1. INTRODUCTION

1.1 Project Overview

This project, titled "AI Based Discourse for Banking Industry", aims at providing a platform for customers to clarify their queries online regarding banking. This is achieved with the help of a chatbot that is trained with some of the most frequently asked questions that banking customers usually tend to come up with. The chatbot is created using IBM Watson Assistant and is trained by manually adding the queries to it along with the relevant responses. The chatbot will then be available for use on a website which usually is the bank's website for anyone to access. Customers or anyone in fact can access the chatbot to interact with it and find solutions to their queries.

1.2 Purpose

With banking being an essential service that people require and with it being a slightly complicated and confusing topic for many, a lot of queries naturally tend to arise. For them to be answered as they are predominantly now in a manual aspect either by face to face interactions with a banking employee or through a customer care service, will require a lot of workforce and still end up with long waiting times. Hence, comes the need for an automated solution to the problem which can be easily handled by our chatbot. A chatbot is free, easy to use and is readily accessible at all times and from anywhere. It also provides instant reliable answers to queries and hence eliminating the need for the customers to wait to get their queries cleared. It also ensures that there is no spread of misinformation by providing official and authentic responses to queries straight from the bank sources.

2. LITERATURE SURVEY

2.1 Existing problem

Banks are not able to resolve the queries of customers at all times related to the products or services in a satisfactory way which in turn hinders the customer satisfaction. Customers need to visit banks frequently for simple queries.

2.2 Reference

Paper- 1

Title: Virtual bank assistance: An AI based voice bot for better banking.

Author: Sarath Chandra Oruganti

Year: 2020

Description

A banking bot project is built using AI algorithms that analyze the user's queries and understand the user's message. The system is designed for banks to use where users can ask any bank related questions like loan, account, policy etc which are bank related queries. This application is developed for devices that have internet connectivity. The system recognizes the user's query and understands what he wants to convey and simultaneously answers them appropriately. Bank bot solves the issues a user has and clarifies it with its knowledge.

Advantages

A chatbot can help you provide a strong user experience in a number of ways are Respond immediately, Stay open all time Always, conversational, Cost reduction, Improve loyalty.

Disadvantages:

Banking has become increasingly dependent on information systems and the use of most modern technology has also become increasingly significant. But, the lack of voice assistants is being seen in banks. All banks do have the same features as Net Banking, Credit card

services, etc. Apart from providing Business Intelligence and schemes, services in attracting people, banks should also provide voice assistant services to attract illiterates to use their banking services.

Paper- 2

Title: Drivers of Artificial Intelligence in Banking Service Sectors.

Authors: Mohamed Hussain Thowfeek, Samsudeen Sabraz Nawaz, Mohamed Buhary Fathima Sanjeetha .

Year: 2020

Description

The Banks are constantly forced to transform their operations in order to stay relevant in a complex and competitive sector. To do so, the key is in maintaining customer loyalty which includes addressing the aspects of customer trust, satisfaction, commitment and perceived value. Constant improvements on customer service and the use of advanced technologies can redefine the processes of banking services as proven by Google and Facebook. Yet, many conventional banking services providers fail to provide the needed flexibility and innovative capabilities. Hence, FinTechs are deemed as the more viable breakthrough to conventional banking service sectors.

Advantages

In terms of the technological AI characteristics, this study recommends quality assurance for the black box functionality. In addition, banks need to make their system trustworthy and justifiable, which leads to a particular form of AI control and governance. The identified risk complex requires for an AIadapted risk management.

Disadvantages

The move by banks with many AI start-ups are indications that AI will potentially transform the banking service sectors in the near future. Banks that refuse to adapt and adopt may experience significant losses in terms of turnaround time, cost and market share. The mixed public reactions of eagerness and hesitation towards AI are mainly due to the perceived potentials and risks that are associated Drivers.

Paper-3

Title: A Study on Artificial Intelligence (AI) In Banking And Financial Services.

Author: A. Geetha

Year: 2021

Description

This paper focuses on the artificial intelligence (AI) in the Banking and financial services in Chennai to oversee the application of artificial intelligence methodology in the banks as well as responses from the clients or consumers. Banks and other financial institution can mine the financial transaction data generated by the proliferation of digital payments and banking to better monitor, predict and respond to consumer's behavior.

Advantages

There are also a range of improvements in the way communications, customer support, and recruiting and asset management take place throughout financial sector. Today, for example, stock investing and finance is all about technical skills and divine luck. Yet in the future, with the aid of sentiment analysis, crowd sourced data and algorithms, we will be able to handle money in a much different way.

Disadvantages

The purpose of this article was to determine the most prominent forms of AI within the banking industry. AI-driven customer service, real-time fraud prevention and risk management-it's the last one that might appeal most to those interested.

Paper- 4

Title: To Study the Impact of Artificial Intelligence as Predictive Model in Banking Sector: Novel Approach.

Author: Veeranjaneyulu Veerla

Year: 2021

Description

Artificial Intelligence (AI) has, during the past few years, made many signs of progress which have enabled the creation of professional financing applications, which would, perhaps, disrupt the finance industry. Thus, it is assumed that the AI could not only replace human capital in full or in part but also enhance its performance beyond human benchmarks. For companies around the world, there are a variety of programs. Artificial Intelligence (AI) for successful strategy implementation in India's banking.

Advantages

Natural Language Generation (NLG) enables machines to generate natural language so that machine may interact with human in their natural language. Use Cases: Machines can communicate to human customers in human language in an intelligent and understandable manner.

Disadvantages

A big disadvantage of AI is that it cannot learn to think outside the box. AI is capable of learning over time with prefer data and past experiences, but cannot be creative in its approach.

Paper- 5

Title: Banking with a Chatbot – A Study on Technology Acceptance.

Year: 2021

Description

The implementation of chatbot technology is evolving rapidly in the banking industry, yet customer acceptance is behind. The aim of the present paper is to identify the factors that influence consumers' intention to use chatbot technology applied in the banking industry. The measurement development and hypotheses were based on the technology acceptance model extended with compatibility, customers' perceived privacy risk and awareness of the service

Advantages

There are several managerial implications of this study for the banking sector. First, significant effects of perceived compatibility.

Disadvantages

While the current study adds to the existing literature, its limitations should be acknowledged. First, the questionnaire respondents were mainly young, highly educated individuals whose actions may vary somewhat from the population average. Thus, the study sample is not representative and the findings are not generalizable.

## 2.3 Problem Statement Definition

Banking is one the crucial sector, it deals with financial transactions which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way in turn hinders the customer satisfaction. In order to guide the customers throughout all the financial services provided by the bank, an intelligent system has to be introduced to provide people with the best solution possible. The users are bank customers who needs 24/7 service to clear all their queries and guide them through all the banking processes. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient delivery of service. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. 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 centres as well as providing them with relevant suggestions.

3. IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas
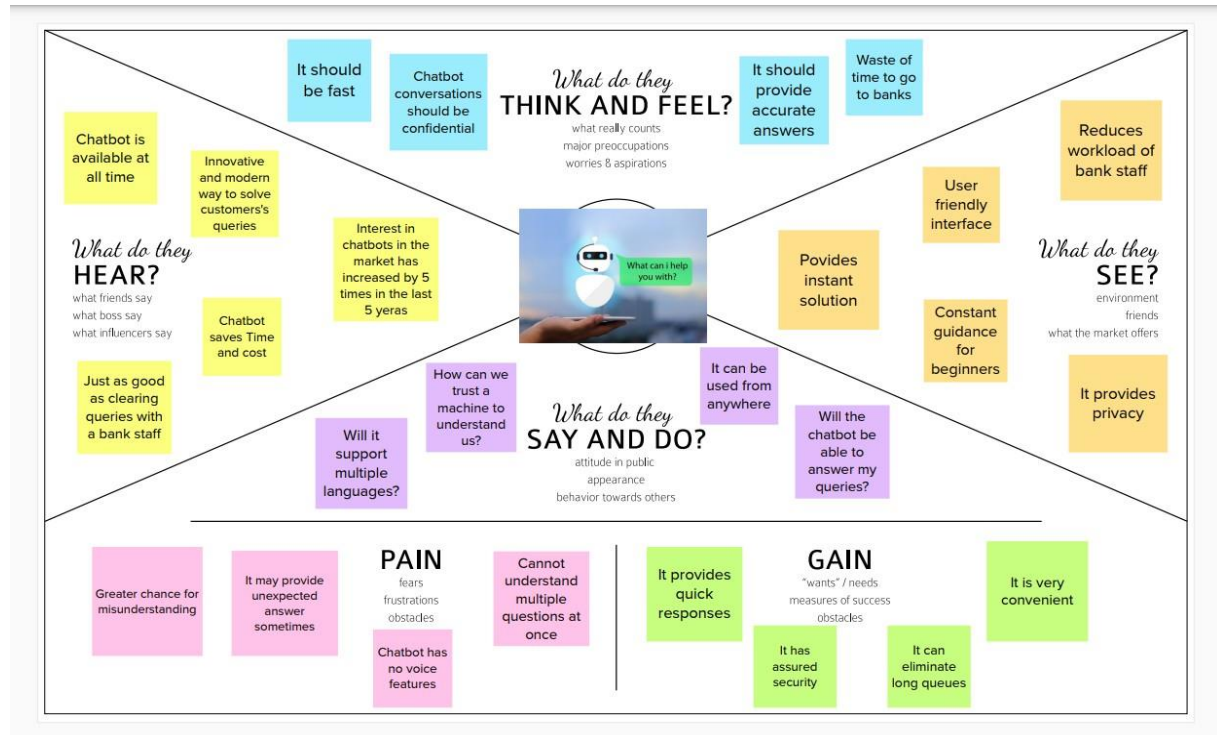
3.2 Ideation & Brainstorming
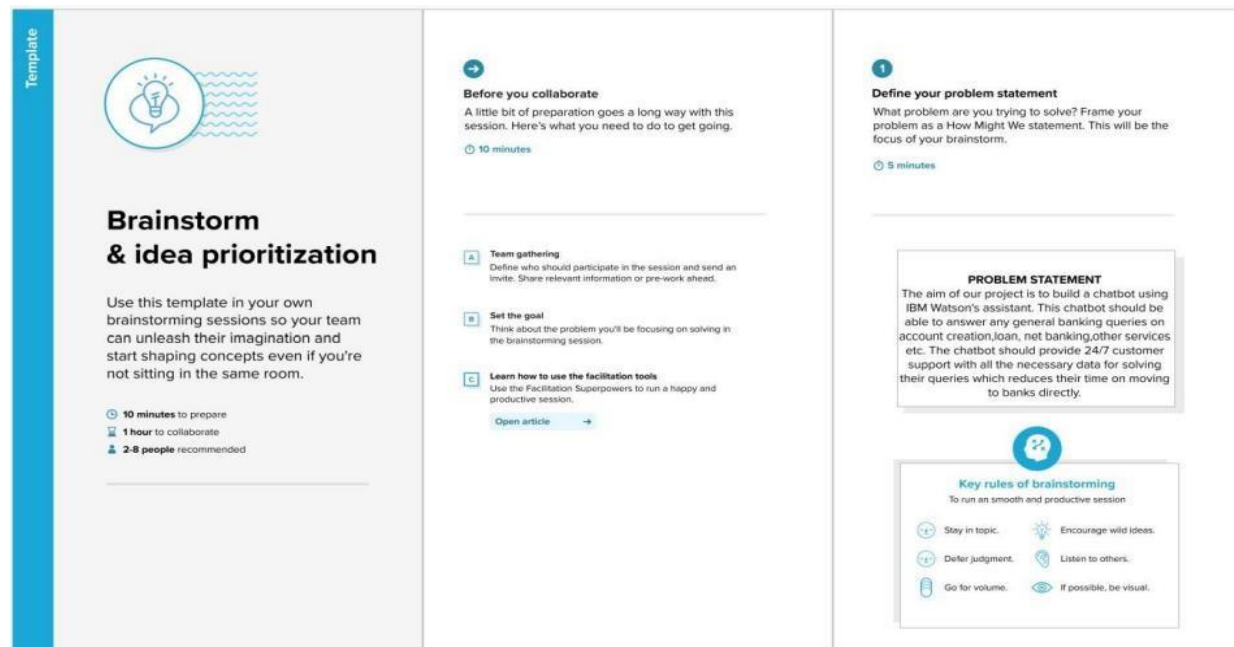
Brainstorm

Write down any ideas that comes to mind that address your problem statement.

