Chapter 1

INTRODUCTION

Chatbots, or conversational interfaces as they are also known, present a new way for individuals to interact with computer systems. Traditionally, to get a question answered by a software program involved using a search engine, or filling out a form. A chatbot allows a user to simply ask questions in the same manner that they would address a human. The most well-known chatbots currently are voice chatbots: Alexa and Siri. However, chatbots are currently being adopted at a high rate on computer chat platforms. The technology at the core of the rise of the chatbot. Recent advances in machine learning have greatly improved the accuracy and effectiveness of natural language processing, making chatbots a viable option for many organizations. A simple chatbot can be created by loading an FAQ (frequently asked questions) into chatbot software. The functionality of the chatbot can be improved by integrating it into the organization's enterprise software, allowing more personal questions to be answered, like "What is my balance?", or "What is the status of my order?". Most commercial chatbots are dependent on platforms created by the technology giants for their natural language processing. These include Amazon Lex, Microsoft Cognitive Services, Google Cloud Natural Language API, Facebook Deep Text, and IBM Watson. Platforms where chatbots are deployed include Facebook Messenger, Skype, and Slack, among many others.

Chapter 2

Literature Survey

Now a day people tend to seek knowledge or information from internet that concern with health through online healthcare services. The basic aim of this system is to bridge the vocabulary gap between the health providers by proving instant replies to the questions.

Chart Bot [1] A chatbot is a computer program designed to simulate human conversation. These chatbots reply to you instantly according to your queries because programmers have inserted thousands of inputs/replies/queries into the database that can be asked by the user. To make an advanced chatbot we've to code more and more but I tried to make a simple chatbot with few lines of codes and queries which help you to get an idea about how chatbot actually works.

Chart Bot [2] Chatbot technology has hit the market recently. This new piece of software enabled brands with a very intuitive way to communicate with their customers — conversation. This triggered a range of new ideas coming to creative minds.

Chart Bot [3] To perfectly simulate a human dialogue, the bot must analyze the input given by the user correctly and formulate a response that should be relevant and appropriate. The Chabot was realized as a website application based on search engines, custom learning, custom cascading style sheets and JavaScript for making conversations as real as possible.

Chart Bot [4] Speech and textual information play a crucial role in communicating between humans. An article in “The New York Times” published that now-a-days the adults are spending more than 8 hours a day on screens of computers or mobiles. So the major communication between humans is conducted through web applications such as WhatsApp, Facebook, and Twitter etc as a form of speech and textual conversation. In the present paper, we have focused on designing a textual communication application namely chatbot in the educational domain. The proposed chatbot assists in answering questions provided by the users. To develop the system, we have employed an ensemble learning method as random forest in the presence of extracted features from our prepared dataset. Besides, the validation system offers an average F-measure 0.870 score on various K-

values under random forest for the proposed chatbot. Finally, we have deployed the proposed system in a form of telegram bot.

Chapter 3

Problem Statement and Proposed Solution

An activity aimed at identifying a problem by specifying the undesirable and problematic state currently occupied, the resources currently available to move away from that problematic state, particularly the available courses of actions, the combinatorial constraints on using them, etc., and the criteria that need to be satisfied to say that a problem no longer exists or is solved. This activity defines the cognitive gap between what is undesirable and what is desirable and delineates the resources for closing it. Problem formulation is the creative and probably the more important step towards overcoming a problematic state than problem-solving.

3.1 General

Chatbots are machine agents that provide access to data and services through natural language interaction. Though the term chatbot is relatively recent, computer systems interacting with users in natural language has been developed and researched since the 1960'ies. The current surge of interest in chatbots is in part due to recent advances in AI and machine learning. Promising chatbot application areas include information services, education, therapy, and in particular customer service. A number of tech-companies provide platforms that may support chatbots for customer service, including IBM Watson, Microsoft Bot Framework and Google owned DialogFlow. Users hold a range of motivations for using chatbots. Brandtzaeg and Følstad found that the most frequently reported motivations for chatbot use were efficiency and convenience, and that user experience, social aspects, and a sense of novelty can also be relevant motivators. A recent study of chatbots for customer service found that customer service interactions are characterized by both emotional and factual statements from customers. Interestingly, AI-powered chatbots may identify and respond to emotional customer statements nearly as well as human operators, due to machine learning capabilities for sentiment detection. While the current body of knowledge include research on users' perceptions of chatbots in terms of, for example, usefulness and user experience, there is a lack of knowledge on users' trust in chatbots. This is a critical knowledge gap, as trust has been shown to be a key factor in users' uptake of interactive systems.

