



AI BASED DISCOURSE FOR BANKING INDUSTRY



NALAIYA THIRAN PROJECT BASED LEARNING

on

**PROFESSIONAL READINESS FOR INNOVATION,
EMPLOYABILITY AND ENTREPRENEURSHIP**

A PROJECT REPORT

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IN
COMPUTER SCIENCE AND ENGINEERING**

HINDUSTHAN INSTITUTE OF TECHNOLOGY

Approved by AICTE, New Delhi, Accredited with 'A' Grade by NAAC
(An Autonomous Institution, Affiliated to Anna University, Chennai)

COIMBATORE – 641 032

November 2022

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CHAPTER-1 INTRODUCTION

1.1 PROJECT OVERVIEW

The ongoing era of digitalization, decentralization and disruption is shaping industries and consumption on a broad scale (Desai, 2014). Digital technologies are connecting billions of consumers and allow the deployment of low cost connected devices in every business sector. The current generation is adjusted to the digital environment and naturally expects services and products to meet the current digital technology standards. Further, investments into digital technologies and businesses have risen and are rewarded by the public markets (PWC Editorial, 2016). Artificial intelligence (AI) technologies are part of this development and the banking sector is hereby deemed to see a major impact. According to a report by Accenture, a global management consulting and professional services company, four out of five bankers assume that AI is going to revolutionize the way banking is executed. The report suggests that artificial intelligence will affect banking by enhancing the customer experience. Banking products and service may become increasingly personalized giving customers the impression that their banking institutes know their specific habits and needs (Accenture, 2016). But the introduction of AI technologies comes with potential challenges and risks. Banks are processing highly sensitive data. Thus, privacy and data security concerns are essential elements of the process. Additionally, customers might prefer the contact with persons regarding certain issues, leading to a rejection of AI based interfaces (Kelly, 2017). Hence, the introduction of such technologies into the active process should be executed with consideration of the possible risks.

1.2 PURPOSE

The Objectives of the Project are:

PRIMARY OBJECTIVES

- The main purpose of chatbots in banking is providing a better customer experience. However, they also help the staff and prevent stressful situations that arise from direct communication with clients.
- The core purpose of banking chatbots is to provide the customers with prompt service and to improve the operational efficiency of the bank and its employees. Besides, Conversational AI in banking also assists the staff to distribute their workload
- Chatbots allow businesses to connect with customers in a personal way without the expense of human representatives. For example, many of the questions or issues customers have are common and easily answered.
- Banking chatbots have huge potential in customer engagement. It gives customers 24/7 access to support and banks can make great use of Conversational AI and improve customer engagement to enhance the experience and improve retention.

CHAPTER-2 LITERATURE SURVEY

2.1EXISTING PROBLEM

The online banking transaction system is the application system with the most complex business, the most demanded, and frequent version updates in the software engineering application system. The existing online banking business sub-module is intelligent and faces major challenges in security. Traditional online banking systems cannot meet this capability. This article combines machine learning and online banking business module design to implement a business agent online banking system based on a new architecture.

2.2 REFERENCES

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

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 bank 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 customers ever-changing needs.

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

- Artificial Intelligence in Banking sector: Evidence from Bahrain

Authors: Y. omna 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.

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

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.

- Conversation to Automation in Banking Through Chatbot Using Artificial MachineIntelligence Language

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: Netbanking 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 question at the same time.

- A Review of Chatbots in the Banking Sector

Authors: Navleen Kaur, Dr Monika Sharma, Supriya Lamba Sahdev, Laraibe Siddiqui

Year: 2020

Title: A Review of Chatbots in the Banking Sector

Methodology: Artificial intelligence (AI), is simulation of human intelligence in machines. Artificial intelligence consists of generally two fundamental ideas. First it involves studying human brains like how their thought process works and secondly it helps representing those processes through machine learning.

Advantage: AI is used in banking industry to minimize the chances of fraud and scam. It is also used to carry out effective decision-making

Disadvantage: 24.1% i.e. 27 people out of 112 are not sure that using artificial intelligence in banking is beneficial. 4.5% i.e. 5 people out of 112 don't think that it is beneficial at all. 22.3%

i.e. 25 people don't agree that it has any impact on fast services.

- Application of Artificial Intelligence and Its Powered Technologies in the Indian Banking and Financial Industry

Authors: Dr.Anil B Malali, Dr.S.Gopalakrishnan

Year: 2020

Title: Application of Artificial Intelligence and Its Powered Technologies in the Indian Banking and Financial Industry

Methodology: Examine the dynamics of AI ecosystems in the banking and financial industry and how it is fast becoming a most important disrupter by looking at some of the critical unsolved problems in this area of business

Advantage: AI will empower banking organizations to completely redefine how they operate, establish innovative products and services, and most importantly impact customer experience interventions.

Disadvantage: AI and ML are replacing the human analysts in business activities since hum

- Chatbots in banking industry : A case study

Authors: Dr. Shalini Sayiwal

Year : 2020

Title: CHATBOTS IN BANKING INDUSTRY: A CASE STUDY

Methodology: Chatbots designed with AI are one of the most promising strategies of a banking business that can lead the bank to win the satisfaction vote of their loyal customers.

Advantage: Chatbots are relatively inexpensive to develop and maintain compared to the human equivalent. Chatbots are more intuitive and easier to use. There is no download required and the experience can be personalized over time through machine learning.

Disadvantage: Chatbots have significant limitations based on accents and languages.

S.No	Author	Title of the Paper	Methodology	Pros (Advantage)	Cons (Disadvantage)
1.	Vinod Kumar Shukla, Sasha Fathima Suhel, Sonali Vyas, Ved Prakash Mishra (2020)	Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language	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 bank and customers.	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 customers ever-changing needs.	The dialogue capability can be limited to very a very specific set or format of questions that are established by the chatbot development team.
2.	Yomna Abdulla, Rabab Ebrahim, Sumathi Kumaraswamy (2020)	Artificial Intelligence in Banking sector: Evidence from Bahrain	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.	AI can be best described as the computerized processes that employ knowledge, reasoning, and communication that aids smart decision making by chatbots in banks.	Banking sector faces significant challenges relating to security, risk management and inefficiency that decrease the overall performance of banks.

