

AI BASED DISCOURSEFOR BANKING INDUSTRY

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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 any one 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 References

Paper 1

Authors: Vinod Kumar Shukla, Sasha Fathima Suhel, Sonali Vyas, Ved Prakash Mishra

Year: 2020

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

Methodology: This paper examines some of the latest AI patterns and activities. System?Chatbots are made. In the banking industry, the introduction of Artificial Intelligence has driven chatbots and changed the face of the interaction between banks and customers.

Advantage: Artificial Intelligence involves creating machines that are capable of simulating knowledge. It also explores the existing usability of chatbot to assess whether it can fulfill the customers ever-changing needs.

Disadvantage: The dialogue capability can be limited to a very specific set or format of questions that are established by the chatbot development team.

Paper 2

Authors: Yomna Abdulla, Rabab Ebrahim, Sumathi Kumaraswamy

Year: 2020

Title: Artificial Intelligence in Banking sector: Evidence from Bahrain

Methodology: 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 the near future.

Advantage: AI can be best described as the computerized processes that employ knowledge, reasoning, and communication that aids smart decision making by chatbots in banks. **Disadvantage:** Banking sector faces significant challenges relating to security, risk management and inefficiency that decrease the overall performance of banks.

Paper 3

Authors: Tebaga Lucky Mamela, Nita Sukdeo, Sambil Charles Mukwakungu

Year: 2020

Title: Adapting to Artificial Intelligence through Workforce Re-skilling within the Banking Sector in South Africa

Methodology: This research paper intends to inspire the banking sector to re-skill the banking Institution's workforces in South Africa to adapt to the Artificial Intelligence technologies. **Advantage:** Re-skilling the banking workforce to cooperate and collaborate effectively with Artificial Intelligence will enable not only efficiency but futuristic innovation and continuous growth.

Disadvantage: Although AI is creating millions of new jobs, the banking institutions does the substitution of workforces with intelligent robots that could increase the inequality among the highly skilled workforce.

Paper 4

Authors: Shashank Bairy, Rashmi R

Year: 2021

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

Methodology: Chatbot is a software application that listens to a user's query in natural language and responds accordingly. There is rapid adoption of the latest technologies in banking and chatbots are one of them. Answering customer queries and assisting customers with banking transactions are some of the ways in which it's making an impact on the industry.

Advantage: Net banking websites are complex and involve navigating through a lot of pages to find the information that users need. Bank staff undergo a lot of stressful situations when communicating with clients directly. Such situations can be avoided gracefully by using chatbots with AI.

Disadvantage: Chatbots cannot hold the conversation which means it cannot answer multiple questions at the same time.

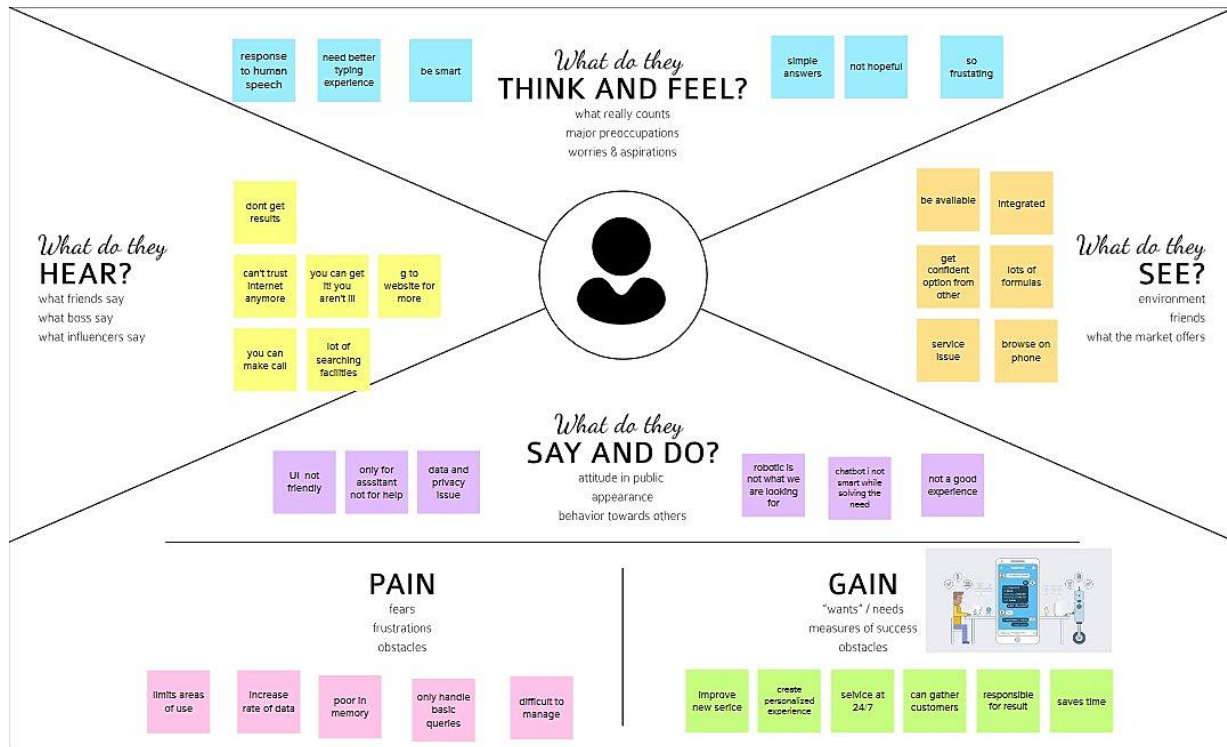
2.3 Problem Statement Definition

Banking is one the crucial sectors, 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 a

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 need 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 centers as well as providing them with relevant suggestions.

3. IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 🕒 10 minutes to prepare
- 🕒 1 hour to collaborate
- 👤 2-8 people recommended



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.

C Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →



Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

building stronger customer relationship

It doesn't make sense to staff a 24/7 customer support, this agent is live so it can cooperate with the customer and easily get attached.



Key rules of brainstorming

To run an smooth and productive session



Stay in topic.



Encourage wild ideas.



Defer judgment.



Listen to others.



Go for volume.



If possible, be visual.

2

Brainstorm

Write down any Ideas that come 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!

Harshavardhan(TL)



Abirami



Arun kumar



Kousalya



3.3 Proposed Solution

S.N O	PARAMETER	DESCRIPTION
1.	ProblemStatement(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.	SocialImpact/CustomerSatisfaction	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 work force and even reduces the work load 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.

3.4 Problem Solution Fit

Define CS, fit into	1. CUSTOMER SEGMENT(S) CS Our customers are bankers who need an intelligent system for handling customer queries	6. CUSTOMER CC Customer constraints include ambiguity in information, unavailability of agents and many other 24/7 service issues	5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they face the problem? There are a lot of chatbots available presently. People have tried appointing real time customer agents but there are a lot <u>issues</u>	Explore AS,
	2. JOBS-TO-BE-DONE / PROBLEMS J&P Effectively handle financial queries Use local and natural human like conversation Ensure user interface is optimal	3. PROBLEM ROOT CAUSE RC The problem mainly is because that since the element of money is involved customers feel pretty unreliable using a digital agent for transactions	7. BEHAVIOUR BE <u>i.e.</u> directly related: find the right solar panel installer, calculate The customer visits their bank branch every time they have some issue or query.	
Focus on J&P, tap into BE, understand	3. TRIGGERS TR Fancy user interface and comfortable transfer and updating of information is the only trigger that we can account here	10. YOUR SOLUTION SL There are a lot of banking bots owned by banks. We can use the already available user information and design an intelligent agent for delivering a perfect discourse system	8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE Customers try the website of the bank and try calling the customer support people. They try raising queries if a terminal is present	Extract online & offline CH of BE
	4. EMOTIONS: BEFORE / AFTER EM They feel scared about their account if the data is inaccurate, they might feel frustrated if their queries are unsolved After usage: They'll feel confident about the discourse system.			
Identify strong TR & EM				

4. REQUIREMENT ANALYSIS

4.1 Functional requirements

FRNO.	FUNCTIONAL REQUIREMENT(EPIC)	SUB REQUIREMENT (STORY /SUB-TASK)
-------	------------------------------	-----------------------------------

FR-1	Savings Account Related Actions	<ul style="list-style-type: none"> ● Type of Savings Account Creation Details ● Interest Rate ● Minimum Balance ● Debit Card ● Credit Card
FR-2	Current Account Related Actions	<ul style="list-style-type: none"> ● Type of Company ● Current Account Closure Steps ● Update GSTIN ● Zero Balance Current Account
FR-3	Loan Account Related Actions	<ul style="list-style-type: none"> ● Type of Loan ● How long for approval ● Available Loan Amounts ● Loan Status ● Joint Loan
FR-4	General Queries Related Actions	<ul style="list-style-type: none"> ● Bank Working Days ● List of Branches ● Storage Locker Facility ● Currency Conversion Facility ● CIBIL ● Find a nearest branch
FR-5	Net Banking Related Actions	<ul style="list-style-type: none"> ● Login Steps ● Change Net Banking Password ● Daily Limit ● Types of Fund Transfer ● Add Beneficiary

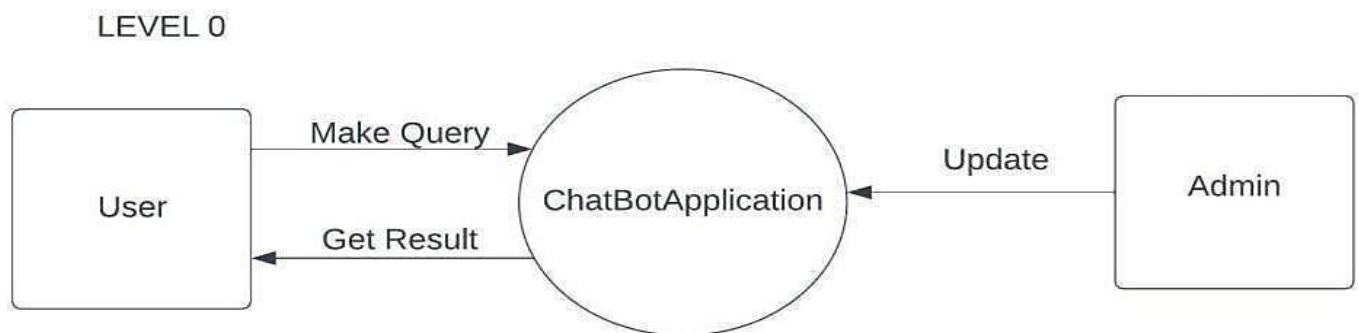
4.2 Non-Functional requirements

NFRNO.	NON - FUNCTIONAL REQUIREMENT	DESCRIPTION
NFR-1	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 a cost efficient manner.

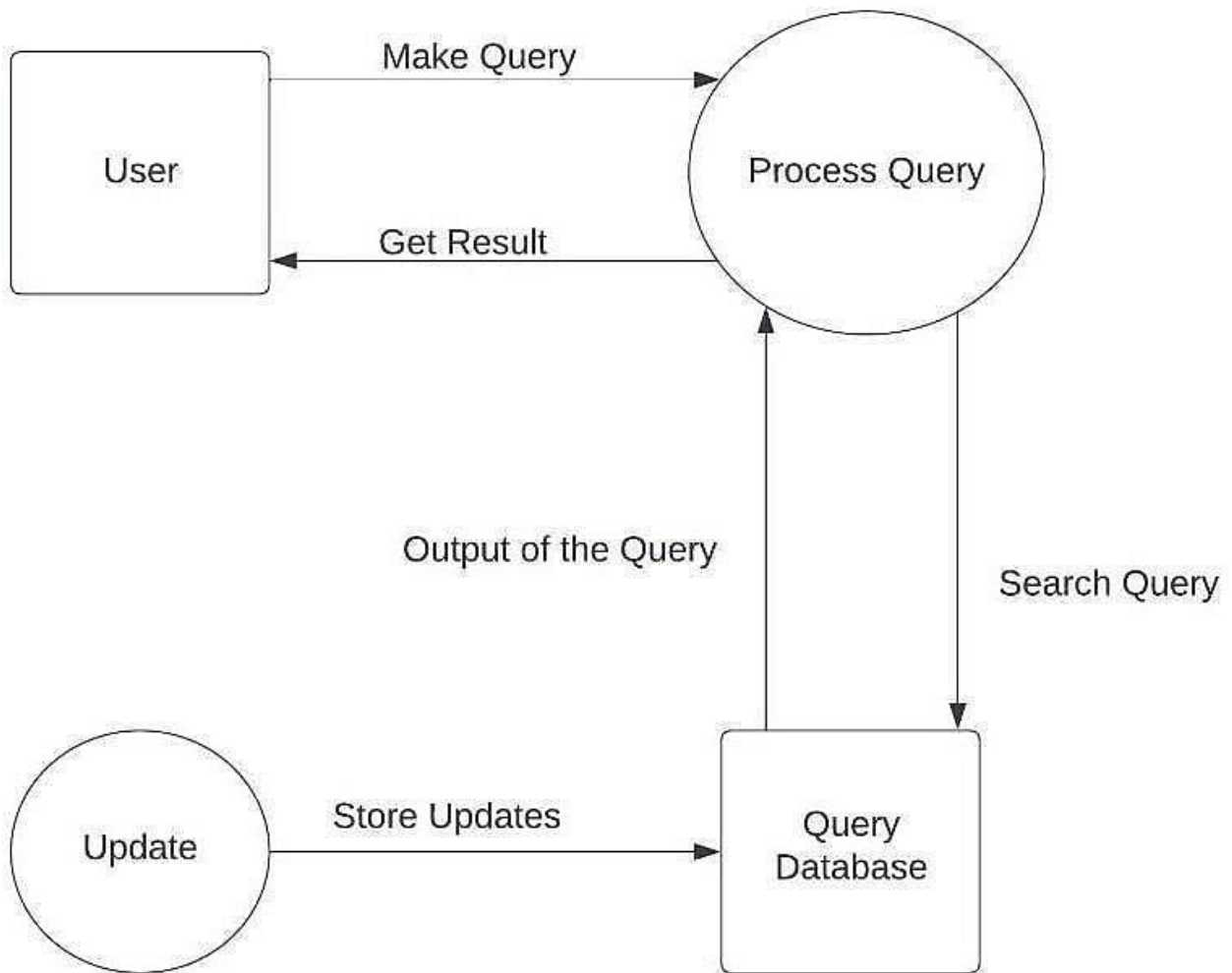
NFR-2	Security	The AI Chatbot maintains a confidential conversation with customers.Chatbot will provide personal and efficient communication between the user and the bank.
NFR-3	Reliability	Chatbots are trained very well using AI to provide solutionsforthepopularandfrequentlyaskedquestions,thereby providing the best suited service quickly.Thus AI Chatbotshasareliableend-user experience.
NFR-4	Performance	AI Chatbots are 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 customizability.Thisensuresfaster,easierandmoreefficient face-time with customers.
NFR-5	Availability	AI Chatbots provide 24/7 service to clear all customer queriesandguidethemthroughallthebankingprocesses.Itisavailableto anyone with accesstotheinternetwithbasichardware.
NFR-6	Scalability	AiChatbotsarehelpingthebankingindustrytoscaletheircustomerserviceand toimprovecustomerservicesatisfactionatthesametime.Itcanbescaledaspert herequirementsofthe bank to include answers to queries related to any new feature or service introduced by the bank.