3.2 Problem Statement

Customer service has always been key to service companies. With the uptake of the internet, customer service has gradually transformed from being personal and dialog-based towards being automated and self-service oriented. However, automation and online self-service solutions do not fully meet users' needs for help and assistance and service providers' costs associated with manual customer service are still increasing. In an effort to provide more efficient customer service, while meeting customers in their preferred channels, service providers offer customer service through a range of online channels, such as company webpages, social media, email, and chat. Customer service through chat is increasingly prioritized. Chat represents a relatively resource effective channel for the service provider, compared to support by e-mail and tele-phone, as customer service personnel may handle multiple requests in parallel. The chat also provides the user with a written summary of the interaction which may be helpful in terms of instruction details or links to useful online resources. Given the increasing uptake of chat as a prioritized channel for customer service, chatbots are seen as ever more relevant as a complement to customer service.

3.3 Aim of the work

To address the identified gap in current knowledge, the aim of this study was to explore and identify an initial set of factors assumed to affect users' trust in chatbots for customer service. While above problem statement [3.2] suggests some factors that may be of relevance, the lack in research on this in the field of chatbots made us choose an exploratory approach.

3.4 Objectives

This study will enable us to establish a tentative overview of factors that may affect trust in chatbots for customer service. This may, in turn, guide future research and support design and development of chatbots for customer service.

Chapter 4

Requirement Specification

Requirements specification is a specification of software requirements and hardware requirements required to do the project. Requirements analysis encompasses those tasks that go into determining the needs or conditions to meet for a new or altered product or project, taking account of the possibly conflicting requirements of the various stakeholders, analyzing, documenting, validating and managing software or system requirements.

4.1 Hardware Requirements

Sl. No	Hardware / Equipment	Specification
1.	Processor	Intel i5 Core Processor
2.	Clock speed	2.20GHz
3.	Monitor	1024*768 Resolution, Color
4.	RAM	4GB

4.2 Software Requirements

Sl. No	Software	Specification
1.	Web Browser	Google Chrome
2.	Operating System	Windows 10
3.	Scripting	HTML5, CSS3, PHP, JavaScript, Bootstrap, jQuery, Angular
4.	Database	MySQL
5.	Tool used	XAMPP Server

A web browser, or simply "browser," is an application used to access and view websites. Common web browsers include Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari. The primary function of a web browser is to render HTML, the code used to design or "mark-up" webpages. Each time a browser loads a web page, it processes the HTML, which may include text, links, and references to images and other

items, such as cascading style sheets and JavaScript functions. The browser processes these items, then renders them in the browser window.

An operating system is a software which acts as an interface between the end user and computer hardware. Every computer must have at least one OS to run other programs. An application like Chrome, MS Word, Games, etc. needs some environment in which it will run and perform its task. The OS helps user to communicate with the computer without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system.

A script or scripting language is a computer language with a series of commands within a file that is capable of being executed without being compiled. Good examples of server-side scripting languages include Perl, PHP, and Python. In this project PHP is used for web application development. The best example of a client side scripting language is JavaScript. A full list of scripting languages and other programming languages can be found through our programming language definition. In this project CSS, html, JavaScript are used for client-side programing.

MySQL is the world’s most popular open source database. With its proven performance, reliability, and ease-of-use, MySQL has become the leading database choice for web-based applications, used by high profile web properties including Facebook, Twitter, YouTube, and all five of the top five websites. In this MySQL is used for data storage.

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. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.

Chapter 5

Analysis and Design

Project design is an early phase of the project where a project's key features, structure, criteria for success, and major deliverables are all planned out. A functional approach is most likely to be successful when the amount system stated information is minimized and information sharing is explicit. So, the implementation technique used is more efficient and compact.

5.1 Analysis

This work aims to provide a fast and convenient way to manage your web page or any application (of a particular company). The chatbot will help facilitate the user with queries and assist with existing solutions.