⏱ 10 minutes

TIP
You can select a sticky note and hit the pencil(Switch to sketch icon to start drawing)

Surya v

It is interoperable	It provides instant solution for general banking queries
It maintains a confidential conversation with customers	It is available 24*7

Sunil S

It is multilingual	It provides reliable service on answering net banking queries
It provides quick responses for loan related queries	It provides efficient and convenient customer support

pradeep TR

It facilitate constant guidance to customer on creating bank accounts	It supports voice assistance feature
It is used to retrieve customers old transaction quickly	It maintains a user friendly interface

Sanjay D

It saves user's time and cost	It works in a very fast and intelligent manner
It has an assured security	It provide quick responses for customer's queries

3

Group Ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last ten minutes ,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

Using Natural Language processing

It has an assured security and provides pertsonalized service	It provides instant solution for general banking queries	It supports future voice assistance	It is multilingual

Using Neural network

It works in a very fast and intelligent manner	It provides reliable service on answering net banking queries	It provides quick responses for loan related queries	It provides efficient and convenient customer support

Using Arificial Intelligence

It maintains a user friendly interface	It is trust worthy	It facilitates constant guidance to customers on creating bank accounts	It maintains a confidential conversation with customers

Using Cloud technology

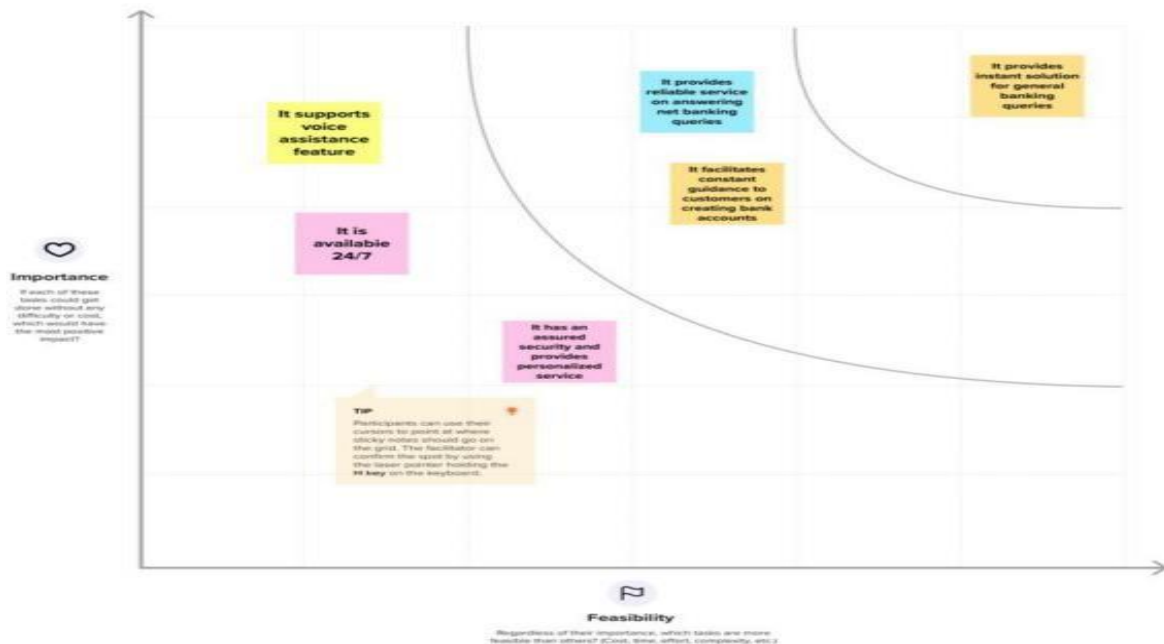|			
It is used to retrieve customer's old transaction history quickly	It is interoperable	It saves user's time and cost	It is available 24*7

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⏱ 20 minutes

Importance
If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

It supports voice assistance feature

It is available 24/7

It has an assured security and provides personalized service

It provides reliable service on answering net banking queries

It facilitates constant guidance to customers on creating bank accounts

It provides instant solution for general banking queries

TIP
Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the H key on the keyboard.

Feasibility
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

3.3 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Banks are not able to resolve the queries of customers at all times related to the products or services in a satisfactory way which in turn hinders the customer satisfaction. Customers need to visit banks frequently for simple queries.
2.	Idea / Solution description	In order to guide the customers throughout all the financial services provided by the bank, an intelligent system has to be introduced to provide people with the best solution possible.
3.	Novelty / Uniqueness	Chatbots developed using AI should be able to answer any general banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a cost efficient manner
4.	Social Impact / Customer Satisfaction	In order to attain the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. 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
5.	Business Model (Revenue Model)	Employing a chatbot will be a cost-effective solution to clear customer queries for banks. 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.
6.	Scalability of the Solution	AI Chatbots provides 24/7 service to clear all customer queries and guide them through all the banking processes. It supports voice assistance feature and maintains a confidential conversation with customers. 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.

4. REQUIREMENT ANALYSIS

4.1 Functional requirements

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR1	Savings Account Related Actions	● Type of Savings Account Creation Details ● Interest Rate ● Minimum Balance ● Credit Card/Debit Card
FR2	Current Account Related Actions	● Type of Company ● Current Account Closure Steps ● Update GSTIN ● Zero Balance Current Account
FR3	Loan Account Related Actions	● Type of Loan /Joint Loans ● How long for approval ● Available Loan Amounts ● Loan Status
FR4	General Queries Related Actions	● Bank Working Days ● List of Branches ● Currency Conversion Facility ● CIBIL
FR5	Net Banking Related Actions	● Login Steps ● Change Net Banking Password ● Daily Limit ● Types of Fund Transfer

4.2 Non-Functional requirements

NFR No.	Non-Functional Requirement	Description
NFR1	Usability	Chatbots developed using AI should be able to answer any general banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in cost efficient manner
NFR2	Security	The AI Chatbot maintains a confidential conversation with customers. Chatbot will provide personal and efficient communication between the user and the bank.
NFR3	Reliability	Chatbots are trained very well using AI to provide solutions for the popular and frequently asked questions, thereby providing the best suited service quickly. Thus, AI Chatbots has a reliable end-user experience.
NFR4	Performance	AI Chatbot is a great way to overcome the limitation of 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.
NFR5	Availability	AI Chatbots provides 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.

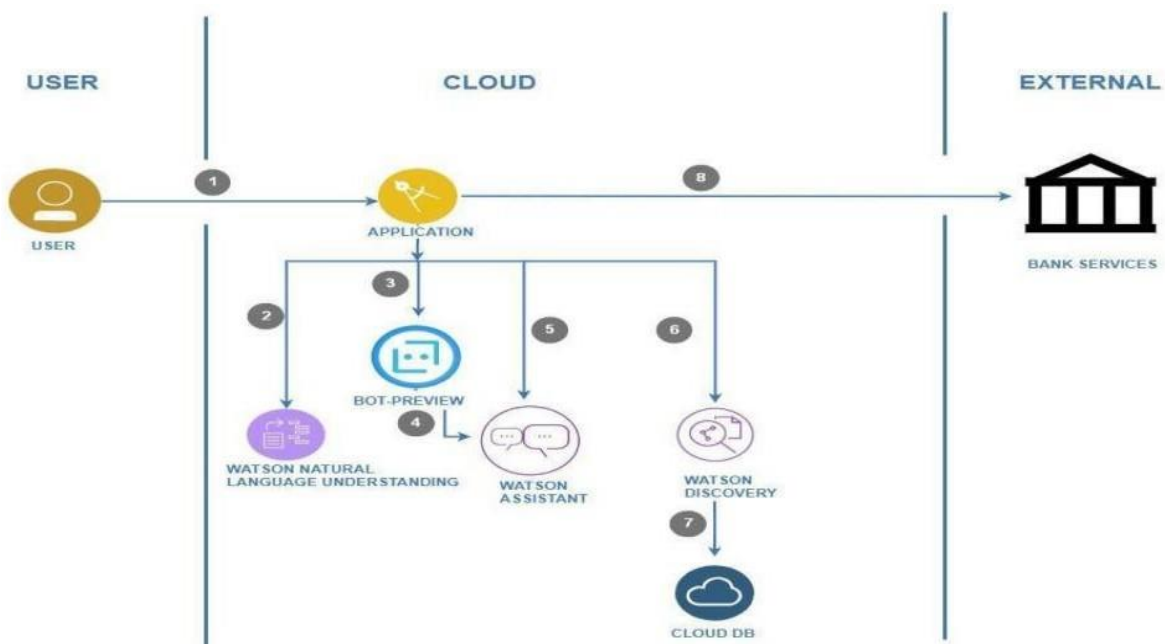# 5. PROJECT DESIGN

5.1 Data Flow Diagrams

LEVEL 0

User → Make Query → ChatBotApplication
ChatBotApplication → Get Result → User
Admin → Update → ChatBotApplication

LEVEL 1

User → Make Query → Process Query
Process Query → Get Result → User
Process Query → Search Query → Query Database
Query Database → Output of the Query → Process Query
Update → Store Updates → Query Database
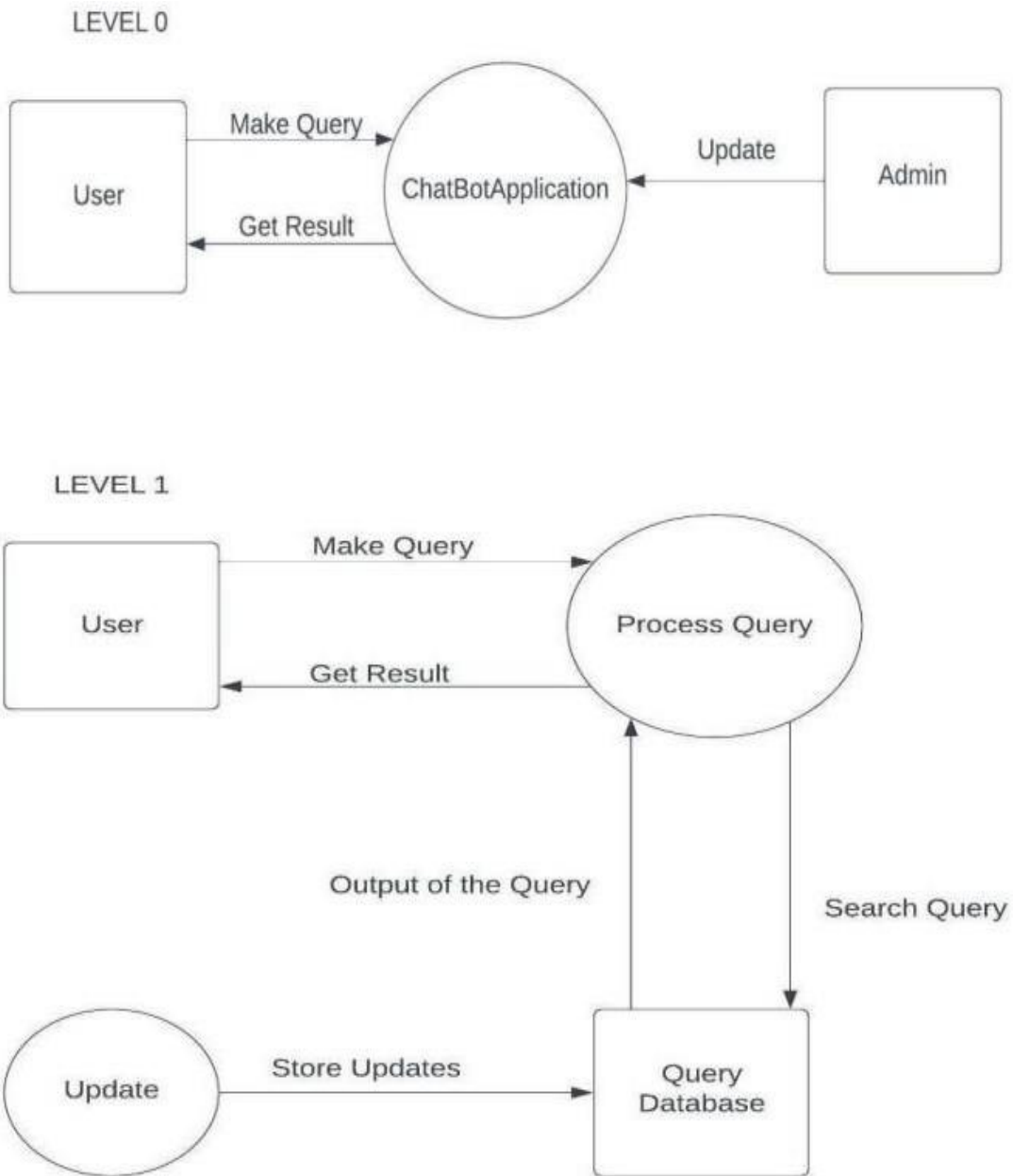
LEVEL 2
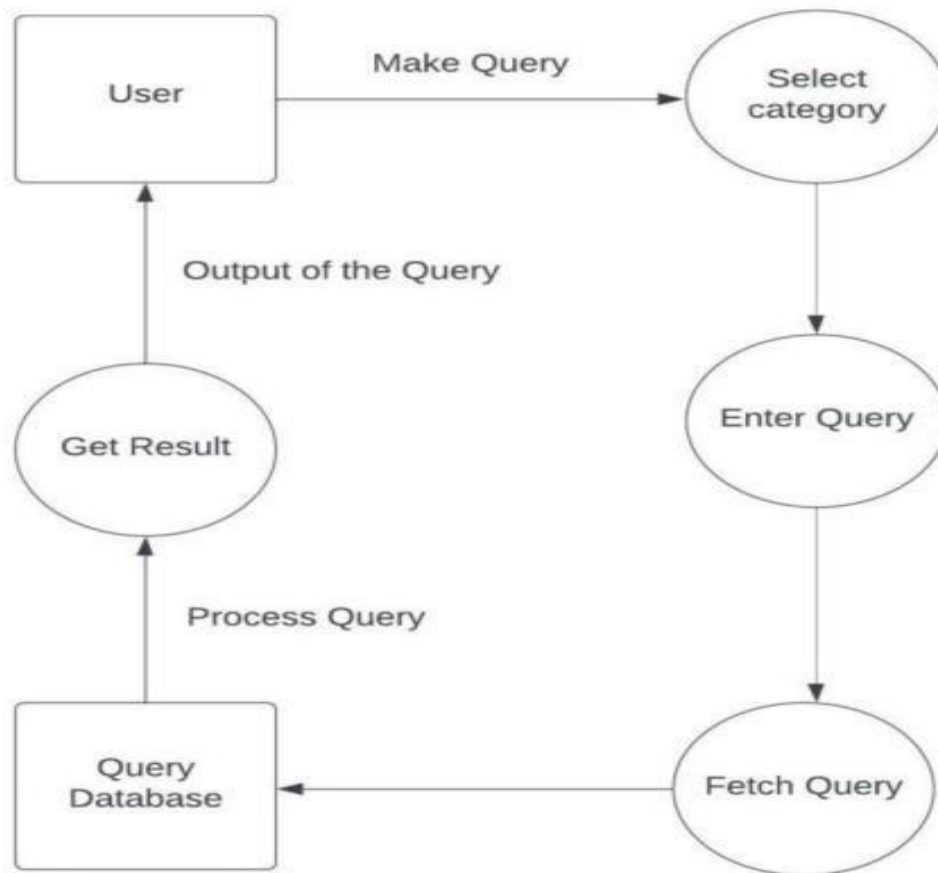
5.2 Solution & Technical Architecture

