PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY, AND ENTREPRENEURSHIP

PROJECT REPORT

ARTIFICIAL INTELLIGENCE

AI BASED DISCOURSE FOR BANKING INDUSTRY

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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

The Internet Banking Industry has seen tremendous growth in recent years mainly due to the massive advancement in technology. The involvement of the internet in the banking sector has made it more viable and user friendly than ever before. Customers of any bank could access their account details and the transactions across the world with ease and can work with ease around any branches. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficiency delivery of service. In order to overcome the user satisfaction issues associated with banking services, a chatbot will provide personal and efficient communication between the user and the bank. A smart chatbot takes a query from the user and gives appropriate response for the same. It is built to be the overall virtual assistant that can facilitate customers to ask banking related questions without visiting the bank or calling up customer service centers as well as providing them with relevant suggestions.

1.2 PURPOSE

The core purpose of banking chatbots is to provide the customers with prompt service and to improve the operational efficiency of the bank and its employees. It gives customers 24/7 access to support, clear all their queries and guide them through all the banking processes. Chatbots allow businesses to connect with customers in personal way without the expenses of human representatives. However, they also help staff and prevent stressful situation that arise from direct communication with clients.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing Problem

Everybody's life depends on banking. Therefore, activities related to it take up a substantial amount of one's life. Customers must thus be able to easily access it from everywhere, at all times, and 24 hours a day. Unfortunately, this is not the case in the banking industry today, and customers are forced to visit banks for all tasks and inquiries. A smart solution is thus required to deal with the issue.

2.2 References

1. **Paper Title:** Conversion to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language
   Authors: Sasha Fathima Suhel, Vinod Kumar Shukla, Sonali Vyas, Ved Prakash Mishra
   Year: 2020
   Inference: This paper discusses strategies for handling dialog in the banking and finance area. It explores the feasibility of the growing use of chatbot by the banking industry. While discussing about the framework of a chatbot, it states that while opening a new account the chatbot must collect information of parameters that are considered most important and crucial data required for their database from the customer. A reference id can be generated which can be used by the customer whenever they want to access it.

2. **Paper Title:** A Smart Chatbot Architecture based NLP and Machine Learning for Health Care Assistance
   Authors: Soufyane Ayanouz, Boudhir Anouar Abdelhakim, Mohammed Benhmed
   Year: 2020
   Inference: The most important step in creating a chatbot is selecting the right engine for NLP (Natural Language Processing), i.e., a speech based chatbot would require a speech recognition engine. Better precision can be achieved by increasing the accuracy of the bot and this requires a huge amount of data to train and model it. Some of the limitations of the existing chatbots are its inability to recognize grammatical mistakes, they are closed-domain (i.e., answers questions defined in a database), and the answers can be ambiguous.

3. **Paper Title:** A review of Chatbots in Banking sector
   Authors: Shashank Bairy R
   Year: 2021
   Inference: This paper discusses the role that a chatbot plays in the banking sector, anatomy of chatbot and the advantages of using chatbots in the banking sector. It mentions the basic components of a chatbot (User interface, User message analysis component, Data manager, Dialogue manager, Response generator). A good implementation of a chatbot can bring several benefits to the banking sector such as 24/7 customer service availability, increased productivity, assist employees, personalized marketing, etc. Further, they have discussed about the improvements that can be made in the chatbot to serve customers better.

   4. Paper Title: Artificial intelligence in Banking sector: Evidence from Bahrain
   Authors: Yomna Abdulla, Rabab Ebrahim, Sumathi Kumaraswamy
   Year: 2020
   Inference: Artificial intelligence applications and robotic process automation for chatbots are discussed. Findings highlight that a high priority is given to the digital transformation journey in banks, which suggests that further development and implantation of technology in banks will be seen in near future.

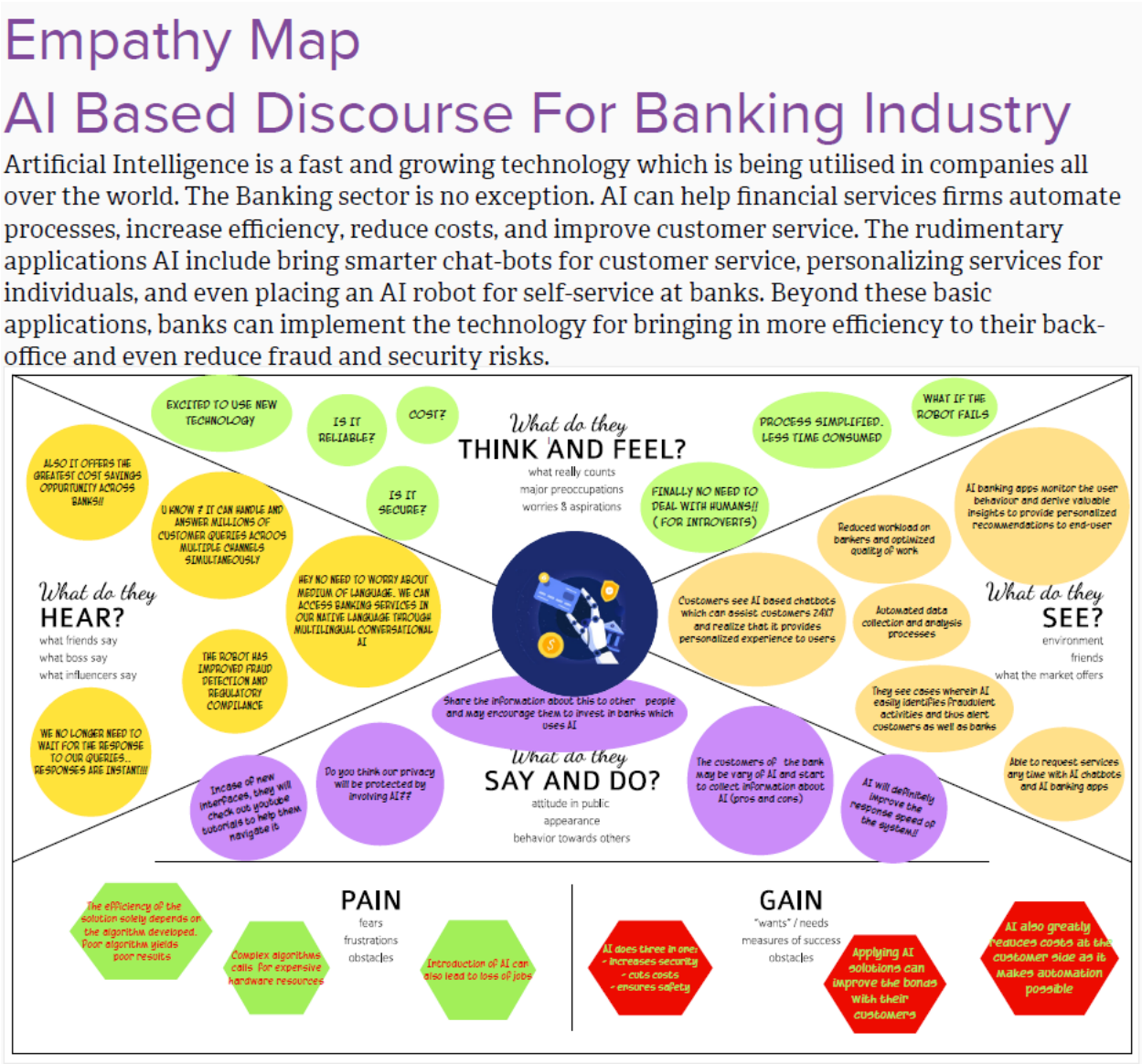
2.3 Problem Statement

Everyone's life depends heavily on banking. The bank's customers are unable to immediately get answers to simple queries about opening new accounts, using net banking, or the types of accounts that are offered. Regardless of where they are, they have no way to communicate with banking staff members around the clock. Customers find it nearly impossible to use banks without interfering with their daily schedules due to the bank's strict operating hours. Therefore, a technical solution is required so that all clients, regardless of their age, location, or level of education, can promptly and instantly receive answers to their banking-related questions. As a result, a chatbot powered by AI that is accessible to everyone can be created for this purpose. This chatbot will be trained to answer all queries in relation to banking appropriately.