5.2 Design

The system that is designed is as per the analysis of requirements. To implement such a system web technology is one of the platforms. Chatbots is actually an innovative approach to automate user personalize message. If the chatbots is well designed and implemented, it could be a tool to attract user engagement and provide good user experience between human and the served field. However, designing and implementing chatbots is not too easy as it is said. Chatbots technology is moving very fast there are a lot of enhancement and new features released from time to time. The development of chatbots should carefully planned, choosing the appropriate platforms tools is very important since it can help in boosting the effectiveness and efficiency of the chatbots.

5.2.1 Data Flow Diagram

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

This work contain various steps that two of module should follow. The data flow diagram of this work is illustrated in figure 5.1:

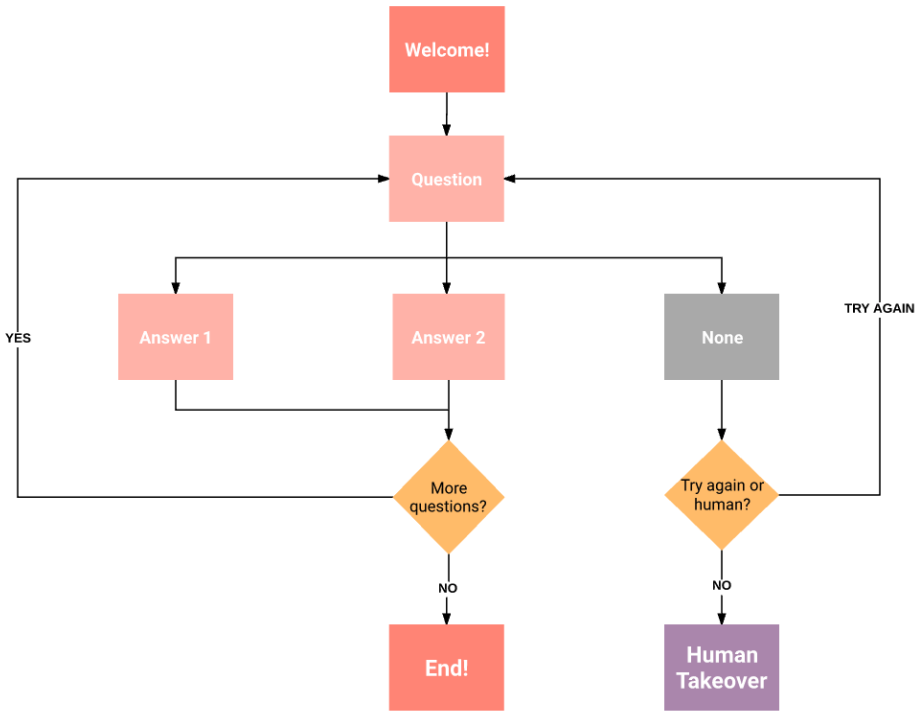

Figure 5.1: Dataflow diagram

5.2.2 Database Design

Database design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, one can begin to fit the data to the database model. Database management system manages the data accordingly.

There is a huge set of data to be used in each of the module of this work. Every data is important in its instance. The management of the data is done using MySQL dsatabse. Figure 5.2 shows the database schema diagram of this work.