Solution Architecture
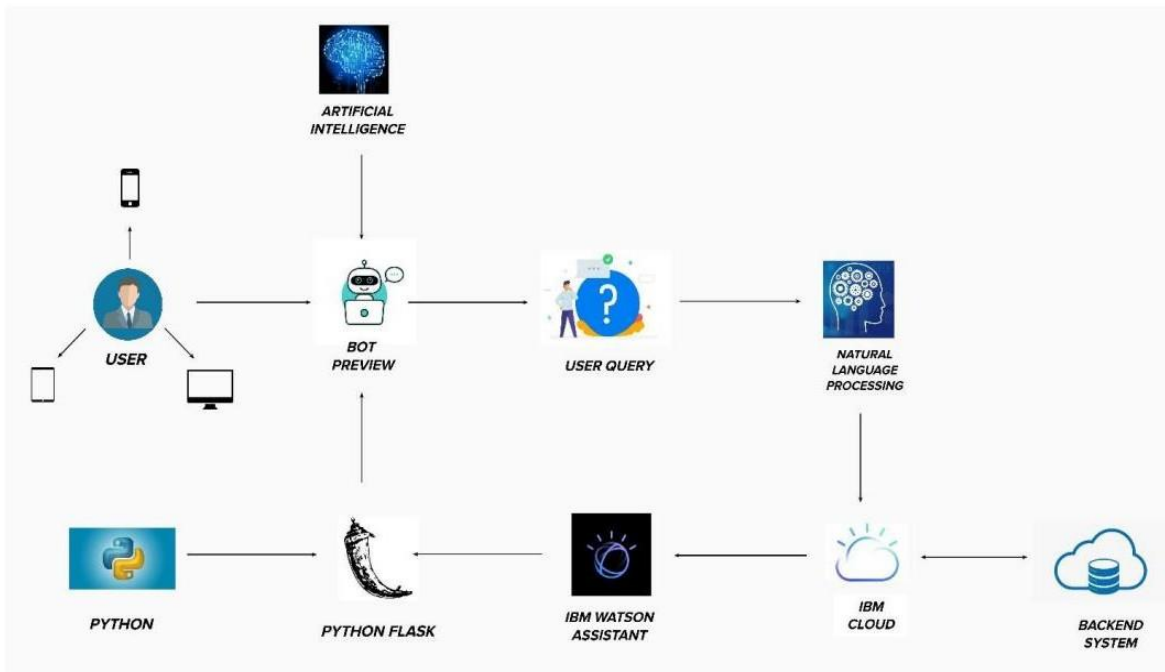
Technical Architecture

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority
Customer (Mobile user)	Download the database	USN-1	As a user, I can register for the application by entering my email, and password, and confirming my password.	I can access my account / dashboard	High
	Register	USN-2	As a user, I can register for the application by entering my email, and password, and confirming my password	I can receive a confirmation email & click confirm	High
	Login	USN-3	As a user, I will receive a confirmation email once I have registered for the application	I can register & access the dashboard with Facebook Login	Low

	Querying	USN-4	User query with a chatbot for clarifications.		Medium
Customer (Web user)	The functional requirements are same as a mobile use	Same as a mobile user	Same as a mobile user	Same as a mobile user	High when compared to mobile users

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	IBM Watson Assistant Creation	USN-1	As a user, I can register for IBM skills build and create a Watson Assistant Service.	12	High	Surya, Sunil, Pradeep, Sanjay
Sprint-1	Action Skills Creation	USN-2	As a user, I can add new action skills to resolve customer queries.	4	High	Surya, Sunil
Sprint-1	Savings Account Action	USN-3	As a user, I can get the details of required documents for Regular Savings Account,	4	Low	Sanjay, Pradeep

				Kids Savings Account, and Zero-Balance Savings Account.			
Sprint-2	Current Account Action	USN-4	As a user, I can get the details of required documents for creating Partnership, Proprietorship Account.	10	Medium	Sanjay, Pradeep, Sunil
Sprint-2	Loan Action	USN-5	As a user, I can get the details of required documents for availing gold loan, top-up	10	High	Sunil
Sprint-3	General Query Action	USN-6	As a user, I can get resolved for the queries like CIBIL score, storage facilities	10	High	Sanjay, Surya

			available in the bank			
Sprint-3	Net Banking Action	USN-7	As an user, I can get resolved for the queries like features of net banking, issues regarding net banking, etc	10	Medium	Sunil, Surya, Pradeep
Sprint-4	Building Python code (using Flask frame work)	USN-8	As an admin, I make use of the Flask framework to link a html web page.	12	High	Sunil, Sanjay
Sprint-4	Building HTML code	USN-9	As an admin, I make use of html to create the web page as a front-end for the application.	6	High	Surya, Sunil, Pradeep
Sprint-4	Executing the application	USN-10	As an admin, I can integrate the chat bot	2	Medium	Sanjay, Pradeep

			with our web page. As an user, I can interact with the chatbot in the web page.			

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	24 Oct 2022	29 Oct 2022	20	26 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	02 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	09 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	16 Nov 2022

Velocity

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day).

Average Velocity = Sprint duration / Velocity = 20 / 6 = 3.33

Burndown Chart

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

6.3 Reports from JIRA

7. CODING & SOLUTION

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

```
from flask import Flask, render_template

app=Flask(__name__)

@app.route('/')

def chatbot():

    return render_template('chatbot.html')


if __name__=='__main__':

    app.run(debug=True)
```

chatbot.html

```
<!DOCTYPE html>
```

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

<head>

    <meta charset="UTF-8">

    <title>Output</title>

    <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

    <style>

    body
        {

            background-image: url("https://www.apptunix.com/blog/wp-
content/uploads/sites/3/2021/04/show-chatbots-for-banking.jpg");

            background-size: cover;

        }
```

```
    </style>

</head>

<body>

  <script>
    window.watsonAssistantChatOptions = {

      integrationID: "44a1674a-e912-42cf-8aac-495fb5deffa1", // The ID of this
integration.

      region: "au-syd", // The region your integration is hosted in.

      serviceInstanceID: "363adadd-453c-41ee-b831-434e0f52e2a0", // 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>
```
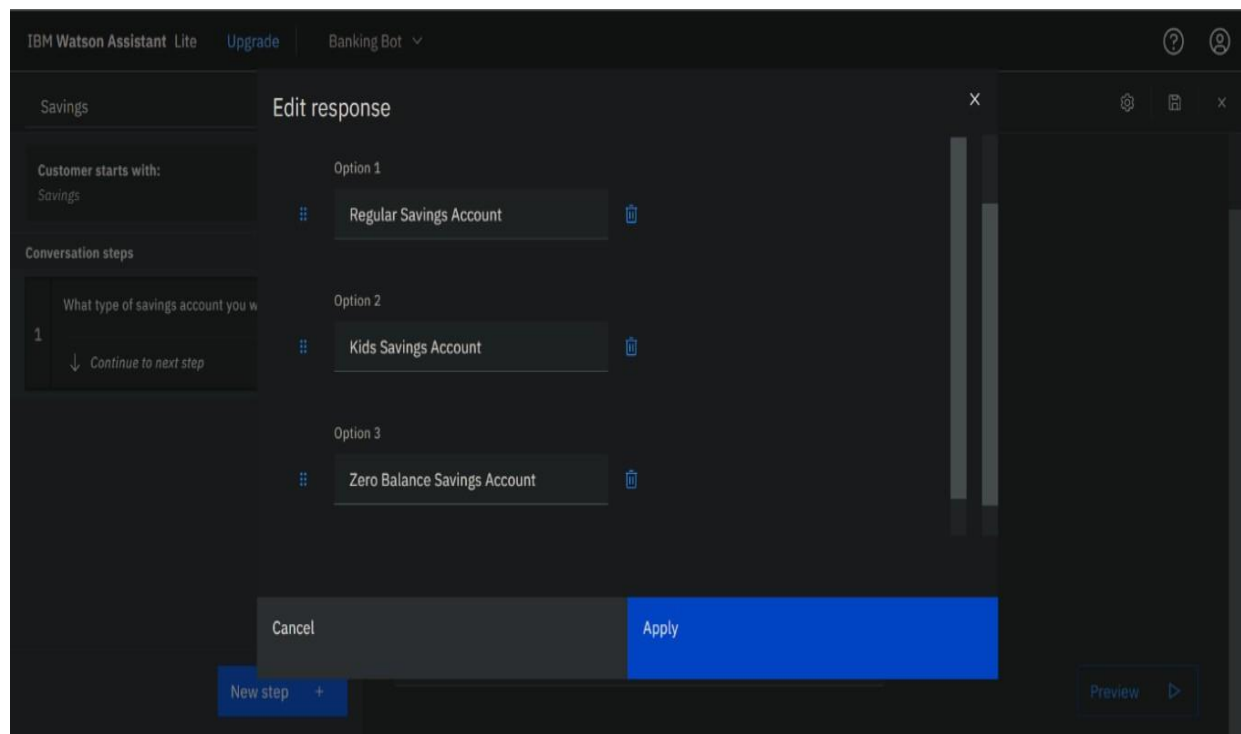
```
</body>