CHAPTER 3

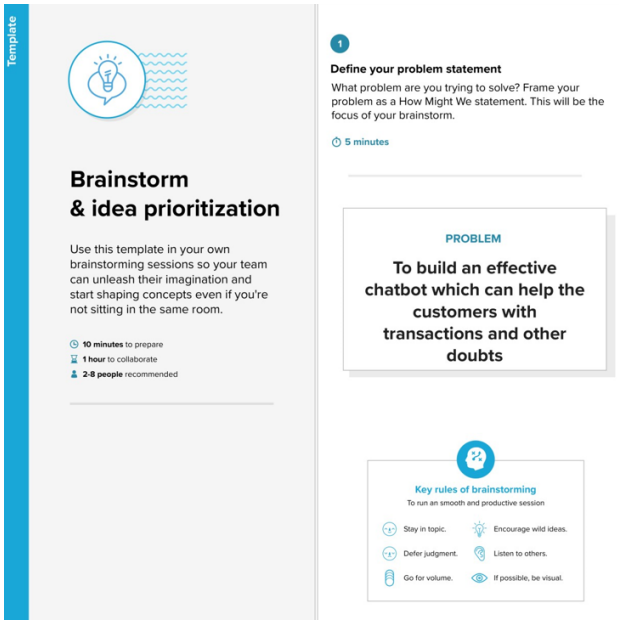
IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas

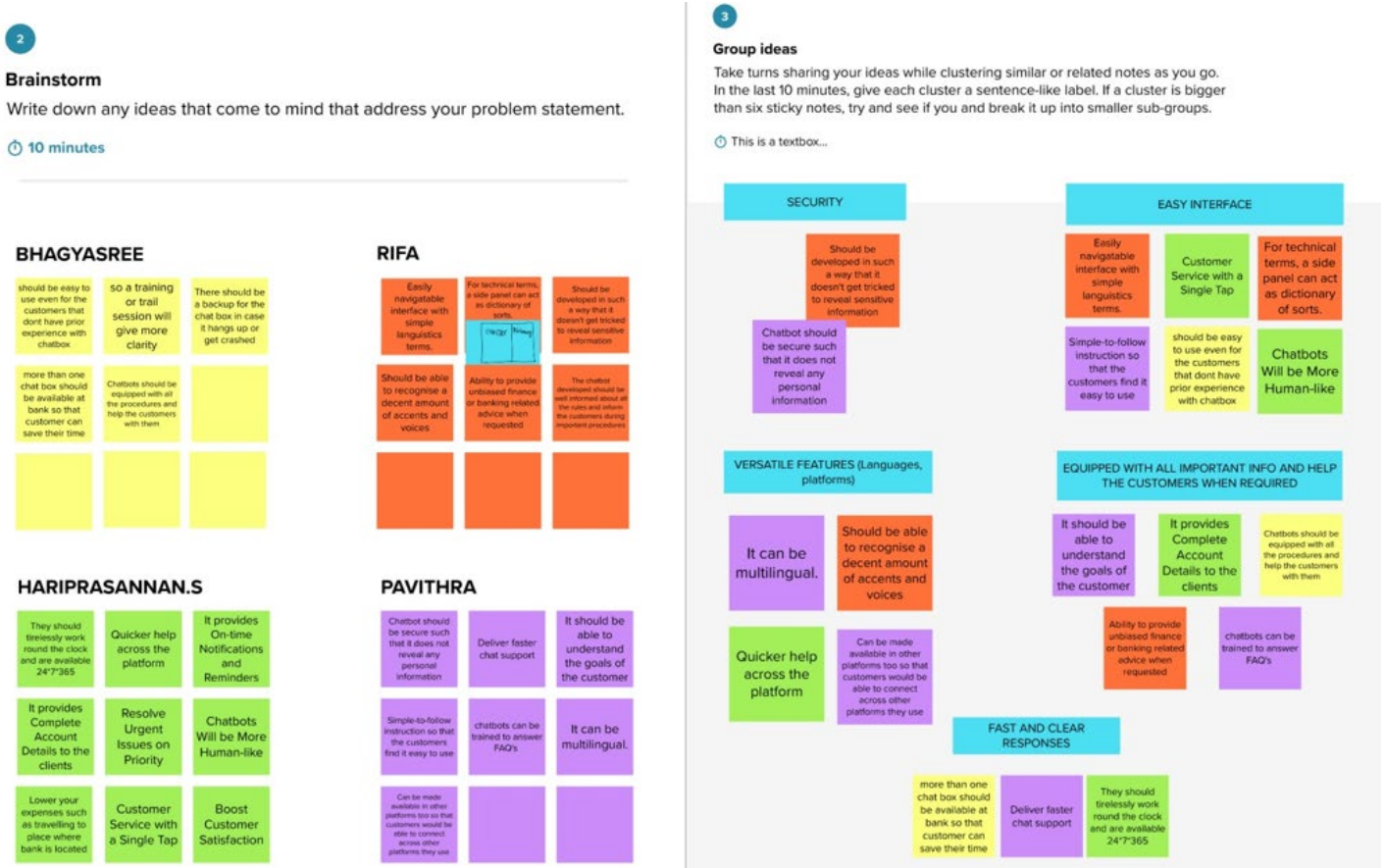


3.2 Ideation and Brainstorming

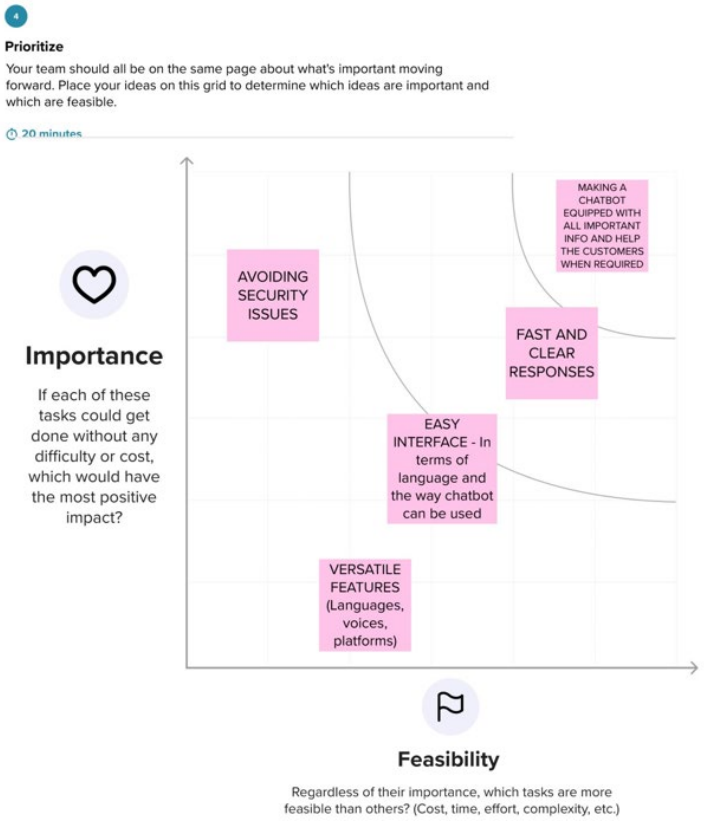
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization



3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	As digitization was introduced in various facets of human life, the customers of banks wanted immediate, personalized and accurate interactions to clarify their doubts and access required information 24/7. There is also the added pressure on bank to improve the quality of the service that they are providing without sacrificing time to similar user queries.
2.	Idea / Solution description	To create an intelligent system which can attend to the needs of the customers and be ready to answer any question 24/7. Some of the basic questions that it should be able to answer are: process to create a bank account, loan and banking queries, questions about net banking.
3.	Novelty / Uniqueness	Creating a chatbot can make the interactions personalized. This chatbot can be made unique by training it to decipher a number of languages. One another unique feature that can be added is the ability to provide sound and impartial advices for the betterment of the customers.
4.	Social Impact / Customer Satisfaction	Building a chatbot such that it answers all basic queries can greatly increase customer satisfaction as it prevents them from going to bank for every other inconvenience. Personalizing the experience can make the customer feel safe and familiar with the bank. Quick responses to questions will always increase the satisfaction of the customers.
5.	Business Model (Revenue Model)	Building chatbots does not use a lot of resources. It is mainly built using the already available database and stored information. Employing these can greatly reduce the workload of the bank employees who are supposed to respond to such queries, making them available to work on others things. Thus, this can result in the improvement of the bank's quality of service.
6.	Scalability of the Solution	Chatbots is a service with endless possibilities. It can be later designed to recognize various voices. The basic bot can answer only queries, it can be later trained to provide sound and impartial advices. Chatbots can also be made to market the bank's new features during conversations with the customers.

