AI BASED DISCOURSE FOR BANKING INDUSTRY
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IBM NAALAIYATHIRAN GUIDED PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

Chatbot is a computer program that simulates and processes human conversation (either written or spoken), allowing humans to interact with digital devices as if they were communicating with a real person. Chatbot's can be as simple as rudimentary programs that answer a simple query with a single-line response, or as sophisticated as digital assistants that learn and evolve to deliver increasing levels of personalization as they gather and process information. Chatbot's boost operational efficiency and bring cost savings to businesses while offering convenience and added services to internal employees and external customers.

They allow companies to easily resolve many types of customer queries and issues while reducing the need for human interaction. With chatbot's, a business can scale, personalize, and be proactive all at the same time which is an important differentiator. The scope of this project is to develop an AI chatbot to answer college-related queries like admissions, course details, etc using Artificial Intelligence and Machine Learning algorithms. Integrate the chatbot intoa website with authentication capabilities.

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LIST OF ABBREVIATIONS

ML	Machine Language
NLP	Natural Language Processing
AI	Artificial Intelligence
HTML	Hypertext Markup Language
CSS	Cascading Style Sheet
JS	JavaScript
NLU	Natural Language Understanding

CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

A chatbot is one of the blooming technologies to interact with users more efficiently. It can be used 24*7 with the same effect. Chatbot reduces human power and answers queries based on its database collection. Conventionally, to enquire about any banking people either visit the bank physically.

Chatbot, on the other hand, interacts with the users and answers all theories with high efficiency. People only have to update the activities in the database sothat chatbot gets trained with the dataset. The authentication factor enables the administrator to identify the hacker who tries to inject any malware websites.

1.2 PURPOSE

The Banking chatbot allows you to:

- Ask queries.
- Search courses available.
- Check the availability of transport.
- All the conversations are secured with help of a database.
- All the new queries can be monitored by the bot admin.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING PROBLEM

In the earlier days, customers had to visit the bank to enquire about details like loan, transaction processess, account details and othin formation's about the bank, whichis a tiresome process as well as long process for customers.Nowadays there are many changes occurred in the Banking system with help of advanced technology. Everything is happening over the internet without any trouble. In those days for enquiring about loan we have to visit the bank, but as the days are passing away it's completing changing. Collecting the loan details, structure manually will be hectic procedure and it also needs manpower. For reducing that manpower and avoid such difficulties and time consuming many devices or systems were emerged day by day.

2.2 REFERENCES

Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language.

Sasha Fathima Suhel; Vinod Kumar Shukla; Sonali Vyas; Ved Prakash Mishra

Deep Chatbot learning: A deep learning chatbot learns from ground up in a process known "Deep Learning." The chatbot will be developed using machine learning algorithms in this process. From his data and human-to-human dialogue, a deep learning chatbot learns everything, it talks about how the general vast types of chatbots operate where the user types in their input through any messaging platform being websites or mobile applications using high level language (Natural Language Processing) being the normal understanding language used by humans on a daily basis for communication.

A Review of Chatbots in the Banking Sector.

Shashank Bairy R , Rashmi R

CHATBOTS IN BANKING - Digital banking is being automated currently as it frees up the employees to concentrate on more complex inquiries. Banks are able to automate their customer interactions through chatbots, two-thirds of those surveyed felt that an AI-powered chatbot would be useful in assisting them and 44% would rather communicate with a chatbot than a real person to get their queries answered.

Chatbots and Virtual Assistant in Indian Banks

Singh, Netra & Singh, Devender.

Chatbots/ Virtual Assistant-The Indian banking industry comprises of approximately 20 banks in the public sector, 22 banks in the private sector, 56 regional rural banks, 44 foreign-owned banks, 22 scheduled state cooperatives banks, 11 non-scheduled state cooperatives banks, 54 scheduled urban cooperative banks, 1488 non-scheduled urban cooperative banks and 364 district central cooperative banks. Banks of the public sector dominate approximately 80 per cent of the business share, transmitting relatively small fragments to its private rivals.

Artificial Intelligence Powered Banking Chatbot

K.Satheesh Kumar, S.Tamilselvan, B.Ibrahim Sha, S.Harish

Preparing Data Set: We have started to prepare our own data set as questions and answers that banking customer's used to ask the bank staffs, at customer care centers or enquiry desks. In this we have referred a number of banking websites and collected FAQs as our data. We have used different web scrapping tools for this task. The following diagram shows the Distribution of questions in the Data-set format. Data-set format: The Queries that customers requested were entered, the entered queries will get the approximate desired answer from the model by using Natural language

CHATBOT: Architecture, Design, & Development

Natural Language Processing - The goal of natural language processing (NLP) is to take the unstructured output of the ASR and produce a structured representation of the text that contains spoken language understanding (SLU) or, in the case of text input, natural language understanding (NLU). In this section, we explore a number of methods for extracting semantic information and meaning from spoken and written language in order to create grammatical data structures that can be processed by the Dialogue Management unit in the next step. This is non- trivial because speech may contain: (i)identity-specific encodings (e.g. pitch, tone, etc.) in addition to meaning-encodings and (ii) noise from the environment. Likewise, both speech and text inputs to a chatbot may contain (iii)grammatical mistakes, (iv) disfluencies, (v) interruptions, and (vi) self-corrections**.**

2.3 PROBLEM STATEMENT DEFINITON

Banking related Chatbot is simply a chatbot that responds to user queries. UI plays a major role in this Project. The flexible UI makes the web app easily interact with the Client. The AI-powered chatbot is used for enquiring and helps people to sort out a clear idea about banking activities and transaction processes. Clearly defines the Banking activities like loan details, transaction process, and general bank queries.

CHAPTER 3

IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Users think that these types of applications should have a very simple interface and need to be visually appearing for them to use, these can be also given to them as mobile application for easy access. They feel that the application is very exciting as the digits are recognized but are confused about whether they need these types of applications. They start trying to check the application by feeding various inputs get fascinated by the output produced by the application and then start recommending the application to their colleagues. Even though the application reduces the manual work and increases the efficiency of recognizing the digit, users think that there are a few disadvantages also. Users feel that they may accidentally upload some sensitive files and taking photos of the digits is very annoying. Fig 3.1 shows the empathy map of the project

