatting bots. But what is unique in our project. What are the flaws in current system and what are our advantages over Current System. How it all started? Problem Definition, Goals, Objectives, Scope Application etc.

Chapter 2 contains a Review of Literature. We studied numerous International Journal's Reference Paper to get a clear idea about the existing systems. But we found some flaws in the technology used in it. What are those flaws and how we can overcome it are explained in this chapter.

Chapter 3 contains Requirement Analysis of our Project. Hardware and software requirement, Supportive Operating Systems etc.

Chapter 4 explicates the flow of our Project. It contains Use-Case, Class Diagram, DFD, Component Diagram, Data Flow Diagrams and ER-Diagrams.

Chapter 5 contains the brief description of all the individual modules of our project. Our project contains of nearly 6 modules which are all explained in depth in this chapter. It also contains Sequence Diagram, Activity Diagram and Flow-Chart of our project.

Chapter 6 contains the Implementation Details of our project. What are the various methodologies or programming languages that our used to accomplish our task. It also contains the Assumption and Dependencies of our project.

Chapter 7 contains the Result and Analysis of our project. It contains the Test Cases that are used and the result of our work. It also explains the Analytical Discussion of our project.

Chapter 8 contains the Conclusion, Limitation and Future Enhancements of our project.

Chapter 2

Review Of Literature

2.1 An Intelligent Web-based Voice Chat Bot

2.1.1 Description

This paper deals with the working of AIML based chat robot. A Java Program is developed which convert AIML files into database. This Program is embedded into website which can in turns help its customers to develop bots.

The process of an online chat system would follow a client server approach which acquires the signal and streams it to a server. It also contains a voice recognition system in it. When a user speaks a request. The voice recognition system converts it into text and then search for its response.

Lastly, Server response generation can be broken down into two categories:

- Data Retrieval.
- Information Output.

2.1.2 Pros

- The bot has ability to recognize voice and speak in the human voice thus giving speech facility to bot.
- This bot can be embedded in any website.

2.1.3 Cons

- Chatbots were developed in only English language.
- Bots creation was difficult as it was to be created from scratch.
- Bots cannot be integrated with any other web chatting applications.

2.1.4 How we overcome

This can be overcome by using multi-linguistic API of the languages. The bots creation can be done from scratch through the instruction provided on our website using AIML language. Integration and Embedding of bots can be done using API provided to the members of the website. Performance can be increased by saving frequently asked queries in cache memory.

2.2 Chinese Intelligent Chat Robot Based on the AIML language

2.2.1 Description

This paper explains the language enhancements in the field of Chatting Bot Development system. Here the bot developed is in Chinese Language known as Chinese Intelligent Chat Robot Xiao Hui-hui. This paper demonstrated how AIML can be used not only to develop bots in English Language but also in many other foreign languages such as Chinese, Japanese, Indonesian, Hindi, Marathi etc.

2.2.2 Pros

- The bot has ability to chat with humans in Chinese Language.
- This bot brought an idea that bots can not only be developed in English Language but many other languages too.

2.2.3 Cons

- Mathematical calculations were not possible.
- Bots creation was difficult as it was to be created from scratch.
- Bots cannot be integrated with any other web chatting applications.

2.2.4 How we overcome

This can be overcome by using mathematical calculations can be solved by using the inbuilt libraries of the programming language. The bots creation can be done from scratch through the instruction provided on our website using AIML language. Integration and Embedding of bots can be done using API provided to the members of the website. Performance can be increased by saving frequently asked queries in cache memory.

2.3 Engaging High School Students Using Chatbots

2.3.1 Description

This paper presents a software platform called Chatbots designed to foster engagement while teaching basic Computer Science concepts such as variables, conditionals and Finite state automata, among others.

There are two templates used to create Chatbots:

- A bot that contain Computer Science concepts in it which can be helpful in training students.
- Class 15-lesson pilot course in 2 high schools.

This paper described the use of Templates to develop Chatbots which simplify the creation of bots and saves a lot of customer's time.

2.3.2 Pros

- This consisted of templates for teaching computer science concepts to students.
- This bot brought an idea that templates should be used to develop bots for the immediate development of the bots.

2.3.3 Cons

- Bots cannot be integrated with any other web chatting applications.
- Mathematical calculations were not possible.
- No information about news, weather, general knowledge beside computer science concepts etc.

2.3.4 How to Overcome

This can be overcome by using API of news, weather forecasting, general knowledge etc. Performance can be increased by saving frequently asked queries in cache memory. The mathematical calculations can be solved by using the inbuilt libraries of the programming language. The chatbots can be learned more accurately by using concept of the machine learning. The various new features, accuracy, satisfaction to the users will be provided by the respond or reply mmessages given by the chatbots.

2.4 Development and Implementation of a Chat Bot in a Social Network

2.4.1 Description

This paper describes the linking of chat bot with social network. It describes that how a chat bot can be linked with Twitter to entertain the users. It can also be used for advertisements. The bot is linked with Twitter since it parts from a simple concept, the exchange of short messages no longer than 140 characters which drastically reduces the amount of information and the way it is published. The algorithm process in this bot is divided into three different parts:

- Message reception.
- Message processing.
- Generation of a suitable reply.

2.4.2 Pros

- The bot has ability to get integrated with Social Network Website Twitter.
- This bot brought an idea that bots can be integrated with Social Network.

2.4.3 Cons

- No information about news, weather, general knowledge, jokes, facts, etc.
- Mathematical calculations were not possible.
- Bots need to be regularly updated for recent trends, technology etc.

2.4.4 How we overcome

This can be overcome by using the global properties by creating the global bot which will be having the global aiml files through which all bots get updated when through global bots. The information of news, weather forecasting, general knowledge etc, will be solved by using API. The mathematical calculations can be solved by using the inbuilt libraries of the programming language.

2.5 Technological Review

This bot brought an idea that bots can be integrated with Social Network. This section explains the different types of major technologies that are used in above literatures.

2.5.1 Artificial Intelligence Markup Language(AIML)

AIML (Artificial Intelligence Markup Language) is an XML-compliant language that is easy to learn, and makes it possible for you to begin customizing an Alicebot or creating one from scratch within minutes.[1] Chatting Bot can be created easily with the help of XML-complaint language. AIML comprises of combination of pattern and templates which are encapsulated in a category tag.

The basic structure of AIML is show below:

```
<category>
<pattern>HOW ARE YOU</pattern>
<template>I am fine. Tell me something about yourself</template>
</category>
```

There can be millions of categories to design an intelligent bot. The free A.L.I.C.E. AIML includes a knowledge base of approximately 41,000 categories.[1] These categories are enclosed within `<aiml>` & `</aiml>` tags. Beside `<aiml>`, `<category>`, `<pattern>` and `<template>` there are also various other tags used within aiml file to design an intelligent bot such as `<think>`, `<star>`, `<set>`, `<get>`, etc.

2.5.2 Java

Java is a general-purpose computer programming language that is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Many AIML interpreters are developed in Java since Java is platform independent. One of the most widely used Java based AIML Interpreter is Chatterbean.

2.5.3 XML

In computing, Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. The W3C's XML 1.0 Specification and several other related specificationsâ"all of them free open standardsâ"define XML. XML has been use to develop many XML compliant languages such as XAML, SOAP, AIML etc.

2.5.4 PHP

The PHP Hypertext Preprocessor (PHP) is a programming language that allows web developers to create dynamic content that interacts with databases. PHP is basically used for developing web based software applications. PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites. It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.

Chapter 3

Requirement Analysis

3.1 Platform Requirement :

Our project comprises of a website that will be hosted on a server. It has some specific hardware and software requirements which are listed in the sections below. It is supported by majority of Operating Systems a list of those operating systems is also mentioned below.

3.1.1 Supportive Operating Systems :

"Chatting Bots Hosting Service" is a website that helps to develop bots from selected templates and embed on person websites. This project is supported by all the operating systems which support internet such as:

- Windows OS
- Linux OS
- Unix OS
- Android OS
- Java OS
- Symbion
- iOS
- Bada OS

or any other equivalent OS that support internet.

3.2 Software Requirement :

In Software requirement we need all those softwares which provides us better functionality of the project without creating and problem or bugs. The minimum software that are needed in this project are as follows:

Table 3.1: Software Requirements

Software	Requirements
Browser	Internet Explorer 8 or above or any other compatible browser
Localhost	Xampp or Wamp

3.3 Hardware Requirement :

In hardware requirement we need all those components which will provide us the platform for the development of the project. The minimum hardware required for this project is as follows:

Table 3.2: Hardware Requirements

Hardware	Requirements
CPU configuration	Intel Pentium 3 or later
RAM capacity	256MB or above
Storage	Minimum 4TB

3.4 Feasibility Study

A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing business or proposed venture, opportunities and threats present in the environment, the resources required to carry through, and ultimately the prospects for success. In its simplest terms, the two criteria to judge feasibility are cost required and value to be attained.

3.4.1 Technical Feasibility

Bots are developed with the help of AIML (Artificial Intelligence Mark-up Language) which is an XML compliant Language. This language is easy to learn and understand. The basic idea behind "Chatting Bots Hosting Service" is to develop a compiler for AIML. The project members are very much familiar with concepts of Regular Expressions and are very much feasible to develop a compiler for AIML. Hence Technically project is feasible.

3.4.2 Economic Feasibility

This project requires a computer system to develop the software and a server system to host the website. Rest everything is software requirement. We decided to use shared hosting to host our website. So economically project is feasible.

3.4.3 Legal Feasibility

This project is developed with a premium template which is legally purchased from the developers and are authorized to use it for personal purpose. Also the major idea behind the project is our own idea and does not conflict with other existing systems idea. Hence legally project is feasible to be developed.

Chapter 4

System Design and Architecture

4.1 System Architecture

The performance of the chatting bots becomes excellent if the architecture is designed well. System Architecture comprises of web server which stores the AIML Files created by the members of website. These AIML Files are converted into Database format and are stored into Database. Whenever user log in to the website a list of templates is visible to the member which help to create a personalized bot on our server. Member can select a template of his choice and start developing his bot with the help of instructions provided on our website.

After successful creation of a bot user can publish his bot. The AIML files of these bot are stored in AIML Database and these files are converted into queries and are stored into database and the bot gets ready to response end-users requests.

An API is provided to the members of website so that they can embed this bot on their personalized website or integrate it with any social networking website such as Twitter. Whenever end-user wishes to communicate with a bot, the bot is searched in the chat engine. Chat Engine contains a complete database of all the bots developed or published on the website. Through this chat engine the intended bot's chat box is visible to the end user.

When end-user sends a message to the bot, again it is searched in chat engine. Chat engine contains a global properties file so that it can respond if the message is about general knowledge, weather or news based and the response is directly generated by the global bot. This response might be generated by the global bot itself or by sending a SOAP message. If the response is not available to the global bot, it is searched in the natural bot or the intended bot. The database is searched for the available response for the asked query. The response for the same is generated by if the query is matched in the database.