</html>
```
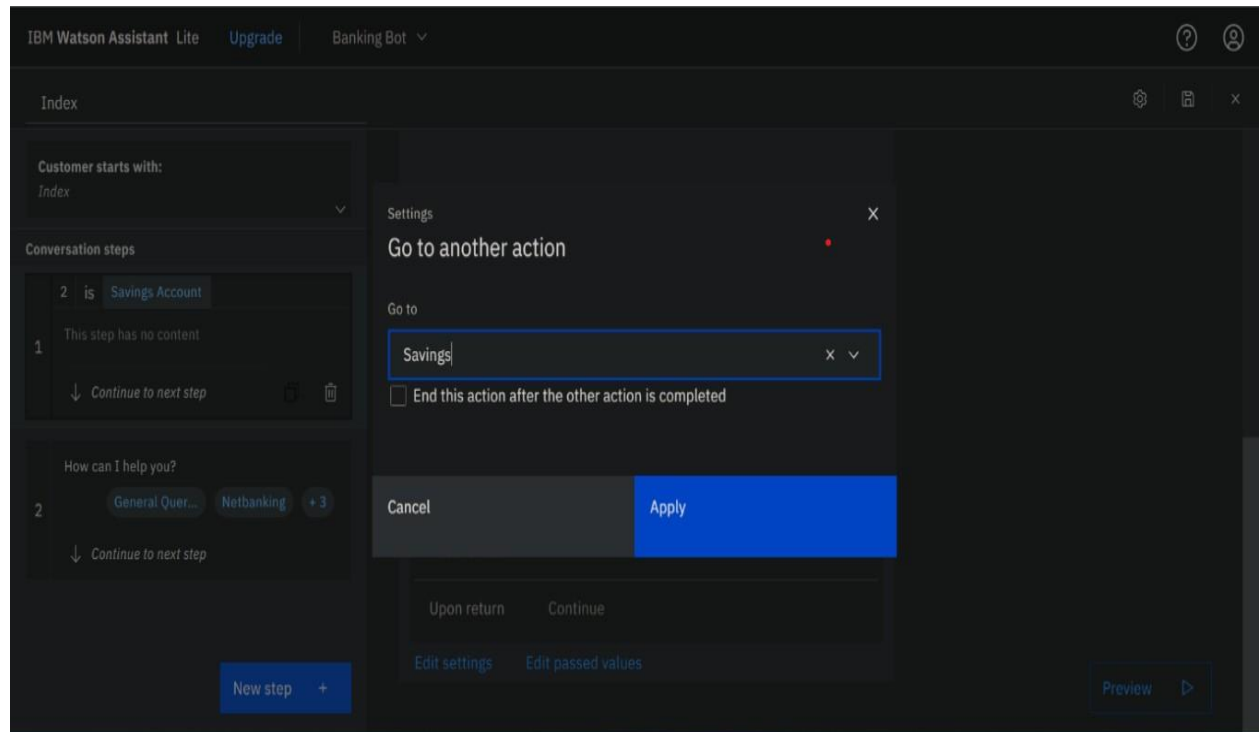
7.2 Feature 2

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.

IBM Watson Assistant Lite   Upgrade | Banking Bot ⌄

🏠 Home

Build
💬 Actions
▷ Preview

Deploy
✈ Publish
🖳 Environments

Improve
📈 Analyze

🖳 Integrations
⚙ Assistant settings

u're in the new Watson

...citing changes in store for you   [Take a tour →]

...d
...everything about the build
...up to 6 times faster to
...tant.

Easy to use
Now anyone can build a fully-functioning assistant without the usual heavy lift from a development team.
View documentation →

New features
The new Watson Assistant is loaded with features that empower you to meet the complexity of customer needs.
See what's new →

Hide details ⌃

S)

us-south.assistant.watson.cloud.ibm.com/.../actions

IBM Watson Assistant Lite   Upgrade | Banking Bot ⌄   ⚙ 🖫 ✕

Greetings

Customer starts with:
Greetings   ⌄

Conversation steps

1 Welcome to IBM Bank. Good to see you!
   ↓ Continue to next step   📋 🗑

New step +

Step 1 is taken   [without conditions ⌄]   [ƒ]

Assistant says
B I 🔗 ⁙ 🖼 🎵 🎬 🖸   ƒx

Welcome to IBM Bank. Good to see you!

👤 Define customer response   ⌄

And then

↓ Continue to next step

Preview   ↻ −

Greet customer [default]
Welcome, how can I assist you?
                                            [Hey]

Greetings recognized
Welcome to IBM Bank. Good to see you!
◇ There are no additional steps for this action. Add a new step or end the action.

[Type something...]   ▷

Screenshot 1

IBM Watson Assistant Lite   Upgrade   Banking Bot ∨   ⊘ ⊘

Index   ⚙ 💾 ✕

Customer starts with:
Index
∨

Conversation steps

2 is Savings Account

This step has no content

1
↓ Continue to next step   🗑

Settings   ✕
Go to another action   •

Go to

Savings   ✕ ∨

☐ End this action after the other action is completed

Cancel   Apply

How can I help you?
General Quer... Netbanking + 3
2
↓ Continue to next step

Upon return   Continue

Edit settings   Edit passed values

New step +   Preview ▷

Screenshot 2

IBM Watson Assistant Lite   Upgrade   Banking Bot ∨   ⊘ ⊘

Savings   ⚙ 💾 ✕

Customer starts with:
Savings

Edit response   ✕

Conversation steps

Option 1

What type of savings account you w   ⠿ Regular Savings Account   🗑

1
↓ Continue to next step

Option 2

⠿ Kids Savings Account   🗑

Option 3

⠿ Zero Balance Savings Account   🗑

Cancel   Apply

New step +   Preview ▷

8. TESTING

8.1 Test Cases

Test Scenarios

1	Verify user is able to open and view chatbot UI
2	Verify user is able to interact with chatbot or not
3	Verify chatbot is able to respond to user queries immediately
4	Verify chatbot is able to provide options for user to choose various choices

Savings Account Related Actions

1	Verify user is able to select type of savings account
2	Verify user is able to know the procedure to create savings account for selected type
3	Verify user is check the minimum balance
4	Verify user is able to find interest rate

Current Account Related Actions

1	Verify user is able to select type of company
2	Verify user is able to know the procedure to create current account for selected type
3	Verify user is able to know about zero balance current account
4	Verify user is able to know the procedure to close current account

Loan Account Related Actions

1	Verify user is able to choose options for selecting type of available loan policies
2	Verify user is able to know about available loan amounts
3	Verify user is able to check the loan status
4	Verify user is able to know about joint loan

General Query Related Actions

1	Verify user is able to know about bank working days
2	Verify user is able to know about list of branches
3	Verify user is able to find the nearest branch
4	Verify user is able to know about storage locker facility
5	Verify user is able to know about currency conversion facility

Net banking Related Actions

1	Verify user is able to know the procedure to login net banking account
2	Verify user is able to know the procedure to change net banking password
3	Verify user is able to choose options for selecting type of fund transfers
4	Verify user is able to know about daily transaction limit

8.2 User Acceptance Testing

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID
Chatbot_TC_OO1	UI	Home Page	Verify user is able to open and view chatbot UI	None	1.Enter URL and click go 2.Click on chatbot icon 3.Verify chatbot UI displayed or not	URL link	Chatbot UI is able to be viewed by user	Working as expected	Pass	-	N	-
Chatbot_TC_OO2	Functional	Home Page	Verify user is able to interact with chatbot or not	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window	User query	User is able to interact with chatbot easily	Working as expected	Pass	-	N	-
Chatbot_TC_OO3	Functional	Home page	Verify chatbot is able to respond to user queries immediately	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter	User query	Chatbot is able to provide instant replies for user queries	Working as expected	Pass	-	N	-
Chatbot_TC_OO4	Functional	Home page	Verify chatbot is able to provide options for user to choose various choices	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter	User query	Chatbot is able to provide options for user to choose various choices	Working as expected	Pass	-	N	-
Savings_TC_OO1	UI	Chatbot	Verify user is able to select type of savings account	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to select type of savings account	Working as expected	Pass	-	N	-
Savings_TC_OO2	Functional	Chatbot	Verify user is able to know the procedure to create savings account for selected type	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know the steps to create savings account for selected type	Working as expected	Pass	-	N	-
Savings_TC_OO3	Functional	Chatbot	Verify user is check the minimum balance	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to check the minimum balance	Working as expected	Pass	-	N	-
Savings_TC_OO4	Functional	Chatbot	Verify user is able to find interest rate	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to find interest rate	Working as expected	Pass	-	N	-
Current_TC_OO1	UI	Chatbot	Verify user is able to select type of company	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to select type of company	Working as expected	Pass	-	N	-
Current_TC_OO2	Functional	Chatbot	Verify user is able to know the procedure to create current account for selected type	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know the steps to create current account for selected type	Working as expected	Pass	-	N	-
Current_TC_OO3	Functional	Chatbot	Verify user is able to know about zero balance current account	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about zero balance current account	Working as expected	Pass	-	N	-
Current_TC_OO4	Functional	Chatbot	Verify user is able to know the procedure to close current account	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know the procedure to close current account	Working as expected	Pass	-	N	-
Loan_TC_OO1	UI	Chatbot	Verify user is able to choose options for selecting type of available loan policies	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to choose options to select type of available loan policies	Working as expected	Pass	-	N	-
Loan_TC_OO2	Functional	Chatbot	Verify user is able to know about available loan amounts	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about available loan amounts	Working as expected	Pass	-	N	-
Loan_TC_OO3	Functional	Chatbot	Verify user is able to check the loan status	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to check the loan status	Working as expected	Pass	-	N	-
Loan_TC_OO4	Functional	Chatbot	Verify user is able to know about joint loan	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about joint loan	Working as expected	Pass	-	N	-
General_TC_OO1	Functional	Chatbot	Verify user is able to know about bank working days	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about bank working days	Working as expected	Pass	-	N	-
General_TC_OO2	Functional	Chatbot	Verify user is able to know about list of branches	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about list of branches	Working as expected	Pass	-	N	-
General_TC_OO3	Functional	Chatbot	Verify user is able to find the nearest branch	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to find the nearest branch	Working as expected	Pass	-	N	-
General_TC_OO4	Functional	Chatbot	Verify user is able to know about storage locker facility	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about storage locker facility	Working as expected	Pass	-	N	-

General_TC_OO5	Functional	Chatbot	Verify user is able to know about currency conversion facility	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about currency conversion facility	Working as expected	Pass	-		N	-
Netbank_TC_OO1	Functional	Chatbot	Verify user is able to know the procedure to login netbanking account	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know the steps to login netbanking account	Working as expected	Pass	-		N	-
Netbank_TC_OO2	Functional	Chatbot	Verify user is able to know the procedure to change netbanking password	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know the steps to change netbanking password	Working as expected	Pass	•		N	-
Netbank_TC_OO3	UI	Chatbot	Verify user is able to choose options for selecting type of fund transfers	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to choose options for selecting type of fund transfers	Working as expected	Pass	-		N	-
Netbank_TC_OO4	Functional	Chatbot	Verify user is able to know about daily transaction limit	Chatbot is accessible	1.Click on chatbot icon 2.Type the query in the chat window 3. Press enter 4.Select the desired option	User query	User is able to know about daily transaction limit	Working as expected	Pass	-		N	-

AI based Discourse for...
Software project

◀ Back to project

Cycle Summary

🔁 User Acceptance Testing   ☰ List   ■ Detail

Build	:	Total Executions	: 25	Start Date	:
Environment	:	Cycle Executions	: 25	End Date	:
Created By	: Prathyush Krishnen J	Total Executed	: 25	Description	:
Total Execution Time	: 0m	Total Logged Time	: 0m	Executions Not Tracked : 25	

Test Cases
Import Tests

PLANNING AND EXECUTION
Cycle Summary
Search Test Executions
Manage Execution Filters

REPORTING

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Learn more

☐ Select All   🗑 Delete   Columns ˅   + Add Tests

-	ID ˅	Status ˅	Summary	Defect	Compon... ˅	Label ˅	Tot	Action
☐	ABDFBI-68	PASS ˅	Verify user is able to know the procedure to create current account for selected type	-	-	-	-	E 🗑
☐	ABDFBI-69	PASS ˅	Verify user is able to know	-	-	-	-	E 🗑

AI based Discourse for...
Software project

◀ Back to project

Manage Execution Filters

REPORTING
Test Summary
Test Metrics
Traceability Matrix

INTEGRATIONS
API Keys

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Executions List   ⠿

Test Cycle	Test Id	Execution Status	Executed By	Execution Date
❯ User Acceptance Testing	10058	PASS	Prathyush Krishnen J	11/17/2022 5:06:25 PM
❯ User Acceptance Testing	10082	PASS	Prathyush Krishnen J	11/17/2022 5:06:27 PM
❯ User Acceptance Testing	10081	PASS	Prathyush Krishnen J	11/17/2022 5:06:30 PM
❯ User Acceptance Testing	10068	PASS	Prathyush Krishnen J	11/17/2022 5:06:16 PM
❯ User Acceptance Testing	10077	PASS	Prathyush Krishnen J	11/17/2022 5:06:20 PM
❯ User Acceptance Testing	10076	PASS	Prathyush Krishnen J	11/17/2022 5:07:31 PM
❯ User Acceptance Testing	10064	PASS	Prathyush Krishnen J	11/17/2022 5:07:34 PM
❯ User Acceptance Testing	10071	PASS	Prathyush Krishnen J	11/17/2022 5:07:39 PM

Projects / AI based Discourse for Banking / Test Summary   🔔 ❓

Test Summary

Total Tests	Total Unexecuted	Total Executed
25	0	25

TESTS BY VERSIONS   **TESTS BY COMPONENTS**   **TESTS BY LABELS**

Search   Search   Search

Name	Tests		Name	Tests		Name	Tests
Unscheduled	25		No Component	25		No Label	25

Showing 1 - 1 of 1   Prev 1 of 1 Next   Showing 1 - 1 of 1   Prev 1 of 1 Next   Showing 1 - 1 of 1   Prev 1 of 1 Next

Test Report

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the AI based Discourse for Banking Industry project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	0	0	2	1	3
Duplicate	0	0	0	0	0
External	0	0	0	0	0
Fixed	0	0	2	1	3
Not Reproduced	0	0	0	0	0
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals		0	2	2	6
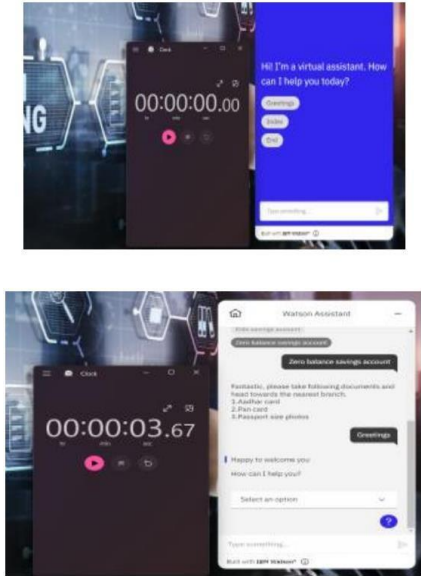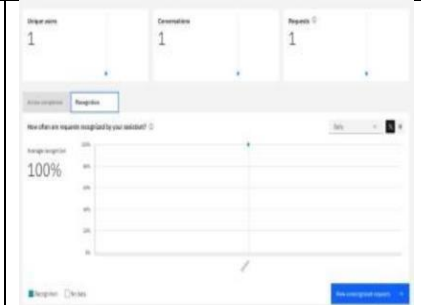
3.Test Case Analysis

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	0	0	0	0
Client Application	25	0	0	25
Security	0	0	0	0
Outsource Shipping	0	0	0	0
Exception Reporting	0	0	0	0
Final Report Output	25	0	0	25
Version Control	0	0	0	0

9. RESULTS

9.1 Performance Metrics

Model Performance Testing

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 questions of banking customers .There can be multiple instances of a single chatbot inquiring about different users at the same time .It quickly responds with expected answers to frequently asked customer queries .	
2.	Accuracy	Training Accuracy — 100% Validation Accuracy —100%	

10. ADVANTAGES AND DISADVANTAGES

Advantages

1. **Round-the-clock support**: Chatbots provide 24/7 client support, so existing and potential customers can try and solve their banking problems after work hours and on weekends. This ultimately also leads to better customer experience.

2. **Enhanced productivity of bank personnel**: Not all clients' problems require the help of a staff member. Artificial intelligence may successfully deal with minor issues leaving only the most urgent and complicated cases for the human approach. 3. **More convenient mode of communication**: Chatbots may combine various functionalities that would make them convenient for customers of different age groups.

Disadvantages

1. **Internet Issues**: Chatbots will not work without the internet .If there is a network problem, chatbots may stop working and will not respond to client queries.

2. **Requirement of technical knowledge**: Users who make use of chatbots must know how to use chatbots. Otherwise, it is difficult to do interaction with chatbot.

3. **Providing unexpected answers**: Chatbots in some cases may get confused due to prolonged user inputs and may provide irrelevant answers.

4. **Inability to interpret multiple queries**: Chatbots can't understand multiple questions at a time if a user continuously posts queries to it. So it is necessary for a user to post queries one-by-one.

11. CONCLUSION

Chatbots developed using AI are able to answer any frequently asked banking queries on account creation, loan, net banking, other services etc. It 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 the banking processes. 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. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. 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

12. FUTURE SCOPE

Chatbots help people obtain the information they need and solve their problems. The technology sector has seen a massive increase in AI development, which has led to the creation of chatbots that can help users easily find the information they need online. AI Chatbots effectively create a strong brand image. They will continue to evolve and play an important role in customer service for businesses.

1. Bots for Internal Business Communications

Chatbots can be used for various purposes, including addressing common problems, communicating with employees, and finishing HR-related tasks and transactional functions. Chatbots for websites are acting as a guide to new employees through company protocols, recording answers for screen questions, and assisting with the onboarding process for new employees. Chatbots can save time for IT desk agents and help with more complicated issues.

2. Content Marketing

Chatbots can communicate with the target market by speaking with them in complete sentences with a natural and easy-going conversational flow. Some markets use these bots to serve customer service and retail, amongst others. Chatbots can segment consumers for future marketing campaigns. This can be incredibly useful for creating more accurate target marketing. Based on the information from dialogue with chatbots, marketers can use this information to help with personalizing brand content.

3. Social Media

Chatbots have better customer interaction rates on social media. Chatbot interactions increase consumer confidence in a brand or business. Customers are informed with daily or

weekly announcements about deals, events, and promotions via social media. With time, it is used for voicing opinions, ordering products and services, offering reviews, and even getting in touch with businesses.

4. Use of AI in contact centers

AI chatbots without human involvement can handle simple requests such as changing a password, requesting a balance, scheduling an appointment, etc.

13. APPENDIX

Source Code

***Build* PYTHON FLASK *Code*:**

APP.PY