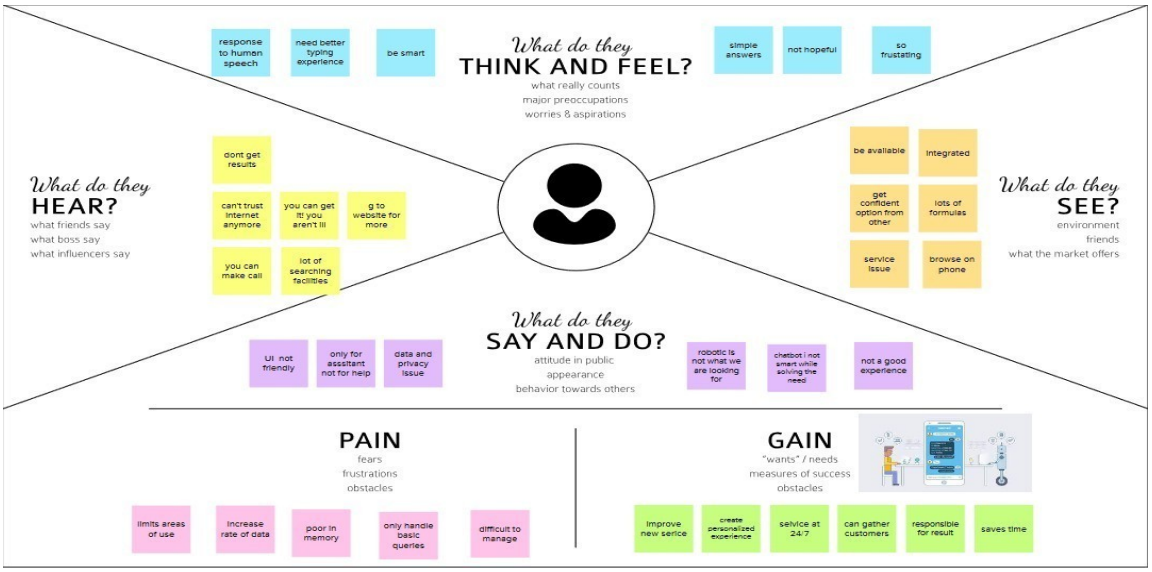


Fig 3.1 Empathy Map

3.2 IDEATION AND BRAINSTORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich number of creative solutions.

Step-1: Team Gathering, Collaboration and Select the Problem Statement

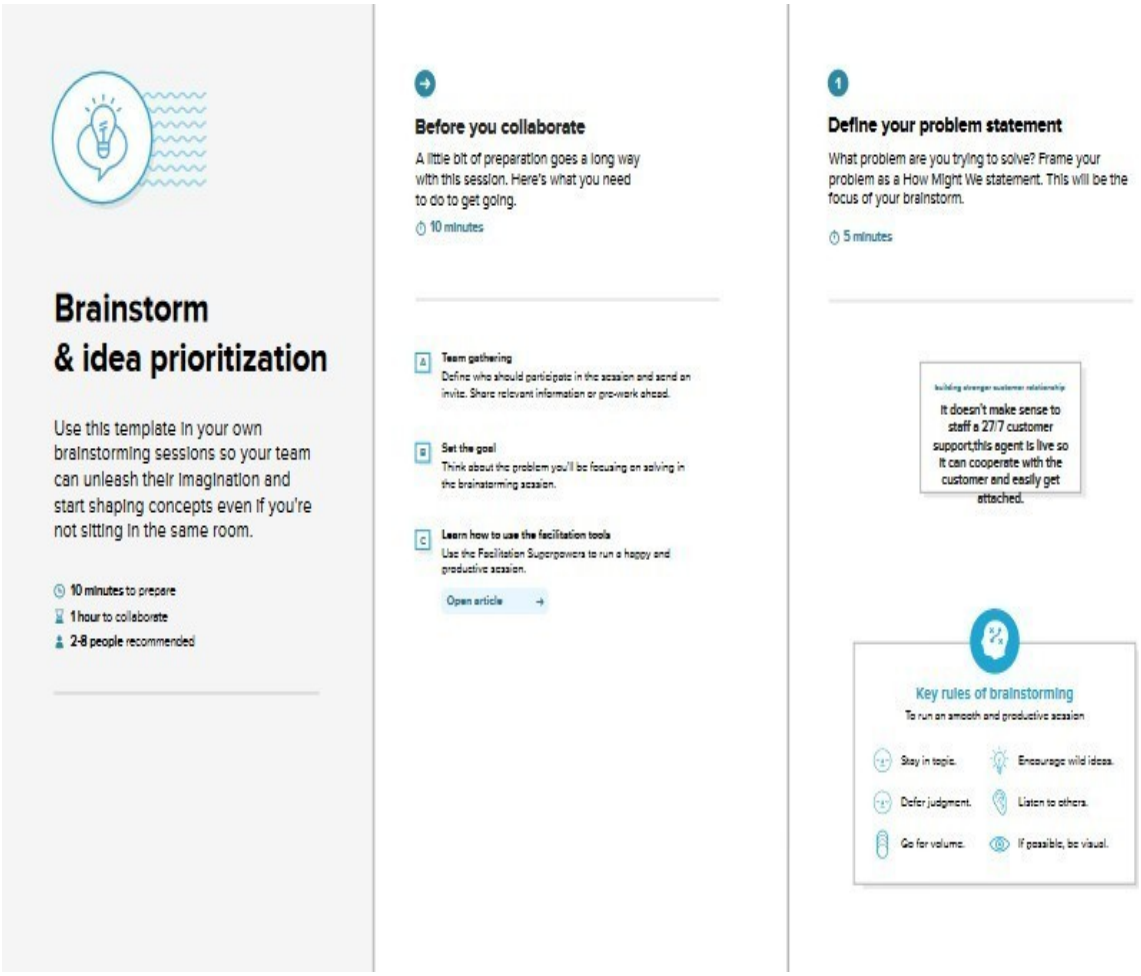


Fig 3.2 Team Gathering, Collaboration and Select the Problem Statement

Step-2: Brainstorm, Idea Listing and Grouping

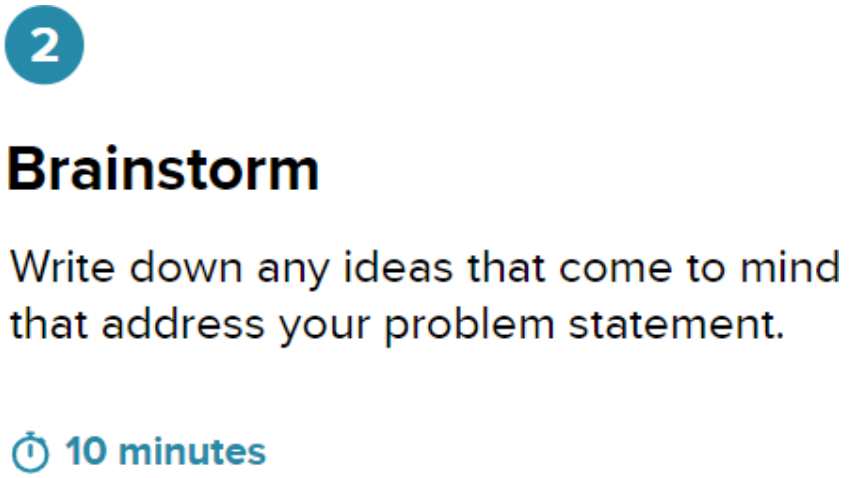
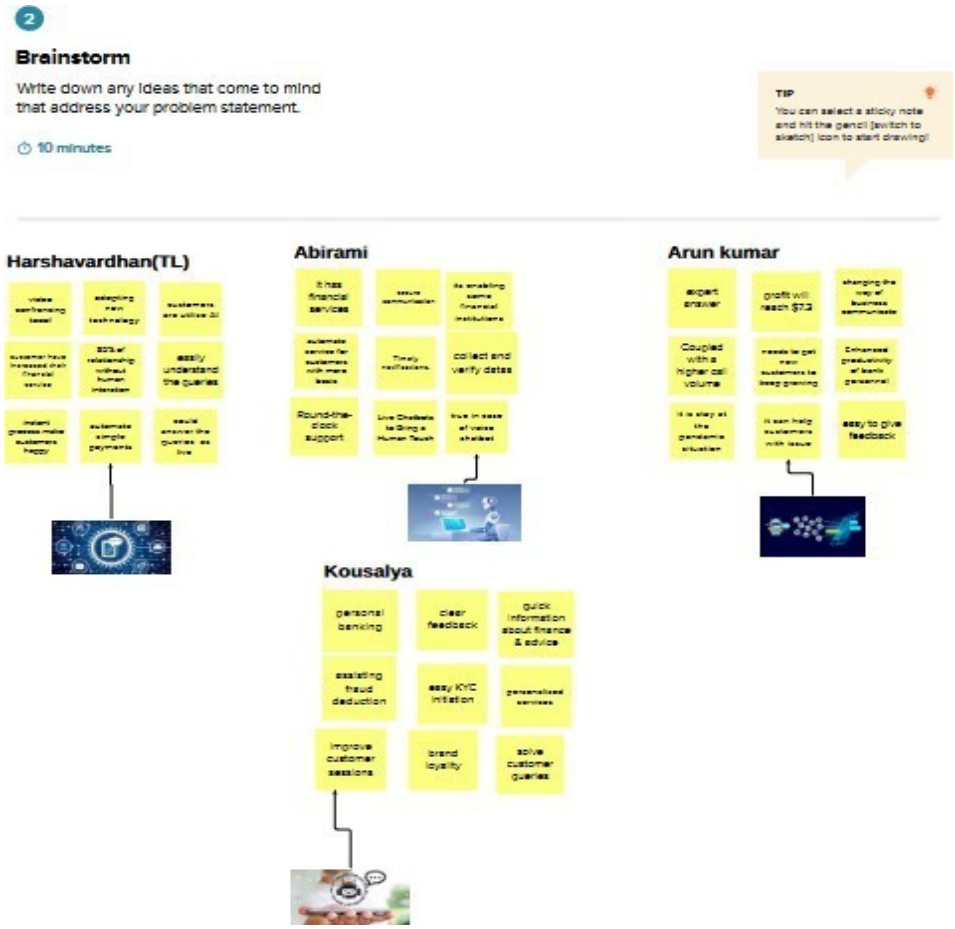