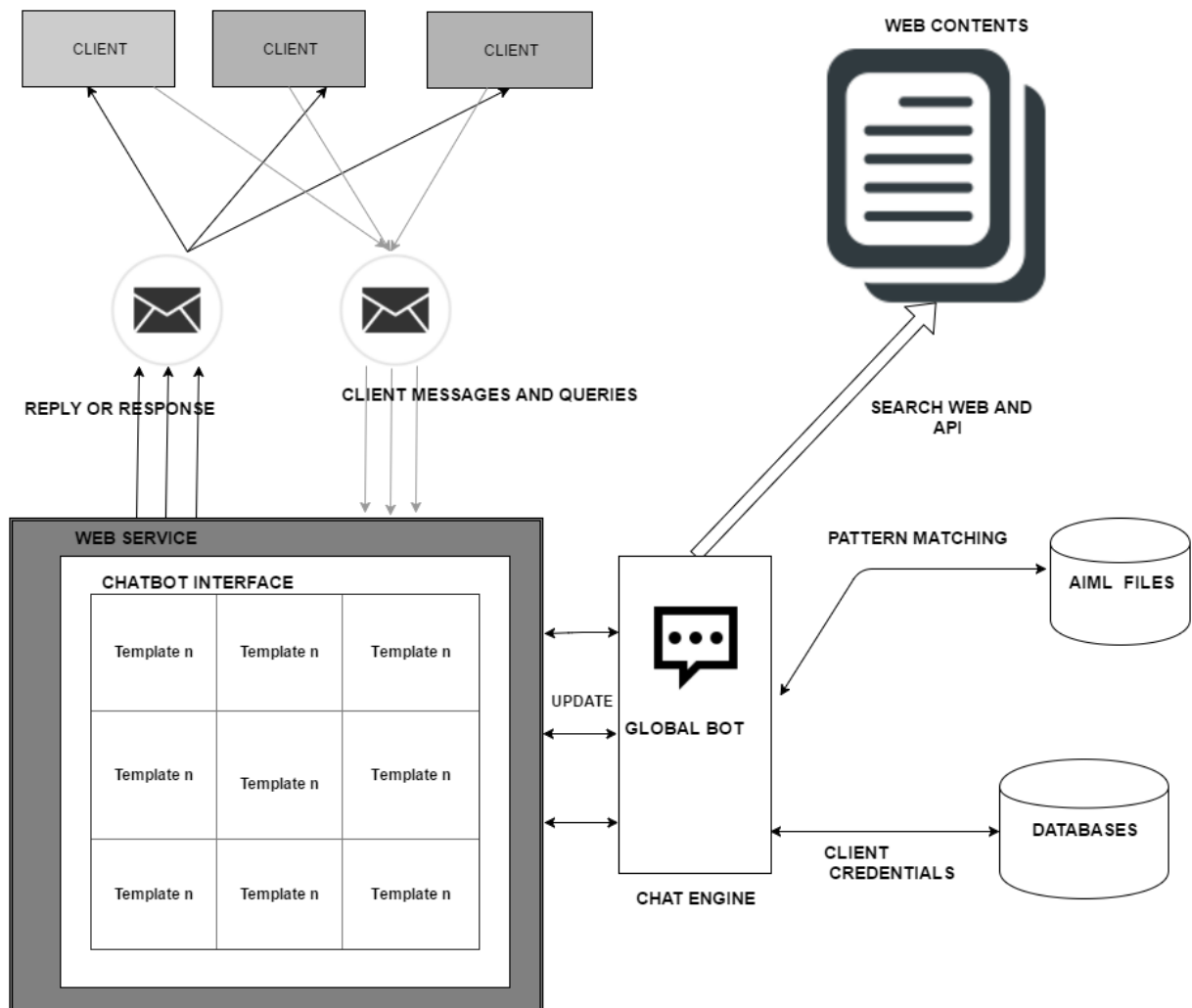


Figure 4.1: System Architecture

4.2 Usecase Diagram

The purpose of use case diagram is to capture the dynamic aspect of a system. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. So when a system is analyzed to gather its functionalities use cases are prepared and actors are identified.

Chatting bot Service provider consists of two main actor user and admin. User can register themselves on the website and login to the site. Users can create Chatbots using any of the available templates. These Chatbots can be embedded with any social media chatting application or any personal website. Whenever any person asks a query to the bot. The bot will search for the respective pattern a generate a response. For chatting bot to stay completely updated, admin can keep updating global bot file so that all the hosted bots get automatically updated. All the individual bots need not be updated manually.



Figure 4.2: Use Case Diagram

4.3 Data Flow Diagrams

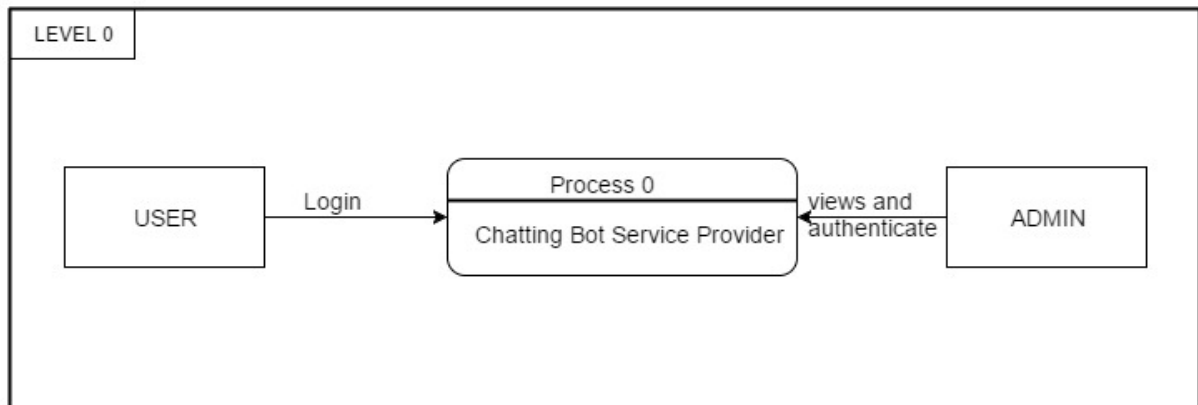


Figure 4.3: Data Flow Diagram level 0

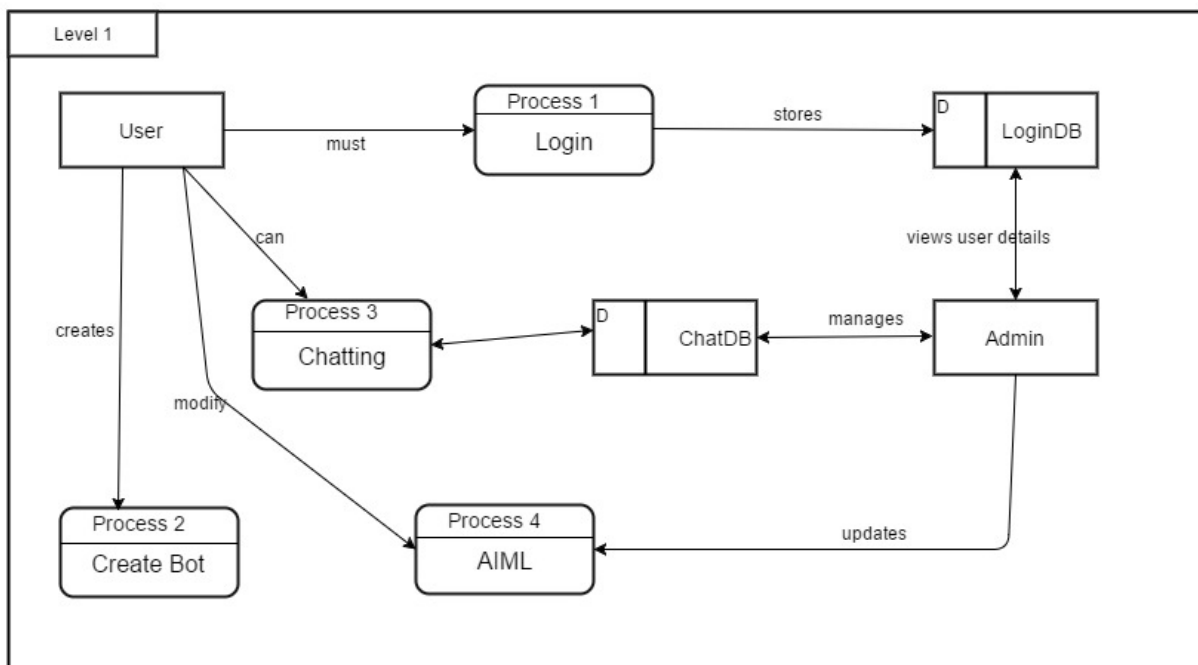


Figure 4.4: Data Flow Diagram level 1

In level 0, it only contains one process node that generalizes the function of the entire system in relationship to external entities. In our system the main process node is the chatting bot service provider which has the two entities i.e. user and admin.

In level 1, we highlight the main functions carried by our system. Here we are having 4 process nodes that show the main function and system flow of the system. For the login process, the data flows from the user to the login database, and also the chatting data will flow to the chat database, and the admin can view and manage the user details and chat. Then for the aiml process, the admin updates the aiml file to keep the system up to date in terms of information and knowledge.