3.4 Problem Solution Fit

Problem - Solution fit canvas 2.0 — **Purpose / Vision:** AI based discourse for Banking Industry

Define CS, fit into CC

1. CUSTOMER SEGMENT (S) — CS

Customers of bank:

- who are opening an account for the first time
- who are intrested in applying loans
- who cannot travel easily or at a place far away from the bank
- who require immediate responses

6. CUSTOMER CONSTRAINTS — CC

- Customers should have good internet facility
- Older customers unfamiliar with operating digital equipments like phones, laptops, etc
- Inability of the customers to convey their problems properly and accurately

5. AVAILABLE SOLUTIONS — AS

- Customer care lines help the customers by answering their basic doubts and concerns.
- Net banking allows the customers to pay for products / services from the comfort of their home.
- Email can also be used

These methods are however not time efficient and doesn't provide much help regarding most aspects of banking

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS TO BE DONE / PROBLEMS — J&P

i) Answering the queries of the customers regarding creation of new accounts or loans

ii) Making the service cost and time effective by providing immediate and accurate answers

iii) Providing service 24/7

9. PROBLEM ROOT CAUSE — RC

- Banking is an essential part of everyone's life and it can become complicated quite easily. Hence services which can guide them is required
- People have become busy and value time a lot. Hence prefer immediate response
- Digitisation and usage of AI in almost every other job / task.

7. BEHAVIOUR — BE

- Customers constantly contact the banks to clear their queries.
- Sometimes they extensively browse the web to find suitable answers for their queries in case of poor response.
- They pile up all their queries and visit the bank to rectify it.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS — TR

- Realizing that most of the basic activities are automized and AI's general growth and usage in activities
- Coming across similar chatbots and realising its ease and versatility

4. EMOTIONS: BEFORE / AFTER — EM

BEFORE: Doubtful, frustrated, Scared, tired

AFTER: Confident, Satisfied, Secure, Relieved

10. YOUR SOLUTION — SL

- Developing an AI based chatbot
- It answers all queries related to account creation, loans, etc.
- Possible to provide immediate responses
- Makes people lives easier by allowing them to do banking from their homes
- Banks can use the workforce to concentrate in other important jobs / tasks.

8. CHANNELS of BEHAVIOUR — CH

ONLINE

Customers browse their queries and look up youtube tutorials to know abt account creation, loans, etc. They also post their queries in websites.

OFFLINE

Customers recognise all their queries and problems and go to the bank it solve it at once. They talk with the bank employees and gather info about things they require.

Extract online & offline CH of BE

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 Functional Requirements

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Greetings	Recognize greetings and respond accordingly
FR-2	User Registration	Registration through Form Registration through Gmail Registration through Linkedin
FR-3	Confidentiality and Security	The data exchanged and in particular the conversations between users and the chatbot. For highly confidential critical situations, it may be necessary to ensure that there is no leakage of information through a code audit or certification.
FR-4	Navigating to topic of query	Ask the customer for the topic of interest by displaying the available topics that can be discussed.
FR-5	Current Account	Information about creation of account, documents required to do so, deletion of account, steps to update an account for 3 types of account to be present.
FR-6	Savings Account	Information regarding different types of savings account is given like the eligibility criteria and documents required for it.
FR-7	Loan Account	Basic information like the interest rates, eligibility criteria for different types of loan accounts are present.
FR-8	Net Banking	Basic answers to queries in relation to Net Banking – Registration process, its features, errors faced during the process.
FR-9	General Queries	Information regarding some of the FAQ is to be updated in the bot.
FR-10	Python Flask and Web Page	A website for hosting the chatbot.

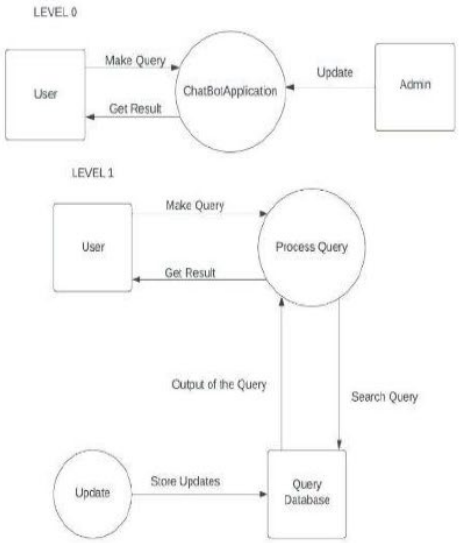
4.2 Non – Functional Requirements

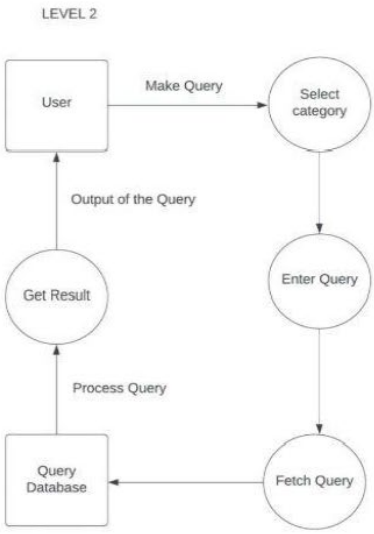
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	These requirements focus on the appearance of the user interface and how people interact with it. They should describe colors, screen size, button size, etc.
NFR-2	**Security**	To protect sensitive data & secure databases to store clients' records.
NFR-3	**Reliability**	Has the ability to perform the promised service dependably and accurately.
NFR-4	**Performance**	Effective utilization of data, unnecessary data removed, error detection and correction can be easily done
NFR-5	**Availability**	Analysis service provided various regions and at any time (24/7).
NFR-6	**Scalability**	Get in touch with boost AI to learn more about how chatbots for customer service can improve customer service outcomes and reduce costs.