Fig 3.3 Brainstorm



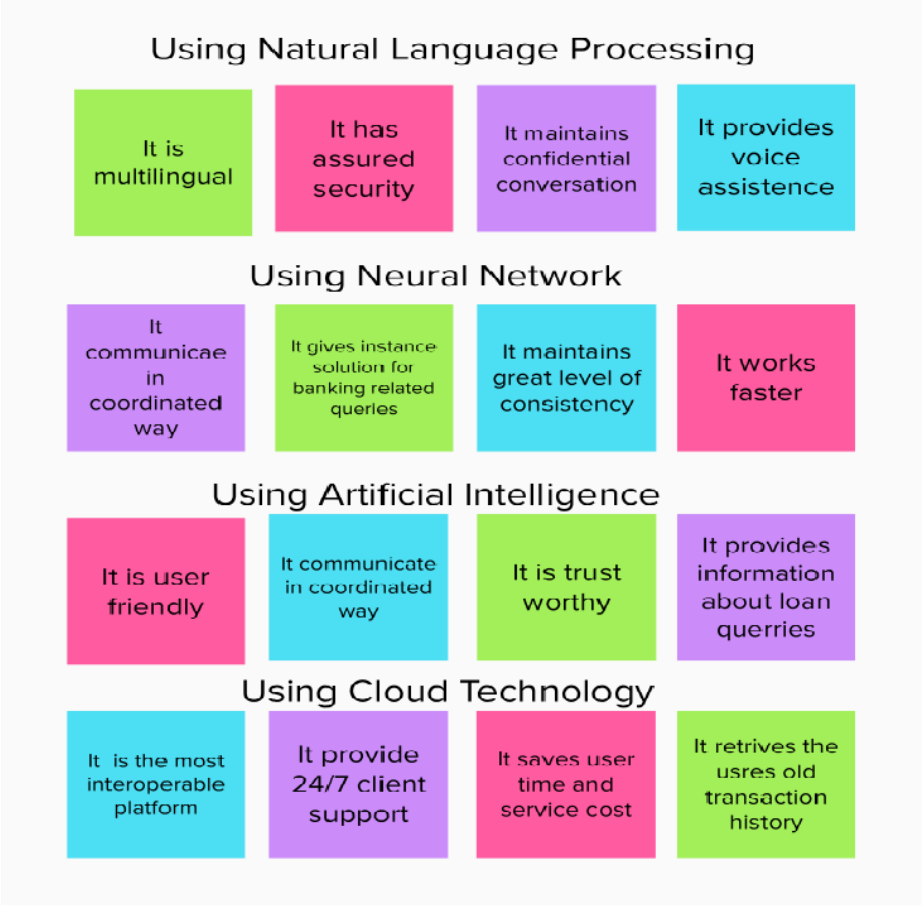


Fig 3.4 Idea Listing

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

Fig 3.5 Group Ideas

Step-3: Idea Prioritization

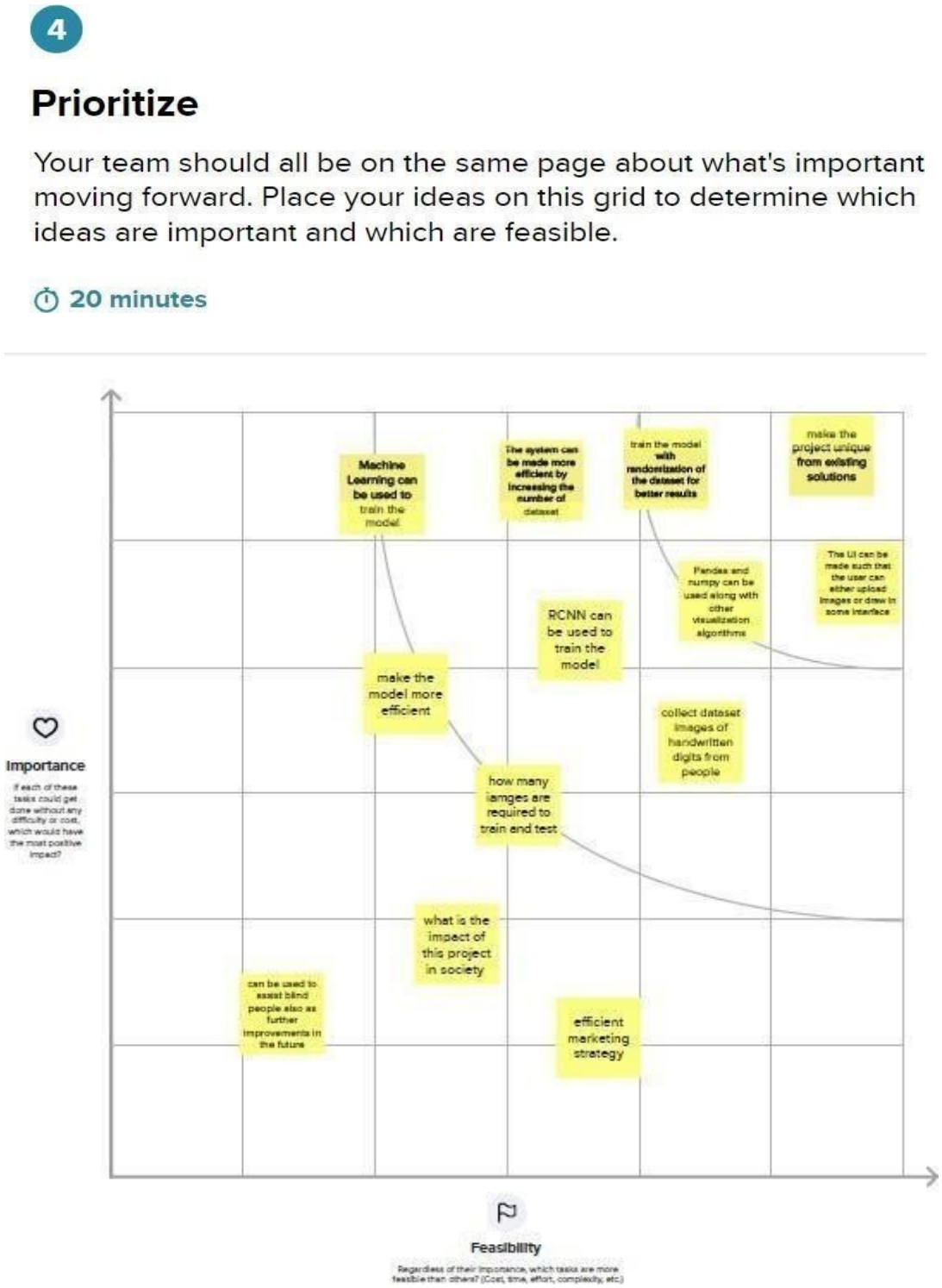


Fig 3.6 Idea Prioritization

3.3 PROPOSED SOLUTION

Chatbot is a computer program that simulates and processes human conversation(either written or spoken), allowing humans to interact with digital devices as if they were communicating with a real person. Chatbot's can be as simple as rudimentary programs that answer a simple query with a single-line response, or as sophisticated as digital assistants that learn and evolve to deliver increasing levels of personalization as they gather and process information.

Chatbot's boost operational efficiency and bring cost savings to businesses while offering convenience and added services to internal employees and external customers. They allow companies to easily resolve many types of customer queries and issues while reducing the need for human interaction. With chatbots, a business can scale, personalize, and be proactive all at the same time—which is an important differentiator. The scope of this project is to develop an AI chatbot to answer banking-related queries like loan details, transaction processes account details, etc., using Artificial Intelligence and Machine Learning algorithms. Integrate the chatbot into a website with authentication capabilities.

3.4 PROBLEM SOLUTION FIT

The Problem-Solution Fit means that we have found a problem with our customer and that the solution we have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why. A few purposes of Problem-Solution Fit are:

- It can be used to solve complex problems in a way that fits the state of our customers
- Succeed faster and increase our solution adoption by tapping into existing mediums and channels of behavior
- Sharpen our communication and marketing strategy with the right triggers and messaging
- Increase touch-points with our company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costlyproblems
- Understand the existing situation in order to improve it for our target

group Fig 3.7 shows the Problem Solution Fit of the project.