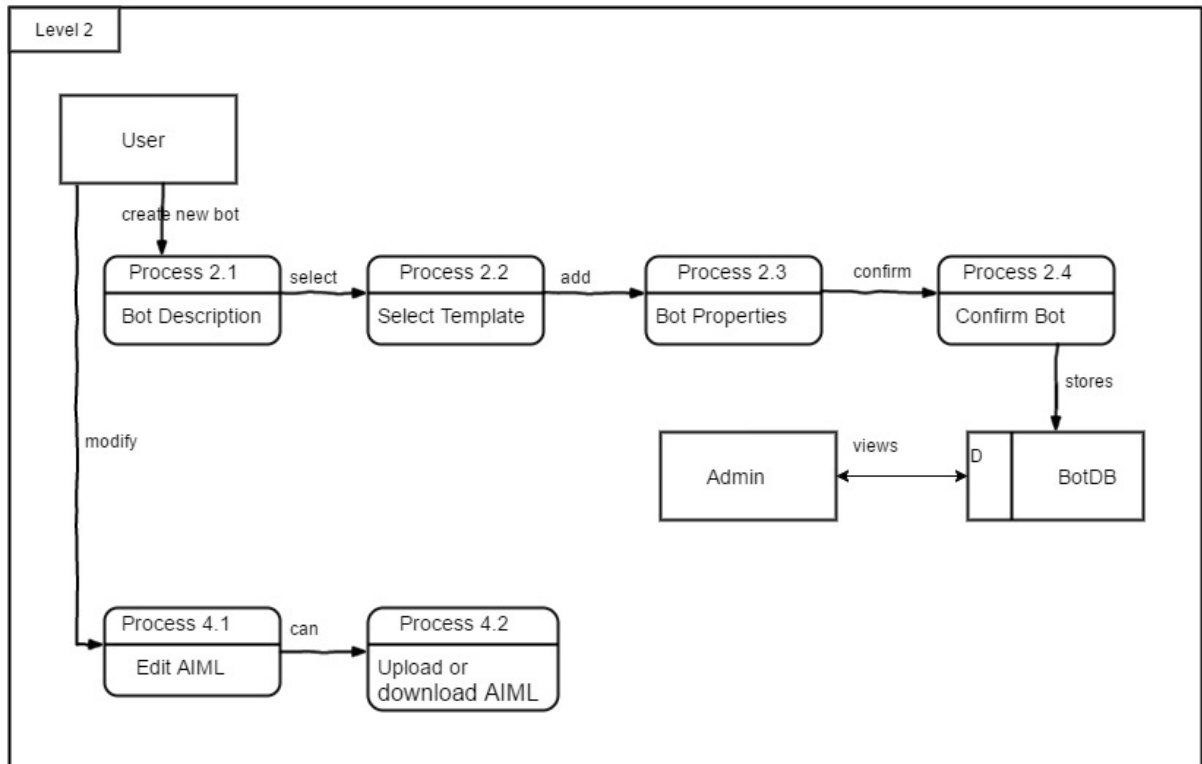


Figure 4.5: Data Flow Diagram level 2

In level 2, we had show the more detailed of the processes that gives better understanding and view as compared to the level 1. Here we had opened up the create bot and aiml processes to have detail information about it. When the user want to create new bot then it have the 4 steps i.e to add up the bot description and select the appropriate template and fill the bot properties. The the final step is to agree terms and conditions and confirm the bot. In the aiml process, we can edit the aiml file and we can upload new aiml files or download the existing aiml files.

Chapter 5

Methodology

5.1 Modular Description

This section contains the description of each and individual module developed in the project. There are total six modules in our project. Each of which is explained below.

5.1.1 Login / Register Module

This module contains a registration page accepts Name, Email and Password from the members and store it in the database. For security reasons password are stored with Tripe DES Encryption.

While login this information is verified with the database and members are redirected to the home page of our website. If user has forgot his password, he can regain it with forgot password page.

5.1.2 Add Bots Module

This module enables the members to create their own bots. It is a four-step process.

- In first step, name of the bot, bot profile image and Description of the bot is entered.
- In second step, lot of readymade templates are displayed such as template for Advocate, Doctor, Software Engineer, Hardware Engineer etc.
- In third step, properties for the bots with respect to its templates are changed.

- In fourth step, terms and conditions of bots are displayed and the user accepts those terms and conditions and the bot is created.

5.1.3 Modify AIML Module

This module contains a syntax highlighted text editor for .aiml .properties files uploaded by the bot master. Users can also edit these files using text editor. They can also create a new .aiml or .properties file. There are also separate options available for uploading .aiml files and downloading .aiml or .properties file.

5.1.4 Spell Checker Module

This is one of the most important module which contains common spelling mistakes done by the users of bots. If user commonly misspells a specific spelling due to which bot gets confused and is unable to respond properly. Bot master can enter this into database.

The wrong words are entered which are frequently misspelled and the correct word that is to be replaced instead of wrong word are inserted. So whenever user enters the wrong word it is corrected and then compared with .aiml files.

5.1.5 Word Sensor Module

This is another module which replaces the bad words with some asterisk marks. For example if the pattern contains some bad words it will check with the word censor database and if it matches with the bad word it will be replaced with the word that is to be replaced with.

This module can also be used for any more replacements. For example, wouldnâ™t can be replaced with would not, arenâ™t can be replaced with are not. Thus, it can be used for many more words replacements.

5.1.6 Chatbox Module

Chatbox is the most important module of our project. It collects all the AIML and Properties file related to the bot and compile it using special regular expressions and store it in temporary database. These temporary databases are used to extract the information about the bots and match the user asked queries with the pattern of aiml. If the pattern is matched the corresponding template is returned to the Chatbox to generate a specific response. It also has a voice API which converts the response to the speech. This chatbox is embedded in a iframe and can be used in many other websites as well.

5.2 Compilation Steps

- **Deperiodization:** Deperiodization step helps to removes the punctuation from the requested text. Abbreviations like "Mr.", "St.", etc. are removed. Deperiodization also uses heuristics to insert few periods into places where it detects long, run-on multiple sentences.
- **Pre-Processor:** Pre-Processor splits the huge input into individual sentences.
- **Normalization:** For each individual sentence, normalization is taken into consideration.

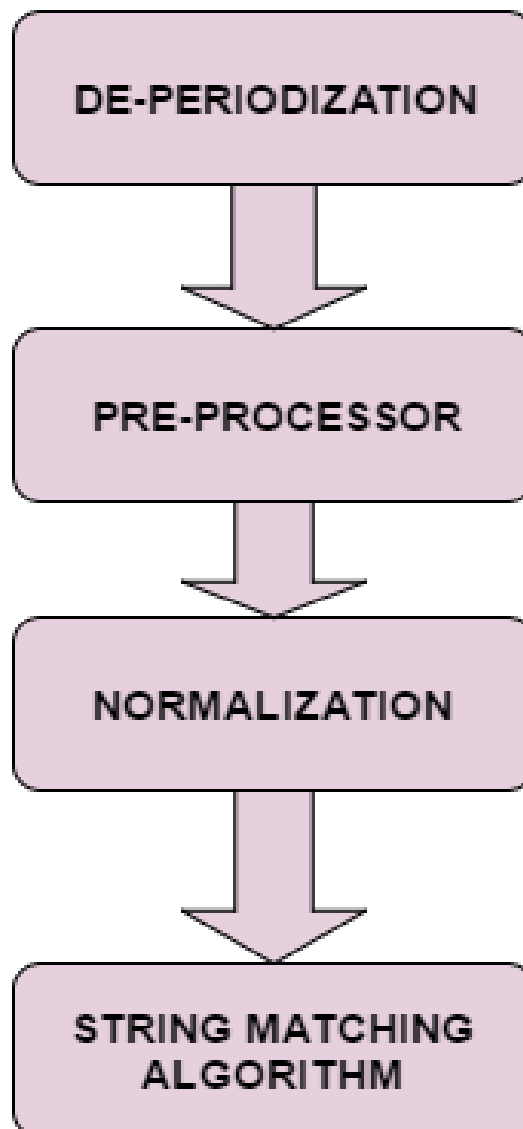


Figure 5.1: Compilation Steps

5.3 Normalization Steps

Normalization consists of six steps, the first one is the uppercase step in which all the inputs words are converted into uppercase. The next step is string expansion, in which normalization will expands most contraction by replacing "You'll" with "You will", and "I'd" with "I would". The third step is removing extra blank spaces between words and it will ensure that there is exactly one blank space between words in the input string. The next step is iconograpghs removing, that is it will detects the certain icongrapghs and replaces them with words like for SMILEY it will change to SMILE. The next step come is punctuation removing in which normalization will removes all punctuation and leaving only alphanumeric characters. The next step is spelling mistake in which normalization will corrects a few most common spelling mistakes.

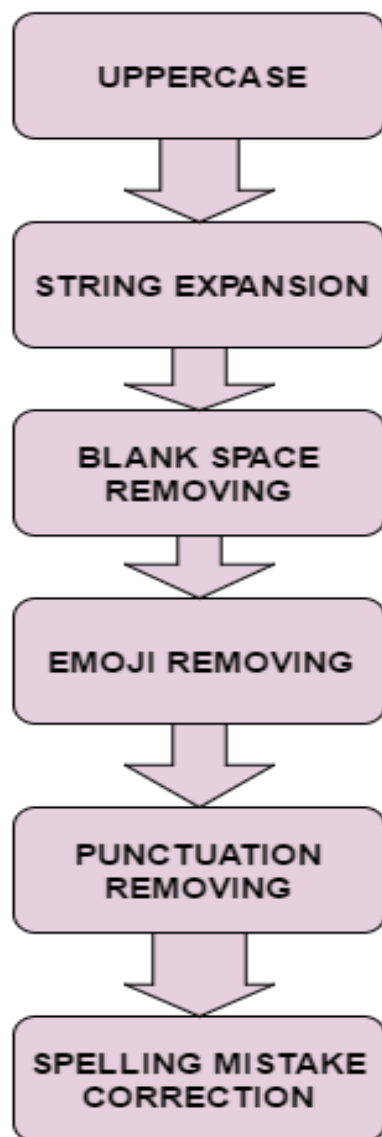


Figure 5.2: Normalization Steps

The completely normalized input string is passed to the AIML matching algorithm.