3.	Tebaga Lucky Mamela, Nita Sukdeo, Sambil Charles Mukwakungu (2020)	Adapting to Artificial Intelligence through Workforce Re-skilling within the Banking Sector in South Africa	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.	Re-skilling the banking workforce to cooperate and collaborate effectively with Artificial Intelligence will enable not only efficiency but futuristic innovation and continuous growth.	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.
4.	Shashank Bairy, Rashmi R (2021)	A Review of Chatbots in the Banking Sector	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.	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.	Chatbots cannot hold the conversation which means it cannot answer multiple question at the same time.
5.	Navleen Kaur, Dr Monika Sharma, Supriya Lamba	Banking 4.0: -The Influence of Artificial	Artificial intelligence (AI), is simulation of human	AI is used in banking industry to minimize the chances of fraud	24.1% i.e. 27 people out of 112 are not sure that

	Sahdev, Laraibe Siddiqui (2020)	Intelligence on the Banking Industry & How AI is Changing the Face of Modern Day Banks	intelligence in machines. Artificial intelligence consists of generally two fundamental ideas. First it involves studying human brains like how their thought process works and secondly it helps representing those processes through machine learning.	and scam. It is also used to carry out effective decision-making.	using artificial intelligence in banking is beneficial. 4.5% i.e. 5 people out of 112 don't think that it is beneficial at all. 22.3% i.e. 25 people don't agree that it has any impact on fast services.
6.	Dr. Anil B Malali, Dr. S. Gopalakrishnan (2020)	Application of Artificial Intelligence and Its Powered Technologies in the Indian Banking and Financial Industry	Examine the dynamics of AI ecosystems in the banking and financial industry and how it is fast becoming a most important disrupter by looking at some of the critical unsolved problems in this area of business.	AI will empower banking organizations to completely redefine how they operate, establish innovative products and services, and most importantly impact customer experience interventions.	AI and ML are replacing the human analysts in business activities since human selection involves high cost.
7.	Dr. Shalini Sayiwal (2020)	CHATBOTS IN BANKING INDUSTRY: A CASE STUDY	Chatbots designed with AI are one of the most promising strategies of a banking business that can lead the bank to win the satisfaction vote of their loyal customers.	Chatbots are relatively inexpensive to develop and maintain compared to the human equivalent. Chatbots are more intuitive and easier to use.	Chatbots have significant limitations based on accents and languages.

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 centers as well as providing them with relevant suggestions.

Who does the problem affect?	A customer of the bank
What are the boundaries of the problem?	Customers who have queries related to banking or trying to use various services of the bank
What is the issue?	Customers need to visit banks frequently for simple queries. Banks are not able to answer huge volumes of customers queries efficiently.
When does the issue occur?	When the customer is unable to visit a bank
Where does the issue occur?	It occurs in banking industries

Why is it important that we fix the problem?	It addresses the queries of customers immediately and effectively in a cost efficient manner.
What solution to solve this issue?	Chatbot should be able to answer any general banking queries on account creation, loan, net banking, other services etc. AI chatbots can help the customers to complete their work quickly and efficiently.
What methodology used to solve the issue?	Artificial intelligence mimics the human brain in order to make chatting with the chatbot more life- like.

Miro Customer Problem Statement Canvas:

I am	I'm trying to	But	Because	Which makes me feel
a student who just created a bank account	understand more about the available features of the bank	I have to waste a lot of time at the bank	I have to ask a bank employee about my doubts	Irritated
a new customer	learn more about banking	it takes a long time	there is always a long queue as bank employees are busy	frustrated
an old customer at the bank	find out my balance and check my statement	I have to travel to the bank now and then	I have to speak to a bank employee to get the work done	exhausted

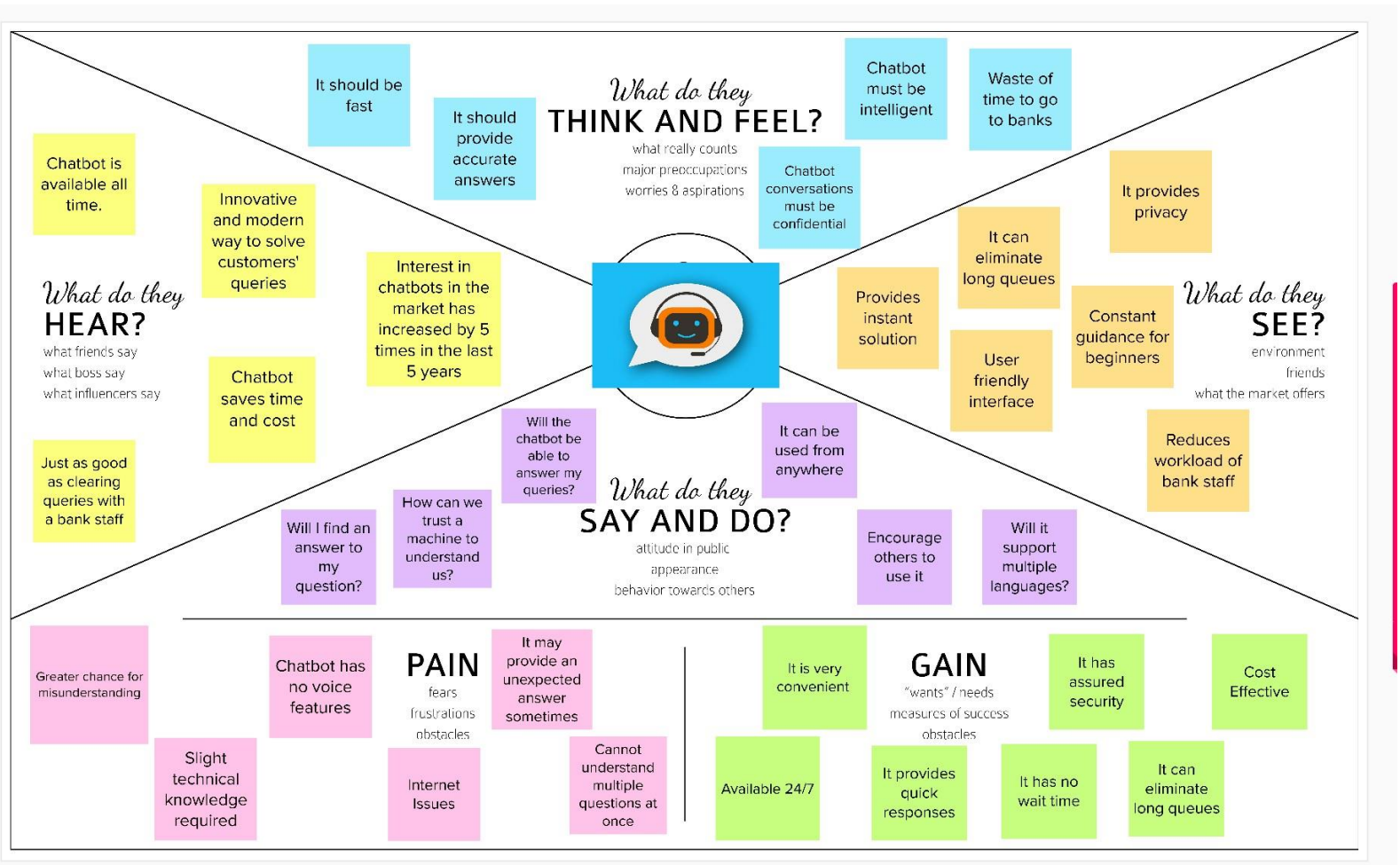
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A student who just created a bank account	Understand more about the available features of the bank	I have to waste a lot of time at the bank	I have to ask a bank employee about my doubts	irritated
PS-2	A new customer	Learn more about banking	It takes a long time	There is always a long queue as bank employees are busy	frustrated
PS-3	An old customer at the bank	Find out my balance and check my statement	I have to travel to the bank now and then	I have to speak to a bank employee to get the work done	exhausted

CHAPTER-3 IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP

Empathy Map Canvas:

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



3.2 IDEATION AND BRAINSTORM


Brainstorm & Idea Prioritization Template:

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

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.