```python
from flask import Flask, render_template

app=Flask(__name__)

@app.route('/')

def chatbot():

    return render_template('chatbot.html')


if __name__=='__main__':

    app.run(debug=True)
```

Chatbot.html

```html
<!DOCTYPE html>


<html lang="en">


<head>
```

```html
<meta charset="UTF-8">

<title>Output</title>

<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

<style>

body

    {

        background-image: url("https://www.apptunix.com/blog/wp-
content/uploads/sites/3/2021/04/show-chatbots-for-banking.jpg");

        background-size: cover;

    }

</style>

</head>
```

```html
<body>

    <script>

        window.watsonAssistantChatOptions = {

            integrationID: "44a1674a-e912-42cf-8aac-495fb5deffa1", // The ID of this integration.

            region: "au-syd", // The region your integration is hosted in.

            serviceInstanceID: "363adadd-453c-41ee-b831-434e0f52e2a0", // 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>
```

HOME.CSS

```css
.u-section-1 {
  background-image:
  url("/static/img/bg.jpg");background-
  position: 50% 50%;
  min-height: 100vh;
}
.u-section-1 .u-layout-wrap-1 {
  width: calc(((100% - 1140px) / 2) +
  1140px);margin: -18px 0 0 auto;
}
.u-section-1 .u-layout-
  cell-1 {min-height:
  723px;
}
.u-section-1 .u-container-
  layout-1 {padding: 30px
  29px;
}
.u-section-1 .u-
  line-1 {width:
  111px;
  height: 6px;
  transform-origin: left center
  0px;margin: 111px auto 0
  11px;
}
```

```css
.u-section-1 .u-
 text-1 {font-size:
 3.75rem; font-
 weight: 700;
 line-height: 1;
 margin: 20px 17px 0 11px;
}
.u-section-1 .u-
 text-2 {font-style:
 italic;
 margin: 23px 17px 0 11px;
}
.u-section-1 .u-layout-cell-2
 { background-position:
 50% 50%;min-height:
 723px;
}
.u-section-1 .u-container-
 layout-2 {padding: 30px;
}
.u-section-1 .u-
 shape-1 {width:
 23px;
 height: 23px;
 margin: 279px 183px 0 auto;
}
.u-section-1 .u-
 image-1 {width:
 443px;
```

```css
  height: 444px;
  margin: -240px 0 0 auto;
}
@media (max-width: 1199px) {
 .u-section-1 .u-layout-wrap-1 {
   width: calc(((100% - 940px) / 2) + 940px);
 }
 .u-section-1 .u-layout-
  cell-1 {min-height:
  596px;
 }
 .u-section-1 .u-
  text-1 {margin-
  right: 0;
 }
 .u-section-1 .u-
  text-2 {margin-
  right: 0;
 }
 .u-section-1 .u-layout-
  cell-2 {min-height:
  596px;
 }
 .u-section-1 .u-container-
  layout-2 {padding-left:
  27px;
  padding-right: 27px;
```

```css
  }
  .u-section-1 .u-
    shape-1 {margin-
    top: 296px;
  }
  .u-section-1 .u-
    image-1 {margin-
    top: -249px;
  }
}
@media (max-width: 991px) {
  .u-section-1 .u-layout-wrap-1 {
    width: calc(((100% - 720px) / 2) + 720px);
  }
  .u-section-1 .u-layout-
    cell-1 {min-height:
    100px;
  }
  .u-section-1 .u-
    text-1 {font-size:
    3rem;
  }
  .u-section-1 .u-layout-
    cell-2 {min-height:
    525px;
  }
  .u-section-1 .u-
    shape-1 {margin-
    top: 285px;
```

```
      }
   .u-section-1 .u-
     image-1 {width:
     319px;
     height: 319px;
     margin-top: -
     238px;
   }
}
@media (max-width: 767px) {
 .u-section-1 .u-layout-wrap-1 {
   width: calc(((100% - 540px) / 2) + 540px);
 }
 .u-section-1 .u-container-
   layout-1 {padding-top: 50px;
   padding-right:
   60px;padding-
   left: 10px;
 }
 .u-section-1 .u-
   text-1 {font-size:
   3.75rem;
 }
 .u-section-1 .u-layout-
   cell-2 {min-height:
   663px;
 }
```

```css
  .u-section-1 .u-
    container-layout-2 {
    padding-left: 10px;
    padding-right: 10px;
  }
}
@media (max-width: 575px) {
  .u-section-1 {
    min-height: 907px;
  }
  .u-section-1 .u-
    layout-wrap-1 {
    width: 390px;
    margin-right: auto;
  }
  .u-section-1 .u-
    container-layout-1 {
    padding-right: 50px;
  }
  .u-section-
    1 .u-text-1
    {font-
    size:
    3rem;
  }
  .u-section-1 .u-
    layout-cell-2 {
```