5. PROJECT DESIGN

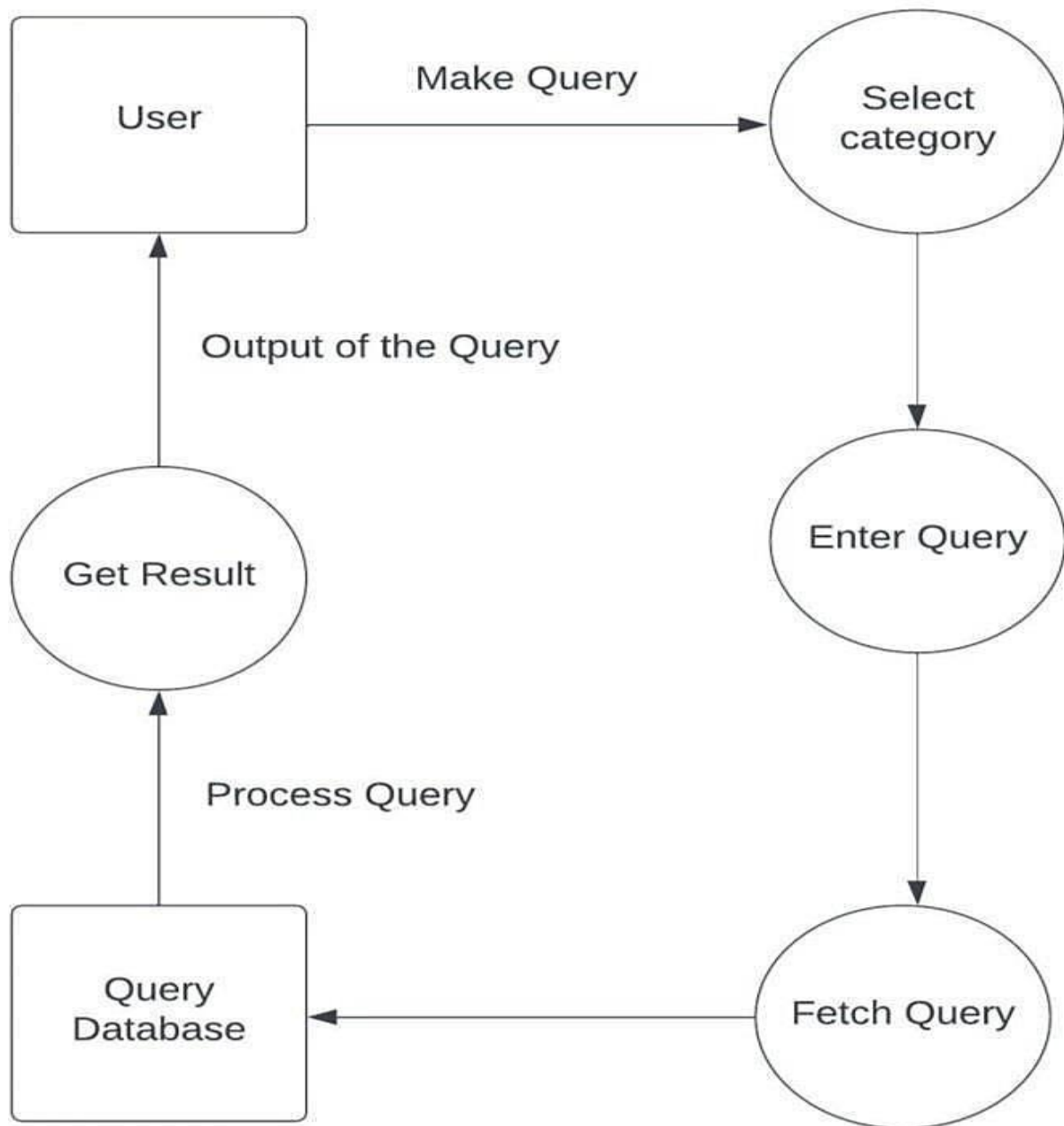
5.1 Data Flow Diagrams



LEVEL 1

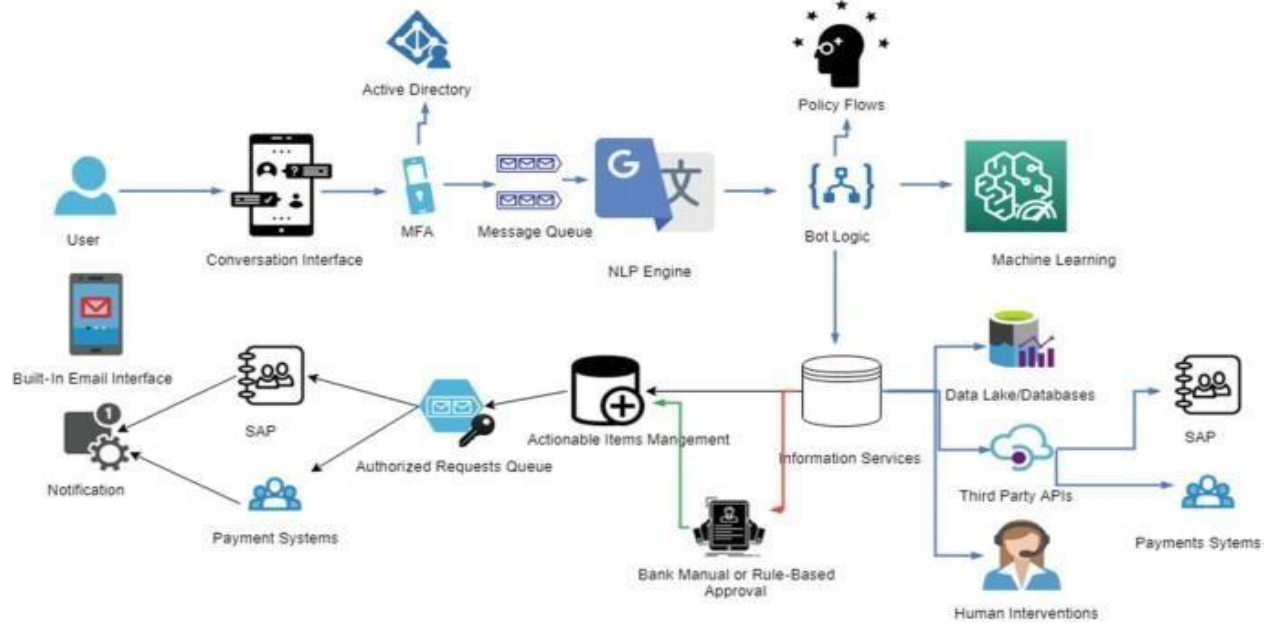


LEVEL 2

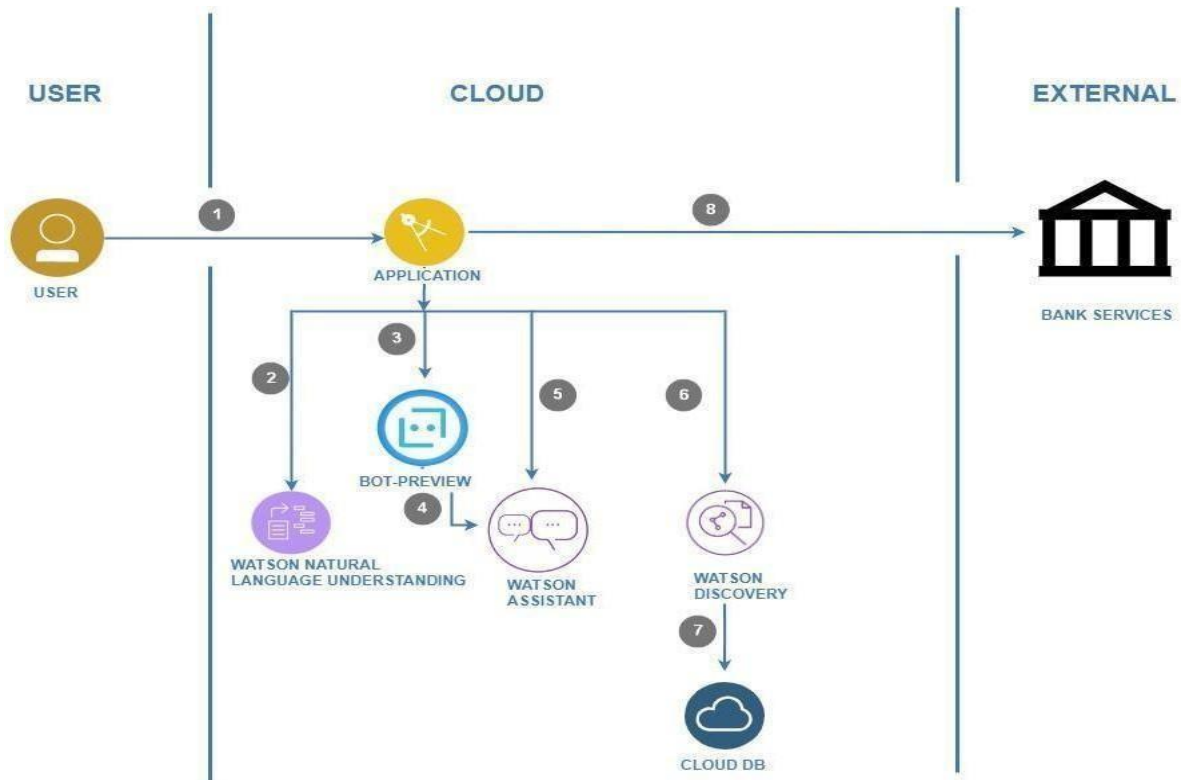


5.2 Solution & Technical

Architecture Solution Architecture



Technical Architecture



5.3 User Stories

USER TYPE	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	ACCEPTANCE CRITERIA	PRIORITY	RELEASE
Customer (Mobile or Web user)	Savings Account Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	I can clear my queries regarding types of savings account	High	Sprint-1
		USN-2	As a user, I can check the Interest Rates of Savings Account	I can clear my queries regarding interest rates of savings account	High	Sprint-1
		USN-3	As a user, I can check the Minimum Balance of Savings Account	I can clear my queries regarding minimum balance of savings account	Medium	Sprint-2
	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	I can clear my queries regarding types of companies	High	Sprint-1
		USN-5	As a user, I want to get details on procedure to close my Current Account	I can clear my queries regarding current account closure	High	Sprint-2
	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	I can clear my queries regarding types of loan account	High	Sprint-1
		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	I can clear my queries regarding loan amounts of loan account	High	Sprint-2
		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	I can clear my queries regarding loan status of loan account	Low	Sprint-2