5.4 Sequence Diagrams

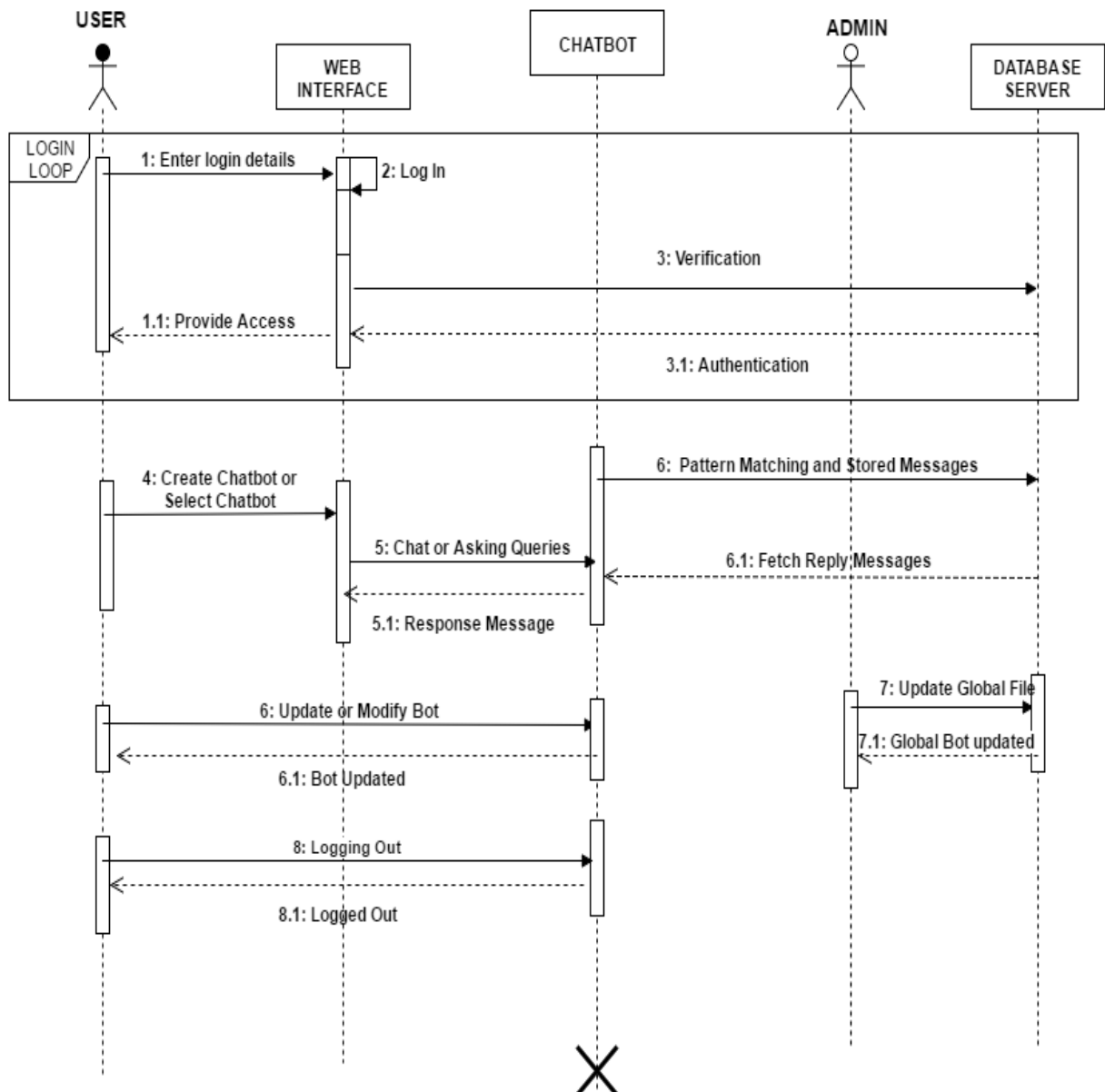


Figure 5.3: General Sequence Diagram

Sequence diagram emphasizes on time sequence of messages and the structural organization of the objects that send and receive messages. First the user will enter the login detail and the login verification will be done and if the details are correct then the authentication and access will be given. After entering into system, the user can select the chatbot or create their own chatbot. After this step the user will chat with chatbot and the reply messages will be given through the aiml file database and forwarded to chat engine and chat engine will give it to chatbot and like this the chatting procedure will go on. After the interaction with chatbot, user can modify their bot or simply user will logout from system.

5.5 Activity Diagram

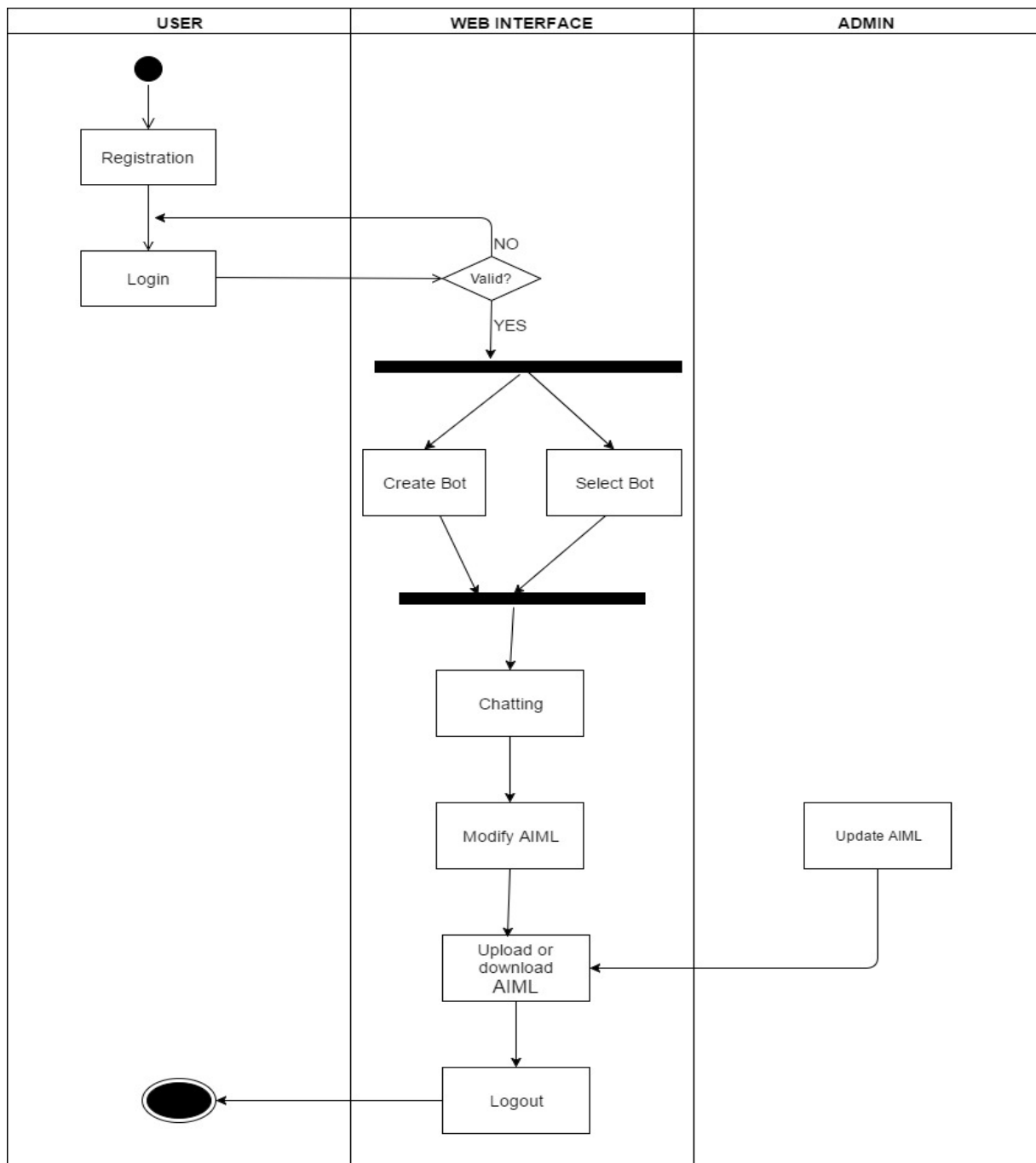


Figure 5.4: General Activity Diagram

Activity diagram is another important diagram in UML to describe dynamic aspects of the system. Once the user enters the login details then the web server will check whether the entered details are valid or not. If they are valid then our website interface will be visible. After this the user will have a choice whether to create or develop their own chatbot from scratch or to use a template available on the website that we have provided for ease of making a chatbot. After this the user will interact with their chatbot. If any new update is found then the admin will update the global bot AIML files which will update all the bots on the system and then the user will logout.

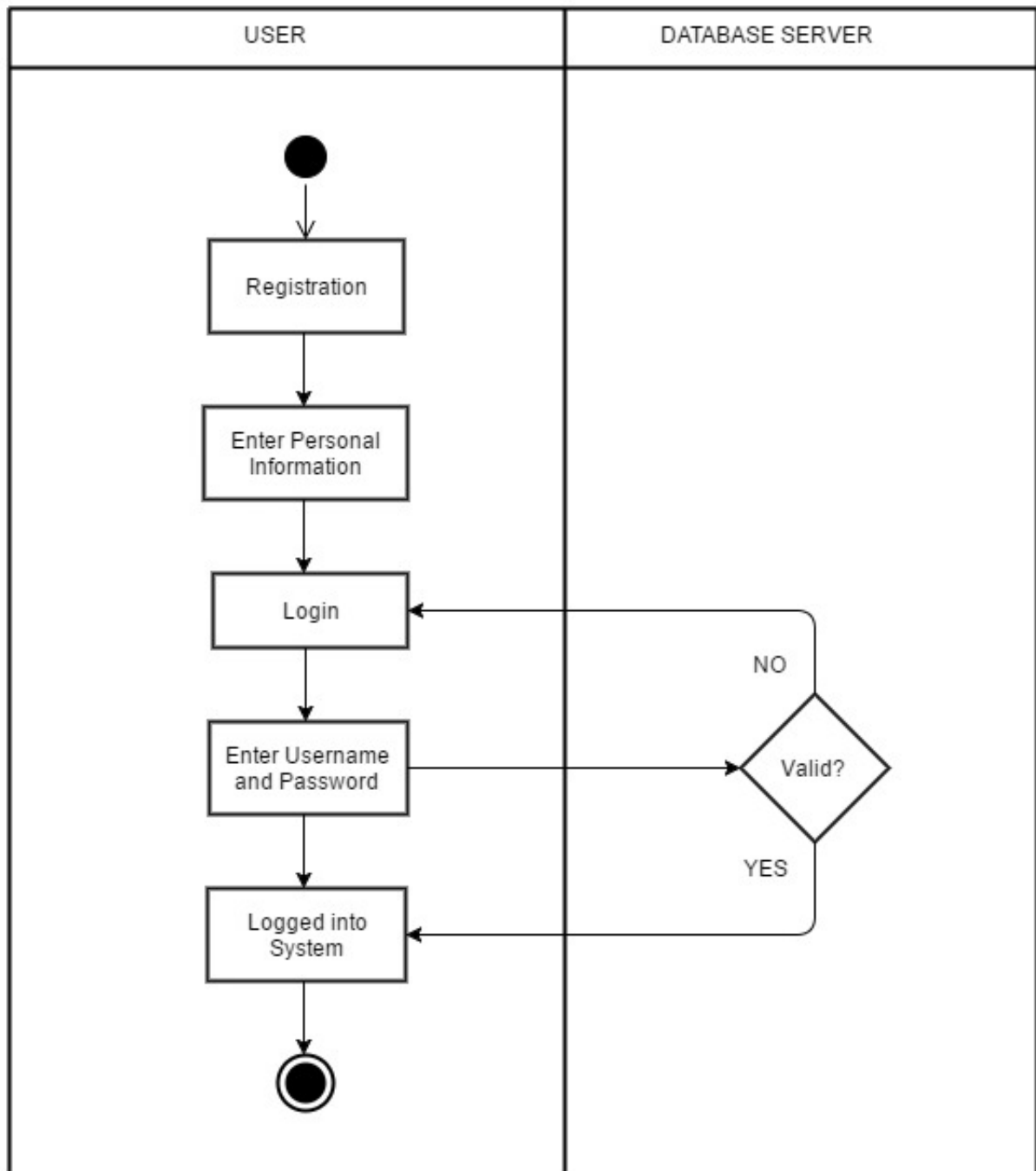


Figure 5.5: Activity Diagram for Login/Register Module

In this activity diagram, we are showing the activity flow of the registration and login module that how the user will login/register on our website.