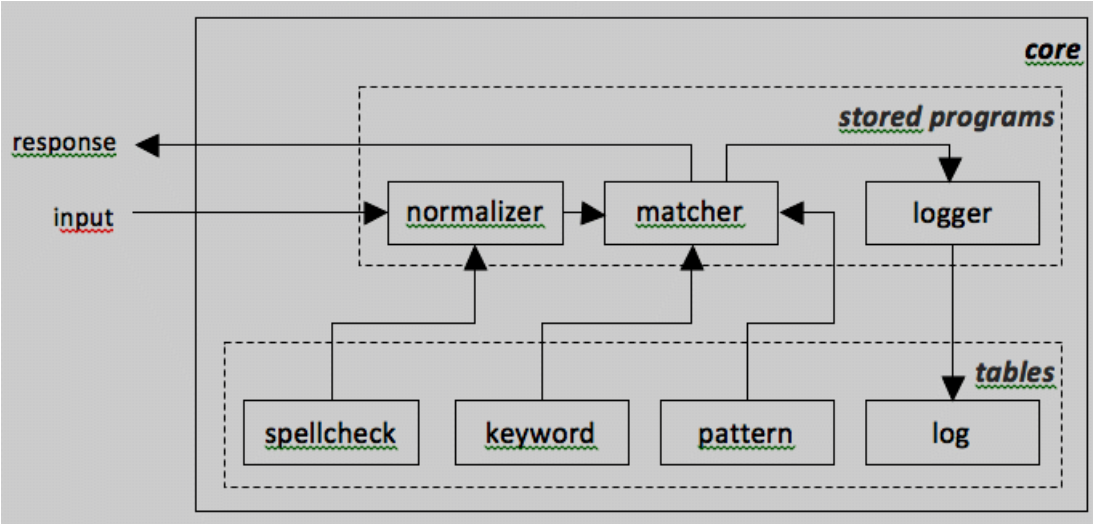

Figure 5.2: Database Design

Chapter 6

Implementation

Implementation is a process of development of an application. Once the system design is completed then actual development of system will starts. The development of application using system design is called the implementation phase. In this phase, largest system is divided into small modules. For each module, algorithms are developed and each algorithm is coded using programming languages. Implementation of proposed system is done as below.

6.1 Implementation of User Interaction Module

Index Page:

```
<?php
$res=mysqli_query($con,"select * from message");
if(mysqli_num_rows($res)>0){ $html='';
while($row=mysqli_fetch_assoc($res)){
$message=$row['message'];
$added_on=$row['added_on'];
$strtotime=strtotime($added_on);
$time=date('h:i A',$strtotime);
$type=$row['type'];
if($type=='user'){ $class="messages-me";
$imgAvatar="user_avatar.png";
$name="You"; }else{ $class="messages-you";
$imgAvatar="bot_avatar.png";
$name="Chat Bot";
}
$html.='<li class="'.$class.' clearfix">
<span class="message-img">
<img src="image/'.$imgAvatar.'" class="avatar-sm rounded-circle">
</span>
<div class="message-body clearfix">
<div class="message-header">
<strong class="messages-title">'.$name.'</strong>
<small class="time-messages text-muted">
<span class="fas fa-time"></span>
<span class="minutes">'.$time.'</span>
</small> </div><p class="messages-p">'.$message.'</p>
</div>
</li>';
}
echo
$html;
```

```
}
Else
{
?>
<li class="messages-me clearfix start_chat"> Please start </li>
<
?php
}
?>
```

CSS :

```
body {
	margin-top: 20px;
	background-color: rgb(255, 0, 234);
}
.unread {
	cursor: pointer;
	background-color: #f4f4f4;
}
.messages-box {
	max-height: 35rem;
	overflow: auto;
	/* background-color: #ECE5DD; */
}
.online-circle {
	border-radius: 5rem;
	width: 5rem;
	height: 5rem;
}
.messages-title {
	float: right;
	margin: 0px 5px;
}
.message-img {
	float: right;
	margin: 0px 5px;
}
.message-header {
	text-align: right;
	width: 100%;
	margin-bottom: 0.5rem;
}
.text-editor {
	min-height: 18rem;
}
.messages-list li.messages-you .messages-title {
```

```
	float: left;
}
.messages-list li.messages-you .message-img {
	float: left;
}
.messages-list li.messages-you p {
	float: left;
	text-align: left;
	background-color: #25D366;
}
.messages-list li.messages-you .message-header {
	text-align: left;
}
.messages-list li p {
	max-width: 60%;
	padding: 5px;
	border: #e6e7e9 1px solid;
}
.messages-list li.messages-me p {
	float: right;
	background-color: #DCF8C6;
}
.ql-editor p {
	font-size: 1rem;
}
```