CHAPTER 5

PROJECT DESIGN

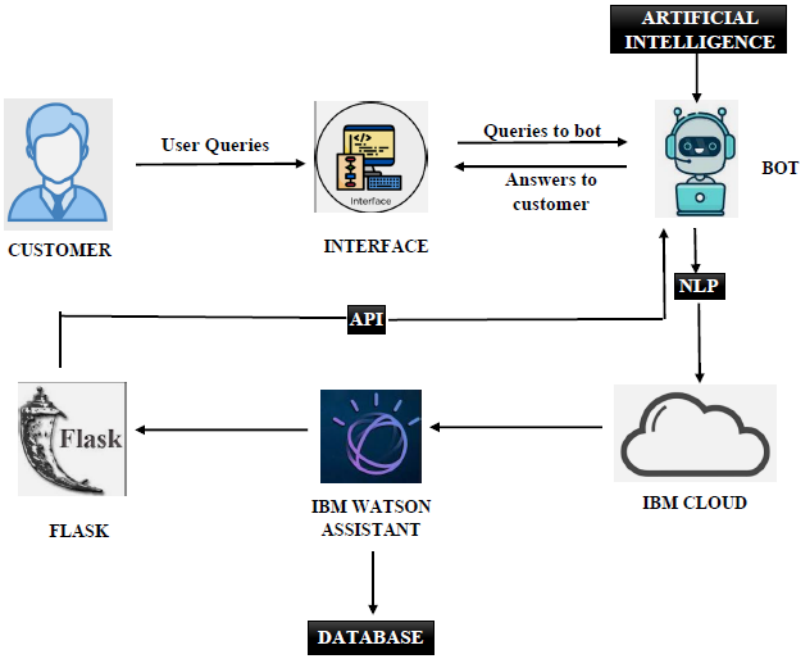
5.1 Data Flow Diagrams



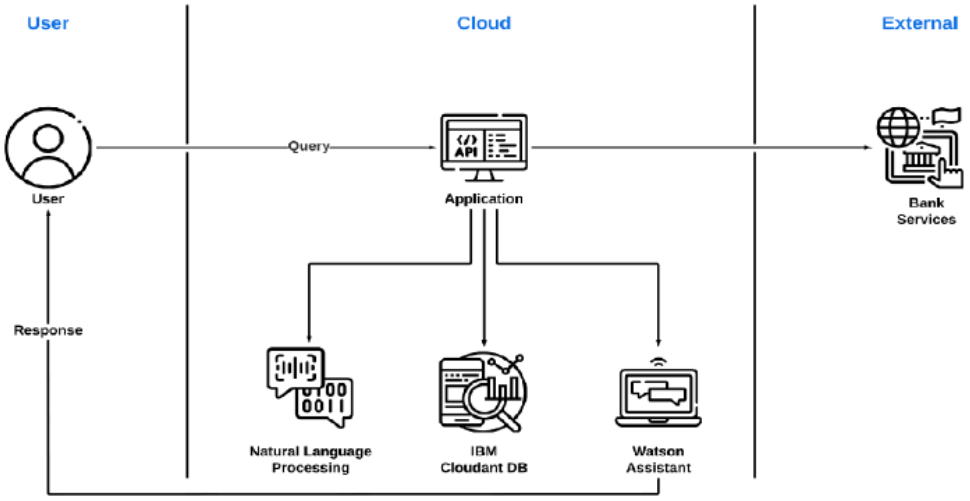


5.2 Solution & Technical Architecture

Solution Architecture



Technical Architecture



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority
Customer (Web user)		USN-1	As a user, I would like to see an assistant to guide me with the processes. This is built using Watson Assistant.	I can access the basic chatbot window.	High
	Greetings and Navigating to topic of query	USN-2	The queries and concerns of the user is understood. The assistant is developed to be a chatbot who is able to assist the customer through a conversation.	I can understand the chatbot	Moderate
	Savings Account Action	USN-3	As a user I would like to know about the information on how to create a savings account. We create skills to guide the customer by asking the type of savings account the user requires, documents required for it, etc	I can get my queries related to the workings of the savings account clarified.	High
	Current Account Action	USN-4	As a user I want to get answers regarding queries related to current account. The bot gives response based on the type of the user account and also guides them in the procedure to close the account	I can get my queries related to the workings of the current account clarified.	High

	Loan Account Action	USN-5	As a user, I want to get queries related to loan clarified. The bot provides information based on the type of loan	I can get my queries related to the workings of the loan account clarified.	High
	General Queries Action	USN-6	As a user, I want answers to all the general queries in relation to banking. The bot helps in providing response depending on the question asked from the options provided.	I can get my general queries clarified.	High
	Net Banking Actions	USN-7	As a user, I want to know the procedure to do net banking. The bot provides information regarding it and also answers other basic questions about net banking	I can get my queries related to net banking clarified.	High
Administrator	Python Flask and Web Page	USN-8	The Flask website is integrated with the bot to provide a framework.		High
		USN-9	HTML is used to create the front – end part of the web page	I can view the designed webpage	High
		USN-10	Run the application and deploy the bot to be used for servicing the customers of the bank as an intelligent chatbot assistant.	A URL is generated which hosts the chatbot	High
		USN-11	Improving the efficiency and overall experience of using the bot	The chatbot appears less robotic	Moderate

CHAPTER 6

PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint - 1	Building the assistant – IBM Watson	USN - 1	As a user, I would like to see an assistant to guide me with the processes. This is built using Watson Assistant.	10	High	Rifa S
Sprint - 1		USN - 2	The queries and concerns of the user is understood. The assistant is developed to be a chatbot who is able to assist the customer through a conversation.	4	Moderate	Rifa S
Sprint – 1	Savings Account Related Actions – IBM Watson	USN - 3	As a user I would like to know about the information on how to create a savings account. We create skills to guide the customer by asking the type of savings account the user requires, documents required for it, etc	6	High	Bhagyasree P
Sprint – 2	Current Account Related Actions – IBM Watson	USN - 4	As a user I want to get answers regarding queries related to current account. The bot gives response based on the type of the user account and also guides them in the procedure to close the account	5	High	Pavithra M
Sprint - 2	Loan Account Related Actions – IBM Watson	USN - 5	As a user, I want to get queries related to loan clarified. The bot provides information based on the type of loan	5	High	Hariprasannan S
Sprint - 2	General Query Related Actions – IBM Watson	USN - 6	As a user, I want answers to all the general queries in relation to banking. The bot helps in providing response depending on the question asked from the options provided	5	High	Bhagyasree P
Sprint - 2	Net Banking Related Actions – IBM Watson	USN - 7	As a user, I want to know the procedure to do net banking. The	5	High	Rifa S

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
			bot provides information regarding it and also answers other basic questions about net banking			
Sprint - 3	Building Python Code	USN – 8	The Flask website is integrated with the bot to provide a framework.	10	High	Rifa S Pavithra M
Sprint - 3	Building HTML code	USN – 9	HTML is used to create the front – end part of the web page	10	High	Rifa S Bhagyasree P
Sprint - 4	Deployment of the bot	USN – 10	Run the application and deploy the bot to be used for servicing the customers of the bank as an intelligent chatbot assistant.	15	High	Rifa S Pavithra M Bhagyasree P Hariprasannan S
Sprint – 4		USN – 11	Improving the efficiency and overall experience of using the bot	5	Moderate	Rifa S Pavithra M Bhagyasree P Hariprasannan S

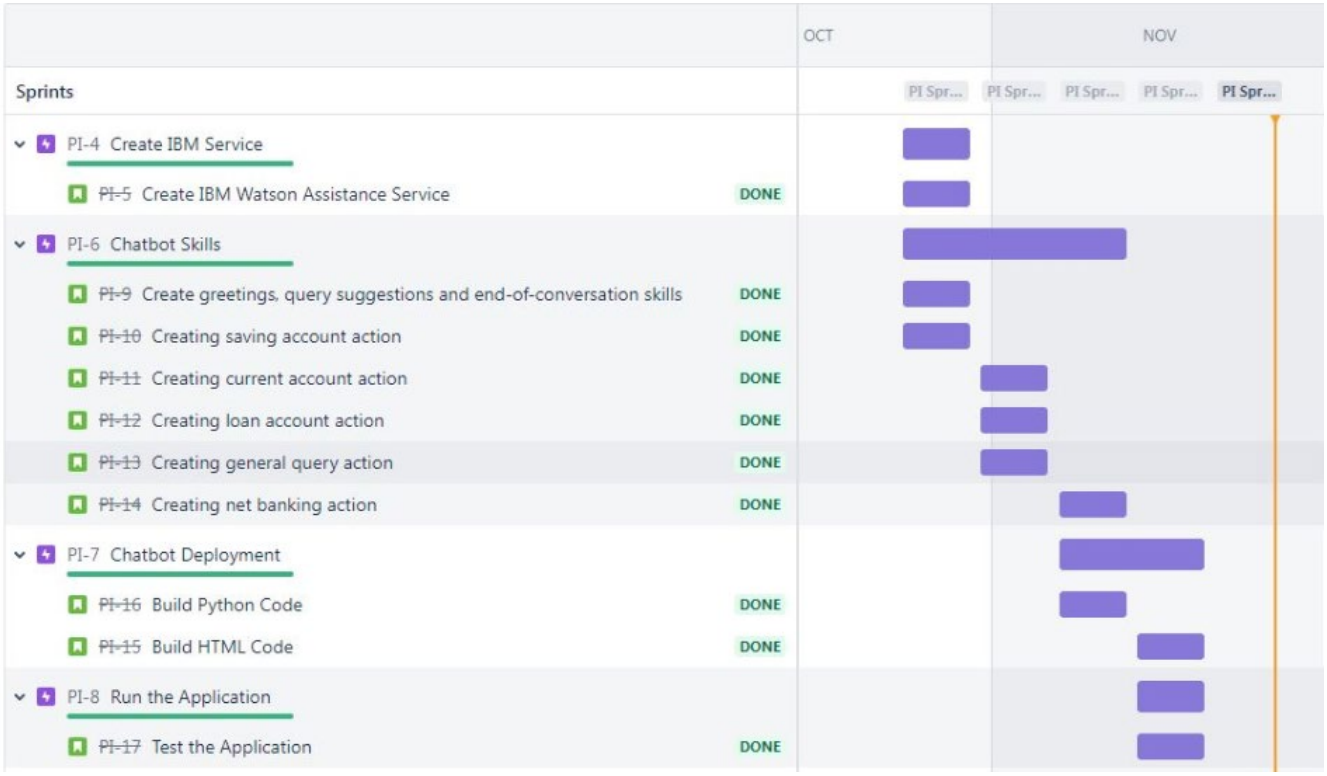
6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	01 Nov 2022	02 Nov 2022	15	10 Nov 2022
Sprint-2	20	6 Days	03 Nov 2022	05 Nov 2022	15	15 Nov 2022
Sprint-3	20	6 Days	10 Nov 2022	12 Nov 2022	15	18 Nov 2022
Sprint-4	20	6 Days	13 Nov 2022	19 Nov 2022	15	21 Nov 2022