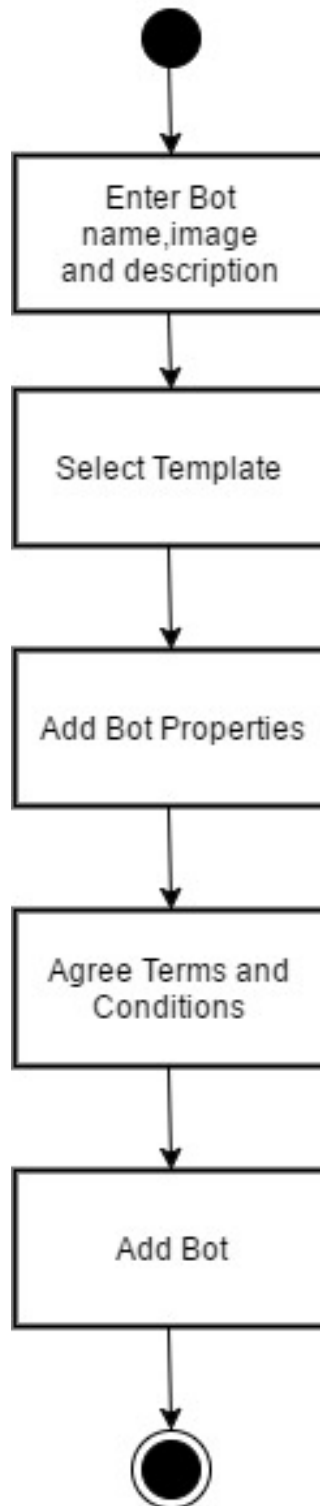


Figure 5.6: Activity Diagram for Add Bots Module

In this activity diagram, we are show the activity flow procedure of creating or adding the new bot in to the system. It has the easy four step that is enter the bot name, image, description. Then the user have to select the template of their choice that which topic or domain bot they want to create and the fill up their related bot properties. And finally accept the terms and conditions and add the bot.

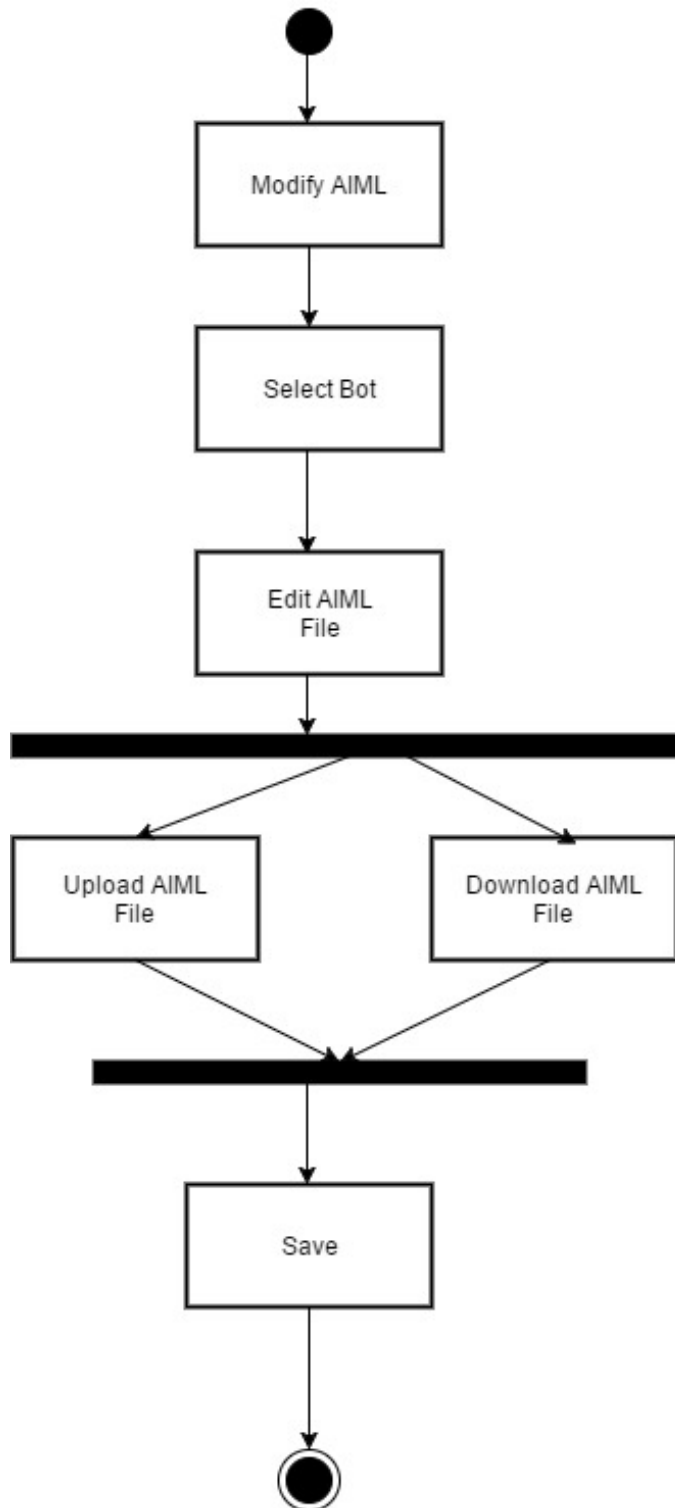


Figure 5.7: Activity Diagram for Modify AIML Module

In this activity diagram we are showing the activity flow of Modify AIML module in which user can edit their aiml file by adding some new pattern and category. First user to have to select the bot for which they want to edit the aiml files. Other option they have is to upload their new aiml create files or simply download the existing aiml files

5.6 Flow-Chart

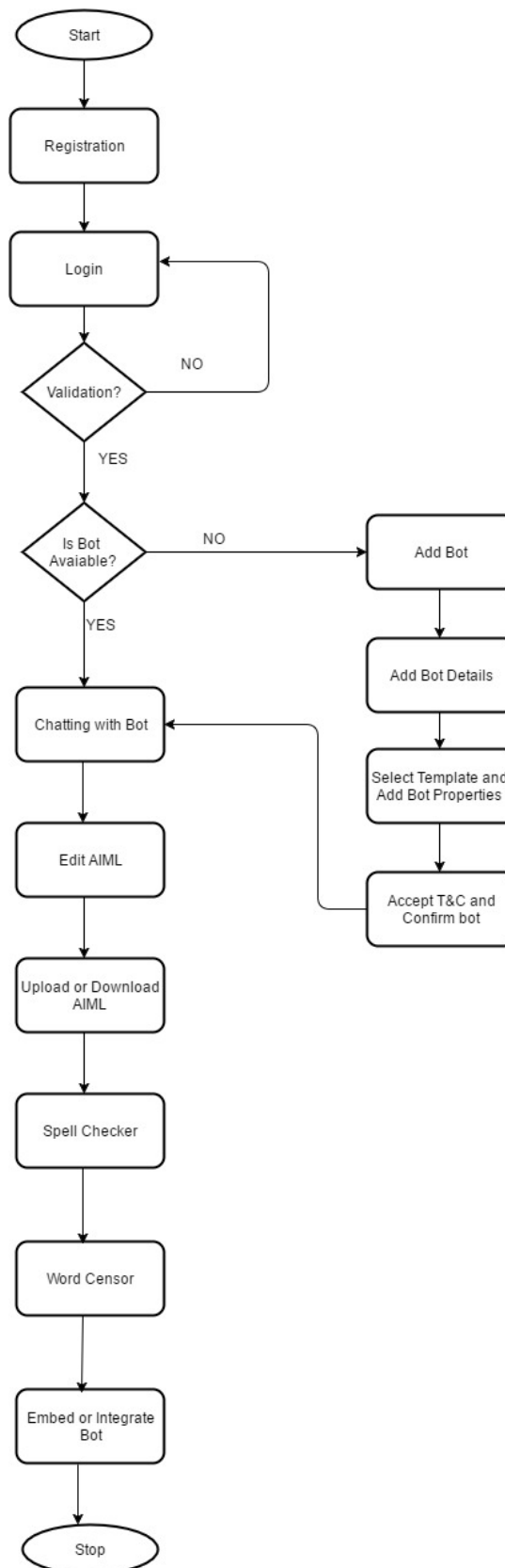


Figure 5.8: General Flow Chat

Chapter 6

Implementation Details

6.1 Assumptions And Dependencies

This section contains the assumptions that we have made while developing this project. If these conditions are not satisfied our project may work improperly or may completely stop working. This section enlists all the assumptions that we have made during project development.

It also contains dependencies of our project i.e. on what things our project is depended upon. Due to lack of these things again our project may work improperly or completely stop working. This section also enlists the dependencies of our project.

6.1.1 Assumptions

We have considered few assumptions during the development of our project. Non-satisfaction of these assumptions may lead to improper working or failure of our project. These assumptions are listed below:

1. **Member is a human:** The person who is going to register on our website and develop a bot is himself not a bot but a human being.
2. **AIML Knowledge by members:** The bot creation can be done only by AIML. So we assume that the member who joins our website is fully aware of AIML. Even though we have existing templates, but if member needs to change response type of any of the pattern, it may become a tedious job for the one having little or no knowledge of AIML.
3. **Error handling in AIML Compilation:** For time purpose we have not included any error displaying system in our AIML Compilation steps. We assume that all the AIML files are in proper syntax and proper tags.

6.1.2 Dependencies

We have few dependencies for the development of our project. Non-satisfaction of these conditions may again lead to improper working or failure of our project. These dependencies are listed below:

1. **Internet Connection:** Internet connection is one of the most important resource without which this website cannot be started. Also, we have used various APIs from Internet to display, weather, news etc. Hence Internet is must for our website to run even though it's on localhost.
2. **Web Server** We require a Web Server which can be used to host our website. It can't be access by clients unless it's hosted.

6.2 Implementation Methodologies

We named our project as ChatBot+. It is developed using PHP Language. AIML files are created or uploaded for bots. In PHP Regular Expressions are used to compile AIML files and these AIML files are then stored in 3 different PHP Arrays for pattern, that template data. These PHP Arrays are parsed with JSON and along with user query are sent to another page to generate response using JQuery AJAX.

The new page first performs the Normalization Steps such as convert the response to uppercase, String Expansion, Add blank spaces between words, Emoji Removal Spelling Mistakes Correction. The query asked by the user is searched within pattern Array. If matched with pattern it is the respective template content is sent as a response to the user. If it contains any Mathematical expression, the expression is solved and proper solution is generated.

6.2.1 AIML Matching Algorithm

The AIML patterns can contain words and wildcards. Wildcards are indicated in AIML by symbols * and underscore. Each of these wildcard is defined as capable of matching one or more words. The only difference between * and underscore is the order in which the matching algorithm tries to match them. So, here is how the matching algorithm works:

The Graphmaster consists of a collection of nodes called Nodemappers. These Nodemappers map the branches from each node. The branches are either single words or wildcards. The root of the Graphmaster is a Nodemapper with about 2000 branches, one for each of the first words of all the patterns (45,000 in the case of the A.L.I.C.E. brain). The number of leaf nodes in the graph is equal to the number of categories, and each leaf node contains the <template> tag. There are really only three steps to matching an input to a pattern. If you are given (a) an input starting with word "X", and (b) a Nodemapper of the graph:

Does the Nodemapper contain the key underscore?