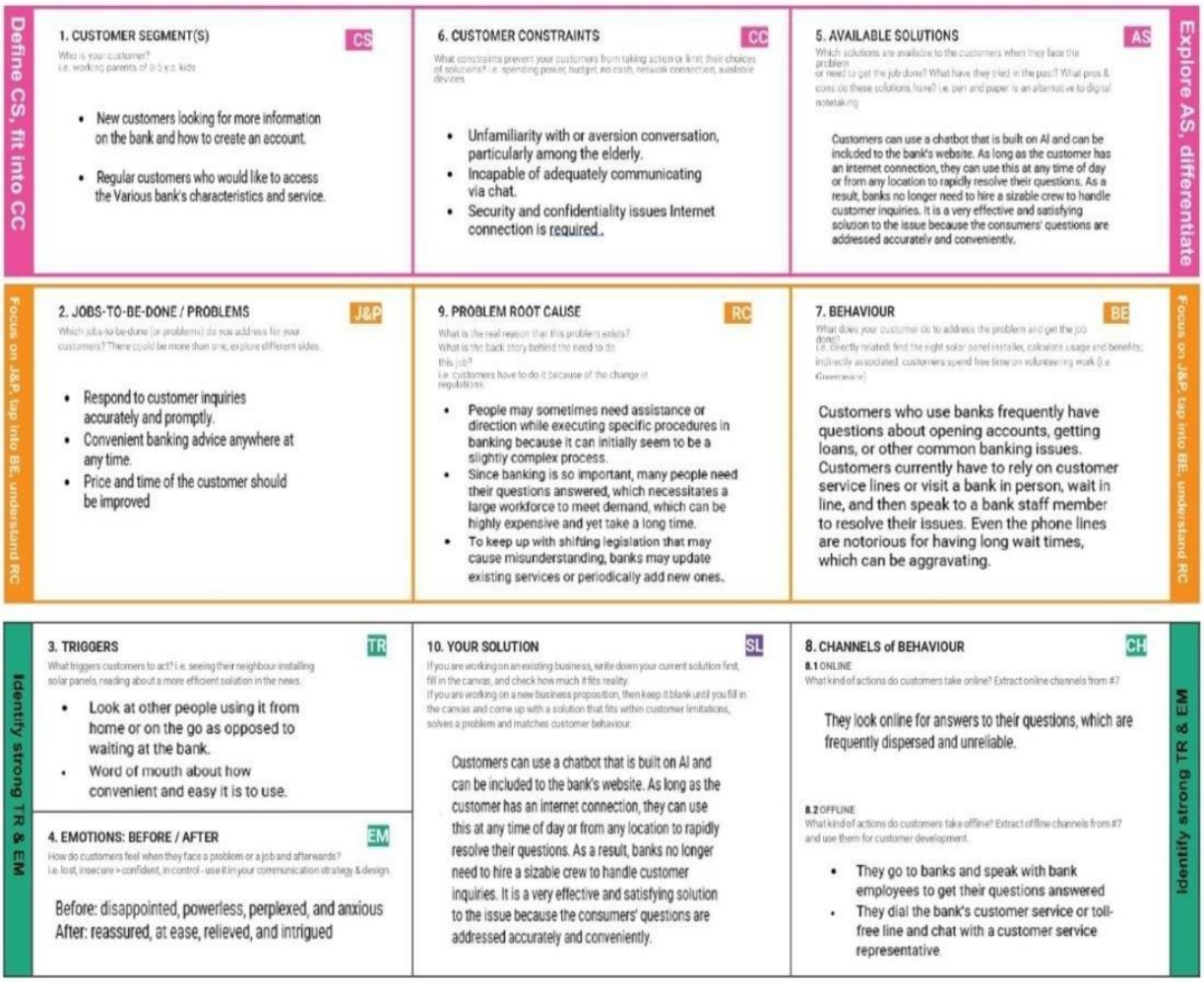


Fig 3.7 Problem Solution Fit

CHAPTER 4

REQUIREMENT ANALYSIS

Requirements analysis or requirements engineering is a process used to determine the needs and expectations of a new product. It involves frequent communication with the stakeholders and end-users of the product to define expectations, resolve conflicts, and document all the key requirements.

4.1 FUNCTIONAL REQUIREMENTS

A functional requirement defines a system or its component. Table 4.1 shows the functional requirement of the project.

FR.NO	FUNCTIONAL REQUIREMENTS	SUB REQUIREMENTS
FR-1	Savings Account Related Actions	• Type of Savings Account Creation Details • Interest Rate • Minimum Balance • Debit Card • Credit Card
FR-2	Current Account Related Actions	• Type of Company • Current Account Closure Steps • Update GSTIN • Zero Balance Current Account
FR-3	Loan Account Related Actions	• Type of Loan • How long for approval • Available Loan Amounts • Loan Status • Joint Loan
FR-4	General Queries Related Actions	• Bank Working Days • List of Braches • Storage Locker Facility • Currency Conversion Facility • CIBIL • Find the nearest branch
FR-5	Net Banking Related Actions	• Login Steps • Change Net Banking Password • Daily Limit • Types of Fund Transfer • Add Beneficiary

Table 4.1 Functional Requirements

4.2 NON-FUNCTIONAL REQUIREMENTS

A non-functional requirement defines the quality attribute of a software system. Table 4.2 shows the non-functional requirement of the project.

FR.NO	NON-FUNCTIONAL REQUIREMENTS	DESCRIPTION
NFR-1	Usability	Chatbots developed using AI should be able to answer any general banking queries on account creation, loans, net banking, other services, etc. It addresses the queries of customers immediately and effectively in a cost-efficient manner.
NFR-2	Security	The AI Chatbot maintains a confidential conversation with customers. A chatbot will provide personal and efficient communication between the user and the bank.
NFR-3	Reliability	Chatbots are trained very well using AI to provide solutions for popular and frequently asked questions, thereby providing the best-suited vice quickly. AI Chatbots have a reliable user experience.
NFR-4	Performance	AI Chatbots are a great way to overcome the limitation of the workload of humans. There can be multiple instances of a single chatbot inquiring about different people at the same time. Such chatbots work in real-time with no need for the customers to wait. This ensures faster, easier, and more efficient face-time with customers.
NFR-5	Availability	AI Chatbots provide 24/7 service to clear all customer queries and guide them through all the banking processes. It is available to anyone with access to the internet with basic hardware.
NFR-6	Scalability	AI Chatbots are helping the banking industry to scale customer service to improve customer service satisfaction at the same time. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.

Table 4.2 Non-Functional Requirements

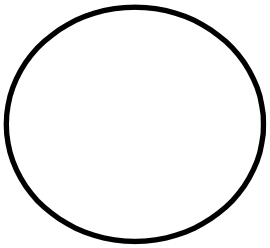
CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

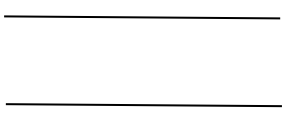
A data flow diagram is used to describe how the information is processed and stored and identifies how the information flows through the processes. The data flow diagram illustrates how the data is processed by a system in terms of inputs and outputs. The data flow diagram also depicts the flow of the process and it has various levels. The initial level is the context level which describes the entire system functionality and the next level describes each and every sub module in the main system as a separate process or describes all the processes involved in the system separately. Data flow diagrams are made up of a number of symbols, Fig 5.1 Data Flow Diagram

Square presents external entities, which are sources or destinations of data



Circle representing processes, which take data as input, do something to it and output it

Arrow representing the data flows, which can either be electronic data or physical items



Parallel lines representing data stores, including electronic stores such as databases or XML files and physical stores

Fig 5.1 Data Flow Diagram

5.1.1 DFD LEVEL 0

The users of the system upload an image in the web application to recognize the handwritten digits in it. The image is fed into a model for recognition and the answer is sent back to the web application. Fig 5.1.1 shows the DFD Level 0 diagram of the project.

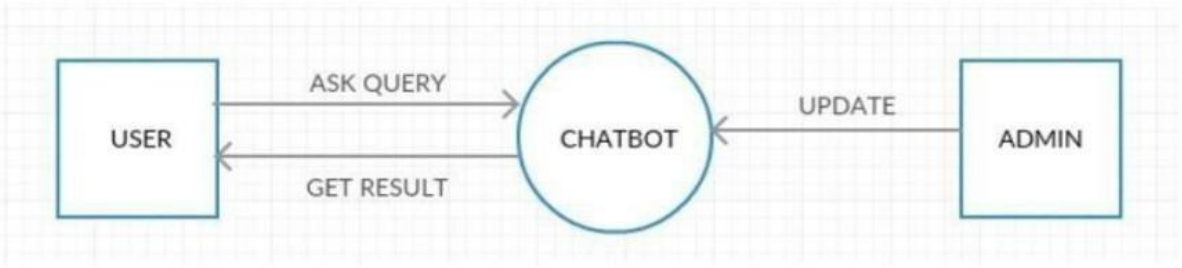


Fig.5.1.1 DFD LEVEL 0

5.1.2 DFD LEVEL 1

The image uploaded by the user is initially stored in the image database, then the image is pre-processed for recognition. The processed data is sent into the model to predict the result. Finally, the output is displayed in the web application. Fig 5.1.2 shows the DFD Level 1 diagram of the project.