6.2 Data Base Query

```
CREATE TABLE `chatbot_hints` (
  `id` int(11) NOT NULL,
  `question` varchar(100) NOT NULL,
  `reply` varchar(100) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

--
-- Dumping data for table `chatbot_hints`
--

INSERT INTO `chatbot_hints` (`id`, `question`, `reply`) VALUES
(1, 'HI||Hello||Hola', 'Hello, how are you.'),
(2, 'How are you', 'Good to see you again!'),
(3, 'what is your name||whats your name ||your name||Your name', 'My name
is Vishal Bot'),
(4, 'what should I call you', 'You can call me Vishal Bot'),
(5, 'Where are your from', 'I m from India'),
(6, 'Bye||See you later||Have a Good Day', 'Sad to see you are going. Have
a nice day');
```

```
-- --------------------------------------------------------

--
-- Table structure for table `message`
--

CREATE TABLE `message` (
  `id` int(11) NOT NULL,
  `message` text NOT NULL,
  `added_on` datetime NOT NULL,
  `type` varchar(10) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

--
-- Dumping data for table `message`
--

INSERT INTO `message` (`id`, `message`, `added_on`, `type`) VALUES
(1, 'Hi', '2020-04-22 12:41:04', 'user'),
(2, 'Hello, how are you.', '2020-04-22 12:41:05', 'bot'),
(3, 'what is your name', '2020-04-22 12:41:22', 'user'),
(4, 'My name is Vishal Bot', '2020-04-22 12:41:22', 'bot'),
(5, 'Where are your from', '2020-04-22 12:41:30', 'user'),
(6, 'I m from India', '2020-04-22 12:41:30', 'bot'),
(7, 'Go to hell', '2020-04-22 12:41:41', 'user'),
(8, 'Sorry not be able to understand you', '2020-04-22 12:41:41', 'bot'),
(9, 'bye', '2020-04-22 12:41:46', 'user'),
(10, 'Sad to see you are going. Have a nice day', '2020-04-22 12:41:46',
'bot');

--
-- Indexes for dumped tables
--

--
-- Indexes for table `chatbot_hints`
--
ALTER TABLE `chatbot_hints`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `message`
--
ALTER TABLE `message`
  ADD PRIMARY KEY (`id`);

--
```

```
-- AUTO_INCREMENT for dumped tables
--

--
-- AUTO_INCREMENT for table `chatbot_hints`
--
ALTER TABLE `chatbot_hints`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=7;

--
-- AUTO_INCREMENT for table `message`
--
ALTER TABLE `message`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=11;
COMMIT;

/*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
/*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
/*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
```

6.3 Accessing Data from Database

```
<?php
date_default_timezone_set('Asia/Kolkata');
include('database.inc.php');
$txt=mysqli_real_escape_string($con,$_POST['txt']);
$sql="select reply from chatbot_hints where question like '%$txt%'";
$res=mysqli_query($con,$sql);
if(mysqli_num_rows($res)>0){
      $row=mysqli_fetch_assoc($res);
      $html=$row['reply'];
}else{
      $html="Sorry not be able to understand you";
}
$added_on=date('Y-m-d h:i:s');
mysqli_query($con,"insert into message(message,added_on,type)
values('$txt','$added_on','user')");
$added_on=date('Y-m-d h:i:s');
mysqli_query($con,"insert into message(message,added_on,type)
values('$html','$added_on','bot')");
echo $html;
?>
```

Chapter 7

Testing

The testing is a process of checking working of software and hardware products. Testing of software is called software testing and testing of hardware product is called hardware testing. Software testing is process of testing the software or application developed by the developers or programmers. Hardware testing is a process of testing the hardware products developed by hardware developers. Again, software and hardware testing include several different types of testing. Among these, most commonly used testing are unit testing and system testing. Once the implementation of system has been completed then the entire system is tested to check whether developed system satisfies the requirements specified by the users. The process of testing entire system is called system testing. On the other hand, system is developed by the integration of different modules. Testing of each module of a system is called the unit testing. Main purpose of the Testing is Software quality checking. In this work, unit tests are conducted on all modules and obtained the expected results. Later, system testing is conducted on entire system and obtained the expected results. Following table shows unit test cases and results of proposed approach.

Table 7.1 Unit test cases for proposed approach

Test Case Number	Input	Stage	Expected Behavior	Observed Behavior	Status P=Pass F=Fail
1	Greeting	Communication Staring	Information Inserted into Table Successfully	As expected	P
2	Replay from System	Output from System	Information Fetched and Table Authenticated Successfully	As expected	P
3	Asking Query	FAQ Registration	Information Uploaded into Table Successfully	As expected	P

4	FAQ stored in Database	View Status	Information Fetched from Table Successfully	As expected	P
5	Date and Time	View Status	Information Fetched from Table and Authenticated Successfully	As expected	P
6	Matching Query with existing Data	Processing Query	Information Fetched from Table Successfully	As expected	P

Chapter 8

Results

Results basically refer to any particular output that comes as a result of the completion of the activities that have been performed as part of the project or a particular project component.