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


Template



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](#) →

1


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

PROBLEM STATEMENT

The aim of our project is to build a chatbot using IBM Watson's assistant. This chatbot should be able to answer any general banking queries on account creation, loan, net banking, other services etc. The chatbot should provide 24/7 customer support with all the necessary data for solving their queries which reduces their time on moving to banks directly.



Key rules of brainstorming

To run a smooth and productive session

- 🕒 Stay in topic.
- 💡 Encourage wild ideas.
- 🕒 Defer judgment.
- 👂 Listen to others.
- 🗣️ Go for volume.
- 👁️ If possible, be visual.

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 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 customercare workforce 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

Problem-Solution fit canvas 2.0

Purpose / Vision AI Based Discourse for Banking Industry

Define CS, fit into CC	<p>1. CUSTOMER SEGMENT(S) CS</p> <p>Who is your customer? I.e. working parents of 0-5 y.o. kids</p> <ul style="list-style-type: none"> New customers who would like to learn more about the bank and how to create an account Regular customers who would like to access the various features and services of the bank 	<p>6. CUSTOMER CONSTRAINTS CC</p> <p>What constraints prevent your customers from taking action or limit their choices of solutions? I.e. spending power, budget, no cash, network connection, available devices.</p> <ul style="list-style-type: none"> Network connection is required Unfamiliarity with/unaccustomed to chatting, especially among elders Unable to convey themselves properly through chat Safety and privacy concerns 	<p>5. AVAILABLE SOLUTIONS AS</p> <p>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? I.e. pen and paper is an alternative to digital notetaking</p> <p>Customer care telephone lines and staff at banks are available to clear customer's queries. Both of these current methods are time consuming and can involve in the customer waiting for a long time to get their answers. A chatbot can squash these issues as they can provide answers instantly at any time from the convenience of the customer's phone.</p>	Explore AS, differentiate
	Focus on J&P, tap into BE, understand RC	<p>2. JOBS-TO-BE-DONE / PROBLEMS J&P</p> <p>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.</p> <ul style="list-style-type: none"> Answering customer queries correctly and quickly Convenience of banking guidance anywhere and anytime Cost and time efficiency and be improved 	<p>9. PROBLEM ROOT CAUSE RC</p> <p>What is the real reason that this problem exists? What is the back story behind the need to do this job? I.e. customers have to do it because of the change in regulations.</p> <ul style="list-style-type: none"> Banking can initially be a slightly complicated task that people sometimes might want guidance or support while performing certain operations As banking is essential, a lot of people need their queries cleared which requires a huge workforce to match the demand which can be very costly and still time taking Banks can introduce new features regularly or might update existing features to keep up with changing regulations that can lead to confusions 	
Identify strong TR & EM		<p>3. TRIGGERS TR</p> <p>What triggers customers to act? I.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</p> <ul style="list-style-type: none"> Word of mouth about how convenient and easy it is to use Watching others use it from home or on the go instant instead of waiting in lines at the bank <p>4. EMOTIONS: BEFORE / AFTER EM</p> <p>How do customers feel when they face a problem or a job and afterwards? I.e. lost, insecure → confident, in control - use it in your communication strategy & design.</p> <ul style="list-style-type: none"> <u>Before</u>: Frustrated, helpless, confused, nervous <u>After</u>: Confident, relieved, at-ease, interested 	<p>10. YOUR SOLUTION SL</p> <p>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</p> <p>Customers can access an AI based chatbot that can be placed in the bank's website. This can then be used to clear the customer's queries instantly and can be used at any time of the day or from any place as long as the customer has an internet connection. This in turn also reduces the need for banks to employ a large workforce to clear customer queries. As the queries of the customers are answered correctly and in a convenient manner, it is a very efficient and satisfactory solution to the problem.</p>	<p>8. CHANNELS of BEHAVIOUR CH</p> <p>8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7</p> <p>They search the web for answers to their queries which are usually scattered and are not reliable.</p> <p>8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</p> <ul style="list-style-type: none"> They visit banks and meet the bank staff to clear their queries They call the customer care/toll free number of the bank and speak to a customer care employee

CHAPTER-4 REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

FR No.	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 Action	<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

Following are the non-functional requirements of the proposed solution.

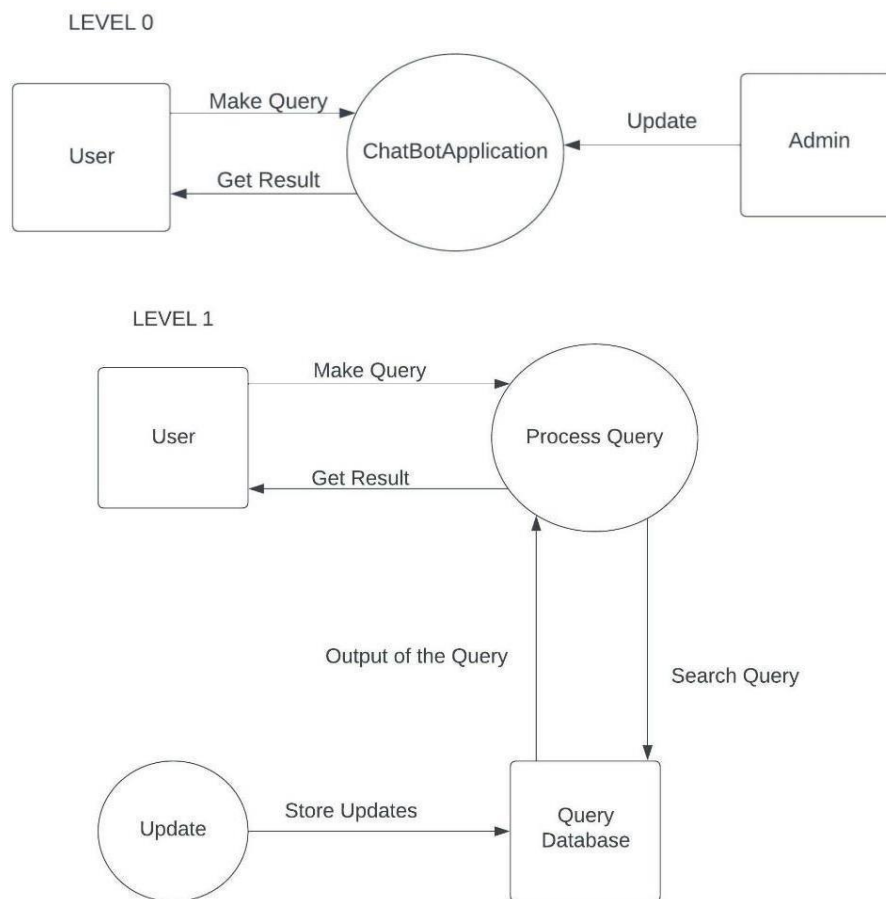
	Non-Functional Requirement	Description
	Usability	Chatbots developed using AI should be able to answer any general banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a cost efficient manner.
	Security	The AI Chatbot maintains a confidential conversation with customers. Chatbot will provide personal and efficient communication between the user and the bank.
	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.
	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 different people at the same time. Such chatbots work in real time with no need for the customers to wait. This ensures faster, easier and more efficient face-time with customers.
	Availability	AI Chatbots provide 24/7 service to clear all customer queries and guide them

		through all the banking processes. It is available to anyone with access to the internet with basic hardware.
	Scalability	AI Chatbots are helping banking industry to scale their customer service and to improve customer service satisfaction at the same time. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.
	Availability	The availability of dataset must be constrained for accurate data
	Scalability	Any kind of data can be explored and the system is quiet expandable