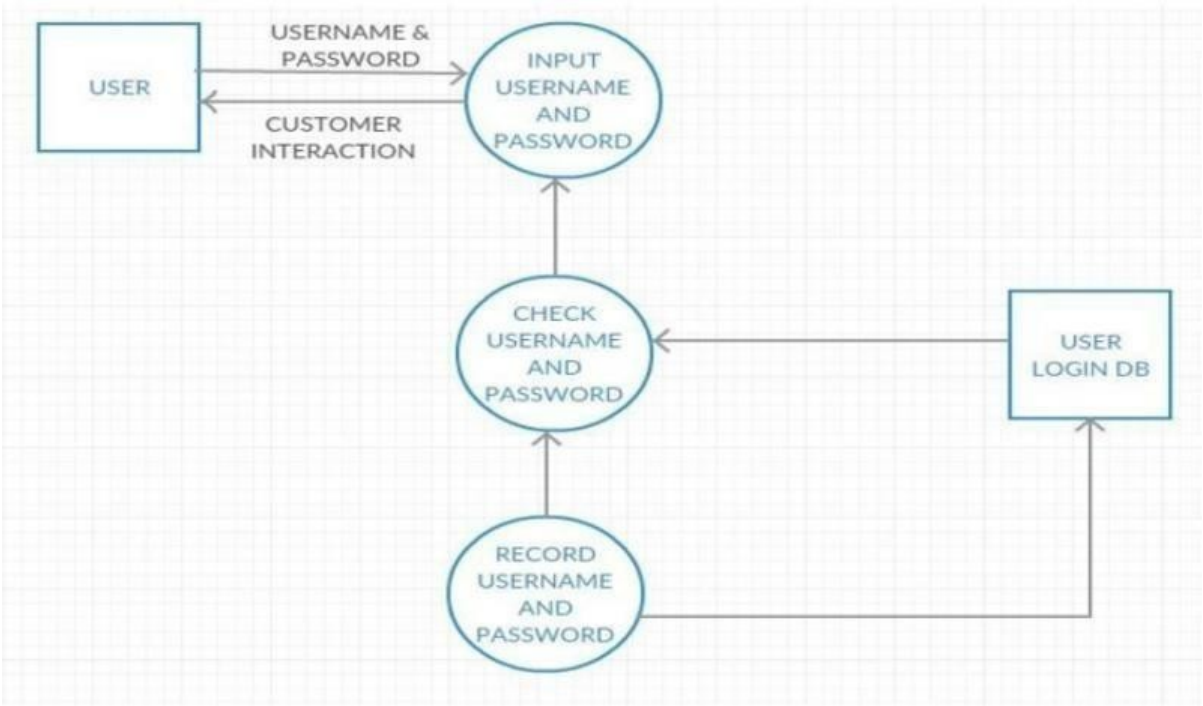


Fig.5.1.2 DFD LEVEL 1

5.1.3 DFD LEVEL 2

CNN Model is first trained with the MNIST dataset, then the processed image is sent into the model which passes through various layers present in the CNN Model for furtherprocessing then the digit is recognized. Fig 5.1.3 shows the DFD Level 2 diagram of the project.

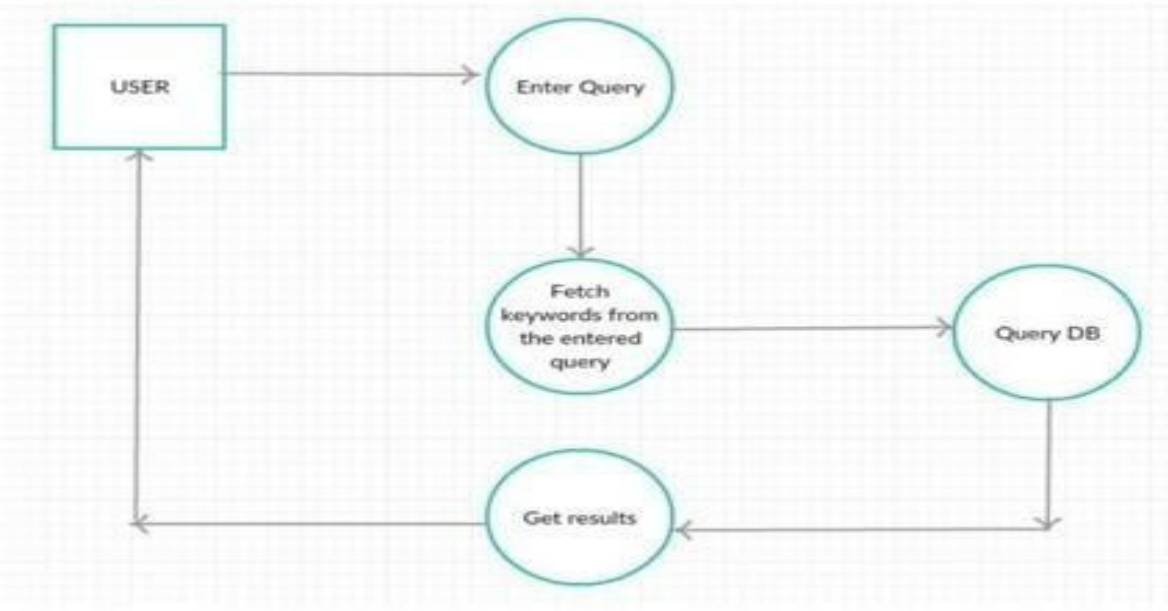


Fig.5.1.2 DFD LEVEL 1

5.2 SOLUTION AND TECHNICAL ARCHITECTURE

Fig 5.2 shows the Solution and Technical Architecture of the project.

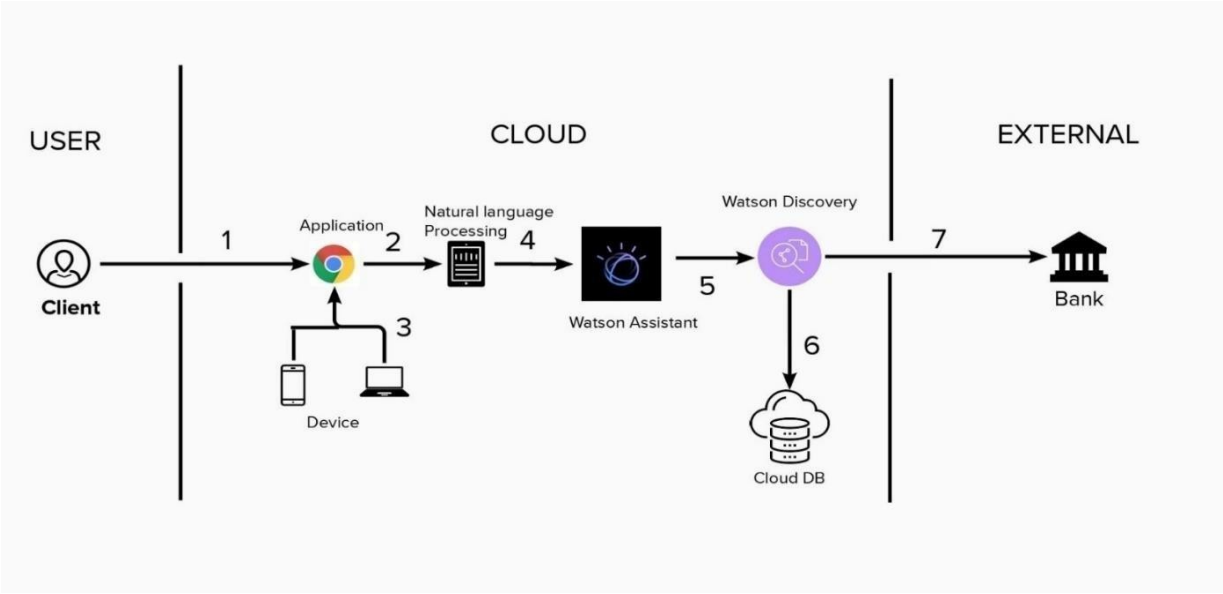


Fig 5.2 Solution and Technical Architecture

5.3 USER STORIES

Table 5.1 shows the User Stories of the project

User Type	Functional Requirement	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile or Web user)	Savings Account Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating those savings accounts.	I can clear my queries regarding types of savings account	High	Sprint-1
		USN-2	As a user, I can check the Interest Rates of Savings Account	I can clear my queries regarding interest rates of savings account	High	Sprint-1
		USN-3	As a user, I can check the Minimum Balance of Savings Account	I can clear my queries regarding minimum balance of savings account	Medium	Sprint-2
	Current Account Related Actions	USN-4	As a user, I can choose the Type of Companies that know the information on documents to be submitted for creating current account	I can clear my queries regarding types of companies	High	Sprint-1
		USN-5	As a user, I want to get details on the Procedure to close my Current Account	I can clear my queries regarding current account closure	High	Sprint-2
	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loan to know the information on choosing an essential loan scheme	I can clear my queries regarding types of loan account	High	Sprint-1
		USN-7	As a user, I can check the loan Amounts that can be offered for corresponding Loan Accounts chosen	I can clear my queries regarding loan amounts of loan account	High	Sprint-2