The final snapshots of this work are as below:

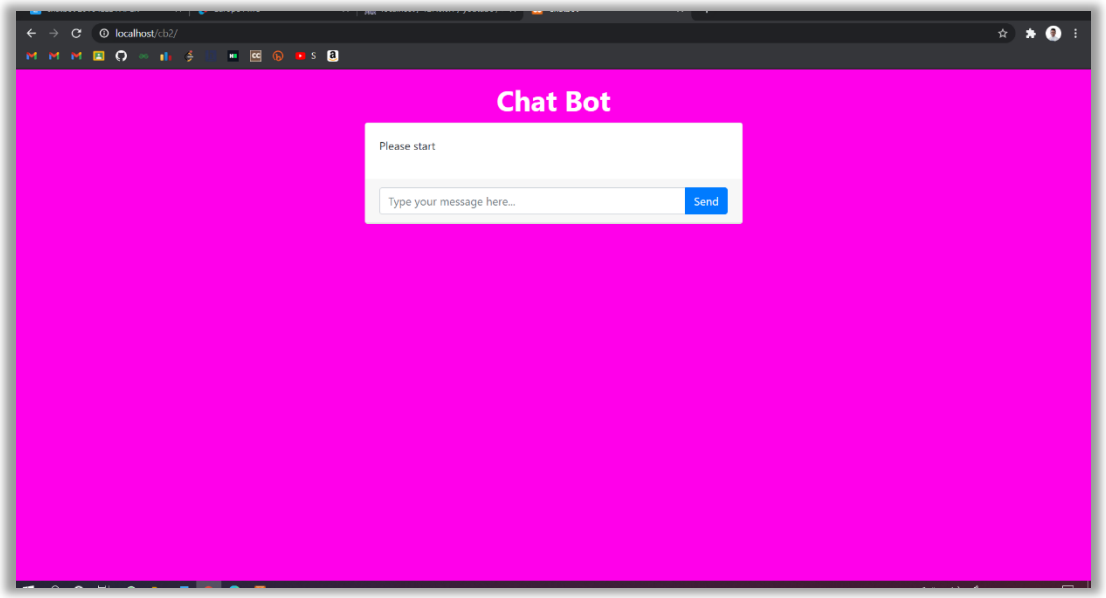

Figure 8.1: Chat Bot Home Page

Figure 8.1 shows the index page.