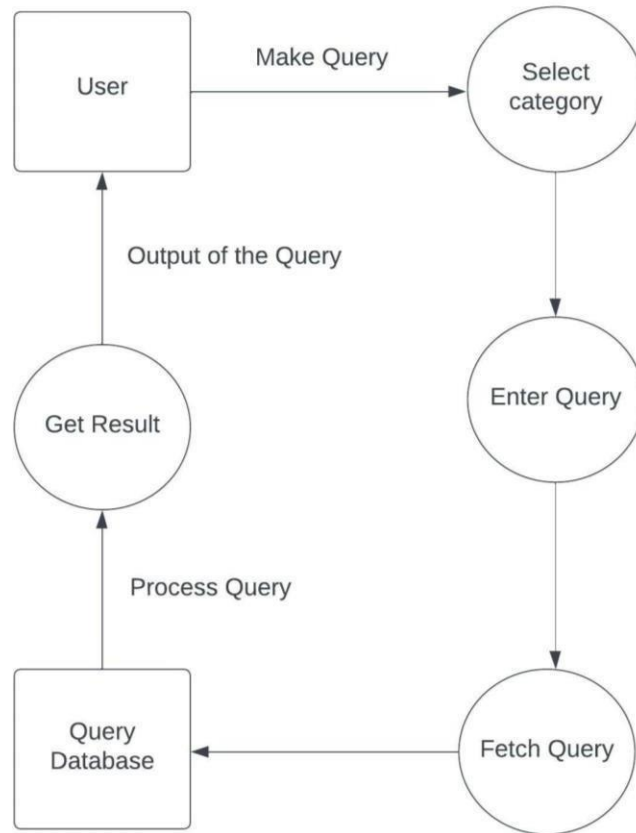
CHATER-5 PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



LEVEL 2

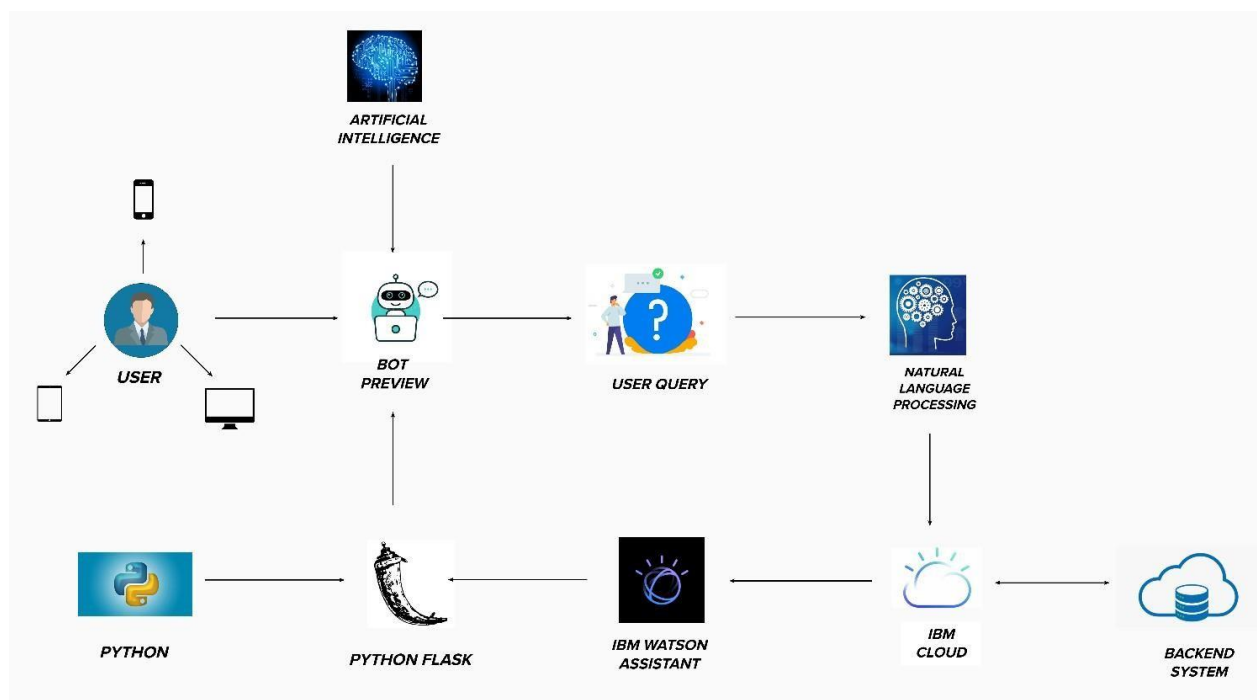


5.2 SOLUTION AND TECHNICAL ARCHITECTURE

SOLUTION ARCHITECTURE

A Solution architecture (SA) is an architectural description of a specific solution. SAs combine guidance from different enterprise architecture viewpoints (business, information and technical), as well as from the enterprise solution architecture (ESA). Ultimately, solution architecture is aimed at the following overarching goals:

- Streamlining of day-to-day activities
- Providing a more efficient production environment
- Lowering costs and gaining cost-effectiveness
- Providing a secure, stable, and supportable environment



TECHNICAL ARCHITECTURE

Technical Architecture Steps:

1. User queries to the Chat Bot
2. Bot previews the query
3. Query is transferred to Watson Assistant
4. Natural Processing Language is used to understand the query
5. Watson Assistant sends the query
6. Watson finds the relevant response from cloud database
7. Queries and responses (sent and received) is stored in cloud database
8. All queries and related information is sent to the bank for improvement