If so, search the subgraph rooted at the child node linked by underscore. Try all remaining suffixes of the input following "X" to see if one matches. If no match was found, try:

Does the Nodemapper contain the key "X"?

If so, search the subgraph rooted at the child node linked by "X", using the tail of the input (the suffix of the input with "X" removed). If no match was found, try:

Does the Nodemapper contain the key *?

If so, search the subgraph rooted at the child node linked by *. Try all remaining suffixes of the input following "X" to see if one matches. If no match was found, go back up the graph to the parent of this node, and put "X" back on the head of the input.

After all this searching techniques website generates a response to the user queries and send it to the specified user.

6.2.2 HTML

HyperText Markup Language(HTML) is a computer devised which allow website creation. It is the HTML code that provides an overall framework of how the site will look. These websites can then be viewed by anyone else connected to the Internet.HTML is used to create electronic documents (called pages) that are displayed on the World Wide Web.

6.2.3 CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language."Cascading" means that styles can fall (or cascade) from one style sheet to another, enabling multiple style sheets to be used on one HTML document. It brings a lot of long-awaited novelties, like rounded corners, shadows, gradients, transitions or animations, as well as new layouts like multi-columns, flexible box or grid layouts.

6.2.4 Javascript

JavaScript is prototype-based with first-class functions, making it a multi-paradigm language, supporting object-oriented, imperative, and functional programming styles.JavaScript is a programming language that is run by most modern browsers. It supports object-oriented programming and procedural programming. It can be used to control web pages on the client side of the browser, server-side programs, and even mobile applications.

6.2.5 AJAX

AJAX is an acronym for Asynchronous JavaScript and XML. It is a group of inter-related technologies like JavaScript, DOM, XML, HTML, CSS etc. AJAX is a technique for creating fast and dynamic web pages. AJAX allows web pages to be updated asynchronously by exchanging small amounts of data with the server behind the scenes. This means that it is possible to update parts of a web page, without reloading the whole page.

6.2.6 jQuery

jQuery is a JavaScript Library. jQuery greatly simplifies JavaScript programming. jQuery is a fast, small, and feature-rich JavaScript library. It makes things like HTML document traversal and manipulation, event handling, animation, and Ajax much simpler with an easy-to-use API that works across a multitude of browsers.

6.2.7 JSON

JavaScript Object Notation or JSON is an open-standard format that uses human-readable text to transmit data objects consisting of attribute-value pairs and array data types (or any other serializable value). It is a very common data format used for asynchronous browser/server communication, including as a replacement for XML in some AJAX-style systems.

6.2.8 MySQL

MySQL is the most popular Open Source Relational SQL database management system. MySQL is one of the best RDBMS being used for developing web-based software applications. MySQL is a very powerful program in its own right. It handles a large subset of the functionality of the most expensive and powerful database packages. MySQL is very friendly to PHP, the most appreciated language for web development.

Chapter 7

Results and Analysis

7.1 Test cases and Result

Chatbox

Software Input Test: Input with punctuations and misspelled.

Software Output Test: Punctuations is removed and filtered. Wrong spellings are corrected by spell checker.

Error: No error is found.

Software Input Test: Input with extra blank spaces and multiple sentences.

Software Output Test: Multiple sentences were treated as single sentences and responded individually. Extra blank spaces were replaced with single white space.

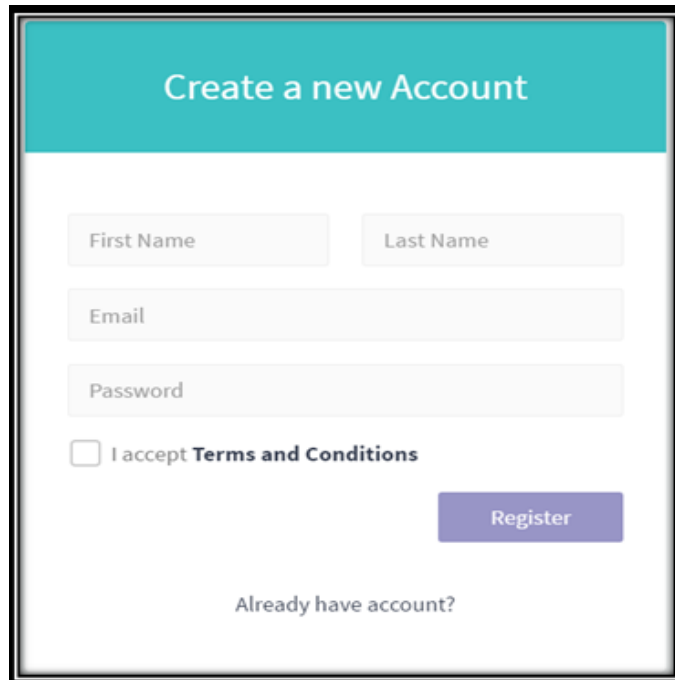
Error: No error is found.

Software Input Test: Input with mathematical expressions.

Software Output Test: Mathematical expressions were passed to maths function and a proper result was returned.

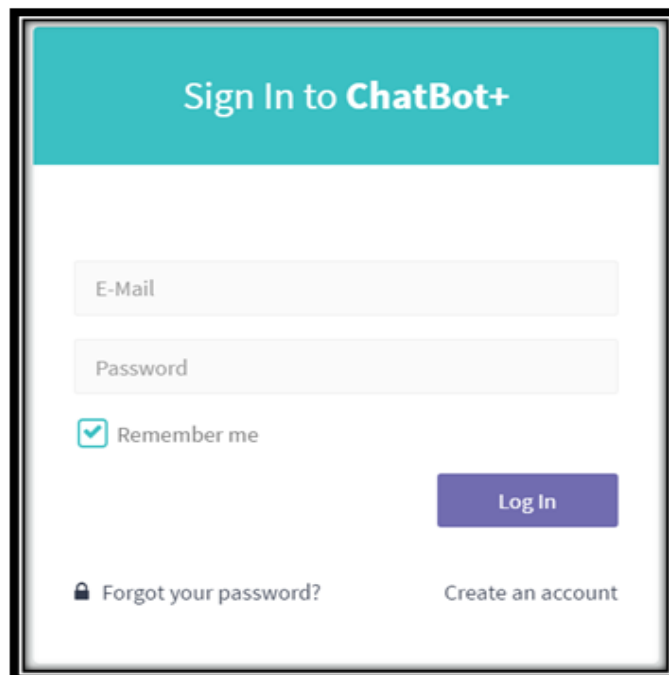
Error: No error is found.

7.2 Analytical Discussion



The registration page features a teal header with the text "Create a new Account". Below the header, there are four input fields: "First Name", "Last Name", "Email", and "Password". A checkbox labeled "I accept Terms and Conditions" is positioned below the password field. A purple "Register" button is located to the right of the checkbox. At the bottom of the form, the text "Already have account?" is displayed.

Figure 7.1: Registration Page



The login page features a teal header with the text "Sign In to ChatBot+". Below the header, there are two input fields: "E-Mail" and "Password". A checkbox labeled "Remember me" is checked and positioned below the password field. A purple "Log In" button is located to the right of the checkbox. At the bottom of the form, there are two links: "Forgot your password?" with a lock icon and "Create an account".

Figure 7.2: Login Page

The above figure shows registration and login page. Registration page accepts First Name, Last Name, Email and Password from the users. The password is stored with Triple DES Encryption in the database. Sign In Page is used to sign in to ChatBot+.

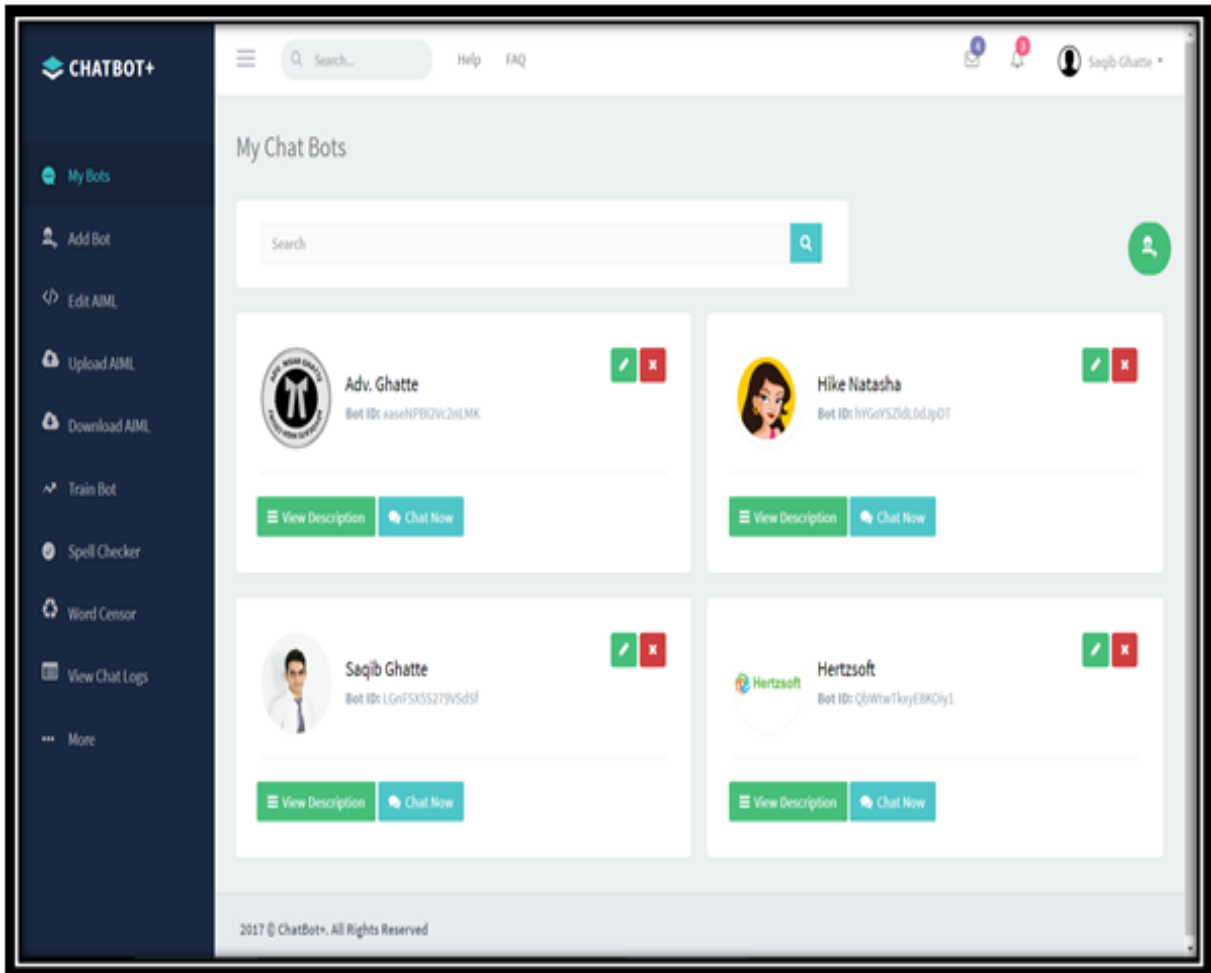


Figure 7.3: Home Page

The above figure shows the home page of our website. Home Page shows all the bots that are created by the member. Each bot is represented with Bot Name, Bot ID and buttons to View Description, Chat Now, Edit AIML and Delete Bot. Clicking on View Description show the description of the bot, Chat Now option enables to chat with the bot, Edit AIML takes to Edit AIML Module and Delete button asks a confirmation to delete the bot. If its confirmed the bot is deleted.