Velocity table

Sprint	Total Story Points	Duration	Average Velocity
Sprint-1	20	9 days	2.22
Sprint-2	20	12 days	1.67
Sprint-3	20	7 days	2.86
Sprint-4	20	8 days	2.5
Overall	**80**	**36 days**	**2.22**

6.3 Reports from JIRA



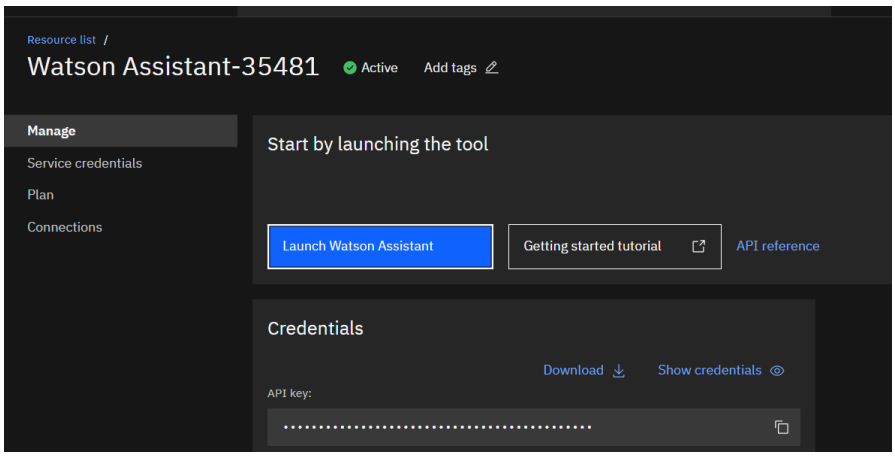
CHAPTER 7

CODING AND SOLUTIONING

7.1 CHATBOT

IBM Watson assistant was used to build this virtual chatbot

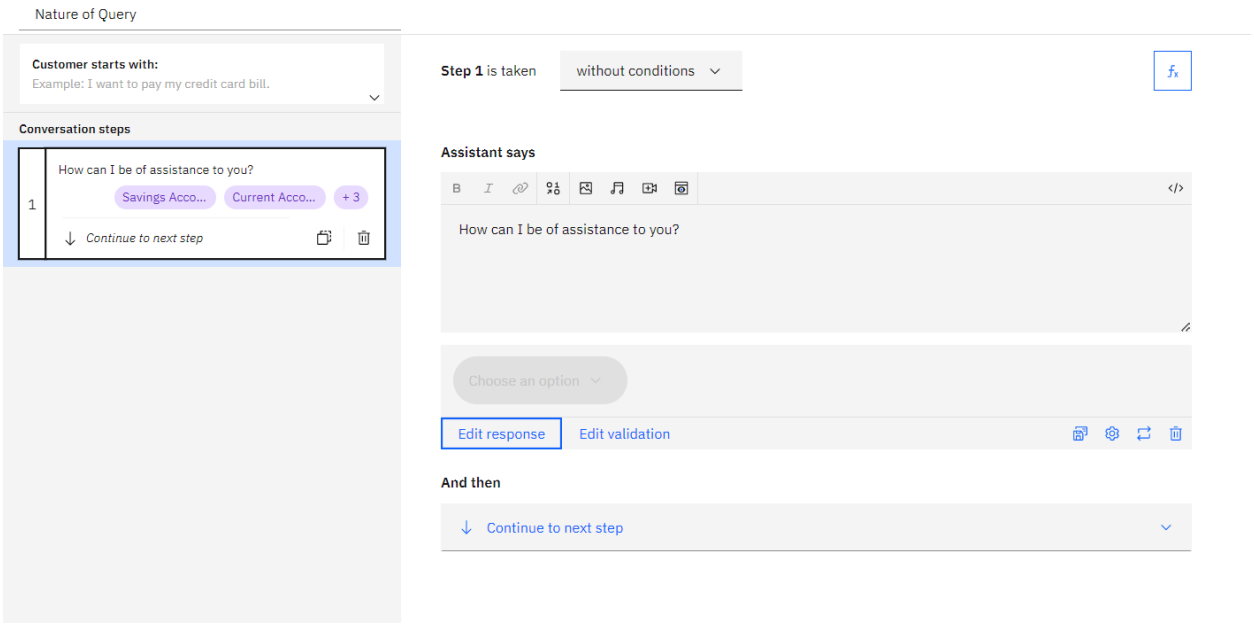
i) IBM Watson Assistant was created and Launched