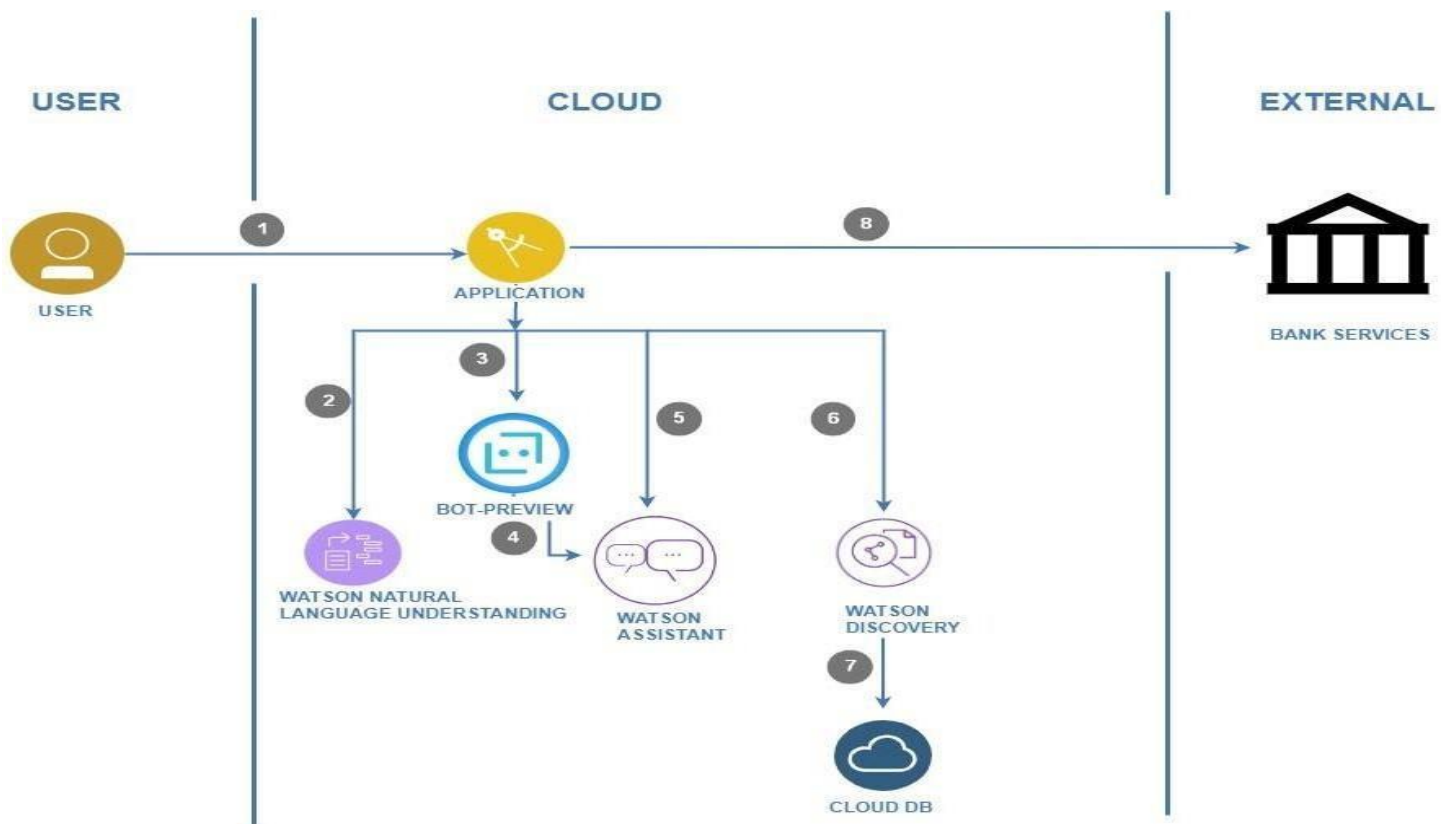


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	Bot Preview	A simple page is presented to the user with a chat layout that has an input box field available to get user queries and preset options are presented for the user to select.	HTML, CSS, JavaScript
2.	Application Logic-1	An input bar is provided that enables the user to type queries.	Java / Python
3.	Application Logic-2	Regularly asked queries or options are presented to the user.	IBM Watson STT service
4.	Application Logic-3	Processes responses to custom queries and displays a relevant response.	IBM Watson Assistant
5.	Cloud Database	Queries and answers to queries are stored in the cloud and are accessed whenever a query is asked.	IBM Cloudant DB
6.	External API-1	It provides an interface between the application and the cloud to send the query from the application to the cloud.	Watson Assistant v2 API
7.	External API-2	A cloud based API that supports several cloud based applications and operations.	IBM Cloud API
8.	Deep Learning Model	It is trained with several queries and uses that knowledge to provide relevant responses to queries with a good enough accuracy.	Deep Learning
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Flask Application Cloud Server Configuration: IBM Cloud	Python Flask, IBM Cloud

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Python Flask, CSS Frameworks
2.	Security Implementations	General access control and the built-in security features of IBM Cloud are present.	IBM Watson Assistant, IBM Cloudant DB
3.	Scalable Architecture	The architecture consists of three tiers, the client side, the web server and the cloud server. Each of these can be scaled as per requirements.	Client Side: Flask (Python) Web Server: IBM Watson Assistant Cloud Server: IBM Cloud
4.	Availability	The chatbot is available 24/7 on almost all devices that support an internet browser.	IBM Cloud, Flask (Python)
5.	Performance	Responds to several thousands of queries at the same time.	IBM Load Balancer, IBM Cloud

5.3 USER STORIES

Use the below template to list all the user stories for the product

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 forms, Loan Accounts	I can clear my queries regarding loan status of loan account	Low	Sprint-2
	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	I can clear my queries regarding currency conversion facilities of bank account	Low	Sprint-1
		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure 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

CHAPTER-6 PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

Product Backlog, Sprint Schedule, and Estimation

Use the below template to create product backlog and sprint schedule

Milestone	Task	Starting Date	Ending Date	Project Completion Status	Team Members
Create IBM Service	Creation of Banking Chatbot or Assistant using IBM Watson Assistant	24 Oct 2022	25 Oct 2022	9%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
	Understanding Customer's Banking Related Queries and skills	25 Oct 2022	29 Oct 2022	15%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
Create Skills and Assistant for Chatbot	Training the Chatbot with Banking related dataset	31 Oct 2022	01 Nov 2022	24%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
	Building action and Adding responses to Account Creation	01 Nov 2022	02 Nov 2022	29%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
	Building action and Adding responses to Banking related queries	02 Nov 2022	03 Nov 2022	34%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R J
	Building action and Adding responses to Net Banking	03 Nov 2022	04 Nov 2022	39%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
	Building action and Adding responses to Loan Queries	04 Nov 2022	05 Nov 2022	44%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
Testing Assistant & Integrate with Flask webpage	Testing the chatbot performance with the trained banking functionalities or conversations	07 Nov 2022	09 Nov 2022	60%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R
	Integration of Flask webpage with the chatbot assistant to provide a framework	09 Nov 2022	12 Nov 2022	83%	Kishore P, Imran Khan S, Irfan Khan Z, Kaviarasan R

Deployment Of Chatbot	Final Deployment of AI based chatbot for	14 Nov 2022	19 Nov 2022	100%	
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6.2 SPRINT DELIVERY SCHEDULE

Product Backlog, Sprint Schedule, and Estimation

Use the below template to create product backlog and sprint schedule

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 the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	4	High	KISHORE P
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	4	High	KISHORE P
Sprint-1		USN-3	As a user, I can check the Minimum Balance of Savings Account	3	Medium	KISHORE P
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	KISHORE P
Sprint-1		USN-5	As a user, I want to get details on procedure to close my Current Account	4	High	KISHORE P
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	IRFAN RAHIM
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	3	High	IRFAN RAHIM
Sprint-2		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	1	Low	IRFAN RAHIM