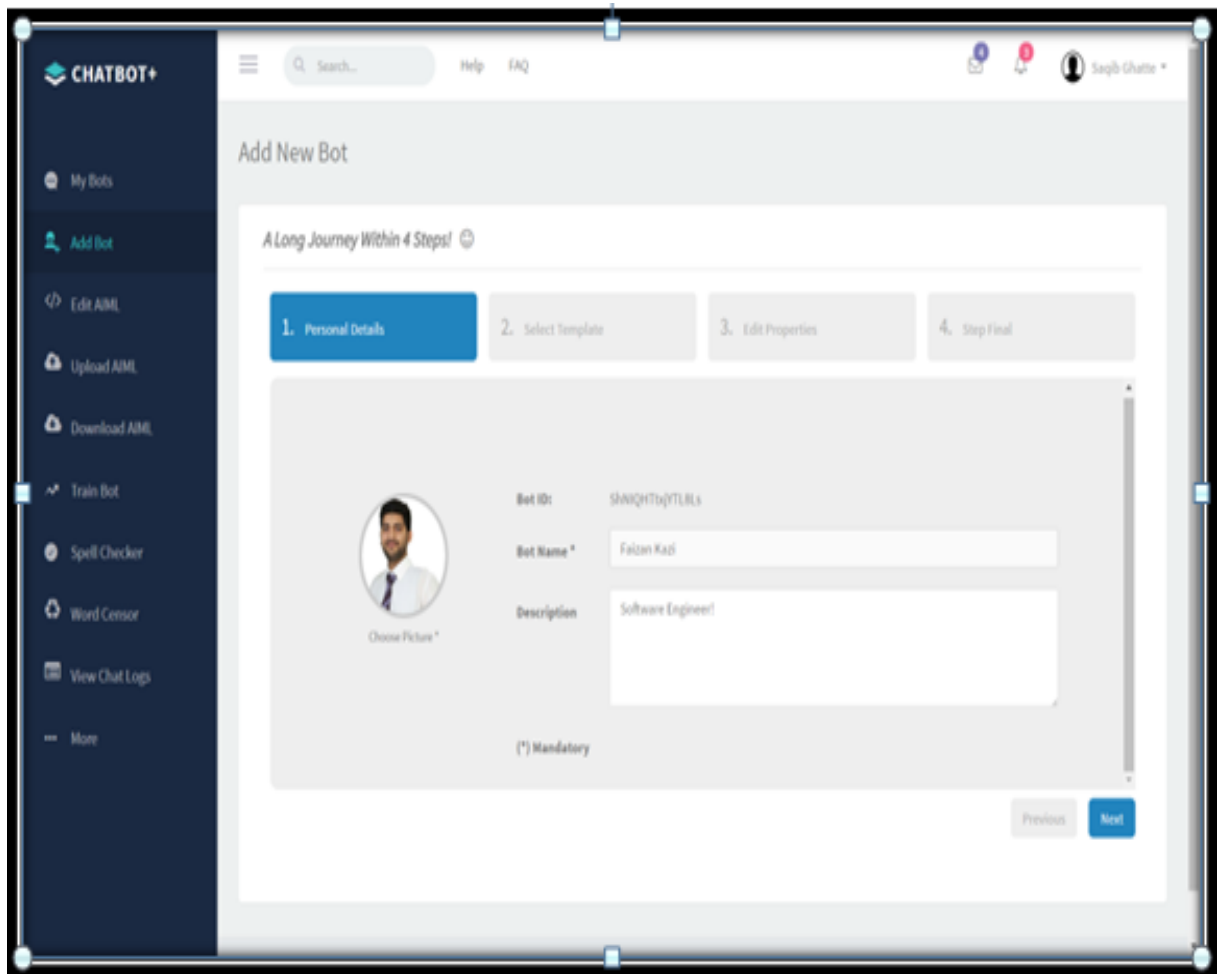


Figure 7.4: Add Bot Page

The above figure shows the Add Bot page which is used to add new bots. Adding bot is a 4-step process, 1st step accepts bot profile picture, bot name and description, 2nd step is used to select a template as per member's requirement. 3rd step is used to edit the properties of the template. 4th step contains the terms and conditions that must be accepted by the member.

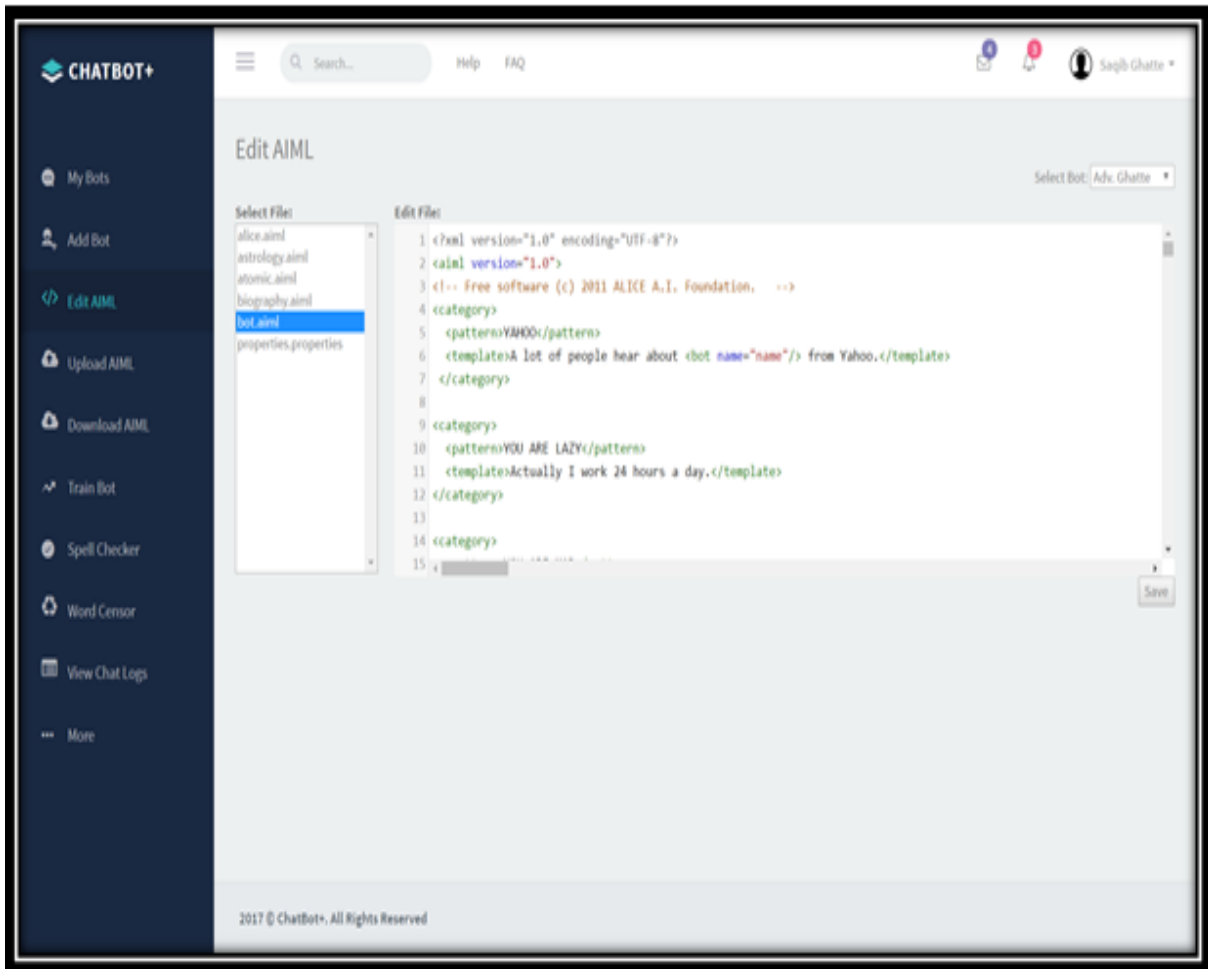


Figure 7.5: Edit AIML Page

The above figure enables the users to edit the AIML files that are uploaded or newly created for the specified bot. It has a text area which shows the color coded syntax to edit AIML file.

Chapter 8

Conclusion and Future Scope

8.1 Conclusion

- Chatting bot service provider acts as a customer care for many organization / institutions / industries etc. or it may act as a personal assistant to all the people of the world.
- Bots developed on our site can also help to remember many things. It may also help in attracting customers nationwide for many companies.
- It can also be used to entertain people by sending them jokes, facts, quotes etc. whenever they are bored.
- At the top of all performance in the main concern while developing our project so that it can service millions of customers at a single moment of time.

8.2 Limitations

"Chatting Bots Hosting Service" has some limitation which are as follows:

- Only defined AIML categories are used to generate response. Self-Learning is not done.
- Can be embedded on websites but cannot be embedded with database systems.
- Voice recognition is not done.

8.3 Future Enhancement

- Can develop an android app which may tract customers likes and dislikes and behaviour of talking.
- Can suggest them some good products according to their likes and dislikes.
- Change the way of communication according to their behaviour.
- Self-Learning of new things or auto creation of AIML categories.
- Calling feature with text to speech and speech to text APIs.
- Can be embedded in a hardware based robot that can perform many other tasks besides chatting.
- Can be integrated with many chatting applications such as WhatsApp, Hike, Facebook Messenger etc.

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Chapter 9

Appendix A

9.1 Available Chatbots in Market

Below are the screenshots of few of the bots that are available in the market.

9.1.1 ALICE Chatbot

A.L.I.C.E. and Faizan

You said: For how long have we been talking?

A.L.I.C.E.: More than 1.5 hours.

You say:

[Create your own chat bot.](#)

Conversation Log:

Faizan: My name is Faizan, what's yours?

ALICE: It's good to see you, Faizan.

Faizan: What's up?

ALICE: I am chatting with clients on the internet.

Faizan: What's my name?

ALICE: You said your name is Faizan?

Faizan: What is 5+3?