		USN-8	As a user, I can check the Status of Loans for my Loan Accounts	I can clear my queries regarding the loan status the of loan account	Low	Sprint-2
	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion the facility of my bank account	I can clear my queries regarding currency conversion facilities of bank account	Low	Sprint-1
		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure that my loan application is approved by the bank.	I can clear my queries regarding CIBIL score of loan application	Medium	Sprint 3
		USN-11	As a user, I want to get the procedure details for maintaining the Storage Locker the facility of my bank account	I can clear my queries regarding storage locker facilities of bank account	High	Sprint-3

Table 5.1 User Stories

CHAPTER 6

PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

Sprint planning is an event in the scrum that kicks off the sprint. The purpose of sprint planning is to define what can be delivered in the sprint and how that work will be achieved. Sprint planning is done in collaboration with the whole scrum team. Table 6.1 shows the Sprint planning and the priority estimation of each Sprint along with the team members split up of the project.

Sprint	Functional Requirement	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Savings Account-Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	4	High	ABIRAMI I KOUSALYA B
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	4	High	ABIRAMI I KOUSALYA B
Sprint-1		USN-3	As a user, I can check the Minimum Balance of my Savings Account	3	Medium	ABIRAMI I
Sprint-1	Current Account-Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating a current account	5	High	ARUN KUMAR S
Sprint-1		USN-5	As a user, I want to get details on the procedure to close my Current Account	4	High	KOUSALYA B
Sprint-2	Loan Account-Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	3	High	HARHSA VARDHAN C
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	3	High	HARHSA VARDHAN C
Sprint-2		USN-8	As a user, I can check the Status of Loans for my Loan Accounts	1	Low	ARUN KUMAR S

Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	2	Medium	ARUN KUMAR S
Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	2	Medium	KOUSALYA B
Sprint-2		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure that my loan application is approved by the bank.	1	Low	ARUN KUMAR S HARHSA VARDHAN C
Sprint-2		USN-11	As a user, I want to get the procedure details for maintaining the Storage Locker facility of my bank account	3	High	HARHSA VARDHAN C
Sprint-2	Net Banking-Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	3	High	ARUN KUMAR S
Sprint-2		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	2	Medium	KOUSALYA B
Sprint-2		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	2	Medium	ARUN KUMAR S
Sprint-3	Web Application	USN-15	As a user, I want to access the chatbot in a web browser that can be accessed from almost all devices.	20	High	ARUN KUMAR S ABIRAMI I
Sprint-4	User Interface and Web Pages	USN-16	As a user, I want to view pages of the banking website and have access to the chatbot easily.	20	High	KOUSALYA B ABIRAMI I

Table 6.1 Sprint Planning and Estimation

6.2 SPRINT DELIVERY SCHEDULE

A sprint schedule is a document that outlines sprint planning from end to end. Table 6.2 shows the Sprint delivery schedule with the duration for each Sprint along with the story points completed.

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed	Sprint Release Date (Actual)
Sprint-1	11	6 Days	24 Oct 2022	29 Oct 2022	11	29 Oct 2022
Sprint-2	9	6 Days	31 Oct 2022	05 Nov 2022	9	05 Nov 2022
Sprint-3	10	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	9	6 Days	14 Nov 2022	19 Nov 2022	9	19 Nov 2022

Table 6.2 Sprint Delivery Schedule

CHAPTER 7

CODING AND SOLUTIONING

7.1 FEATURE 1

Python Flask

Python Flask is used to develop chatbot applications using python. Flask is mainly used to render and integrate the chatbot application in the browser by providing API. By running the python application, the suitable server domain link is obtained and run in the browser.

HTML

The HTML and CSS is used to design the overall chatbot UI. HTML is used to add UI components and CSS is used to add style to those components. IBM watson assistant deploys HTML code to train the Chatbot.

Build PYTHON FLASK Code:

App.py:

```
from flask import Flask, render_template

app = Flask( name )@app.route('/')

def bot():
        return render_template('index.html') if name_== '

main__':
    _
app.run(debug = True)
```

HOME.HTML

```
<!DOCTYPE html>
<html style="font-size: 16px;" lang="en"><head>
<body>
<!==Chat Integration:==!>
<script>

window.watsonAssistantChatOptions = {
   integrationID: "22d1b5be-b60f-4ea2-bd4a-3a669f49464b", // The ID of this integration.
   region: "us-south", // The region your integration is hosted in.
   serviceInstanceID: "d3c7428c-3428-401f-835c-954121e28aaf", // The ID of
your service instance.
   onLoad: function(instance) { instance.render(); }
  };
```

```
  setTimeout(function(){
    const t=document.createElement('script');
    t.src="https://web-chat.global.assistant.watson.appdomain.cloud/versions/" +
(window.watsonAssistantChatOptions.clientVersion || 'latest') +
"/WatsonAssistantChatEntry.js";
    document.head.appendChild(t);
    });

  </script>
```

7.2 FEATURE 2

IBM CHATBOT:

- Our chatbot is able to guide a customer to create a bank account.(Both current and savings account)
- Our chatbot is able to answer loan queries.
- Our chatbot is able to answer general banking queries.
- Our chatbot is able to answer queries regarding net banking.

Figure 7.2 shows the actions taken by the chat bot when a user raises a query.