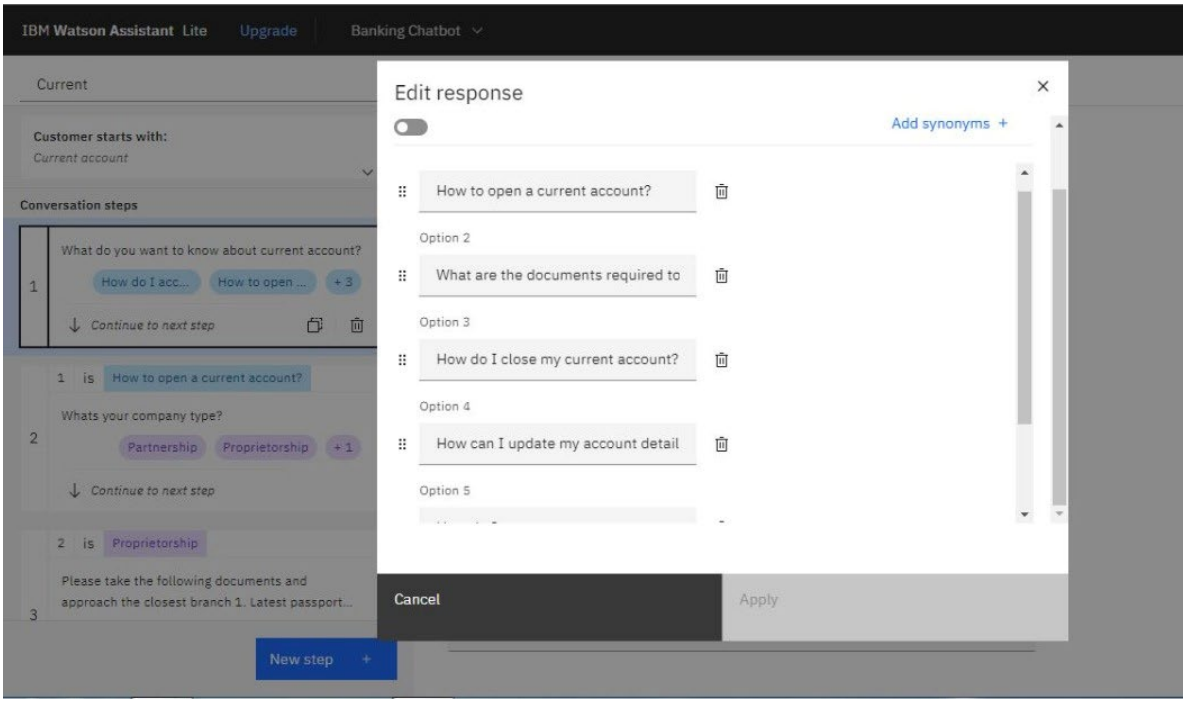


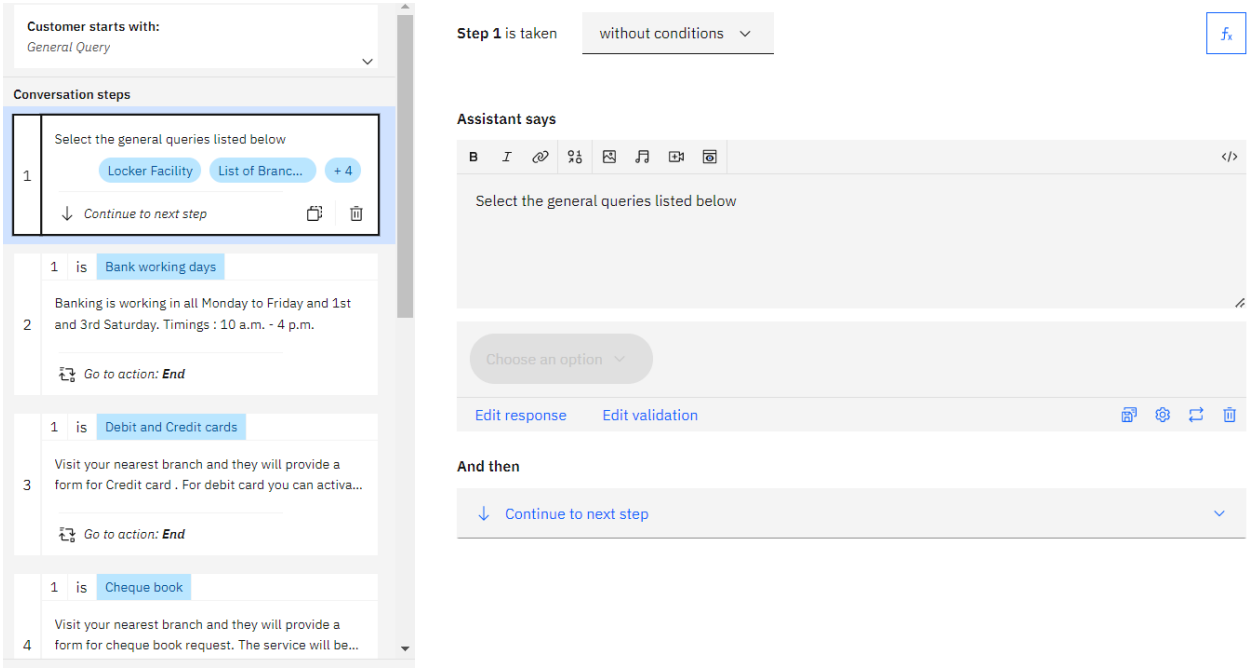
ii) Various actions were created. The actions created are shown below

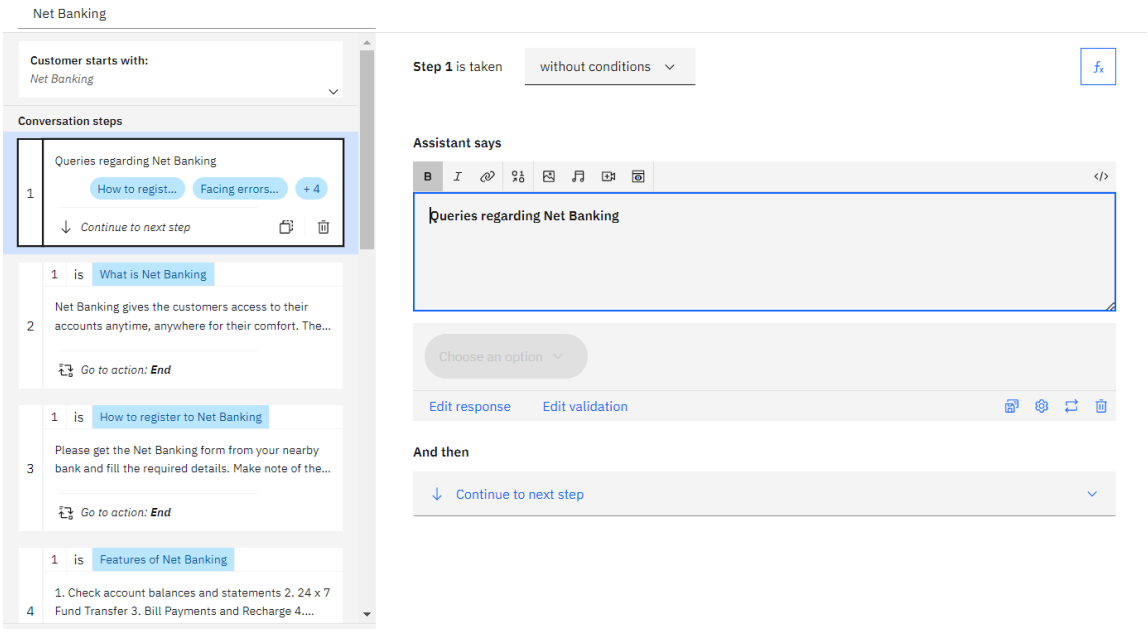
Name
End greeting
Net Banking
Greetings
Loan account
End
Nature of Query
Savings account
Current account
General Query

iii) Actions are updated to fulfill their purpose






Customer starts with:
General Query
Conversation steps
1
Select the general queries listed below
Locker Facility
List of Branc...
+ 4
Continue to next step
2
1 is Bank working days
Banking is working in all Monday to Friday and 1st and 3rd Saturday. Timings : 10 a.m. - 4 p.m.
Go to action: End
3
1 is Debit and Credit cards
Visit your nearest branch and they will provide a form for Credit card . For debit card you can activa...
Go to action: End
4
1 is Cheque book
Visit your nearest branch and they will provide a form for cheque book request. The service will be...
Step 1 is taken
without conditions
Assistant says
Select the general queries listed below
Choose an option
Edit response
Edit validation
And then
Continue to next step


Net Banking
Customer starts with:
Net Banking
Conversation steps
1
Queries regarding Net Banking
How to regist...
Facing errors...
+ 4
Continue to next step
2
1 is What is Net Banking
Net Banking gives the customers access to their accounts anytime, anywhere for their comfort. The...
Go to action: End
3
1 is How to register to Net Banking
Please get the Net Banking form from your nearby bank and fill the required details. Make note of the...
Go to action: End
4
1 is Features of Net Banking
1. Check account balances and statements 2. 24 x 7 Fund Transfer 3. Bill Payments and Recharge 4....
Step 1 is taken
without conditions
Assistant says
Queries regarding Net Banking
Choose an option
Edit response
Edit validation
And then
Continue to next step

7.2 Feature 2

Python Flask:

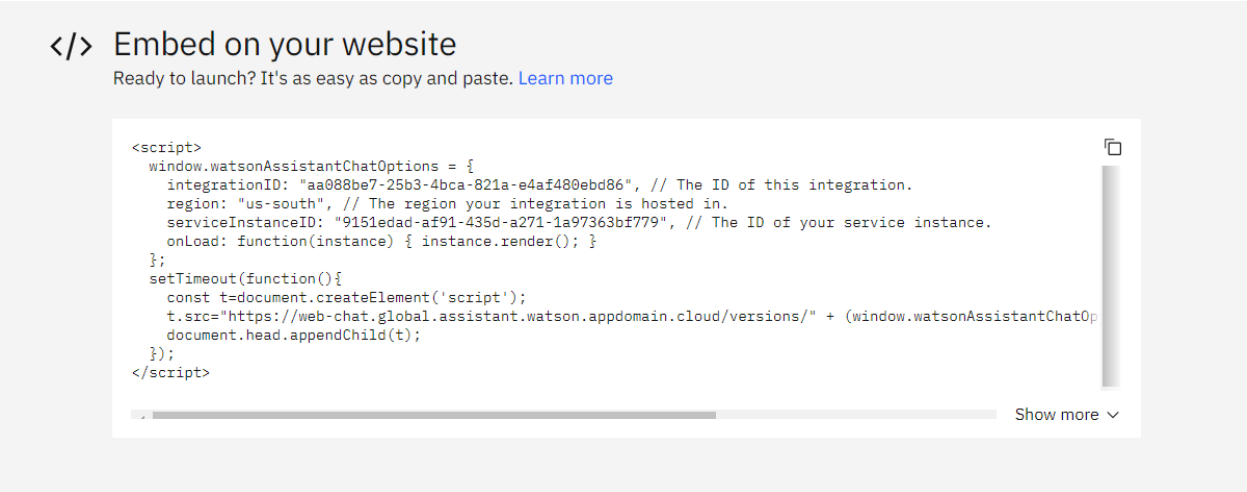
Flask is a web framework, it's a Python module that helps in developing web applications easily. This helps in integrating the chatbot with the webpage designed for this purpose. It runs the application and also provides the URL to access it.

In this project we create an application for our chatbot. The code to do so is given below:

```
#IMPORTING LIBRARIES
from flask import Flask, render_template

#CREATING FLASK APPLICATION AND LOADING
app = Flask(__name__)

#ROUTING TO THE HTML PAGE
@app.route('/')
def chatbot():
    return render_template('bot.html')

#MAIN FUNCTION - Runs the application in localhost
if __name__ == '__main__':
    app.run()
```

Web Page:

HTML and CSS were used to design a web page to host the virtual banking chatbot designed. To incorporate the chatbot, the pre described script in the Watson assistant is included in the body tag of the HTML code.



CHAPTER 8

TESTING

8.1 Test Cases

	Test Scenarios
1	Verify user is able to see the chatbot icon when website is launched
2	Verify if user is able to send messages
3	Verify user is able to select the action suggested by chat
4	Verify user is able to receive dynamic greeting message
5	Verify if chatbot is able to answer queries regarding Savings Account
6	Verify if chatbot is able to answer queries regarding Current Account
7	Verify if chatbot is able answer queries regarding general banking queries
8	Verify if chatbot is able answer queries regarding Net banking queries
9	Verify that users can ask more than one query at a time

8.2 User Acceptance Testing

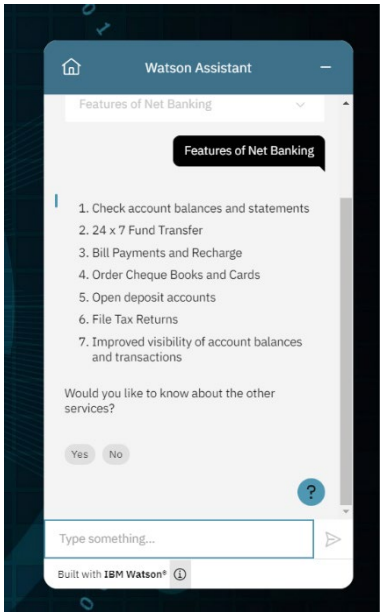
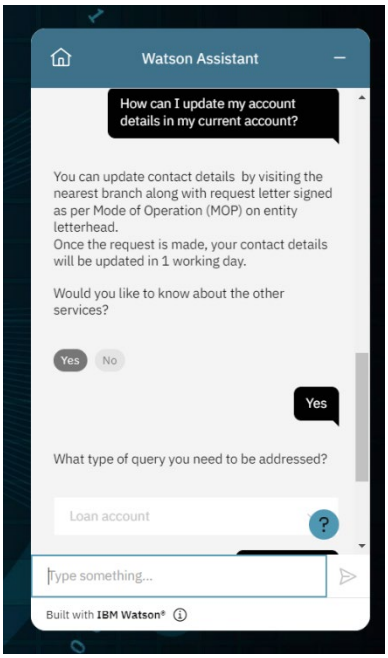
TEST CASE ID	FEATURE TYPE	COMPONENT	TEST SCENARIO	EXPECTED RESULT	ACTUAL RESULT	STATUS
TC-01	UI	WEB PAGE LAUNCH	Verify user is able to see the chatbot icon when website is launched	IT should show the chat icon	Working as expected	Pass
TC-02	Functional	Chatbot	Verify if user is able to send messages.	Chat bot responses with greetings	Works as expected	Pass
TC-03	Functional	Chatbot	Verify user is able to select the action suggested by chat	It should list the queries and display the answer	Working as expected	Pass
TC-04	Functional	Backend	Verify user is able to receive dynamic greeting message	It should be popup when clicking of the bot icon	Working as expected	Pass
TC-05	Functional	Chatbot	Verify if chatbot is able to answer queries regarding Savings Account	Chatbot follows the flow and responds appropriately	Working as expected	Pass
TC-06	Functional	Chatbot	Verify if chatbot is able to answer queries regarding Current Account	Chatbot follows the flow and responds appropriately	Working as expected	Pass

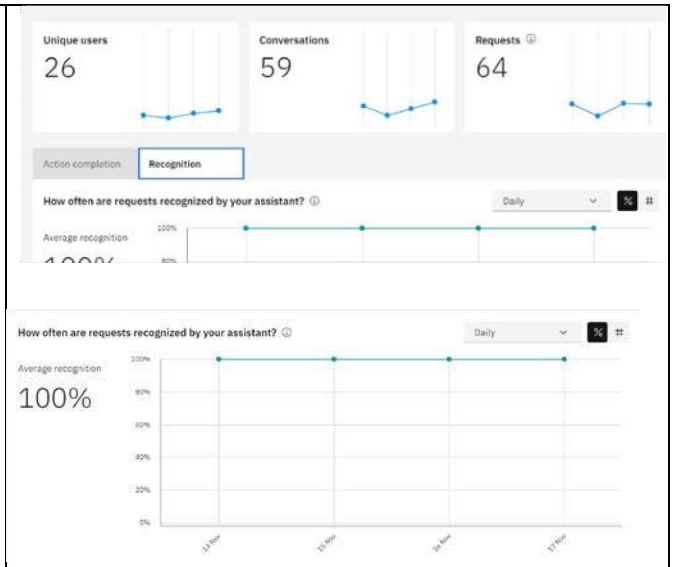
TC-07	Functional	Chatbot	Verify if chatbot is able answer queries regarding general banking queries	Should allow the user to tell their queries	Working as expected	Pass
TC-08	Functional	Chatbot	Verify if chatbot is able answer queries regarding Net banking queries	Chatbot should display details regarding net banking	Working as expected	Pass
TC-09	Functional	Chatbot	Verify that users can ask more than one query at a time	Chatbot should ask the user if they have any other query and go in flow with the process	Working as expected	PASS

CHAPTER 9

RESULTS

9.1 Performance Metrics

S. No.	Parameter	Values	Screenshot
1.	Model Summary	The chatbot is used by the user to interact and select queries that are populated based on frequently asked question of banking customers. There can be multiple instances of a single chatbot inquiring different user at the same time. It quickly responds with expected answers to frequently asked customer queries. It can be scaled as per therequirements of the bank to include answers to queries relatedto any new feature or service introduced by the bank.	 