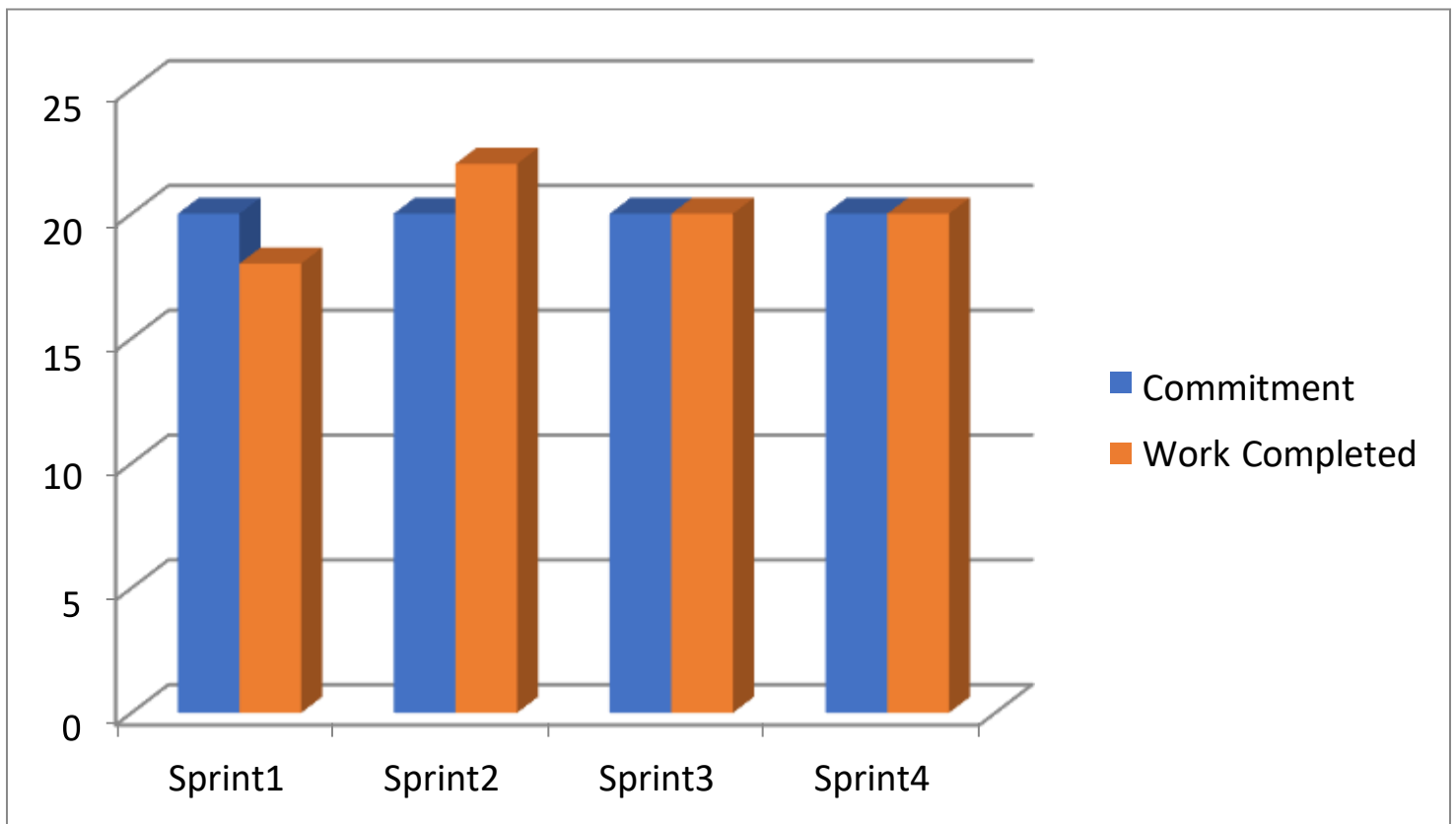
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	2	Medium	IRFAN RAHIM
Sprint-2		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	1	Low	IRFAN RAHIM
Sprint-2		USN-11	As a user, I want to get the procedure details for maintaining Storage Lockerfacility of my bank account	3	High	IRFAN RAHIM
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	IRFAN RAHIM
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	IRFAN RAHIM
Sprint-2		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	2	Medium	IRFAN RAHIM
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	IMRAN KHAN Z
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	KAVIARAS AN R

6.3 REPORTS FROM JIRA

Project Tracker, Velocity & Burndown Chart:

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
]	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