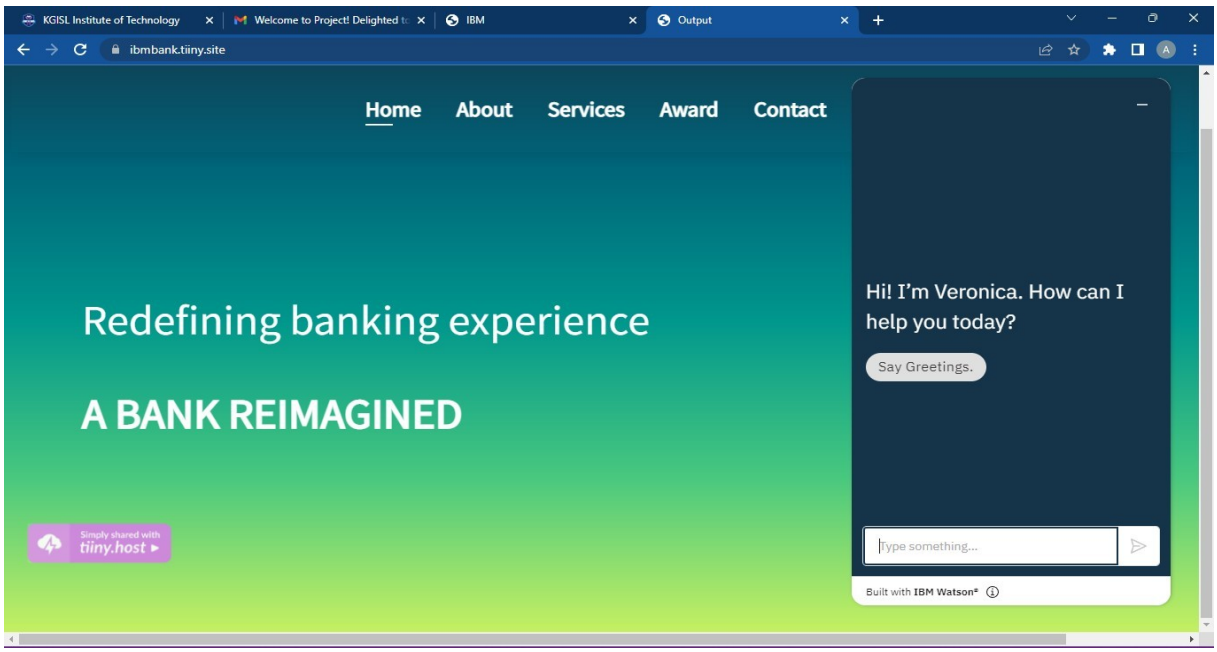


Fig 7.2.1 Chatbot Greeting Page

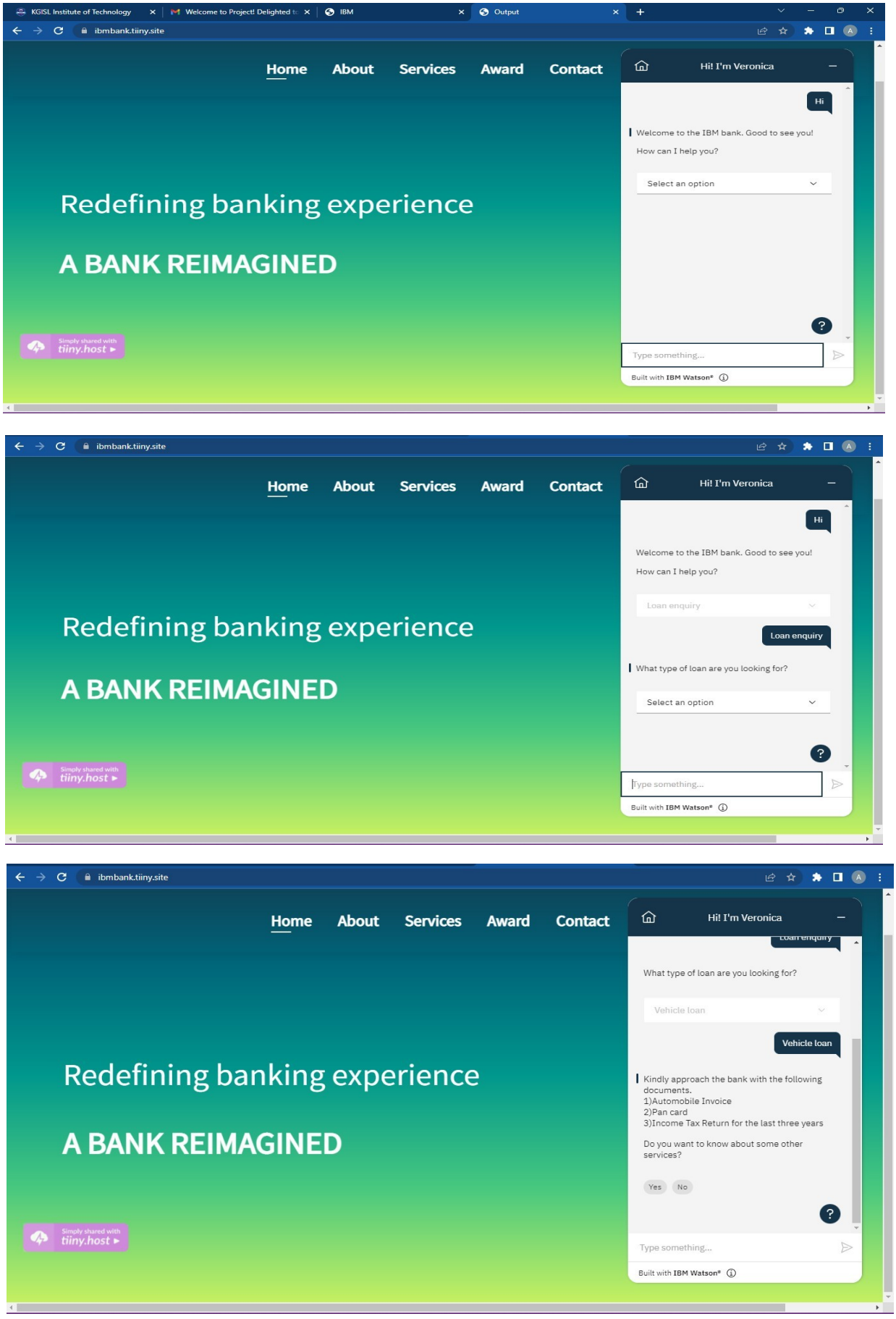


Fig 7.2.2 Handling loan queries

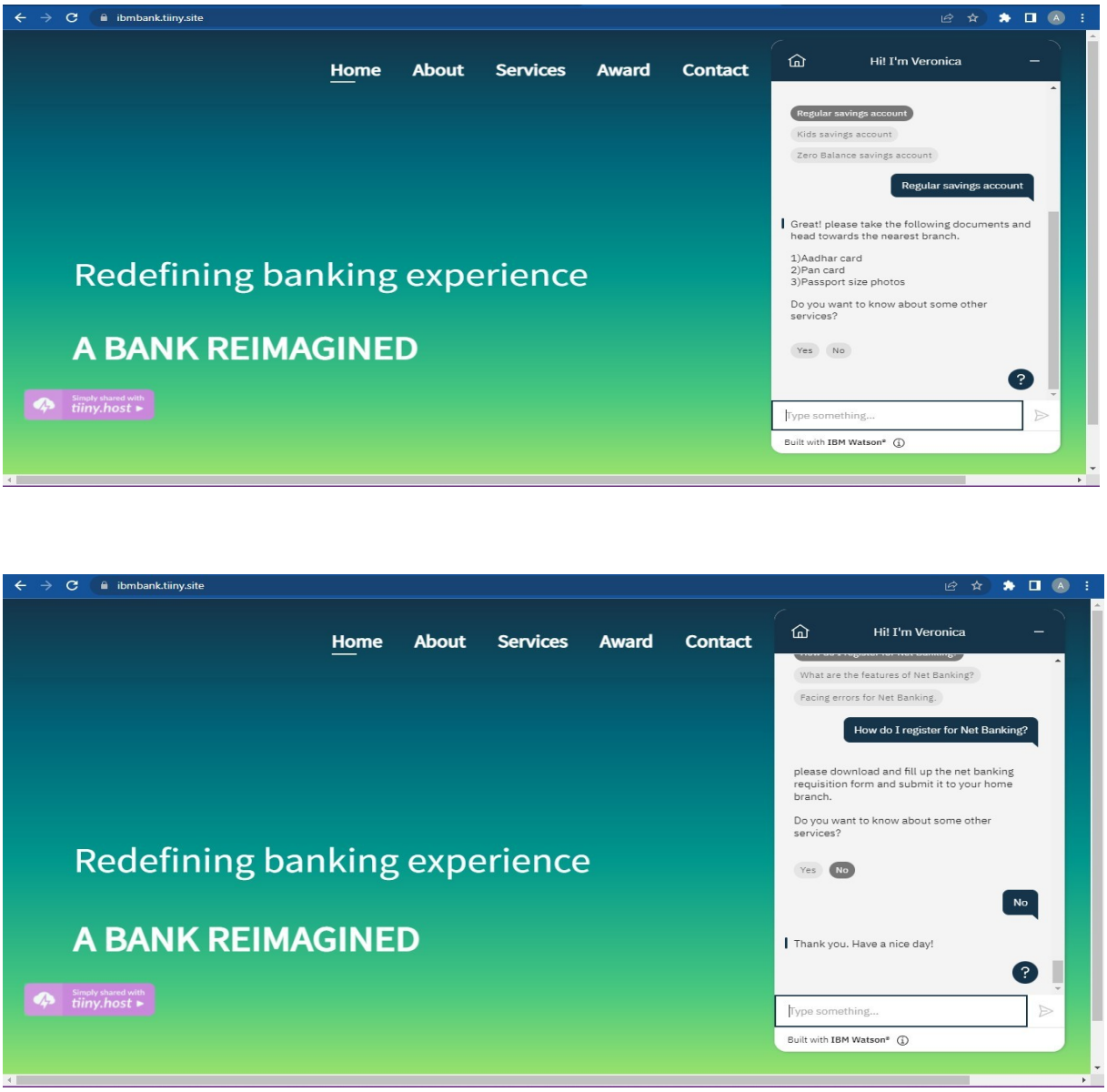


Fig 7.2.3 Ending a chat with a user

CHAPTER 8

TESTING

8.1 TEST CASE

A test case is a set of actions performed on a system to determine if it satisfies software requirements and functions correctly. Table 8.1 shows the test cases with the test scenario and the status of the test.