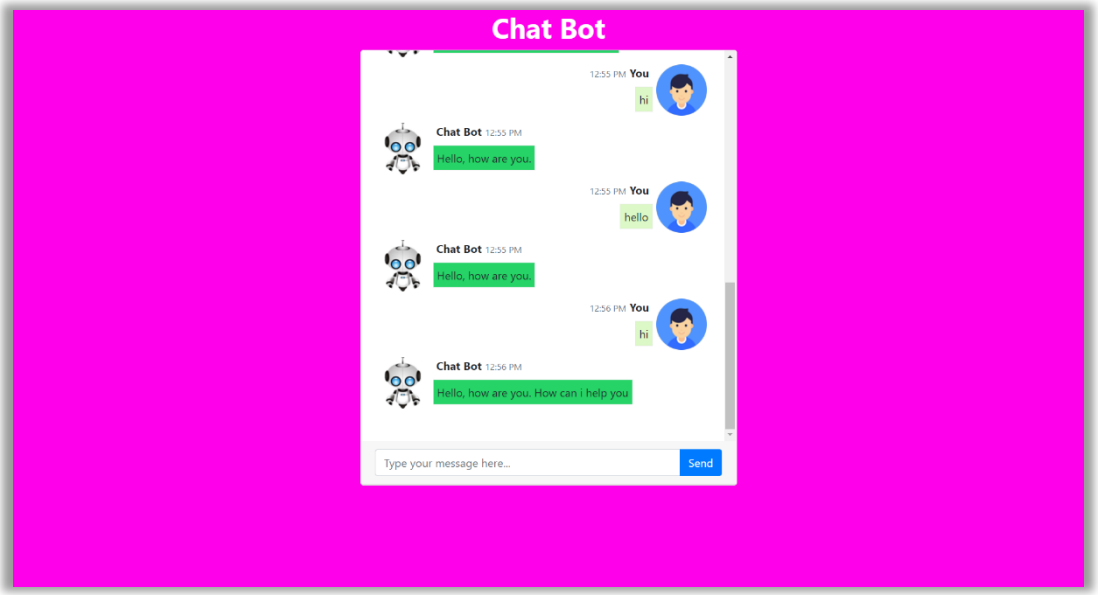

Figure 8.2: Conversation between user and Chat Bot

When user starts to communicate with Chat Bot, Chat Bot replies to user immediately in this page shown in figure 8.2.

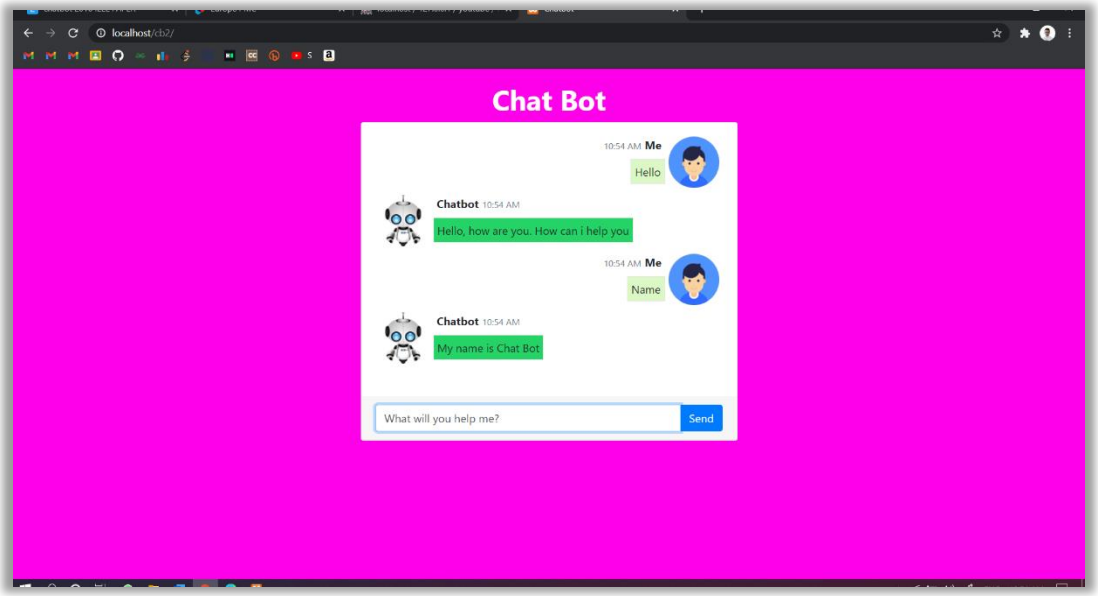

Figure 8.3: User Typing query in Text Box

There will be a text box provided to give input to the system in this page shown in figure 8.3.