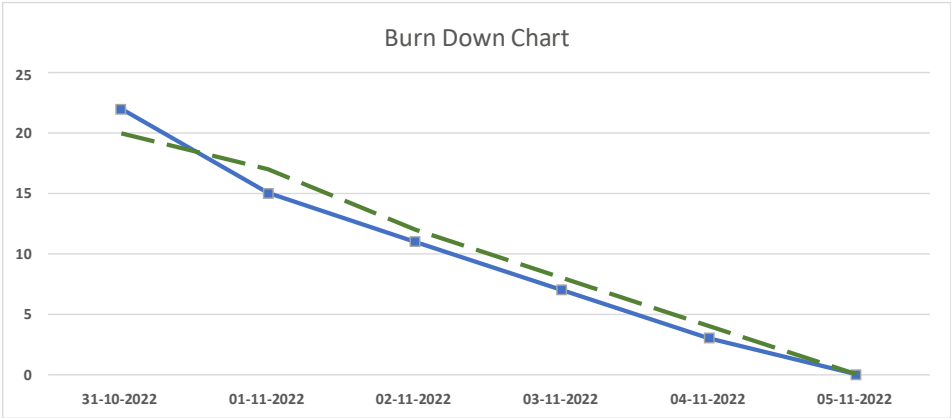
VELOCITY CHART



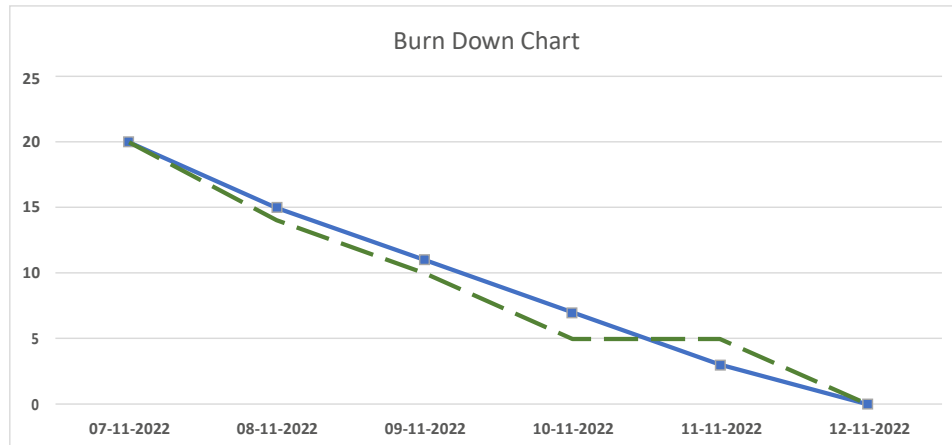
BURNDOWN CHART



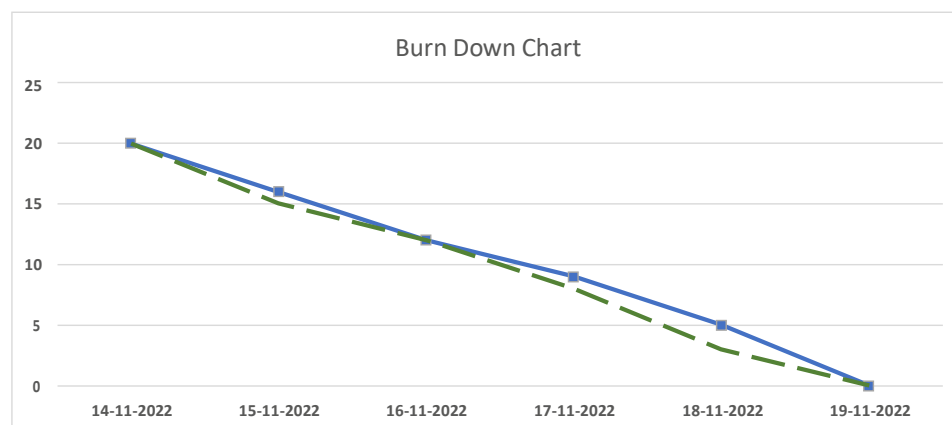
Sprint 1



Sprint 2



Sprint 3

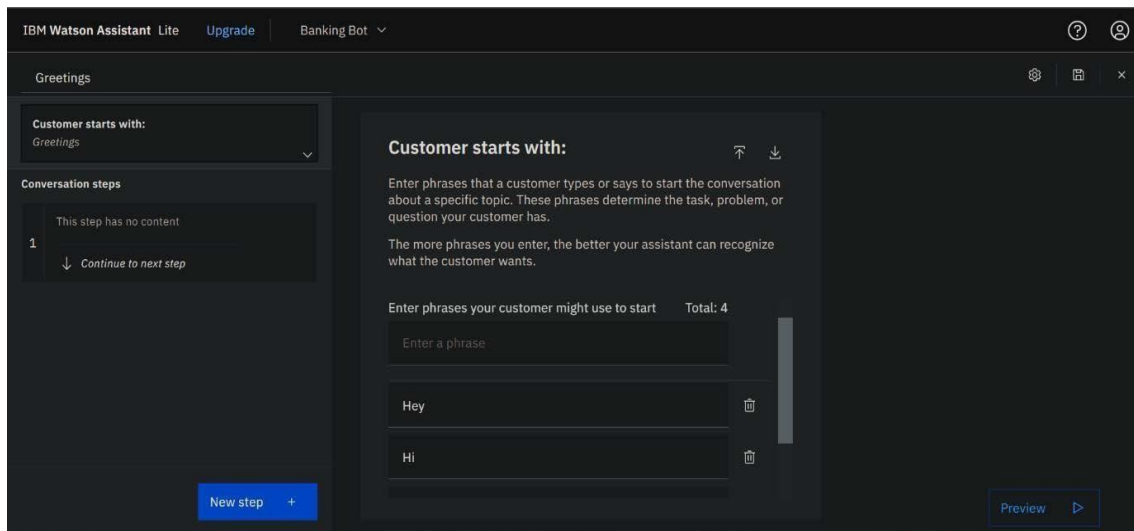
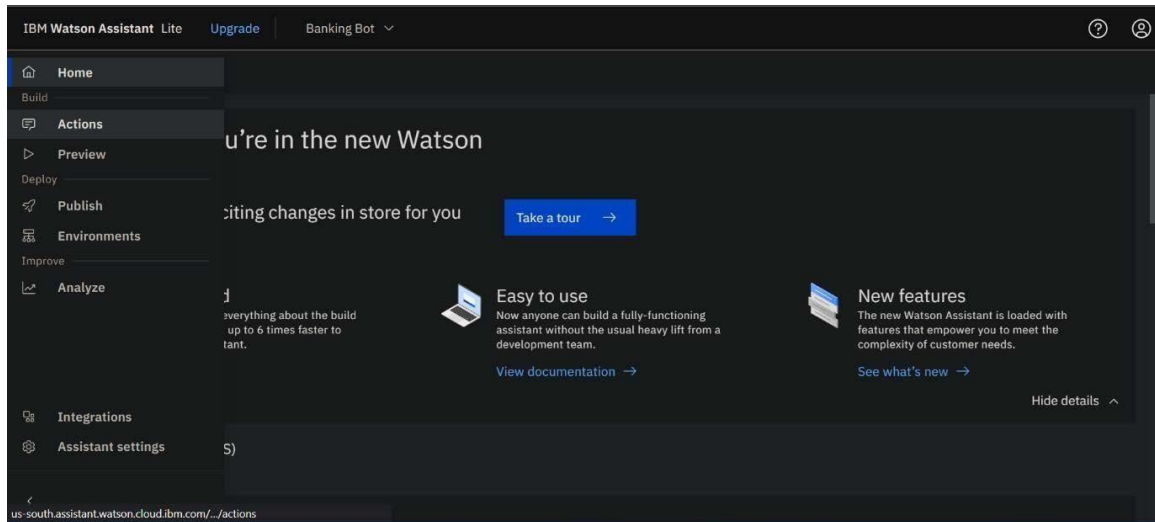