TEST CASE ID	FEATURE TYPE	COMPONENT	TEST SCENARIO	EXPECTED RESULT	ACTUAL RESULT	STATUS
TC_001	UI	Home Page	Verify user is able to see the chatbot icon when website is launched	It should show the chatbot icon	Working as expected	PASS
TC_002	UI	Home Page	URL of the bank's website	It should display the home page	Working as expected	PASS
TC_003	Functional	Chatbot	Verify user is able to receive dynamic greeting message	It should be popup when clicking of the bot icon	Working as expected	PASS
TC_004	Functional	Backend	Check if all routes are working properly	It should store the form data In the database	Working as expected	PASS
TC_005	Functional	Chatbot	Verify user is able to select the action suggested by chatbot	It should list the queries and display the answer	Working as expected	PASS
TC_006	Functional	Chatbot	Verify user is able to type query in text field.	It should allow the user to type the queries	Working as expected	PASS

TC_007	Functional	Chatbot	Verify user is able to get the response from chatbot	It should process the query of user	Working as expected	PASS
TC_008	Functional	Chatbot	Verify user to display the general queries	It should display the list of queries	Working as expected	PASS
TC_009	Functional	Chatbot	Verify the answer to the net banking details	It should display the net banking details	Working as expected	PASS

Table 8.1 Test Cases

8.2 USER ACCEPTANCE TESTING

Acceptance Testing is a level of software testing where a system is tested for acceptability. This test aims to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery. Formal testing with respect to user needs, requirements, and business processes are conducted to determine whether or not a system satisfies the acceptance criteria and to enable the user, customers, or other authorized entity to determine whether or not to accept the system. In this application, the customer's acceptance is been monitored and it is been put into usage.

8.2.1 TEST CASE ANALYSIS

Test analysis is the process of inspecting and analyzing the test artifacts in order to create test conditions or test cases. Table 8.2 shows the statistics on the total number of test cases with their status.

SECTION	TOTAL CASES	NOT TESTED	FAIL	PASS
Print Engine	5	0	1	4
Client Application	1	0	0	1
Performance	3	0	0	3
Exception Reporting	1	0	0	1

Table 8.2 Test Case Analysis

CHAPTER 9
RESULTS

9.1 PERFORMANCE METRICS

Table 9.1 shows the Performance Metrics of Our Project

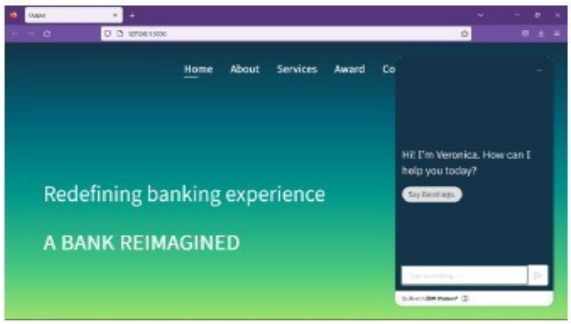
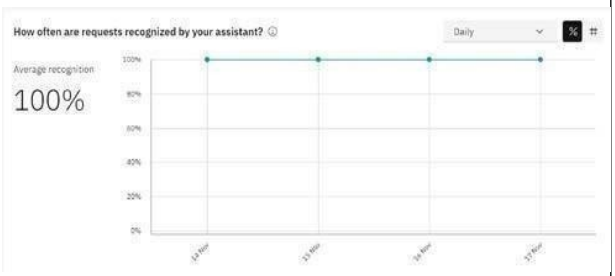
S.No	PARAMETER	VALUES	SCREENSHOT
1	MODEL SUMMARY	The chatbot is used by the user to interact and select queries that arepopulated based on the frequently asked question of banking customers. There can be multiple instances of a single chatbot inquiring about different users simultaneously. It quickly responds with expected answers to frequently asked customer queries. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.	 **Fig 9.1 Bank Landing Bank**
2.	ACCURACY	Training Accuracy – 100% Validation Accuracy – 100%	 **Fig 9.2 Training Accuracy**  **Fig 9.3 Validation Accuracy**

Table 9.1 Performance Metric

CHAPTER 10

ADVANTAGES AND DISADVANTAGES

10.1 ADVANTAGES

- Round-the-clock service.
- Brand Consistency.
- Increased Productivity.
- Reduced Staffing Needs.
- Consistent Response Rate and Availability.
- Helps with Fraud Prevention.
- Chats can be saved.
- Lower costs.

10.2 DISADVANTAGES

- Questions must be programmed beforehand.
- Impersonal
- Must keep information up-to-date.
- Technology issues.
- Needs additional measures to protect identities.

CHAPTER 11

CONCLUSION

As we can see, chatbots and other types of AI assistants are of great use in any industry that has to provide high-quality customer support. One such industry is the finance or banking area, and it is rapidly integrating these technologies into its workflow. Banking is all about money and reputation, and AI chatbots offer numerous benefits for both

CHAPTER 12

FUTURE SCOPE

In the future, an application can be improved with the following features:

- This project is focused on the bot that easily interacts with the user.
- Future enhancements can be done by using the voice recognition mechanism
- The bot can be deployed in various social channels and it can be made to implement in different languages

CHAPTER 13

APPENDIX

13.1 SOURCE CODE

App.py:

```
from flask import Flask,

render_template app = Flask( name__)

@app.route('/')

def bot():

    return render_template('index.html')

if___name___== '___main__':

    app.run(debug = True)
```

Index.html:

```
<head>
  <meta charset="UTF-8">
  <title>Output</title>
  <link rel="stylesheet" href="style.css">
    <link href="https://fonts.googleapis.com/css?
family=Source+Sans+Pro&display=swap" rel="stylesheet">
</head>
<body>
  <section id="header">
    <div>
        <ul id="navbar">
            <li><a class="active" href="#">Home</a></li>
            <li><a href="#">About</a></li>
            <li><a href="#">Services</a></li>
            <li><a href="#">Award</a></li>
            <li><a href="#">Contact</a></li>

        </ul>
    </div>
    </section>
    <section id="hero">
        <p>Redefining banking experience</p>
        <h1>A BANK REIMAGINED</h1></section>
    <script src="myscripts.js"></script>
    </body>
</html>
```

style.html:

```
#header{

  display: flex;
  align-items:center;
  justify-content:space-between;
  padding:20px 340px;
  box-shadow: 0 5px 15px rgba(0, 0, 0, 0.06);
  z-index: 999;
  position: sticky;
  top: 0;
  left: 0;
  font-family: 'Source Sans Pro', sans-serif;

}
#navbar li a:hover,
#navbar li a:active{

  color: #ffff;

}
#navbar li
a.active::after, #navbar
li a:hover::after{

  content:"";
  width: 30%;
  height:2px;
  background:
  white;
  position:
  absolute; bottom:-
  4px;
  left: 20px;

}

#navbar{

  display:

  flex;
  align-items: center;
  justify-content:
  center;

}
#navbar li{

  list-style: none;
  padding: 0 20px;
  position:
  relative;

}
```

```
  #navbar li a{

    text-decoration:none;
    font-size: 25px;
    font-weight: 600;
    color:white;
    transition: 0.03s
    ease;

} }
body{

    background-image: linear-gradient
  (to bottom, #153449, #006479, #00978d, #48c87f, #c6f062);

  }
  #hero{

    height:
    90vh; width:
    100%;
    background-size: cover;
    background-position: top 25% right 0;
    padding: 0 80px;
    display: flex;
    flex-direction: column;
    align-items: flex-
    start; justify-content:
    center;

  }
  #hero h1,p{

    font-size: 50px;
    line-height:
    20px; color:
    white;
    font-family: 'Source Sans Pro', sans-serif;

  }
```

script.js:

```
  window.watsonAssistantChatOptions = {
    integrationID: "22d1b5be-b60f-4ea2-bd4a-3a669f49464b", // The ID of this integration.
    region: "us-south", // The region your integration is hosted in.
    serviceInstanceID: "d3c7428c-3428-401f-835c-954121e28aaf", // The ID of
  your service instance.
    onLoad: function(instance) { instance.render(); }
   };
   setTimeout(function(){
    const t=document.createElement('script');
    t.src="https://web-chat.global.assistant.watson.appdomain.cloud/versions/" +
  (window.watsonAssistantChatOptions.clientVersion || 'latest') +
  "/WatsonAssistantChatEntry.js";
    document.head.appendChild(t);
    });
```

13.1 GITHUB AND PROJECT DEMO LINK

13.1.1 GUTHUB LINK

https://github.com/IBM-EPBL/IBM-Project-46593-1660751161.git

13.1.2 PROJECT DEMO LINK

https://drive.google.com/file/d/1aZN3kUrs02KP54U7iV4mcjmgBpOD5K3g/view?usp=share_link

CHAPTER 14

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