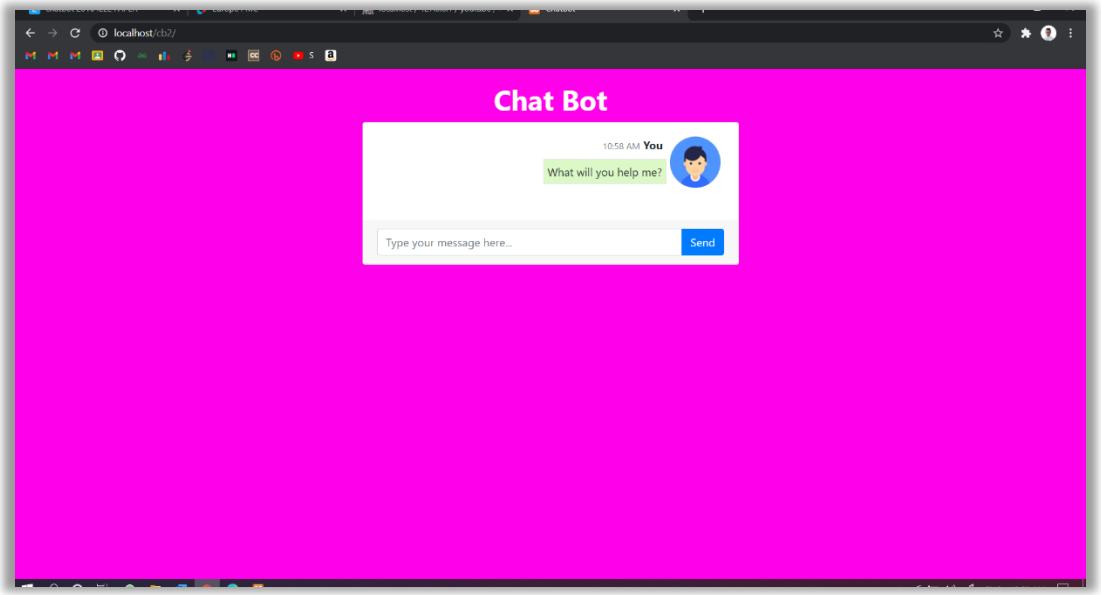

Figure 8.4: Query from User

User asked FAQ's to Chat Bot in this page shown in figure 8.4

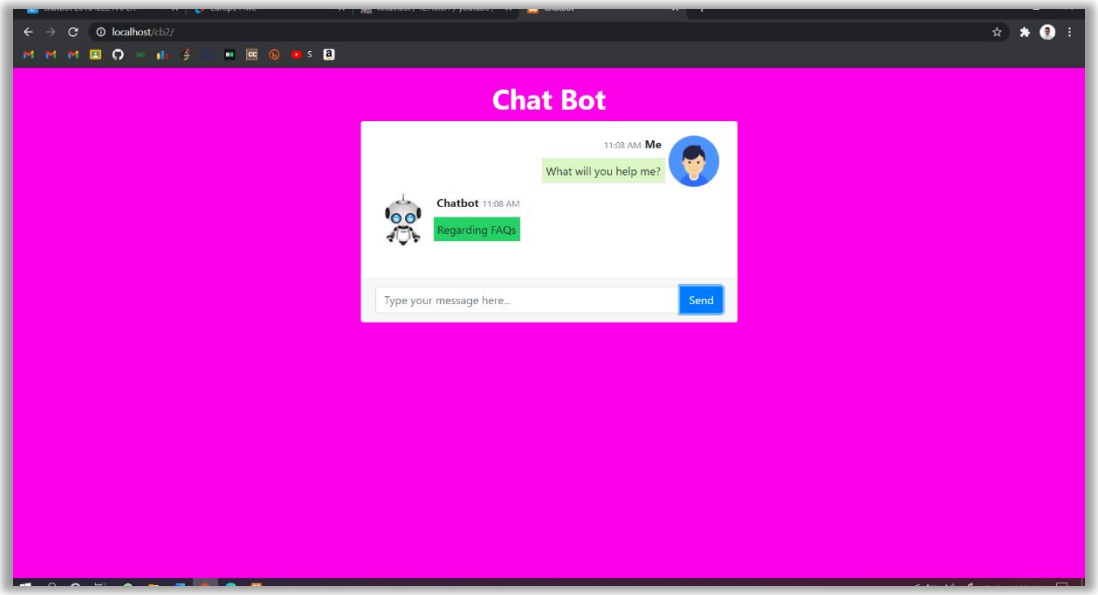

Figure 8.5: Replay from the Chat Bot

By taking the input from user Chat Bot processes and replayed to user to in this page shown in figure 8.5

Chapter 9

Conclusions and Scope for Future Work

This project is designed and developed as per the requirements of the FAQ in common websites. It can be a prototype of how a website can be designed and how functionalities can be implemented in complaint management system. The complete system is thoroughly tested with availability of data and through reports which are prepared manually. Design procedures and outputs are described in this project report. The design is easy to understand that any new modules can be incorporated easily. This work can be further improved using latest web technologies and tools. Enhancing the design and adding more features and functionalities it might be a good product.

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