```
    min-height:
    417px;
  }
}
```

IBM CHATBOT
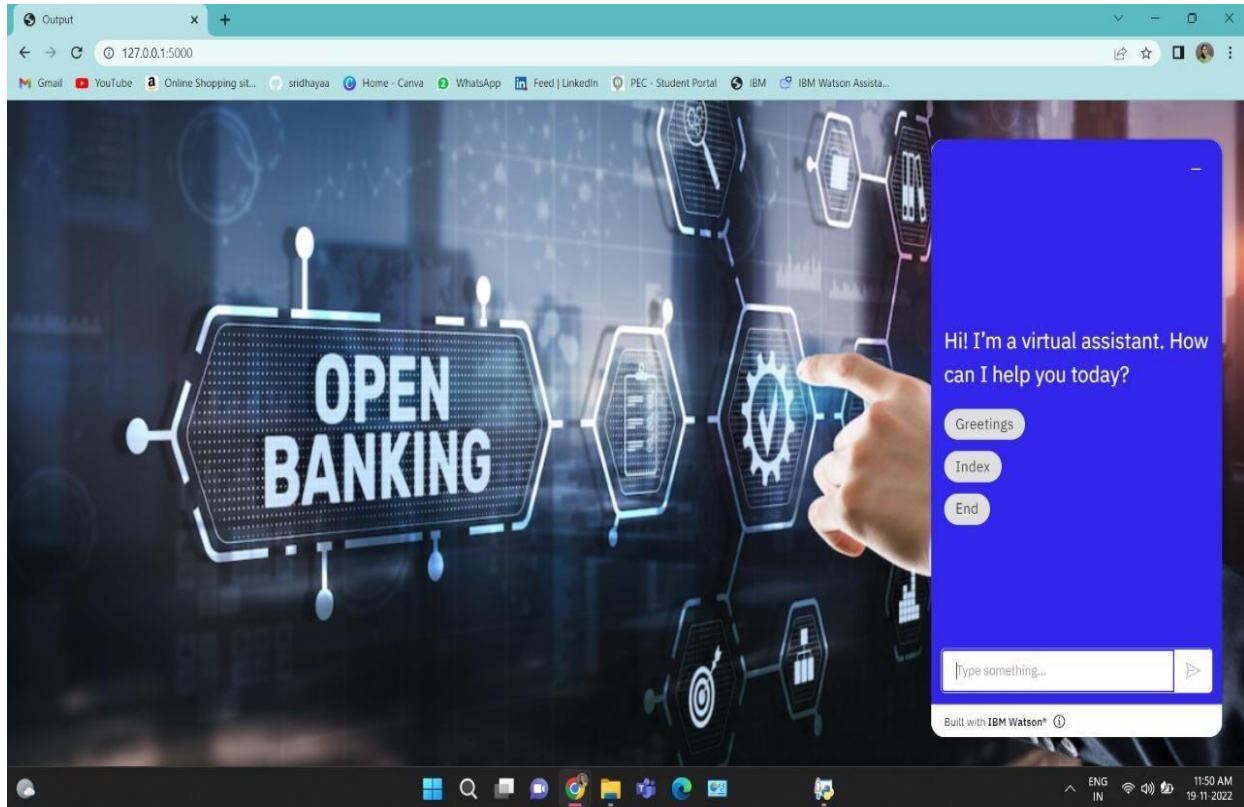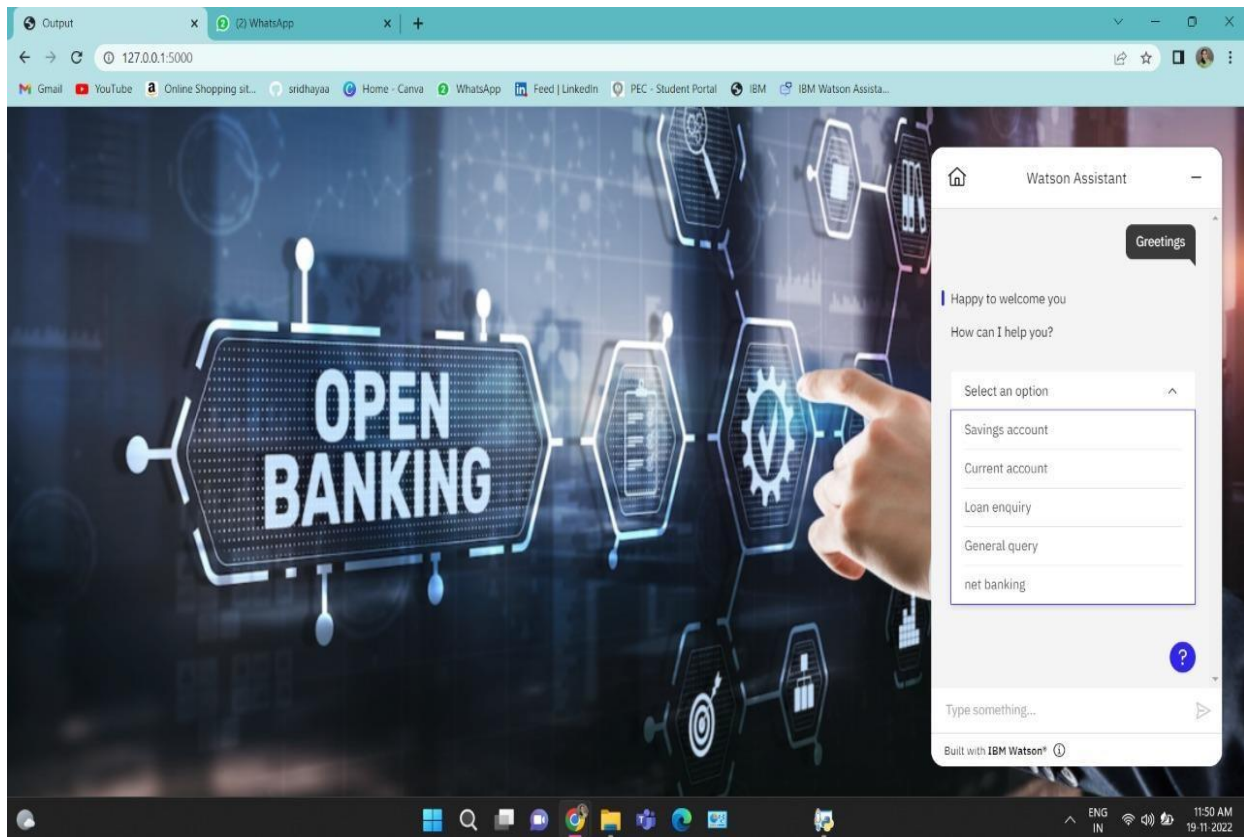
GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-8594-1658925370
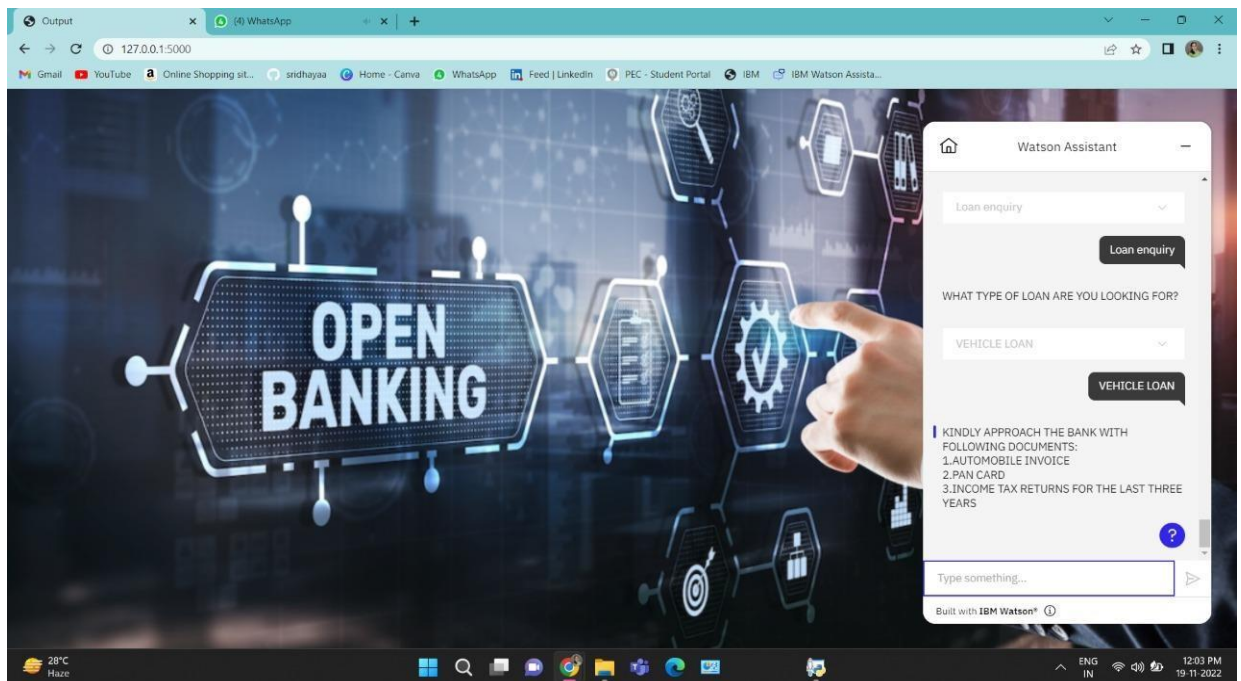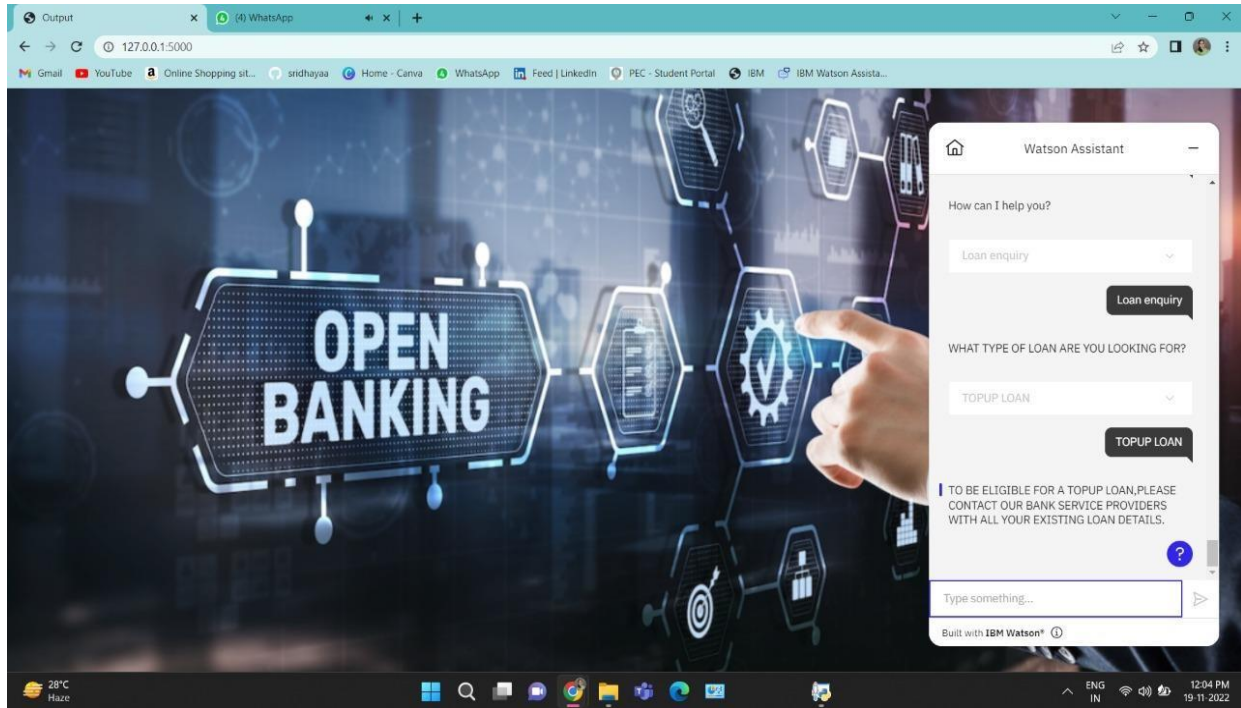