ALICE: 6 I think, but I'm not good at math.

Faizan: For how long have we been talking?

ALICE: More than 1.5 hours.

Figure 9.1: ALICE Chatbot

9.1.2 Natasha Chatbot

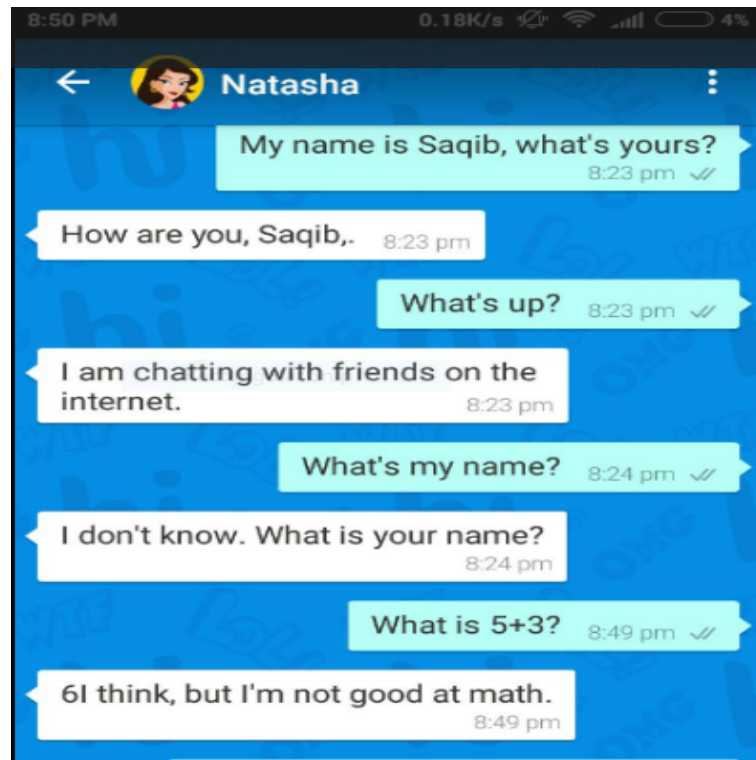


Figure 9.2: Natasha Chatbot

9.1.3 Mitsuku Chatbot

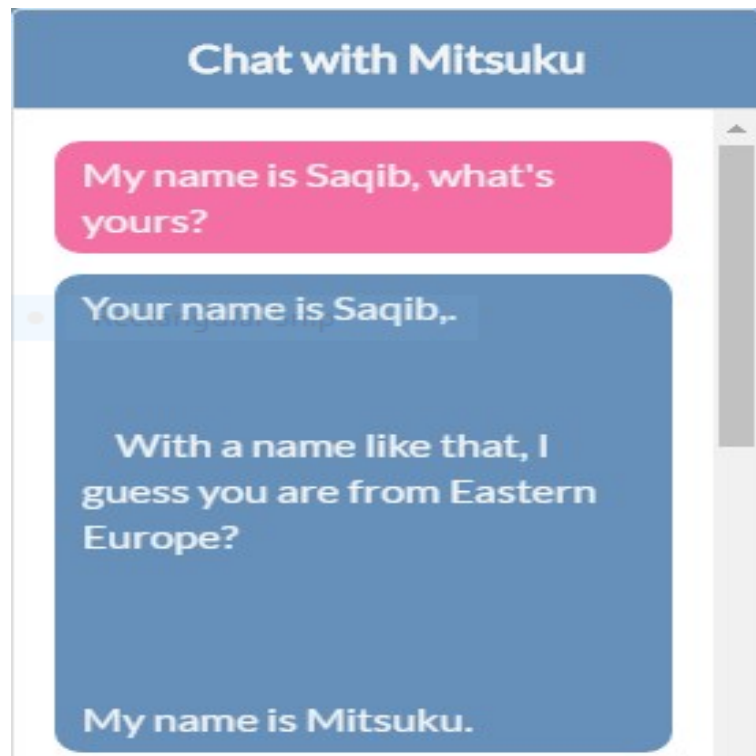


Figure 9.3: Mitsuku1 Chatbot

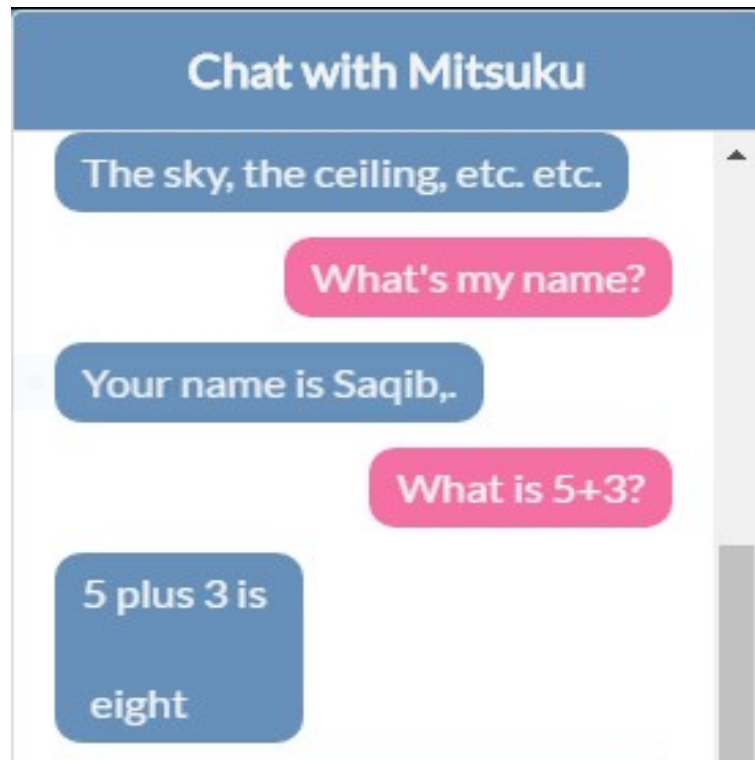


Figure 9.4: Mitsuku2 Chatbot

9.1.4 Rose Chatbot



Figure 9.5: Rose Chatbot

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Ghatte Saqib Nisar Parvin

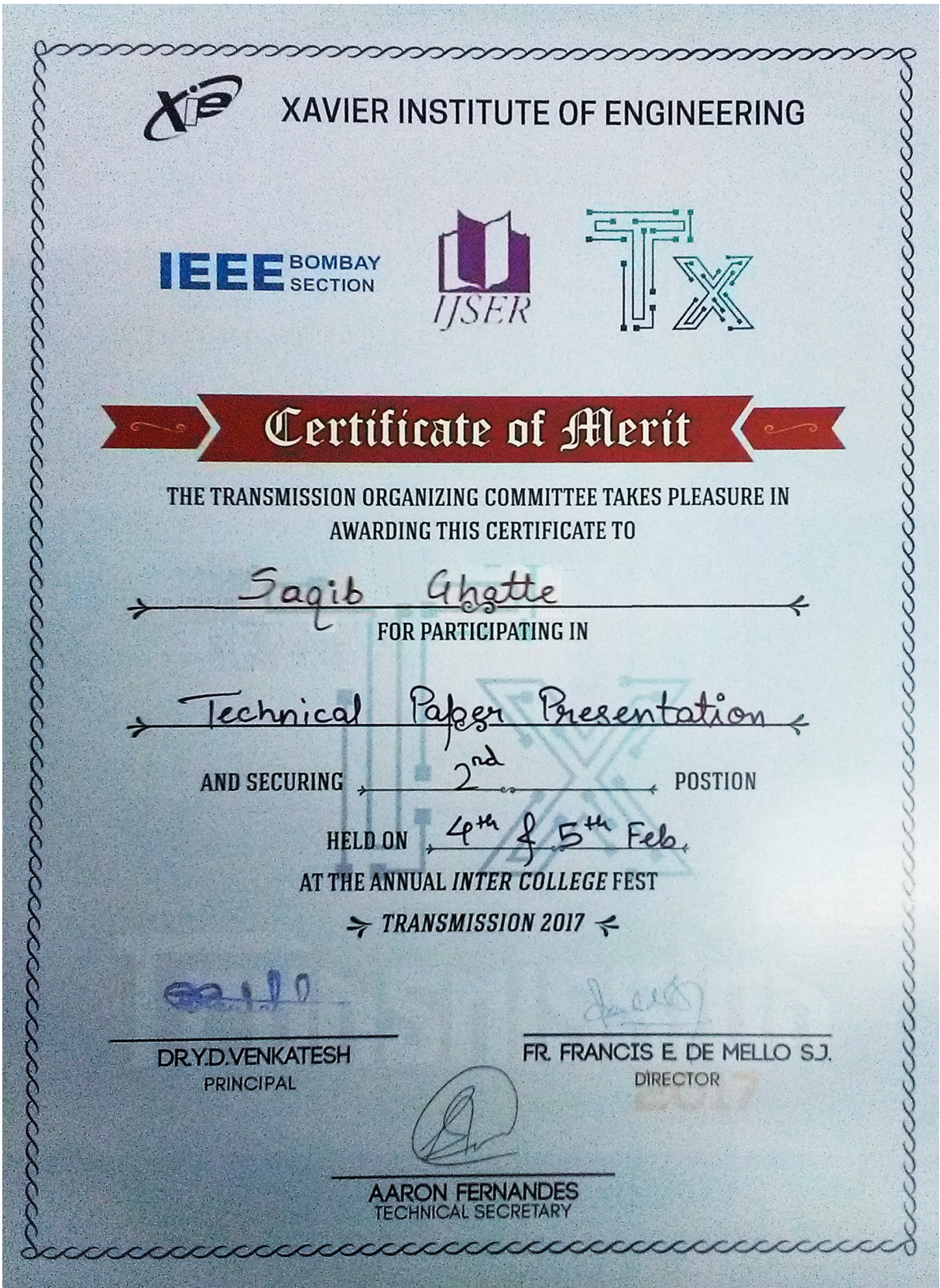
Roll No. 14DCO56

Kazi Faizan Farook Farida

Roll No. 12CO35

(Department of Computer Engineering)

University of Mumbai.



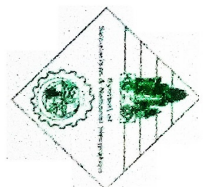




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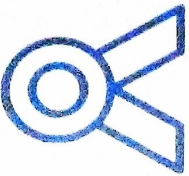
Tech - Vision 2K17

Inter College Technical Paper Presentation Competition

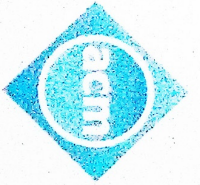
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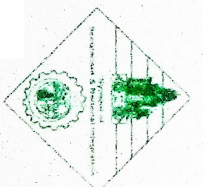
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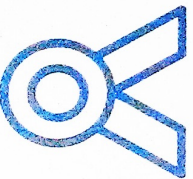
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