USER TYPE	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	ACCEPTANCE CRITERIA	PRIORITY	RELEASE
		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	I can clear my queries regarding CIBIL score of loan application	Medium	Sprint 3
		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	I can clear my queries regarding storage locker facilities of bank account	High	Sprint-3
	Net Banking Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	I can clear my queries regarding change of net banking password	Medium	Sprint-2
		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	I can clear my queries regarding types of fund transfers in net banking	High	Sprint-3
		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	I can clear my queries regarding adding beneficiaries in net banking	Low	Sprint-3
Administrator		USN-15	As an admin, I can change responses to queries and modify them as and when needed.	I can modify responses of the chatbot	Medium	Sprint-1
		USN-16	As an admin, I can add more options to queries and add new options as new features get added.	I can add more options and queries into the chatbot	Medium	Sprint-1

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	Savings Account Related Actions	USN-1	As a user in Savings Account option, I can select the Type of Savings Account to get details regarding documents required for creating Savings Account	4	High	<u>ABIRAMI I</u>
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	4	High	<u>ABIRAMI I</u>
Sprint-1		USN-3	As a user, I can check the Minimum Balance of Savings Account	3	Medium	<u>ABIRAMI I</u>
Sprint-1	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	5	High	<u>ARUN KUMAR S</u>
Sprint-1		USN-5	As a user, I want to get details on procedure to close my Current Account	4	High	<u>ARUN KUMAR S</u>
Sprint-2	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	3	High	<u>KOUSALYA B,</u> <u>ABIRAMI I</u>
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	3	High	<u>KOUSALYA B,</u> <u>ABIRAMI I</u>
Sprint-2		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	1	Low	<u>KOUSALYA B,</u> <u>ABIRAMI</u>
Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	2	Medium	<u>ARUN KUMAR S,</u> <u>HARSHA</u> <u>VARDHAN C</u>
Sprint-2		USN-10	As a user, I want to check my <u>CIBIL</u> score for my loan application and to ensure whether my loan application is approved by the bank.	1	Low	<u>ARUN KUMAR S,</u> <u>HARSHA</u> <u>VARDHAN C</u>
Sprint-2		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	3	High	<u>ARUN KUMAR S,</u> <u>HARSHA</u> <u>VARDHAN C</u>

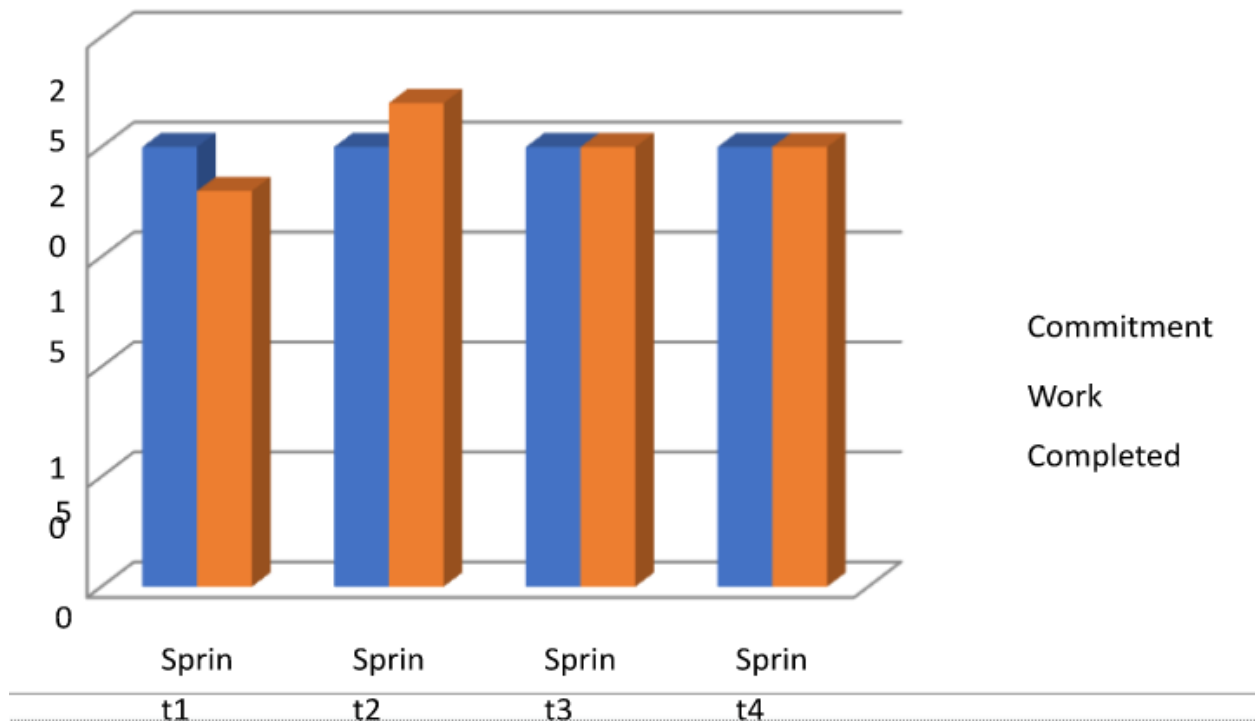
Sprint-2	Net Banking Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	3	High	ABIRAMI I, ARUN KUMAR S
Sprint-2		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	2	Medium	ABIRAMI I, ARUN KUMAR S
Sprint-2		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	2	Medium	ABIRAMI I, ARUN KUMAR S
Sprint-3	Web Application	USN-15	As a user, I want to access the chatbot in a web browser that can be accessed from almost all devices.	20	High	HARSHAVARDHAN, ABIRAMI I, ARUN KUMAR S, KOUSALYA B
Sprint-4	User Interface and Web Pages	USN-16	As a user, I want to view pages of the banking website and have access to the chatbot easily.	20	High	HARSHAVARDHAN, ABIRAMI I, ARUN KUMAR S, KOUSALYA B

6.2 Sprint Delivery Schedule

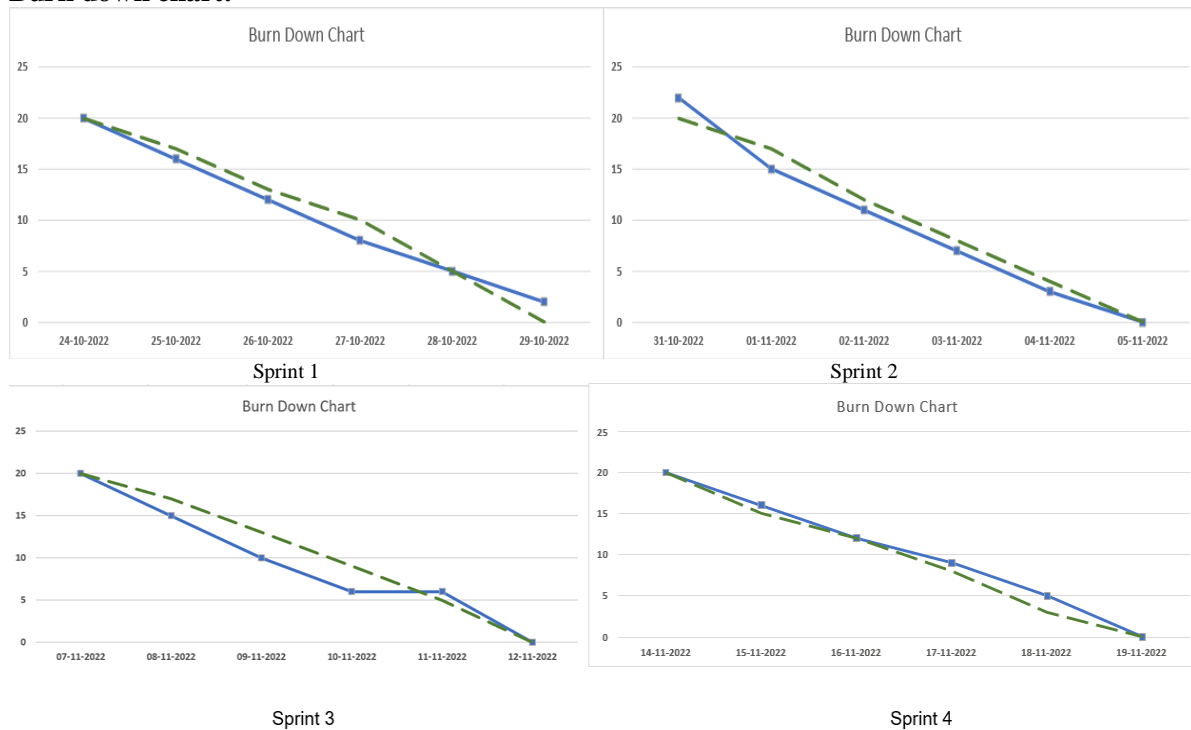
SPRINT	TOTAL STORY POINTS	DURATION	SPRINT START DATE	SPRINT END DATE (PLANNED)	STORY POINTS COMPLETED (AS ON PLANNED END DATE)	SPRINT RELEASE DATE (ACTUAL)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	18	02 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	22	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

SPRINT	TOTAL STORY POINTS	DURATION	AVERAGE VELOCITY
Sprint-1	20	6 Days	20/6 = 3.33
Sprint-2	20	6 Days	20/6 = 3.33
Sprint-3	20	6 Days	20/6 = 3.33
Sprint-4	20	6 Days	20/6 = 3.33
Overall	80	24 Days	80/24 = 3.33

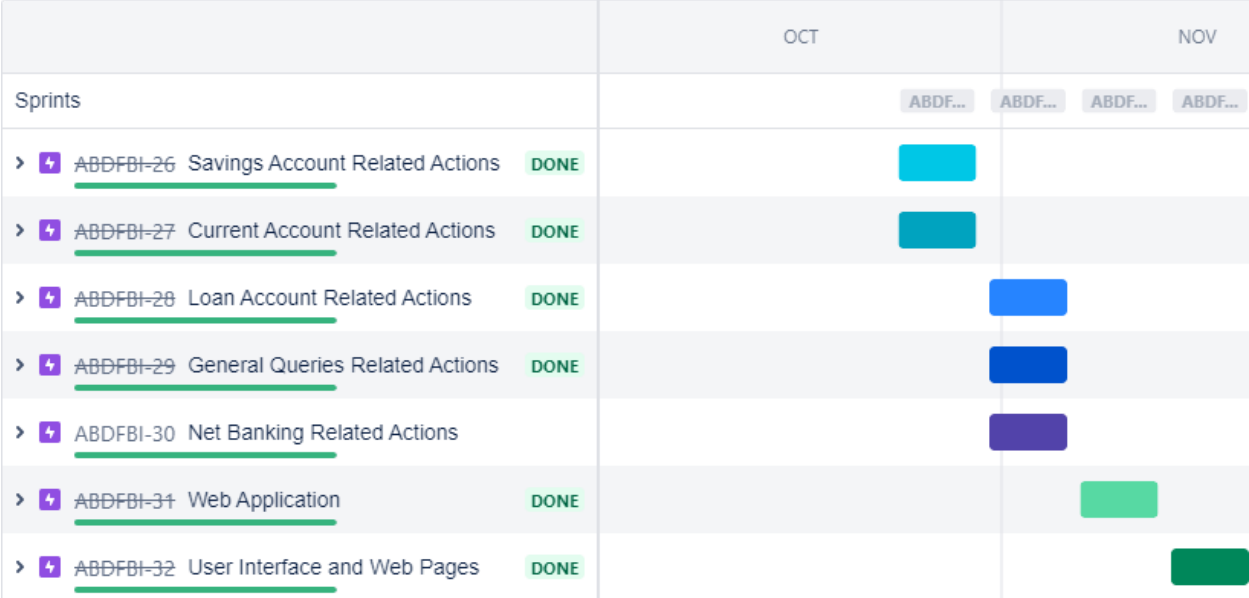
6.2 Velocity chart



Burn down chart:



6.3 Reports from JIRA



7. CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1

Python Flask

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

HTML

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

Build PYTHON FLASK Code:

APP.PY

```
from flask import Flask, render_template
app = Flask(__name__)
@app.route('/')
def bot():
    return render_template('index.html')
if __name__ == '__main__':
    app.run(debug = True)
```

HOME.HTML

```
<!DOCTYPE html>
<html lang="en">
<head> <meta charset="UTF-8">
<title>Output</title>
<link href="https://fonts.googleapis.com/css?family=Source+Sans+Pro&display=swap"
rel="stylesheet">
<style>
#header{
display: flex;
align-items:center;
justify-content:space-between;
padding:20px 340px;
box-shadow: 0 5px 15px rgba(0, 0, 0, 0.06);
z-index: 999;
position: sticky;
top: 0;
left: 0;
font-family: 'Source Sans Pro', sans-serif;
}
#navbar li a:hover,
#navbar li a:active{
color: #ffff;
}
#navbar li a.active::after,
#navbar li a:hover::after{
content:"";
```

```

width: 30%;
height: 2px;
background: white;
position: absolute;
bottom: -4px;
left: 20px;
}
#navbar{
display: flex;
align-items: center;
justify-content: center;
}
#navbar li{
list-style: none;
padding: 0 20px;
position: relative;
}
#navbar li a{
text-decoration: none;
font-size: 25px;
font-weight: 600;
color: white;
transition: 0.03s ease;
}
body{
background-image: linear-gradient(to bottom, #153449, #006479, #00978d, #48c87f, #c6f062);
}
#hero{
height: 90vh;
width: 100%;
background-size: cover;
background-position: top 25% right 0;
padding: 0 80px;
display: flex;
flex-direction: column;
align-items: flex-start;
justify-content: center;
}
#hero h1,p{
font-size: 50px;
line-height: 20px;
color: white;
font-family: 'Source Sans Pro', sans-serif;
} </style></head>
<body> <section id="header"> <div>
<ul id="navbar">
<li><a class="active" href="#">Home</a></li>
<li><a href="#">About</a></li>
<li><a href="#">Services</a></li>
<li><a href="#">Award</a></li>
<li><a href="#">Contact</a></li>