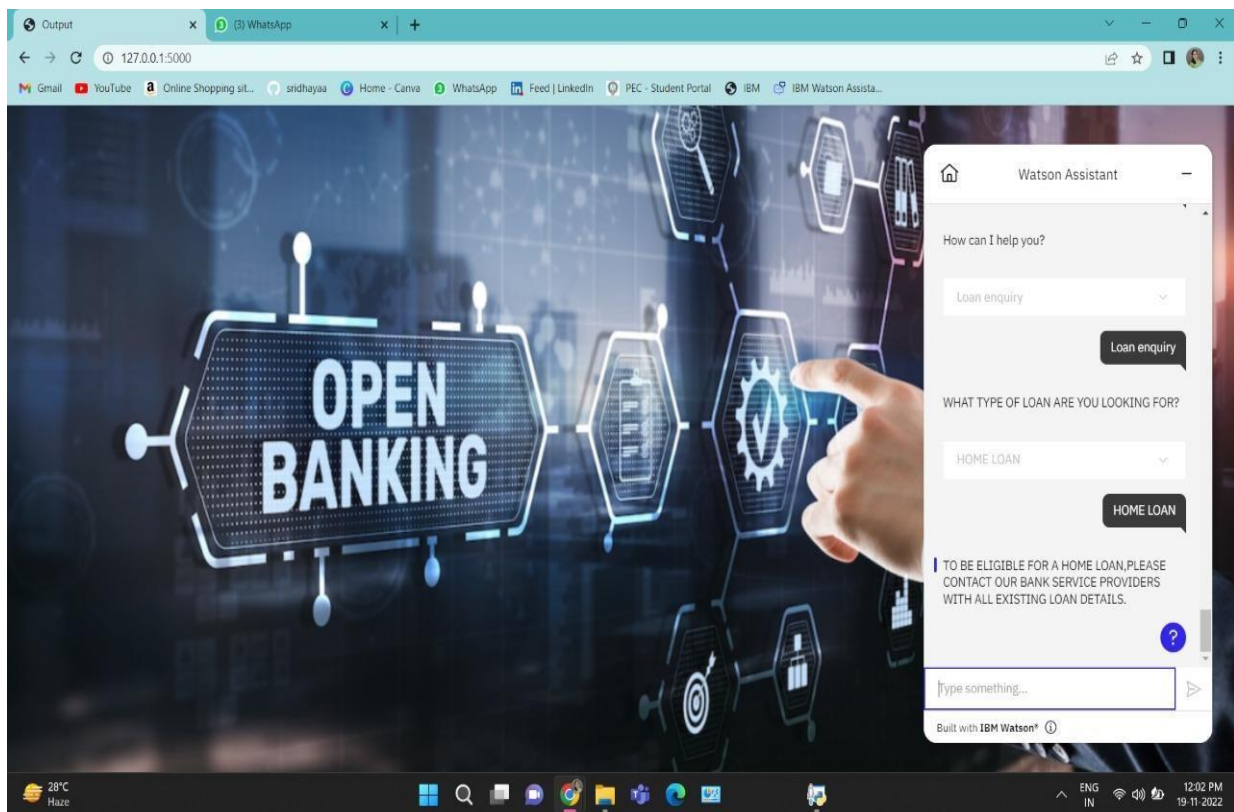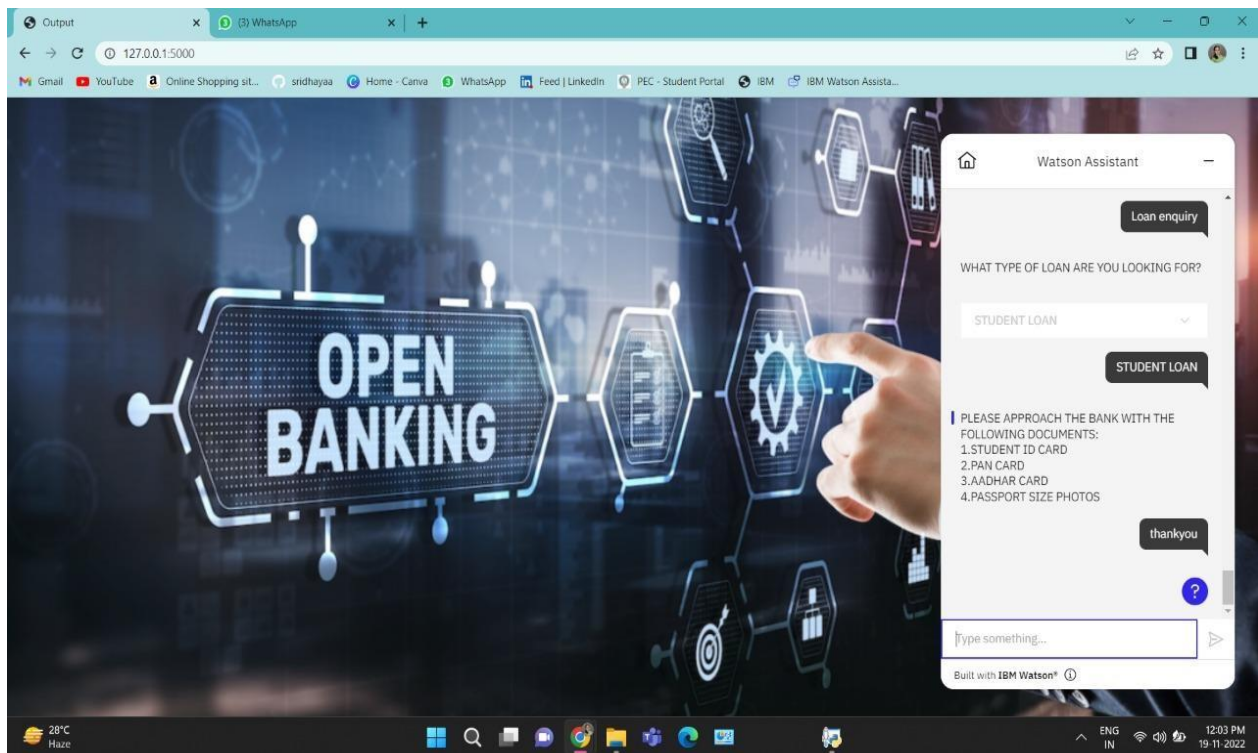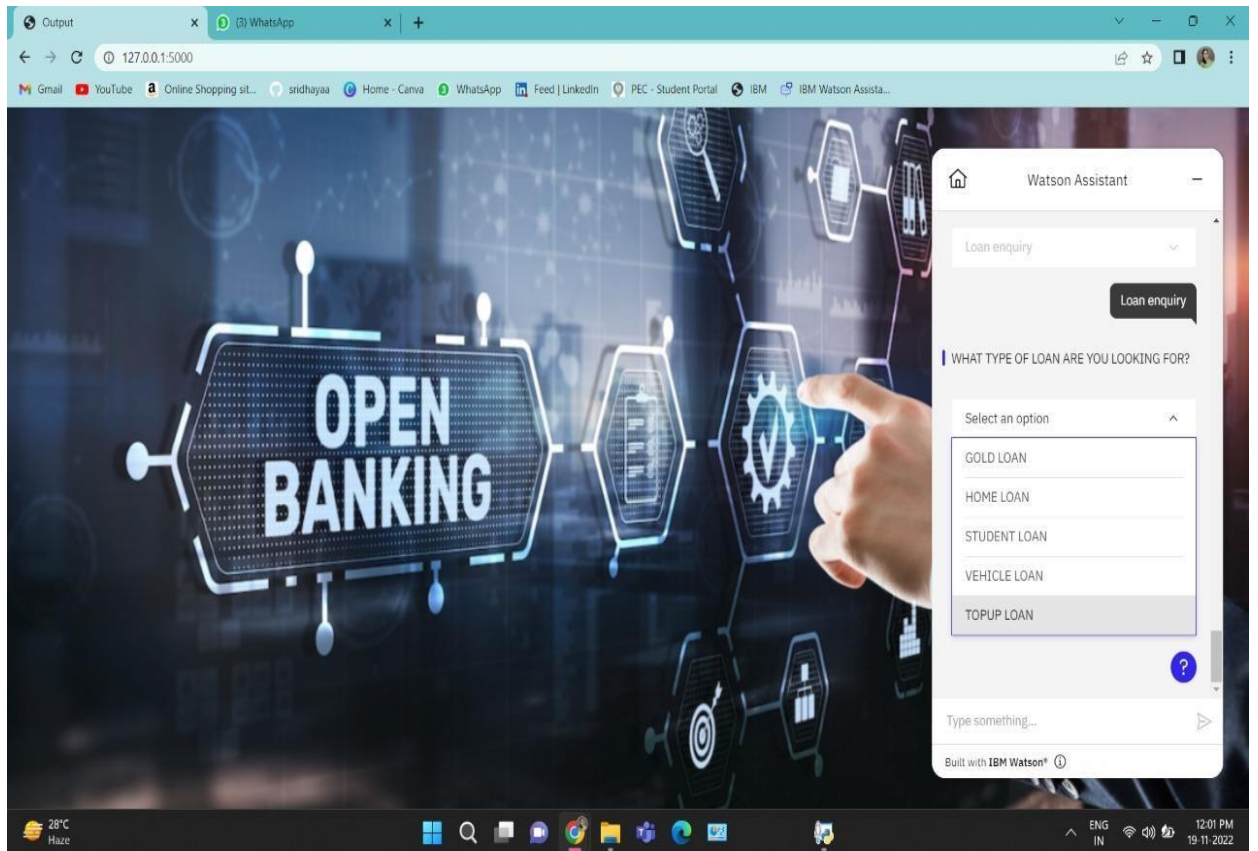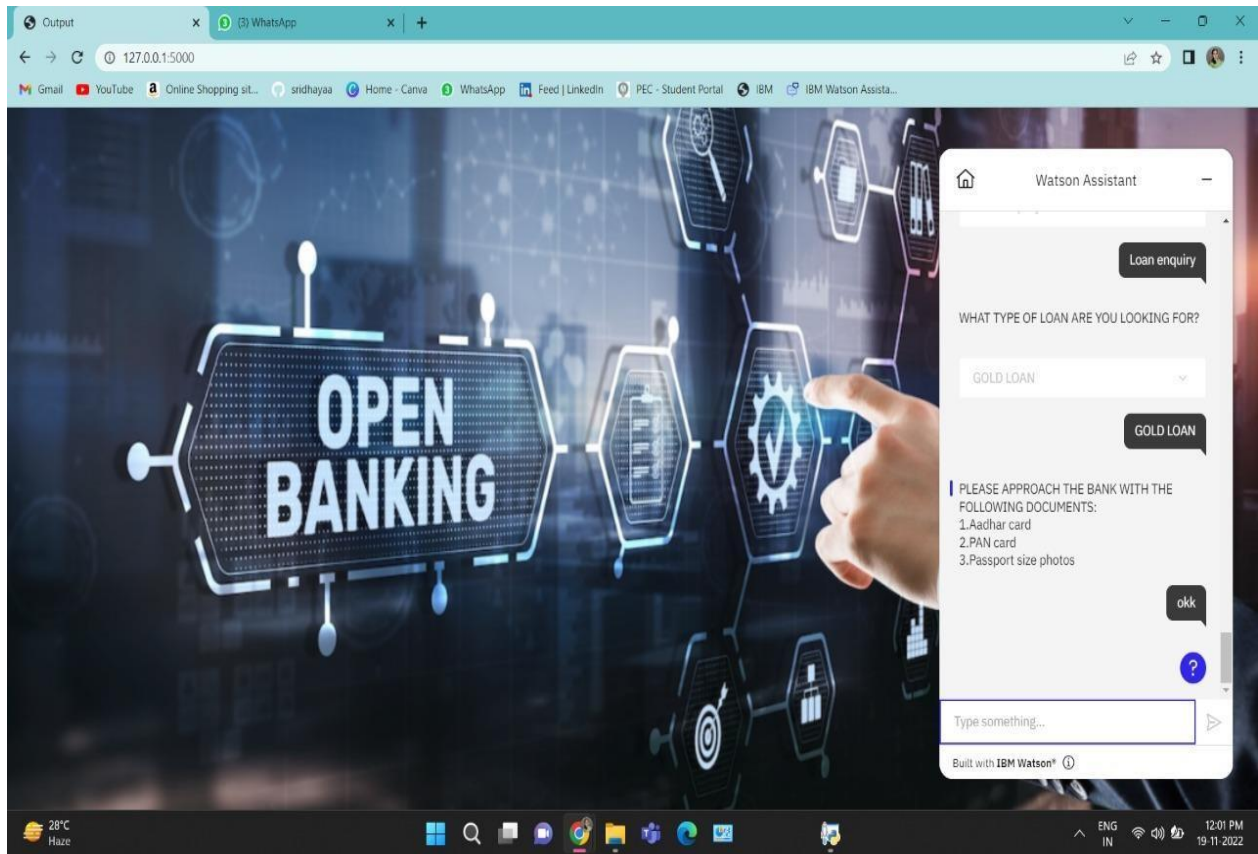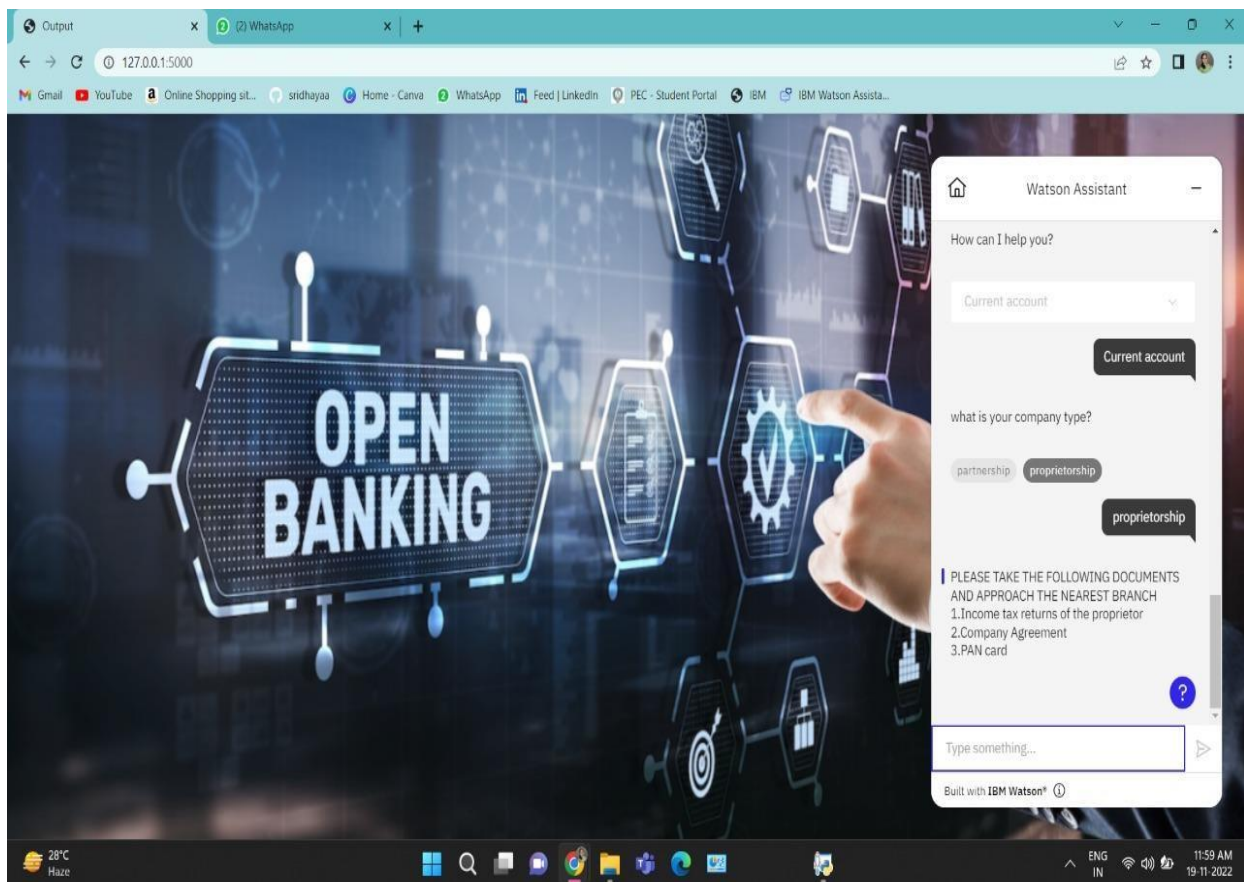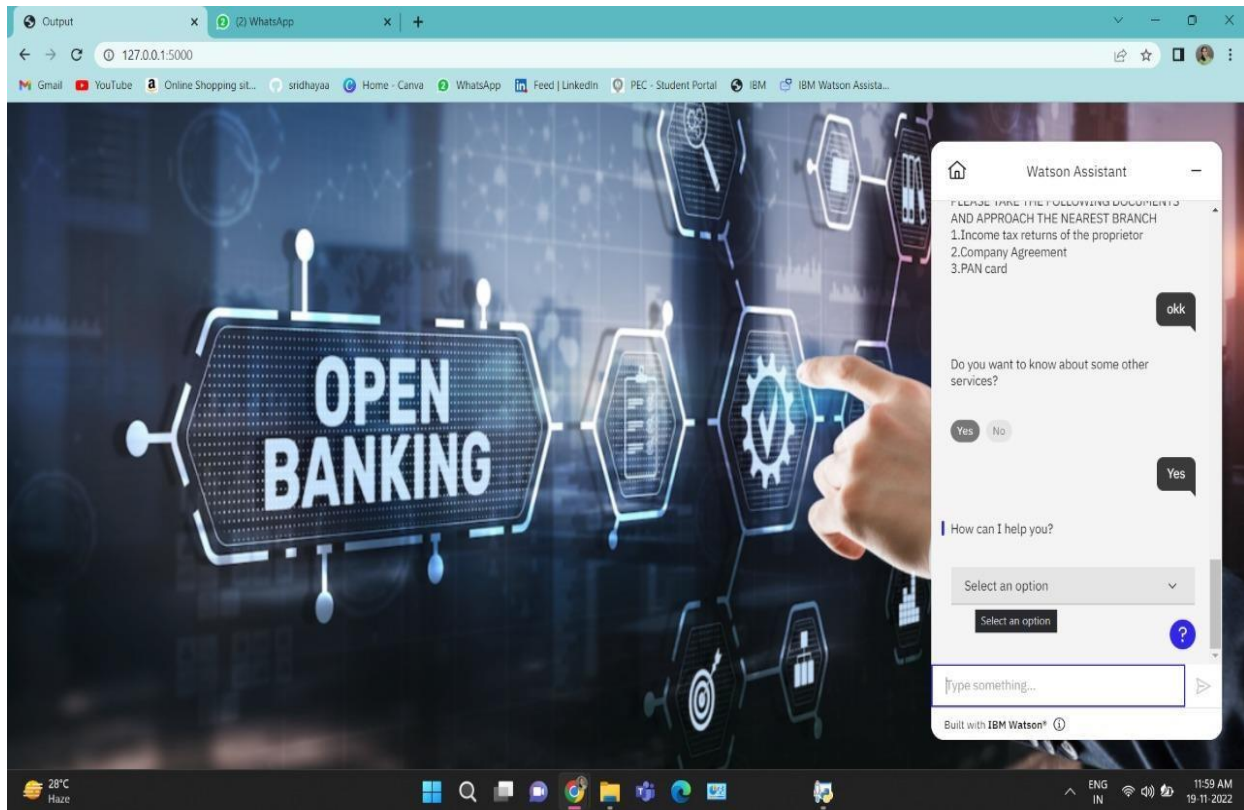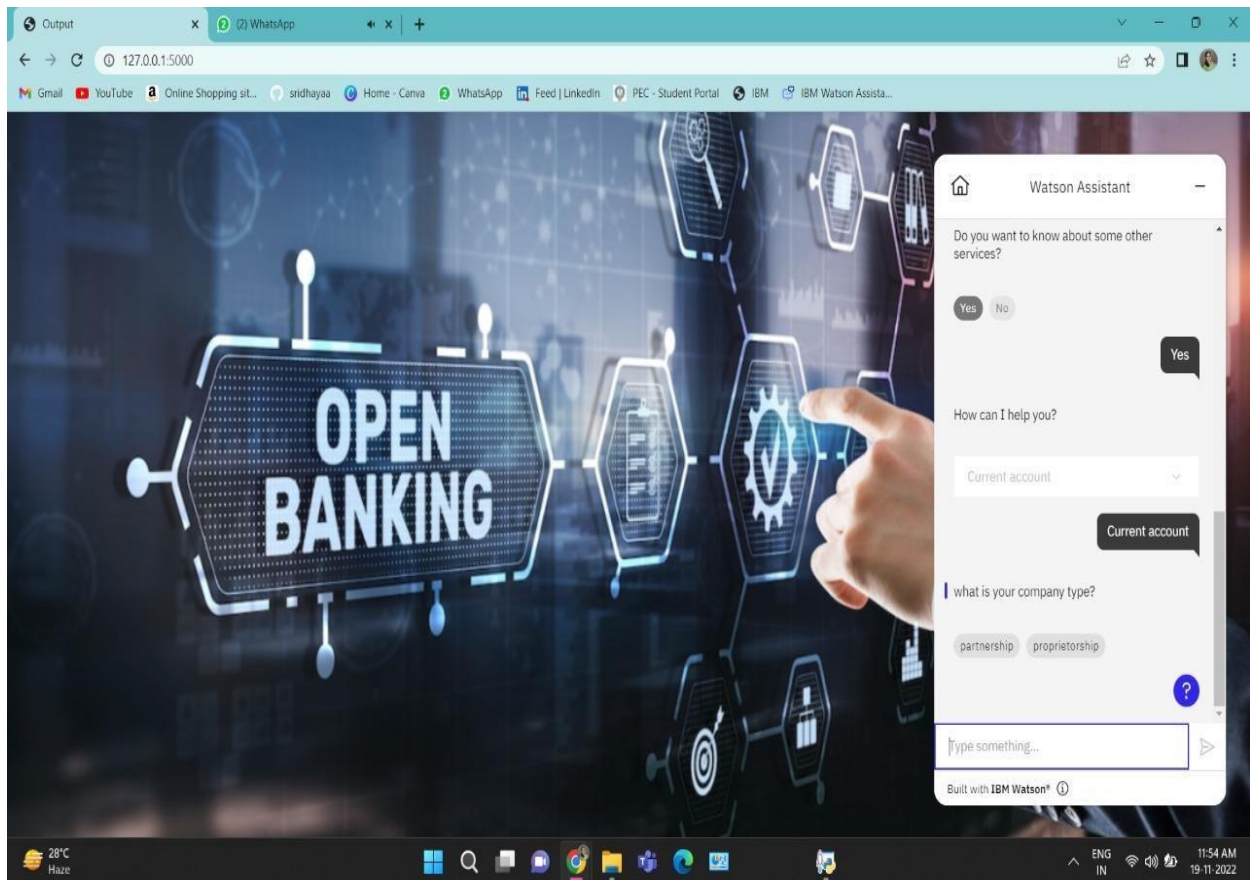