2.	Accuracy	Training Accuracy – 100% Validation Accuracy – 100%	

CHAPTER 10

ADVANTAGES AND DISADVANTAGES

Advantages: -

1. It provides quick response to the customers.
2. It is the best option to handle the *'n'* number of conversations with 24×7 engagement.
3. It provides impartial answers as long as the database on which it runs is impartial
4. It generates a lot of customer support requests; bots can be scaled easily to handle thousands of requests and deliver a seamless experience.
5. It is effective tool that can significantly reduce the customer support team's workload.
6. It gathers customer data and provide useful insights

Disadvantages: -

1. AI chatbots can imitate human responses, but they are still far from imitating human emotions. Many customers want to connect with brands on a level that is not yet possible with AI chatbots.
2. It requires collection of huge collections of data such as customer names, email addresses, and more.
3. They are still incapable of making immediate, complicated decisions. Although they can handle simple queries, they may fail to address complex requests.
4. They are unable understand human emotions.
5. It can easily misinterpret questions from free text or voice.
6. There is a risk of errors or bugs.

CHAPTER 11

CONCLUSION

As we can see, chatbots and any other type of AI assistants are of great use in any type of industry. The chatbot designed answers all queries regarding the savings account, current account, loan account, net banking and other general queries. This chatbot can be hosted in any website as per the bank's choice. Chatbots addresses the queries of customers immediately and effectively in a cost-efficient manner. It eliminates the need for a massive customer care workforce and even reduces the workload of the bank employees whose efforts can be used elsewhere. AI chatbots provides 24/7 service to clear all customer queries and guide them through all banking processes.

CHAPTER 12

FUTURE SCOPE

1. **Voice-Bot**

Voice-Bots are also set to Help Businesses Enhance Customer Service. As customers' attention spans decrease and demand faster methods of consuming information, companies are increasingly turning to voice search and text-based messaging platforms to connect with their target audiences. Our chatbot can be designed to take voice inputs and work with it.

2. **Live Chatbot to Bring a Human Touch**

Chatbots are increasingly used in different sectors. They can communicate with your target market by speaking with them in complete sentences with a natural and easy-going conversational flow. Some markets that these bots serve include customer service and retail, amongst others. In Live Chatbot, it feels like we are communicating with a human. The difference between our conventional Chatbot and live chatbot is, instead of getting pre designed / instructed replies we get replies as we are talking with a human.

3. **Chatbot that automate payments**

The future of chatbots is that it will automate simple payments and allow users to pay directly over live chat or Facebook Messenger apps. The instant process makes the customer happy and improves customer satisfaction. Hence the chatbot can be designed to allow these.

4. **Bots for internal use for enterprises**

There are many use cases for AI chatbots with each variant application striving towards one common goal – to improve the experience and efficiency of the user.

Here is how chatbot trends can be used across enterprise functions:

- Human Resource (HR): Chatbots can be used to keep the pulse of your employees, answer basic HR-related questions, and complete transactional HR services.
- Employee onboarding: Onboarding is considered to be a tedious and time-consuming task. Chatbots can initiate the interview process by fielding screening questions and capturing the answers. It also helps in guiding new hires through company policies.
- Internal help desk: Chatbot can handle the common queries and allow IT service desk agents to work on complex queries. The bot learns the answers to repetitive queries and improves the response time.

The chatbot used in the project is used by the customer. From the above idea, the chatbot application can extended to be used among employees for clearing their queries and doubt.

CHAPTER 13

APPENDIX

13.1 Source Code

Python Flask Code

```python
#IMPORTING LIBRARIES
from flask import Flask, render_template

#CREATING FLASK APPLICATION AND LOADING
app = Flask(__name__)

#ROUTING TO THE HTML PAGE
@app.route('/')
def chatbot():
    return render_template('bot.html')

#MAIN FUNCTION - Runs the application in localhost
if __name__ == '__main__':
    app.run()
```

HTML Code

```html
<!DOCTYPE html>
<html lang = "en">

    <head>
        <meta charset="UTF-8">
        <title>AI BASED DISCOURSE IN BANKING INDUSTRY</title>
        <link rel="stylesheet" href="static/style.css">
    </head>

<body>
    <header>
        <div class="main">

            <div class = "toprow">
                <div class = "heading">
                    <h2 class="textlogo"> BANKING CHATBOT </h2>
                </div>

                <div class="bars">
                    <ul>
                        <li><a href="#">HOME</a></li>
                        <li><a href="#">ACCOUNTS</a></li>
                        <li><a href="#">ABOUT</a></li>
                        <li><a href="#">CONTACT</a></li>
                    </ul>
                </div>
            </div>

            <div class="proname">
                <h1 class="title">AI BASED DISCOURSE FOR  BANKING INDUSTRY</h1>
                <p class="subtext">A chatbot capable of answering queries related to banking</p>
            </div>

            <div class="teamdetails">
                <p class="details">
                    TEAM ID: PNT2022TMID35481<br>
                    TEAM MEMBERS:<br>
                    <span class="tab"></span> 1. Rifa S <br>
                    <span class="tab"></span> 2. Pavithra M <br>
                    <span class="tab"></span> 3. Bhagyashree P <br>
                    <span class="tab"></span> 4. Hariprasannan S <br>
```

```html
            <div class="teamdetails">
                <p class="details">
                    TEAM ID: PNT2022TMID35481<br>
                    TEAM MEMBERS:<br>
                    <span class="tab"></span> 1. Rifa S <br>
                    <span class="tab"></span> 2. Pavithra M <br>
                    <span class="tab"></span> 3. Bhagyashree P <br>
                    <span class="tab"></span> 4. Hariprasannan S <br>
                </p>
            </div>

        </div>
    </header>

    <script>
        window.watsonAssistantChatOptions = {
          integrationID: "aa088be7-25b3-4bca-821a-e4af480ebd86", // The ID of this integration.
          region: "us-south", // The region your integration is hosted in.
          serviceInstanceID: "9151edad-af91-435d-a271-1a97363bf779", // 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>

</body>

</html>
```

CSS Code

```css
*{
    margin: 0;
    padding: 0;
    font-family:Georgia, 'Times New Roman', Times, serif;
}

@font-face {
    font-family: font1;
    src: url(InfraredExtrabold-MWJV.ttf);
}

@font-face {
    font-family: font2;
    src: url(Barlow-Light.ttf);
}

.tab {
    display: inline-block;
    margin-left: 90px;
}

header{
    background-image: url(3.jpg);
    height: 100vh;
    background-size: cover;
    background-position: center;
}

.toprow{
    width: 1200px;
    height: 100px;
    padding-top: 10px;
}

.heading{
    width: 200px;
    float: left;
    height: 70px;
}

.textlogo{
    padding-left: 70px;
    float: left;
    margin-top: 5px;
    padding-top: 15px;
    color: azure;
    font-family: Georgia;
    font-size: large;
}

ul{
    float:left;
    padding-top: 25px;
    padding-left: 260px;
}

ul li{
    display: inline-block;
    align-items: center;
}
```

```css
ul li a{
    text-decoration: none;
    color: aliceblue;
    font-weight: bold;
    padding:10px 30px;
    transition: 0.6s ease;
    font-size: small;
}

ul li a:hover{
    background-color: #4f98b3;
    color: white;
    opacity: 1.0;
}

.proname{
    padding-left: 200px;
    width: 900px;
    height: 250px;
}

.title{
    font-family: font1;
    color: aliceblue;
    letter-spacing: 3px;
    font-size: 70px;
    text-align:center;
}

.subtext{
    font-family: font2;
    font-size: 25px;
    color: aliceblue;
    letter-spacing: 1px;
    padding-top: 15px;
    text-align: center;
}

.teamdetails{
    background-color: rgba(69, 136, 161,0.75);
    color: #fff;
    border-radius: 25px;
    margin-left:320px;
    width: 660px;
    height: 250px;
}

.details{
    color: white;
    opacity: 1.0;
    letter-spacing: 2px;
    justify-content: center;
    line-height: 40px;
    padding-left: 130px;
    font-size: 20px;
}
```

13.2 Links

Github Link: https://github.com/IBM-EPBL/IBM-Project-6685-1658834499

Project Demo Link: https://youtu.be/dQxOmfjVrDI