```



```

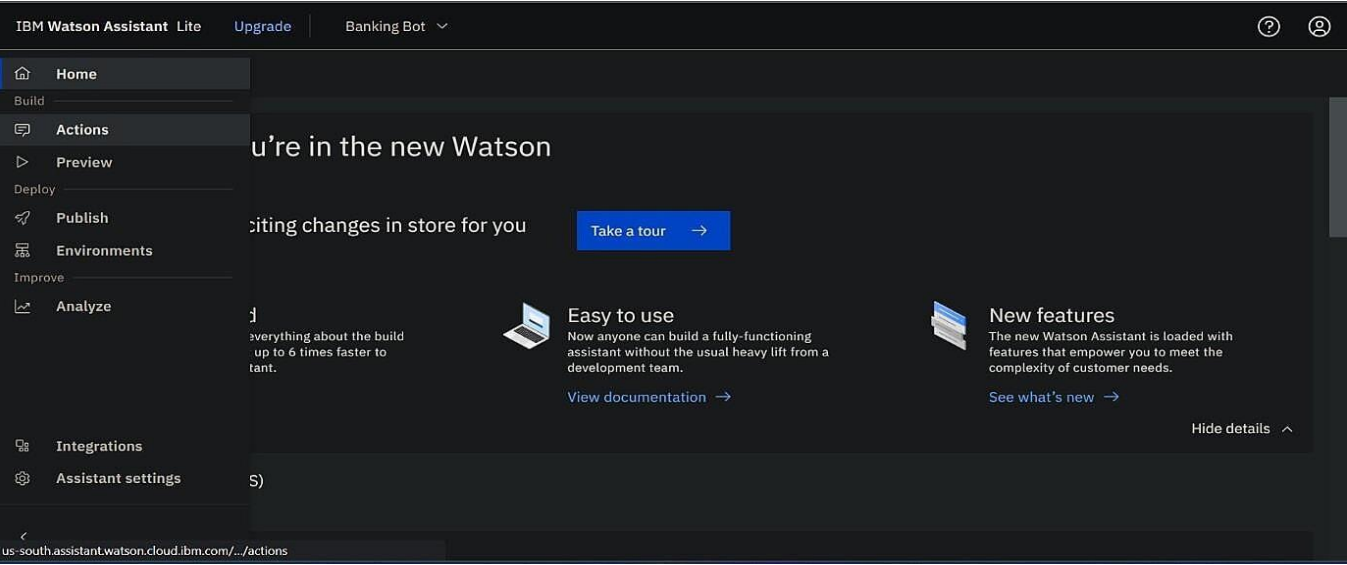
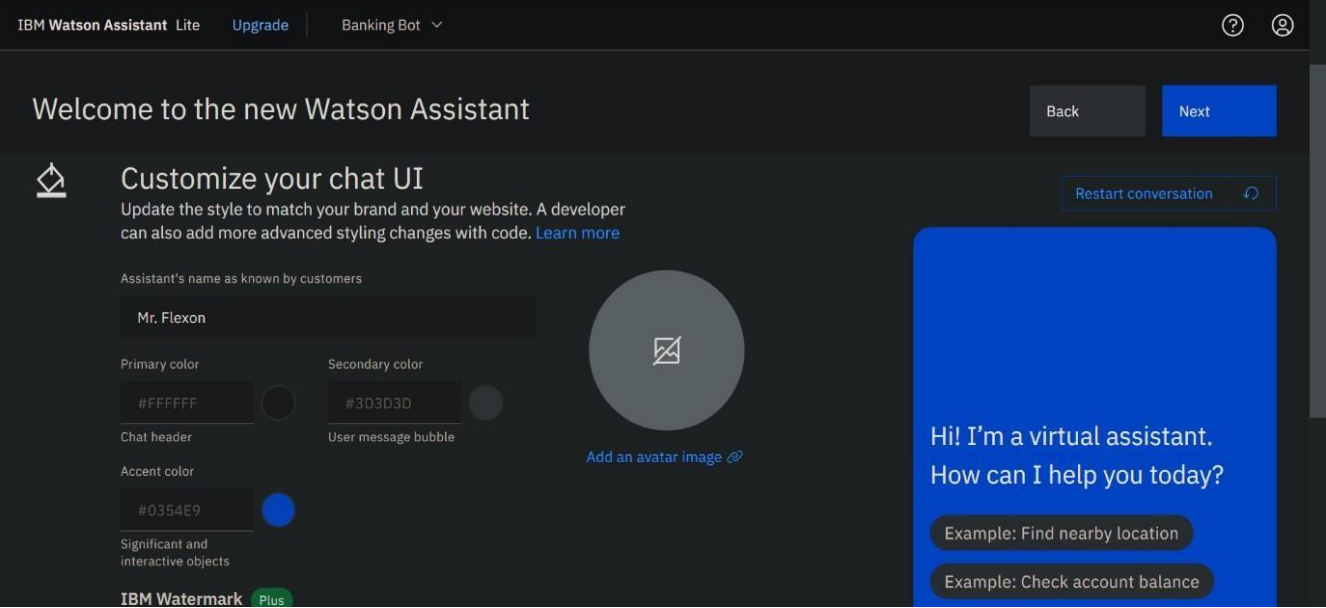
</ul> </div> </section>
<section id="hero">
<p>Redefining banking experience</p>
<h1>A BANK REIMAGINED</h1>
</section> <script>
window.watsonAssistantChatOptions = {
integrationID: "22d1b5be-b60f-4ea2-bd4a-3a669f49464b",
region: "us-south", // The region your integration is hosted in.serviceInstanceID: "d3c7428c-3428-401f-
835c-954121e28aaf",
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>

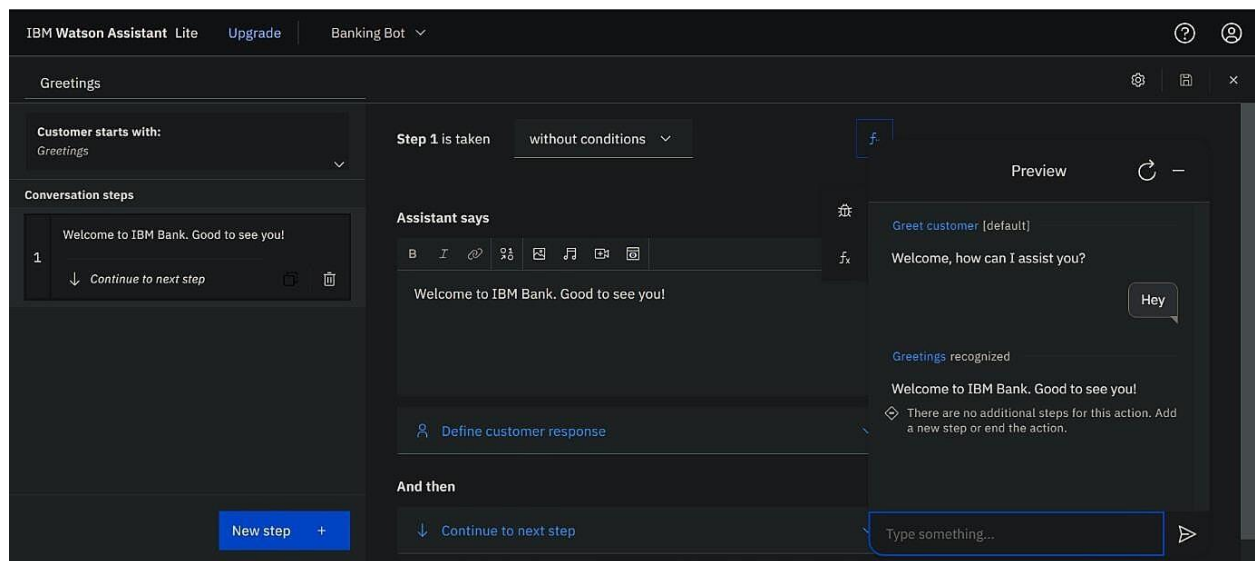
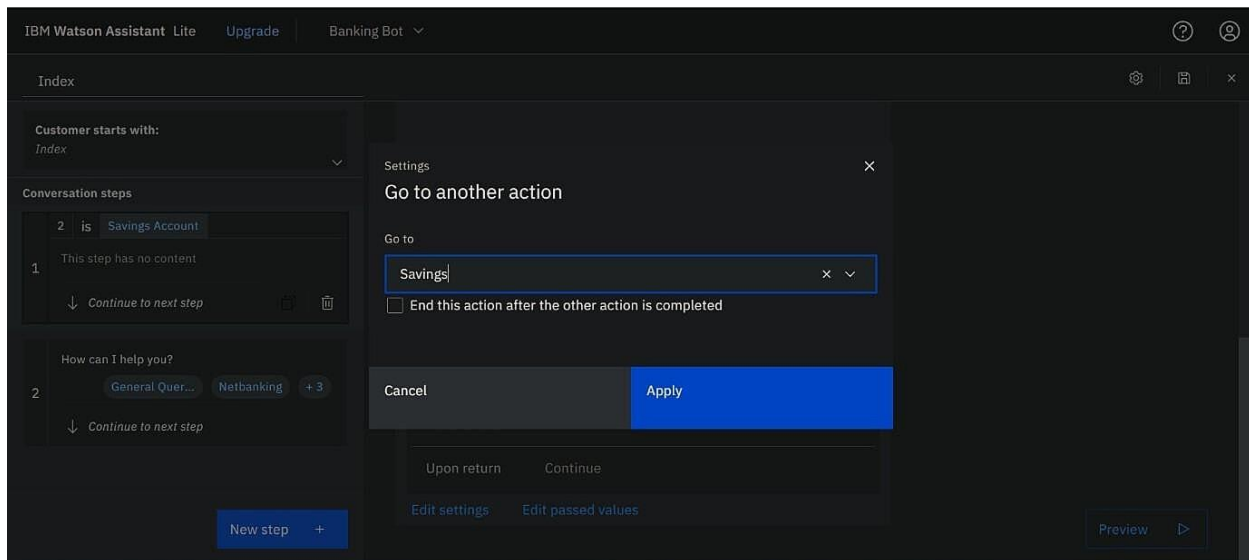
```

7.2 Feature 2

IBM CHATBOT:

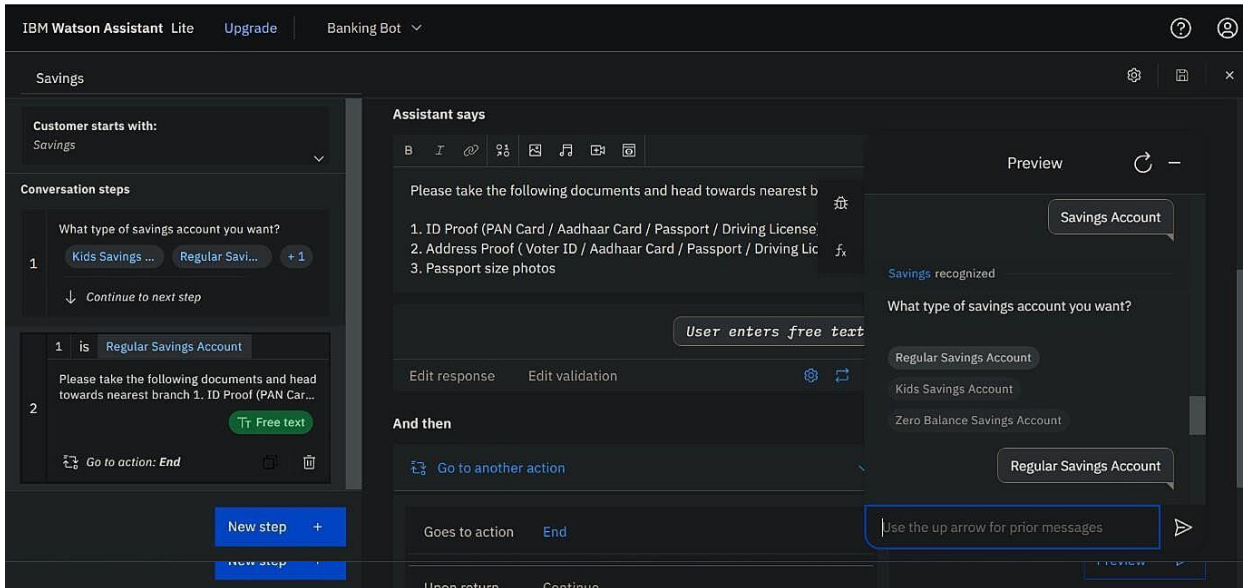
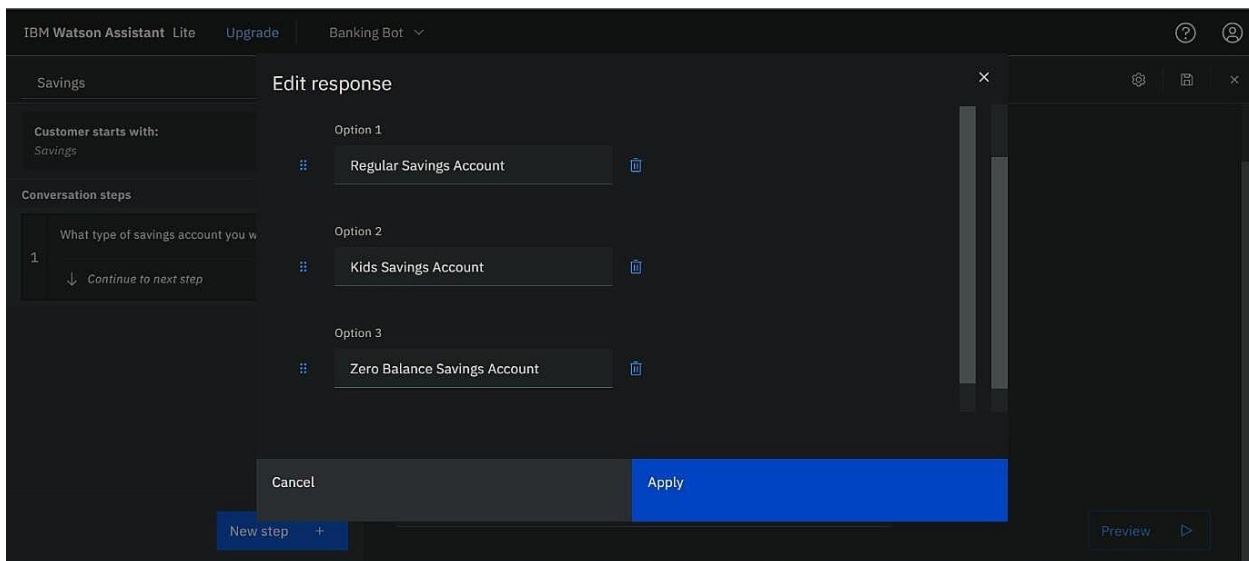
- Our chatbot is able to guide a customer to create a bank account.
- Our chatbot is able to answer loan queries.
- Our chatbot is able to answer general banking queries.
- Our chatbot is able to answer queries regarding net banking.





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 netbanking account
2	Verify user is able to know the procedure to change netbanking 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-conditions	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	% for Automation (%)	Pass/Fail
Interest_TC_001	UI	Home Page	Verify user is able to open a new dashboard	None	1. Click on the link to go to the dashboard 2. Click on the dashboard icon 3. Verify the dashboard is displayed as expected	UI link	Dashboard of a user is displayed by user	Working as expected	Pass		95	Pass
Dashboard_TC_001	Functional	Home Page	Verify user is able to interact with dashboard as expected	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to interact with dashboard as expected	Working as expected	Pass		95	Pass
Dashboard_TC_002	Functional	Home Page	Verify dashboard is able to respond to user queries immediately	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	Dashboard is able to provide instant replies for user queries	Working as expected	Pass		95	Pass
Dashboard_TC_003	Functional	Home Page	Verify dashboard is able to provide options for user to choose various options	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	Dashboard is able to provide options for user to choose various options	Working as expected	Pass		95	Pass
Savings_TC_001	UI	Dashboard	Verify user is able to select type of savings account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Savings_TC_002	Functional	Dashboard	Verify user is able to know the procedure to create savings account for selected type	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Savings_TC_003	Functional	Dashboard	Verify user is able to know minimum balance	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know the minimum balance	Working as expected	Pass		95	Pass
Savings_TC_004	Functional	Dashboard	Verify user is able to find interest rate	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Current_TC_001	UI	Dashboard	Verify user is able to select type of current account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to select type of current account	Working as expected	Pass		95	Pass
Current_TC_002	Functional	Dashboard	Verify user is able to know the procedure to create current account for selected type	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Current_TC_003	Functional	Dashboard	Verify user is able to know about bank balance current account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about bank balance current account	Working as expected	Pass		95	Pass
Current_TC_004	Functional	Dashboard	Verify user is able to know the procedure to close current account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Loan_TC_001	Functional	Dashboard	Verify user is able to check the loan status	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass
Loan_TC_002	Functional	Dashboard	Verify user is able to know about loan limit	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about loan limit	Working as expected	Pass		95	Pass
Interest_TC_001	Functional	Dashboard	Verify user is able to know about bank interest rates	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about bank interest rates	Working as expected	Pass		95	Pass
Interest_TC_002	Functional	Dashboard	Verify user is able to know about loan interest	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about loan interest	Working as expected	Pass		95	Pass
Interest_TC_003	Functional	Dashboard	Verify user is able to find the required branch	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to find the required branch	Working as expected	Pass		95	Pass
Interest_TC_004	Functional	Dashboard	Verify user is able to know about savings interest facility	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about savings interest facility	Working as expected	Pass		95	Pass
Interest_TC_005	Functional	Dashboard	Verify user is able to know about business loan interest facility	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know about business loan interest facility	Working as expected	Pass		95	Pass
Interest_TC_006	Functional	Dashboard	Verify user is able to know the procedure to open recurring account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know the steps to open recurring account	Working as expected	Pass		95	Pass
Interest_TC_007	Functional	Dashboard	Verify user is able to know the procedure to change recurring account	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user in the chat window 3. Press enter 4. Select the desired option	User query	User is able to know the steps to change recurring account	Working as expected	Pass		95	Pass
Interest_TC_008	UI	Dashboard	Verify user is able to choose options for selecting type of fund transfer	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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 transfer	Working as expected	Pass		95	Pass
Interest_TC_009	Functional	Dashboard	Verify user is able to know about daily transaction limit	Dashboard is accessible	1. Click on the dashboard icon 2. Page the user 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		95	Pass

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Executions List

Test Cycle	Test Id	Execution Status
User Acceptance Testing	10058	PASS
User Acceptance Testing	10062	PASS
User Acceptance Testing	10081	PASS
User Acceptance Testing	10068	PASS
User Acceptance Testing	10077	PASS
User Acceptance Testing	10076	PASS
User Acceptance Testing	10064	PASS
User Acceptance Testing	10071	PASS

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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

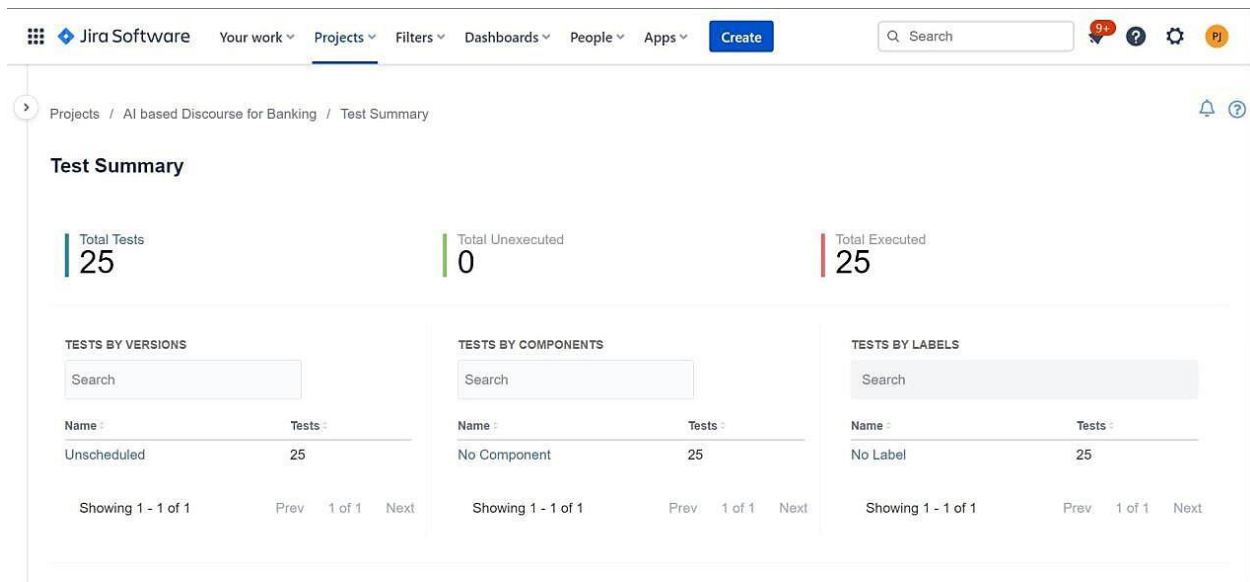
Select All

Delete

Columns

Add Tests

ID	Status	Summary	Defect	Compon...	Label	To	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



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

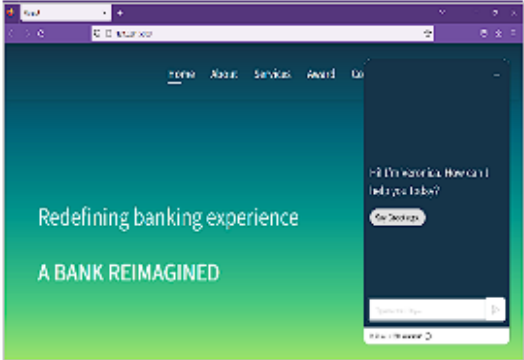
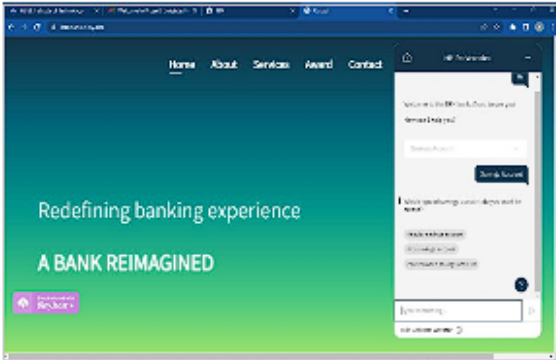
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	0	0	0	0
Client Application	25	0	0	25
Security	0	0	0	0
Outsource Shipping	0	0	0	0
Exception Reporting	0	0	0	0
Final Report Output	25	0	0	25
Version Control	0	0	0	0

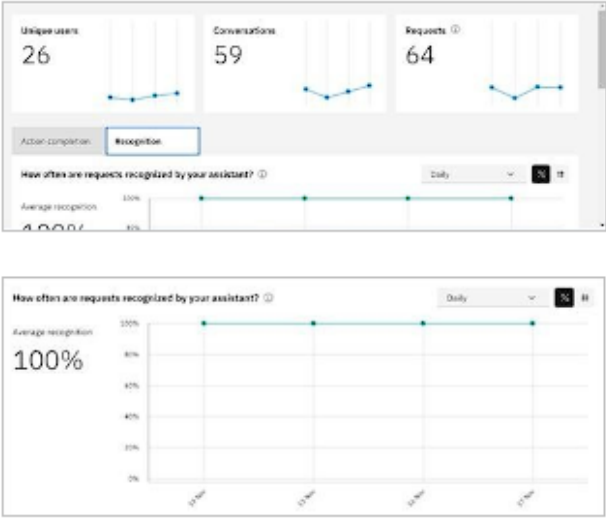
9. RESULTS

9.1 Performance Metrics

Model Performance

Testing:

S.NO	PARAMETER	VALUES	SCREENSHOT
1.	Model Summary	<p>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 serving different users at the same time. It quickly responds with expected answers to frequently asked customer queries. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.</p>	 

2.	Accuracy	<p>Training Accuracy – 100%</p> <p>Validation Accuracy – 100%</p>	 <p>The screenshot shows a dashboard for an AI assistant. At the top, there are three metrics: 'Unique users' with a value of 26, 'Conversations' with a value of 59, and 'Requests' with a value of 64. Each metric has a small line graph showing a slight upward trend. Below these metrics is a section titled 'How often are requests recognized by your assistant?' with a 'Daily' filter and a '100%' average recognition rate. A line graph shows the recognition rate is consistently at 100% over four data points.</p>
----	----------	---	---

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

```
from flask import Flask, render_template
app = Flask(__name__)
@app.route('/')
def bot():
    return render_template('index.html')
if __name__ == '__main__':
    app.run(debug = True)
```