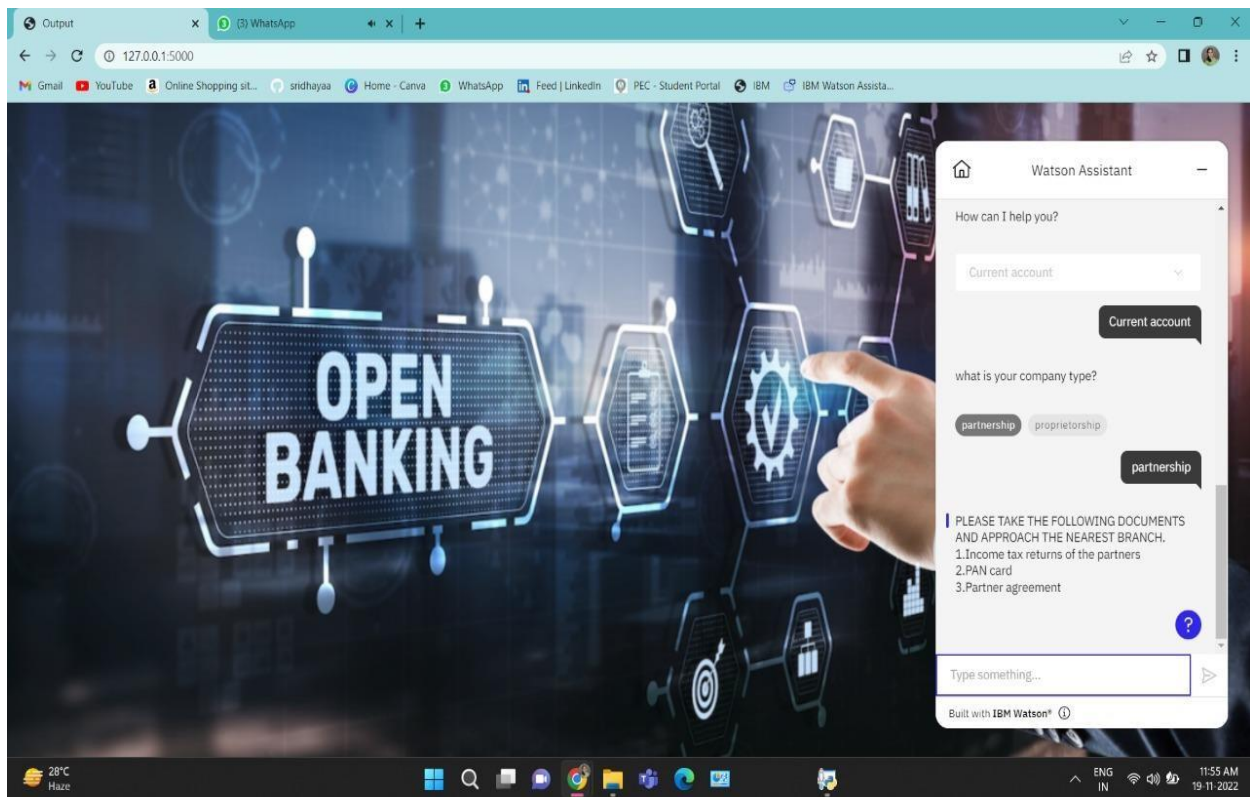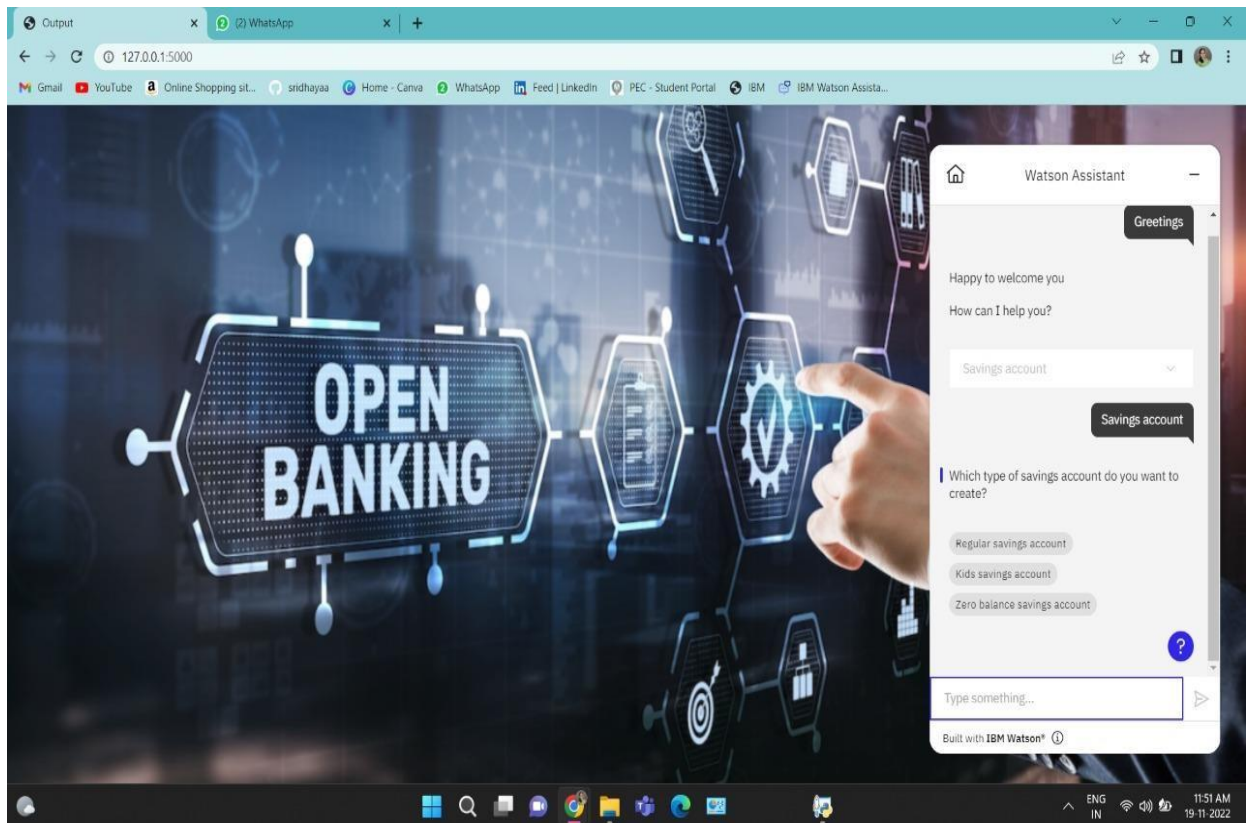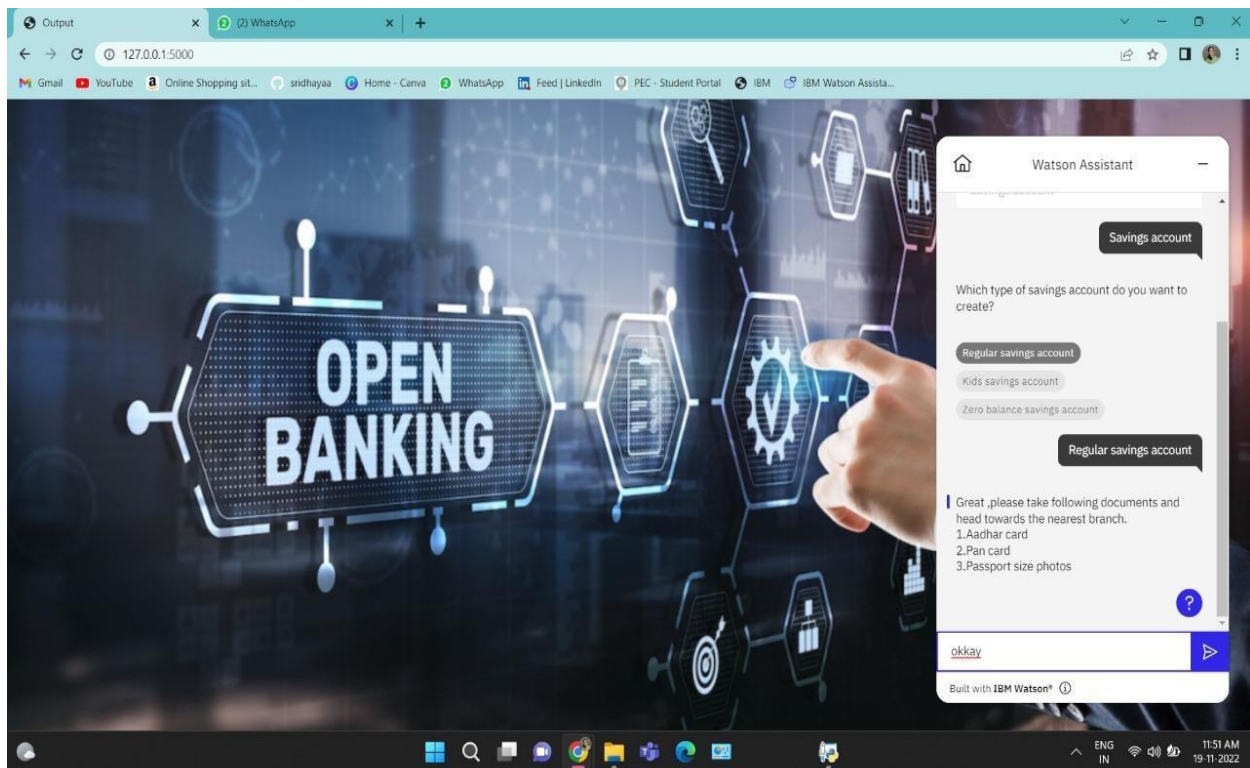
DEMO LINK:

IBM-EPBL/IBM-Project-8594-1658925370/blob/main/Final%20Delivarables/watson-banking-chatbot-master/FInal%20demo%20video.mp4