HOME.HTML

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Output</title>
  <link href="https://fonts.googleapis.com/css?family=Source+Sans+Pro&display=swap"
rel="stylesheet">
  <style>
    /* Header start*/
    #header{
      display: flex;
      align-items:center;
      justify-content:space-between;
```

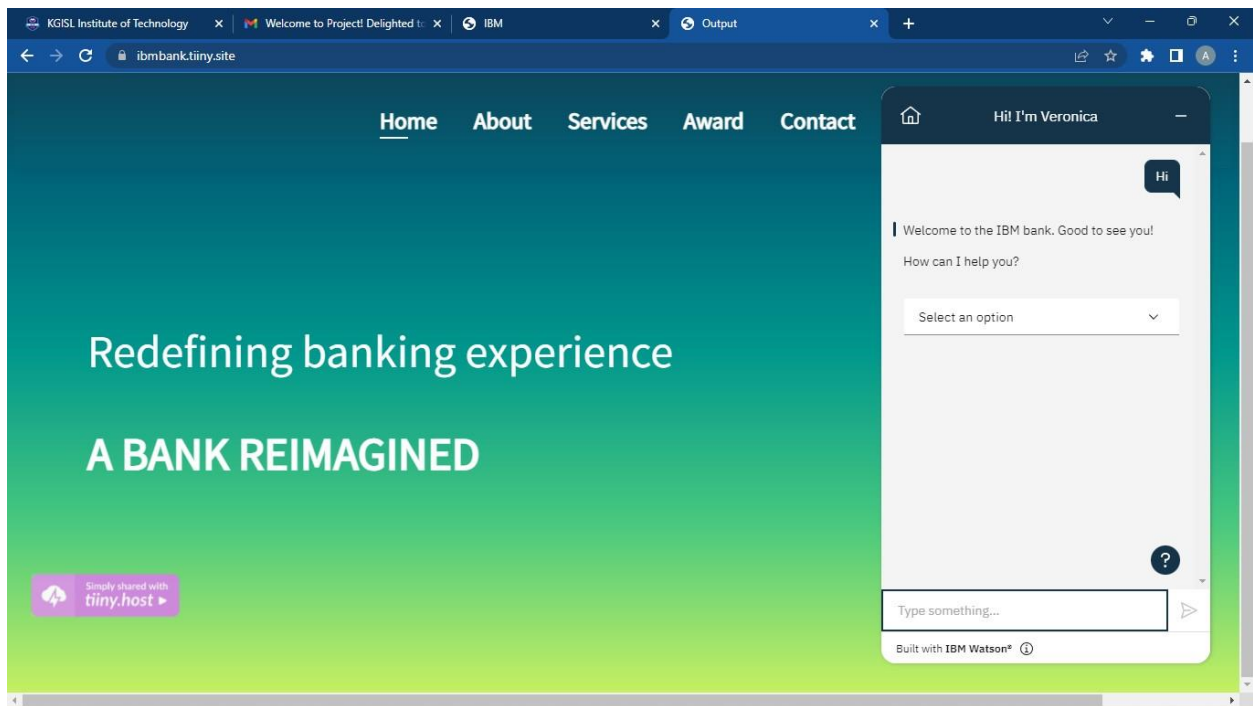
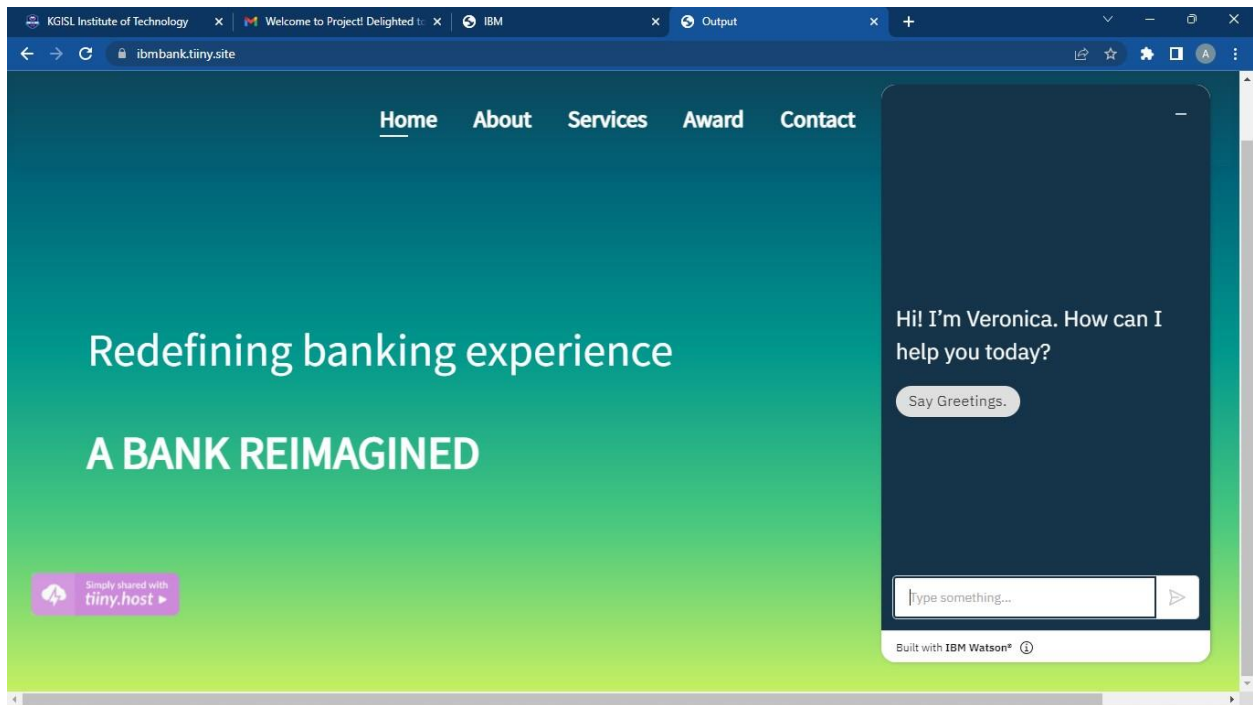
```
padding:20px 340px;
box-shadow: 0 5px 15px rgba(0, 0, 0, 0.06);
z-index: 999;
position: sticky;
top: 0;
left: 0;
font-family: 'Source Sans Pro', sans-serif;
}
#navbar li a:hover,
#navbar li a:active{
  color: #ffff;
}
#navbar li a.active::after,
#navbar li a:hover::after{
  content: "";
  width: 30%;
  height: 2px;
  background: white;
  position: absolute;
  bottom: -4px;
  left: 20px;
}
#navbar{
  display: flex;
  align-items: center;
  justify-content: center;
}
#navbar li{
  list-style: none;
  padding: 0 20px;
  position: relative;
}
#navbar li a{
  text-decoration: none;
  font-size: 25px;
  font-weight: 600;
  color: white;
  transition: 0.03s ease;
}
body{
  background-image: linear-gradient(to bottom, #153449, #006479, #00978d, #48c87f, #c6f062);
}
#hero{
  height: 90vh;
  width: 100%;
  background-size: cover;
  background-position: top 25% right 0;
  padding: 0 80px;
  display: flex;
  flex-direction: column;
  align-items: flex-start;
```

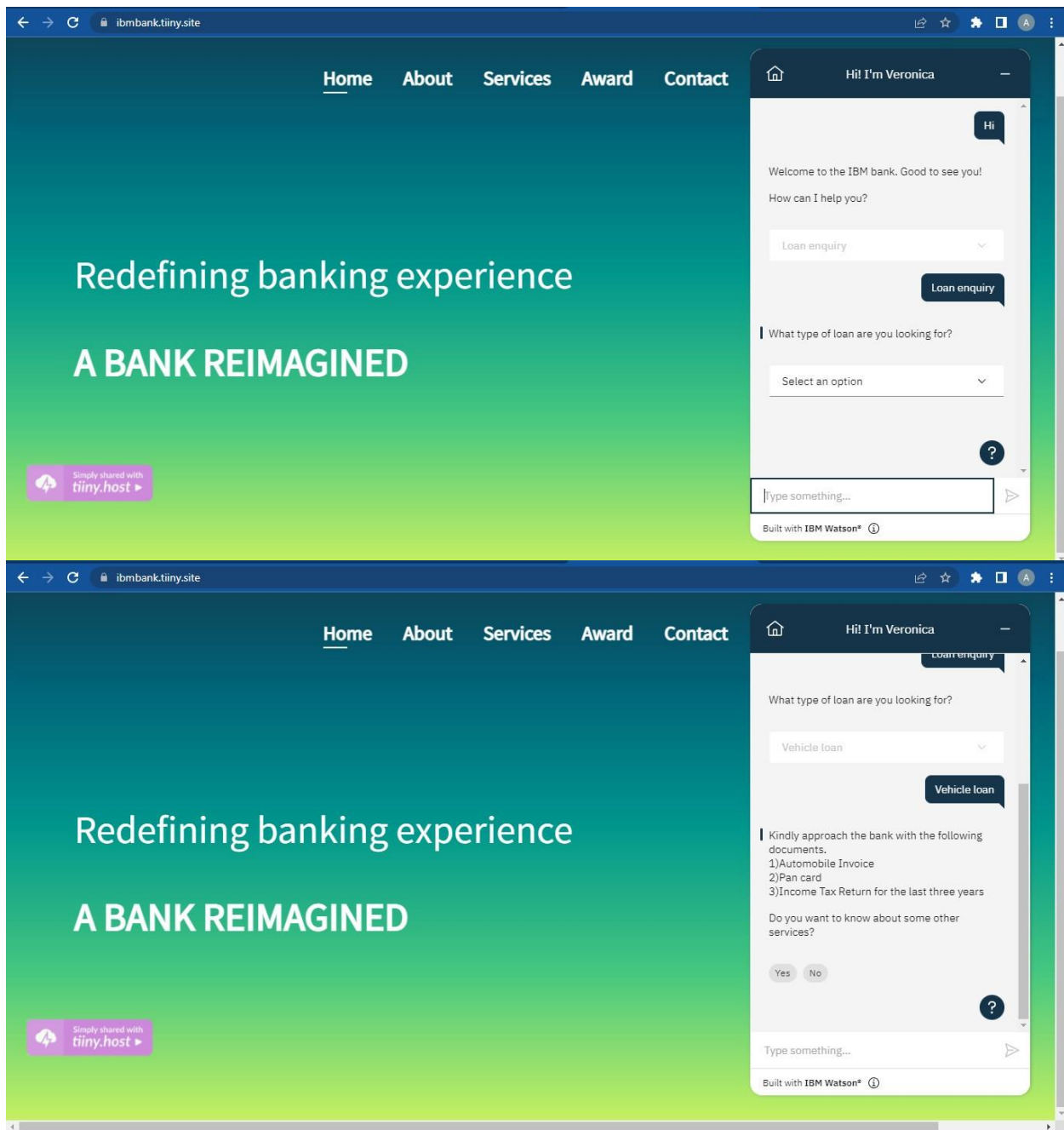
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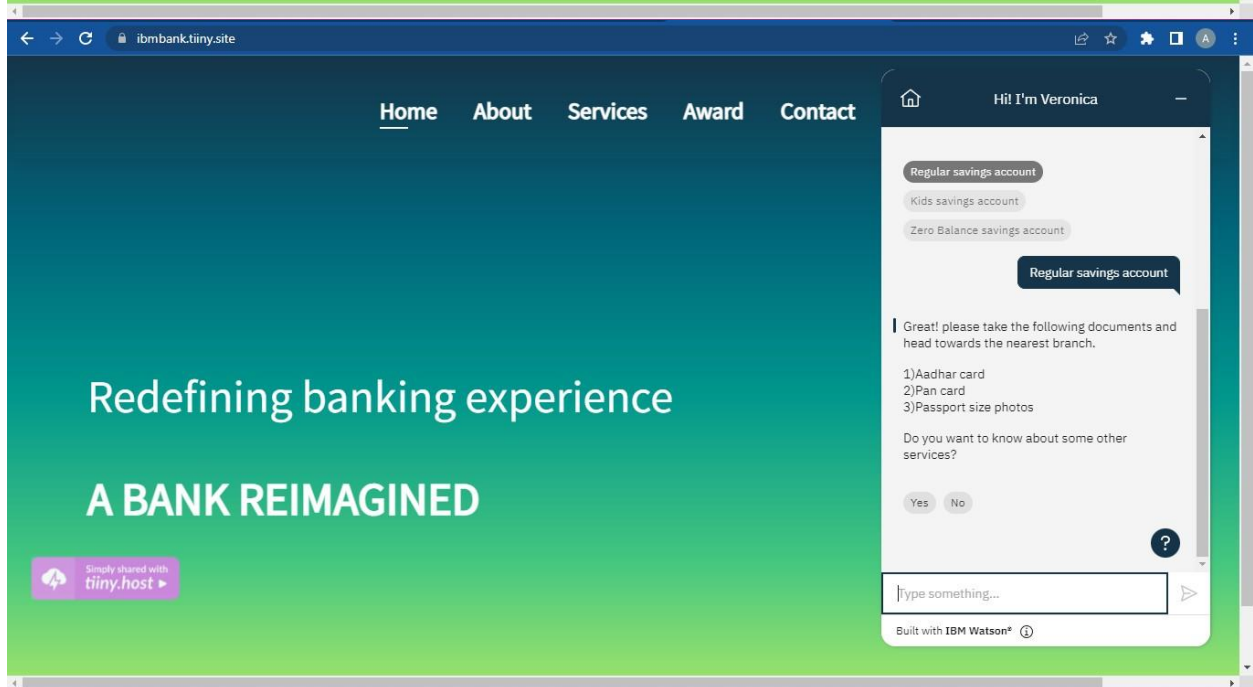
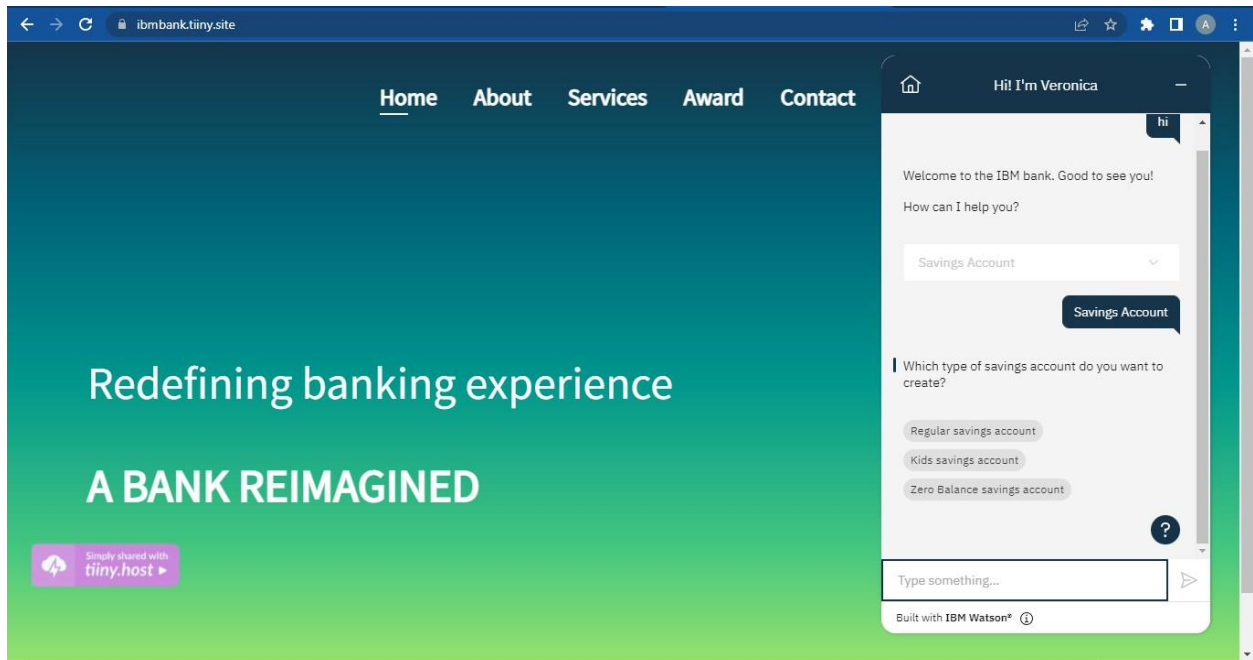
justify-content: center;}
#hero h1,p{
font-size: 50px;
line-height: 20px;
color: white;
font-family: 'Source Sans Pro', sans-serif;
}
</style>
</head>
<body>
<section id="header">
<div>
<ul id="navbar">
<li><a class="active" href="#">Home</a></li>
<li><a href="#">About</a></li>
<li><a href="#">Services</a></li>
<li><a href="#">Award</a></li>
<li><a href="#">Contact</a></li>
</ul>
</div>
</section>
<section id="hero">
<p>Redefining banking experience</p>
<h1>A BANK REIMAGINED</h1>
</section>
<script>
window.watsonAssistantChatOptions = {
integrationID: "22d1b5be-b60f-4ea2-bd4a-3a669f49464b", // The ID of this integration.
region: "us-south", // The region your integration is hosted in.
serviceInstanceID: "d3c7428c-3428-401f-835c-954121e28aaf", // The ID of your service instance.
onLoad: function(instance) { instance.render(); }
};
setTimeout(function(){
const t=document.createElement('script');
t.src="https://web-chat.global.assistant.watson.appdomain.cloud/versions/" +
(window.watsonAssistantChatOptions.clientVersion || 'latest') + "/WatsonAssistantChatEntry.js";
document.head.appendChild(t);
});
</script>
</body>
</html>

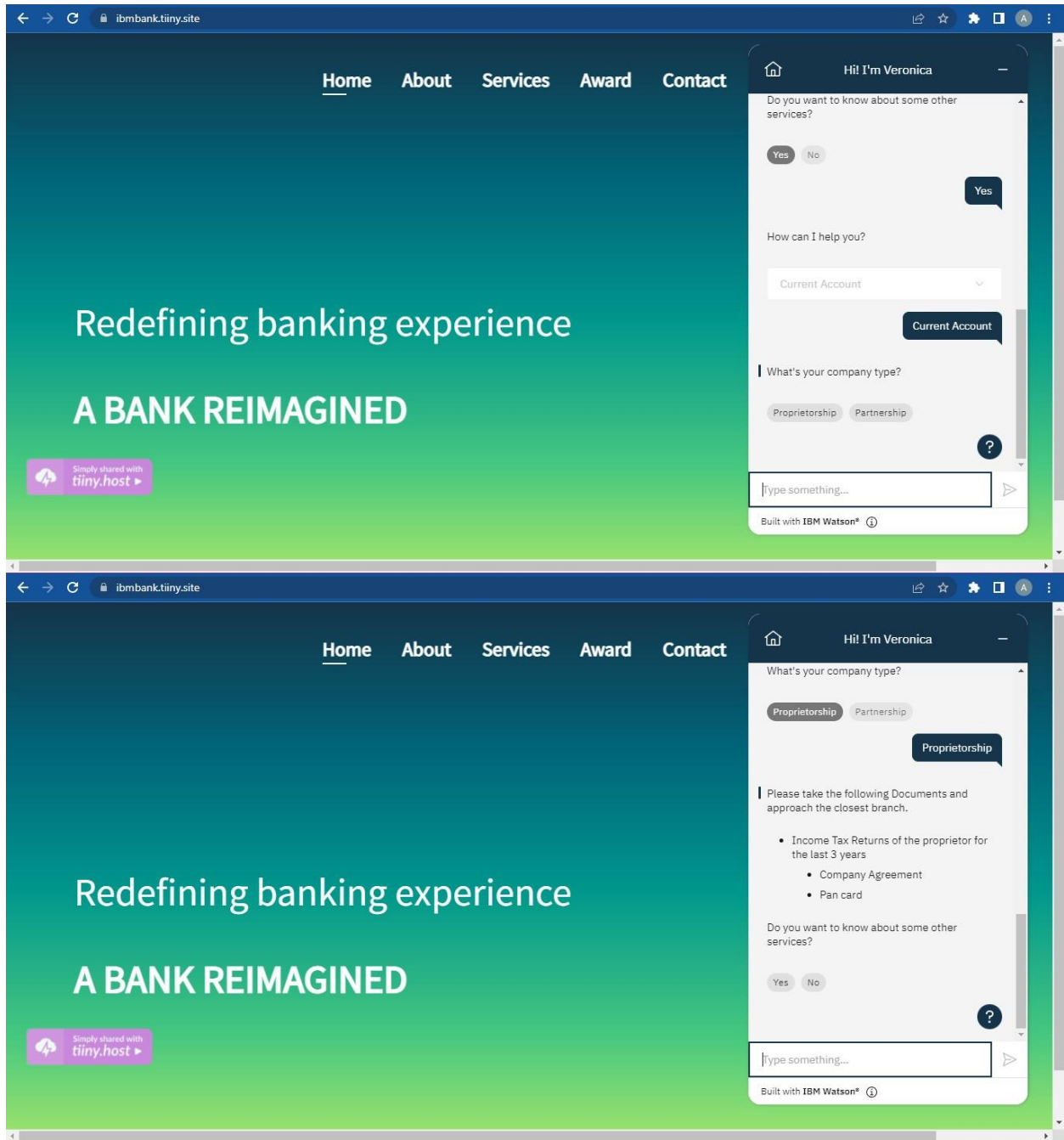
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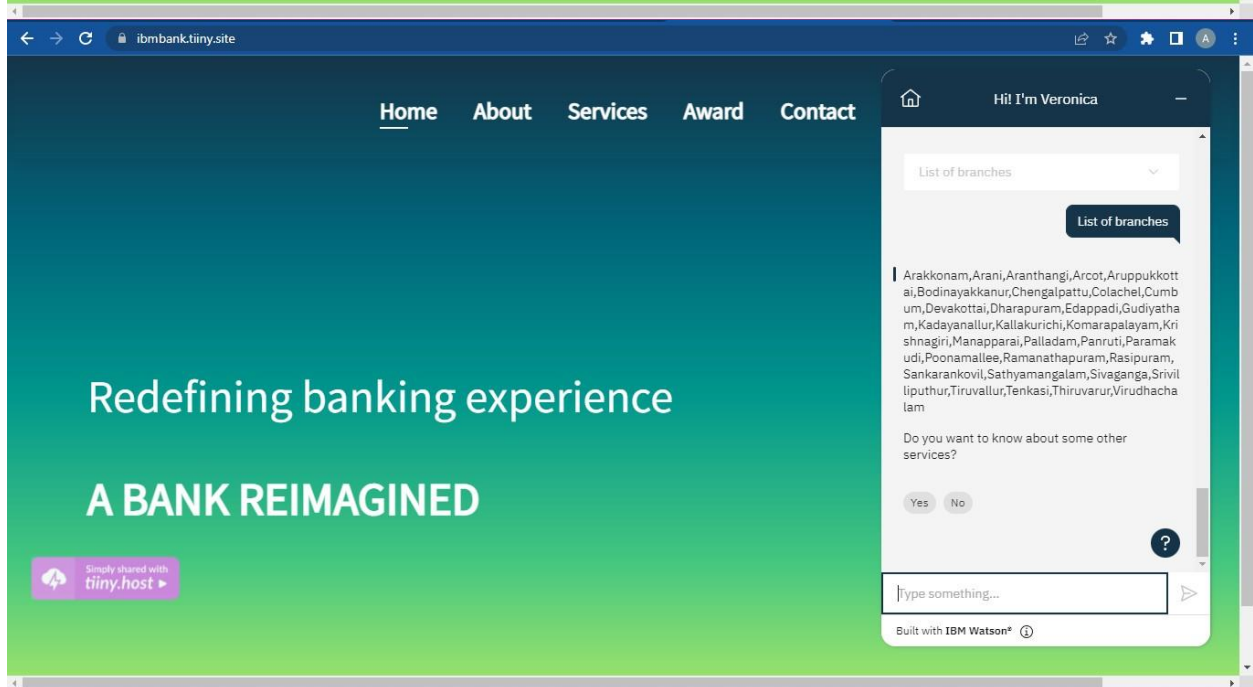
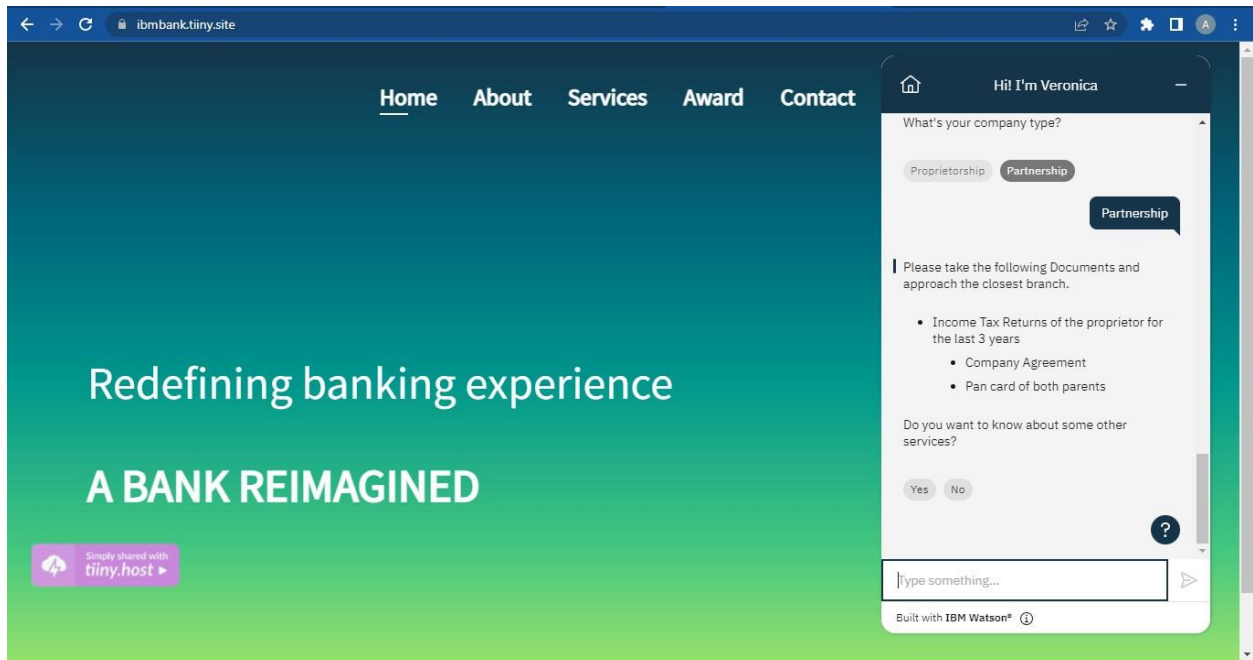
IBM CHATBOT :

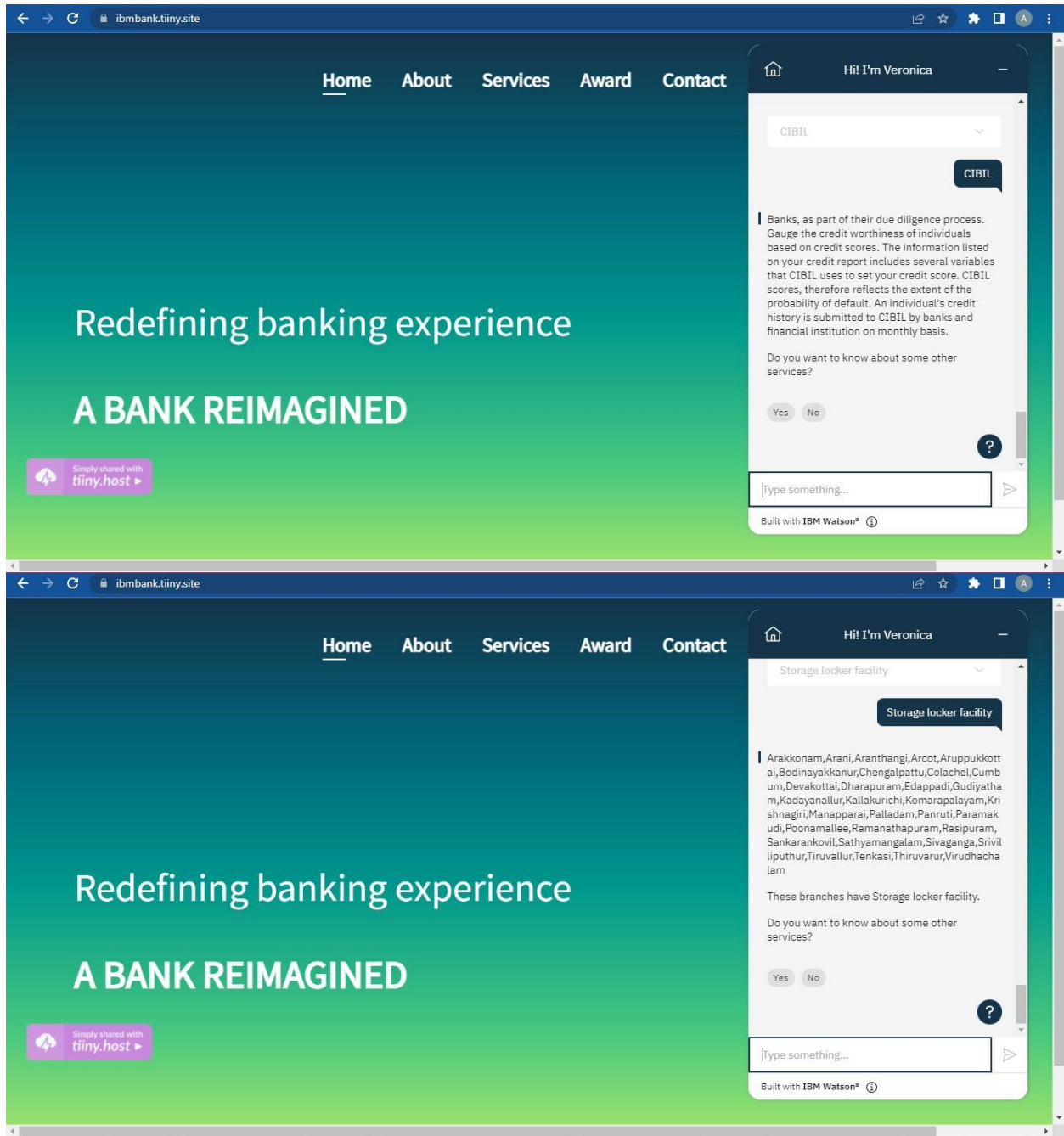


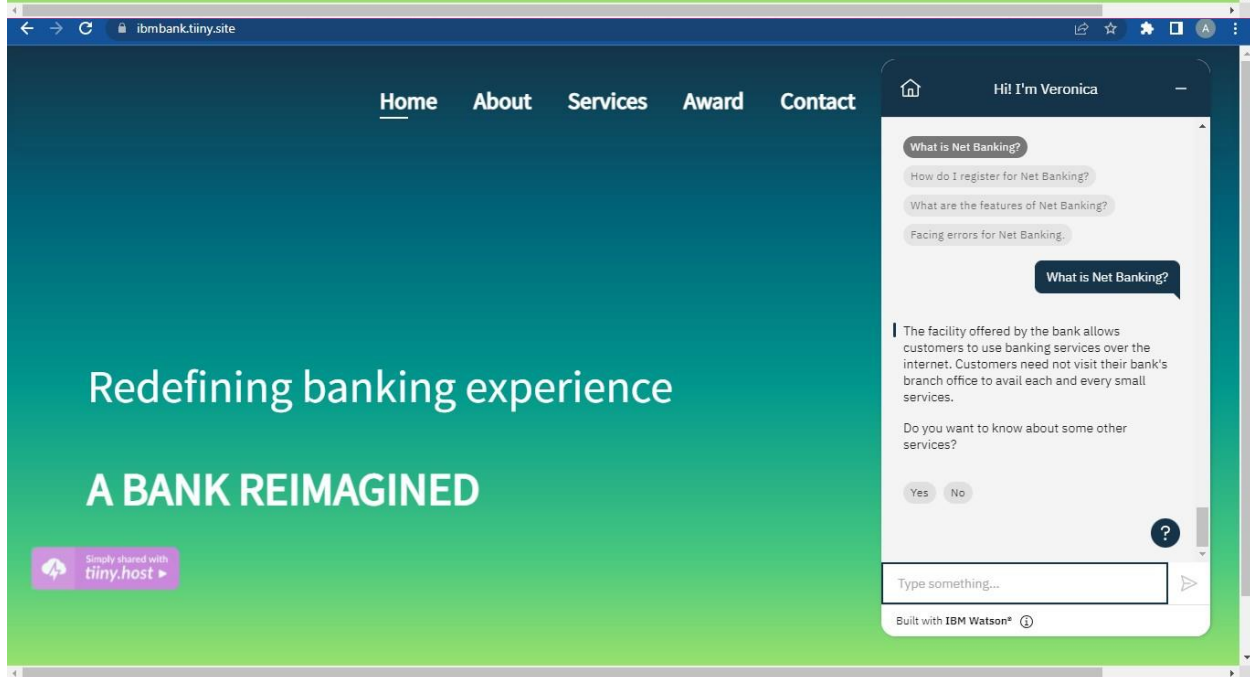
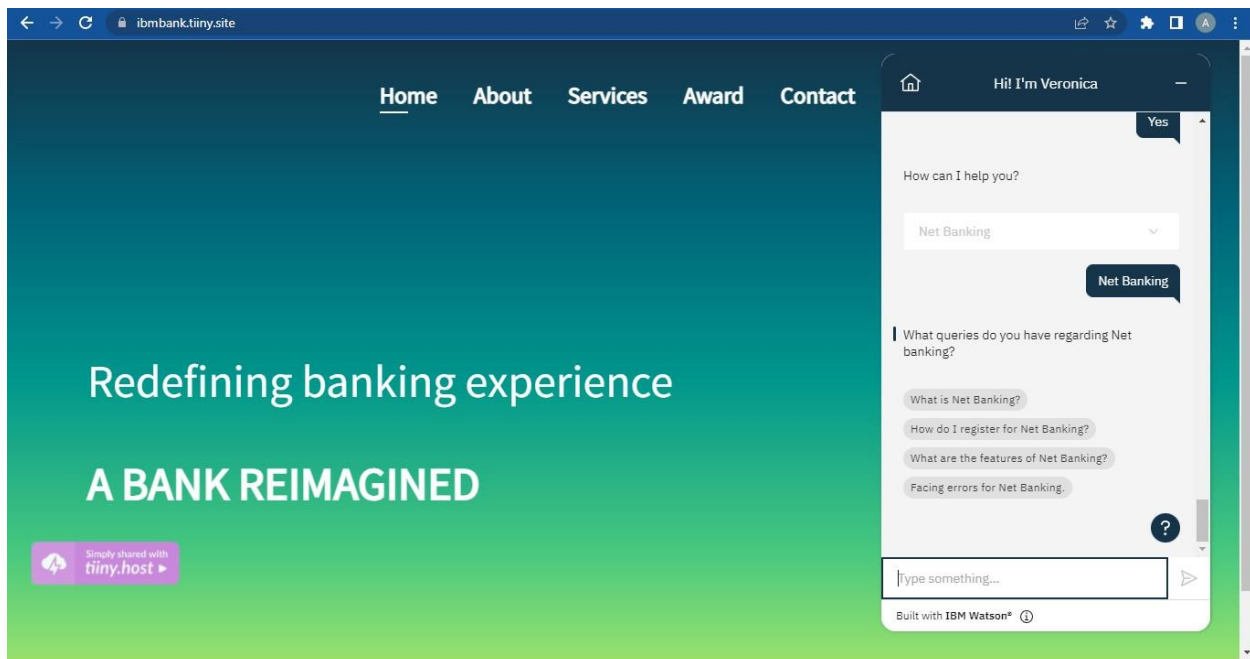


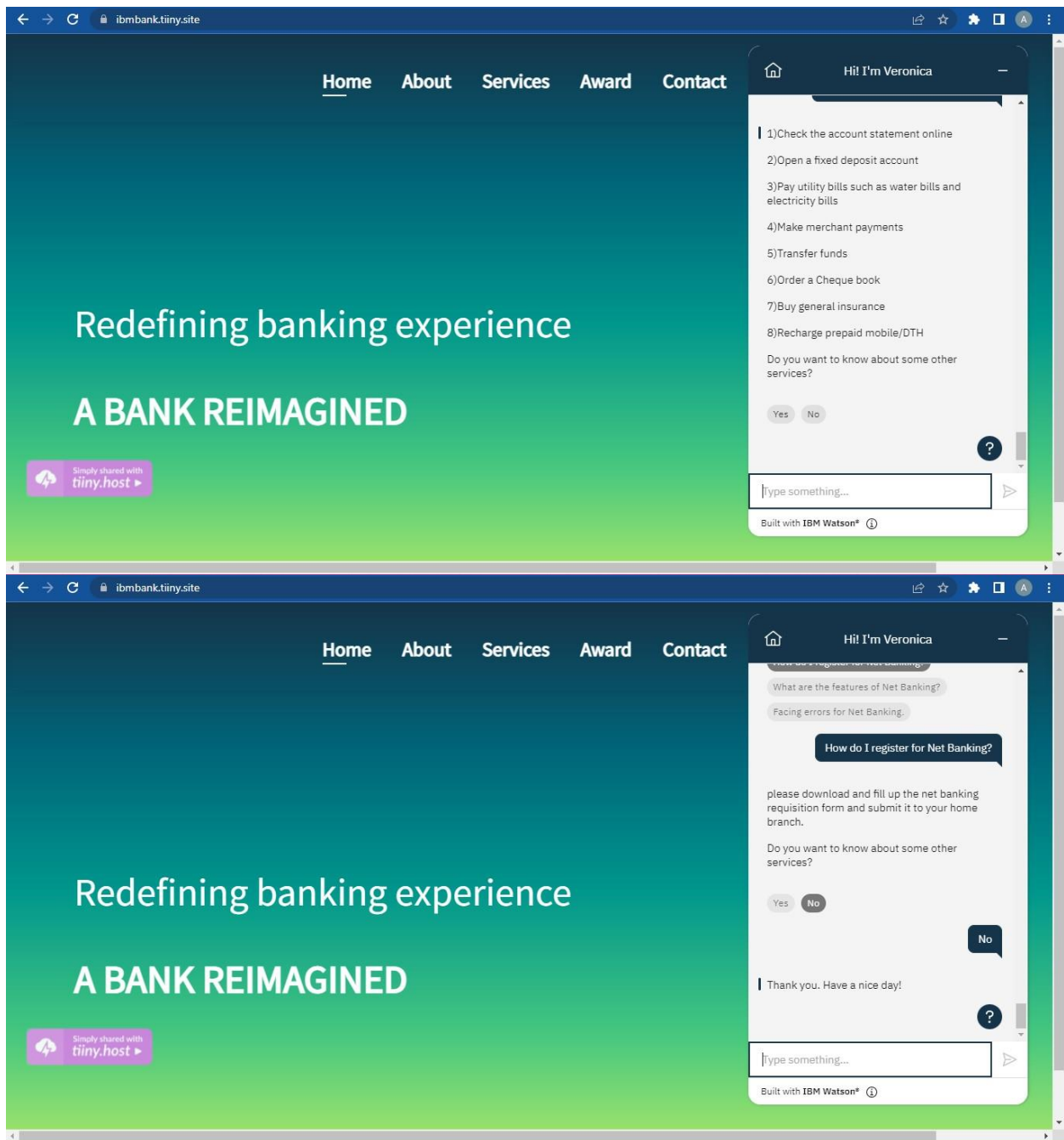












GITHUB LINK:

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

PROJECT DEMO LINK:

[Project Demo Video](#)