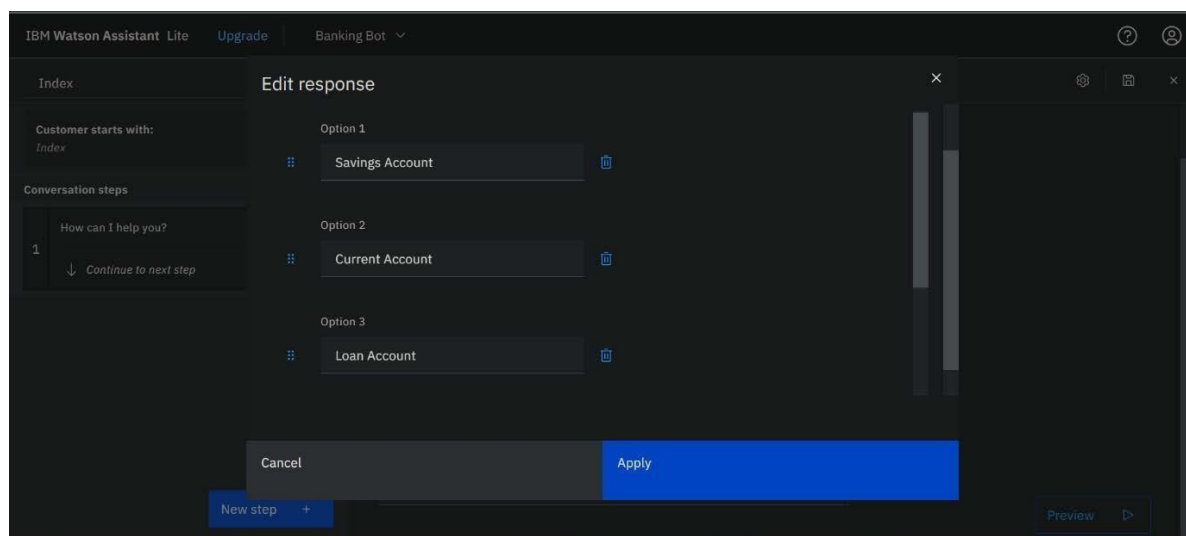
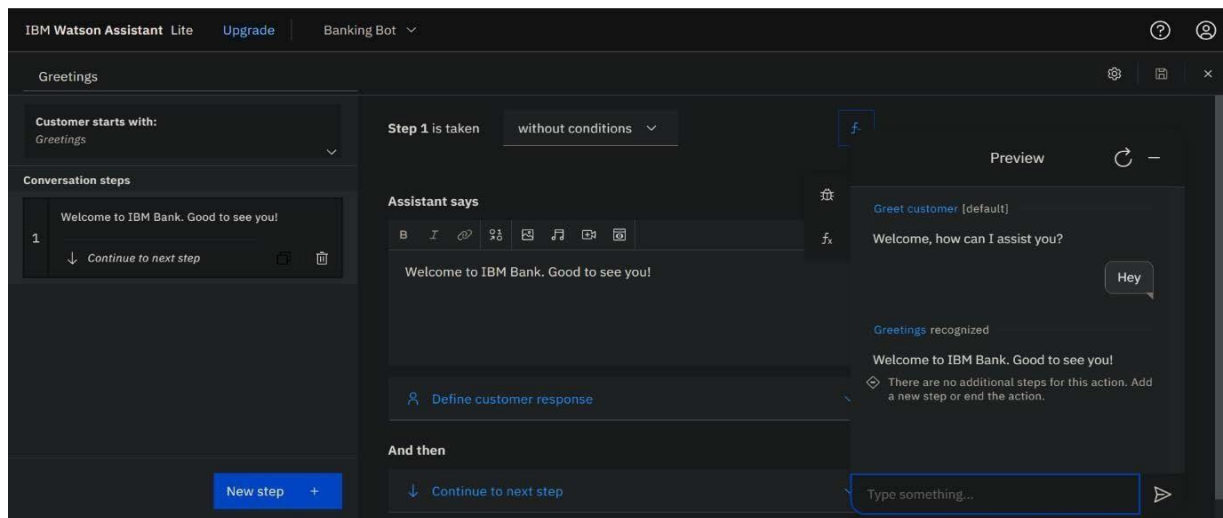
Sprint 4

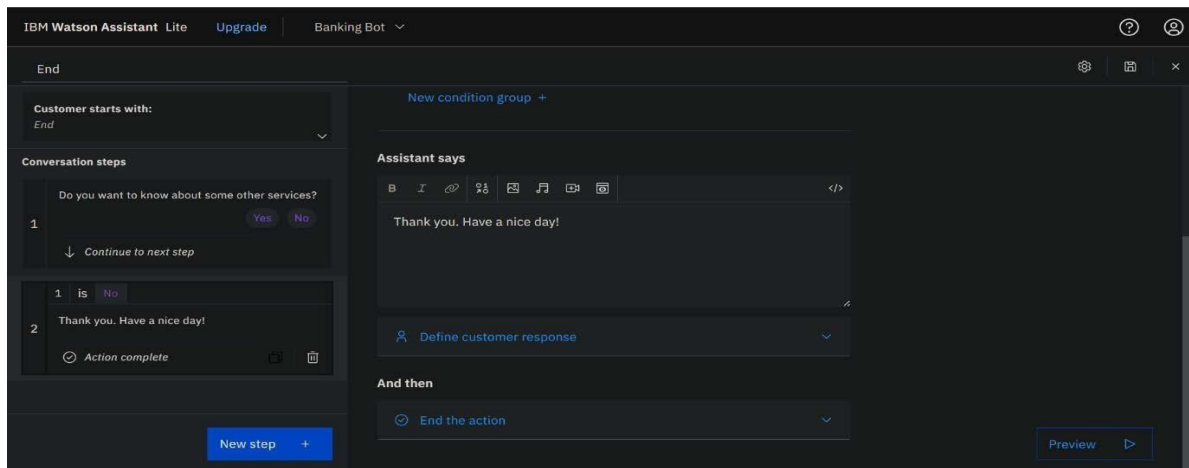
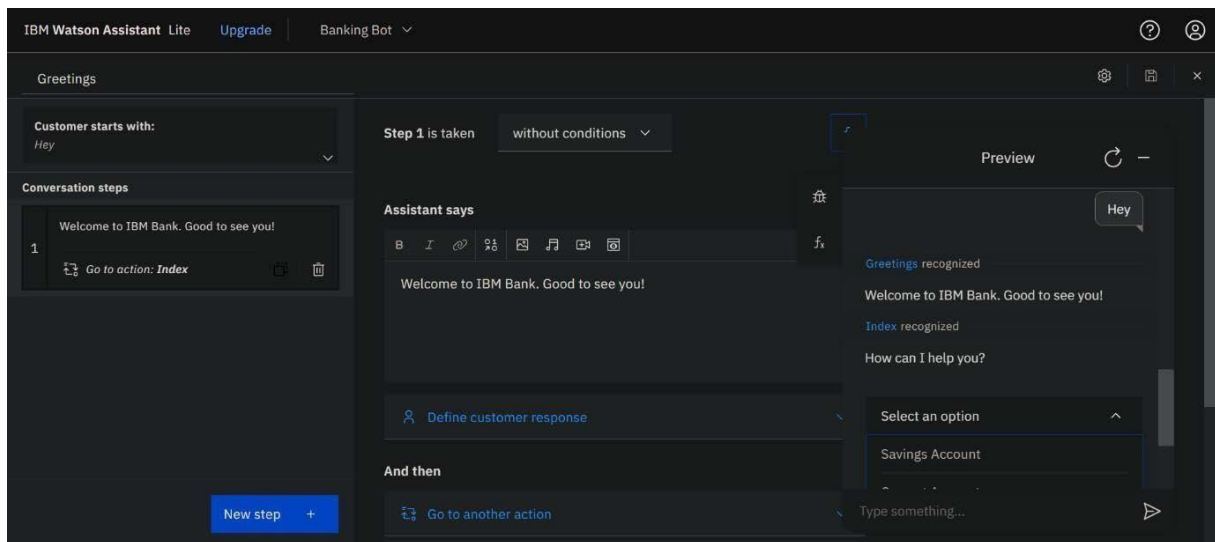
CHAPTER-7 CODING AND SOLUTIONING

7.1 FEATURE 1

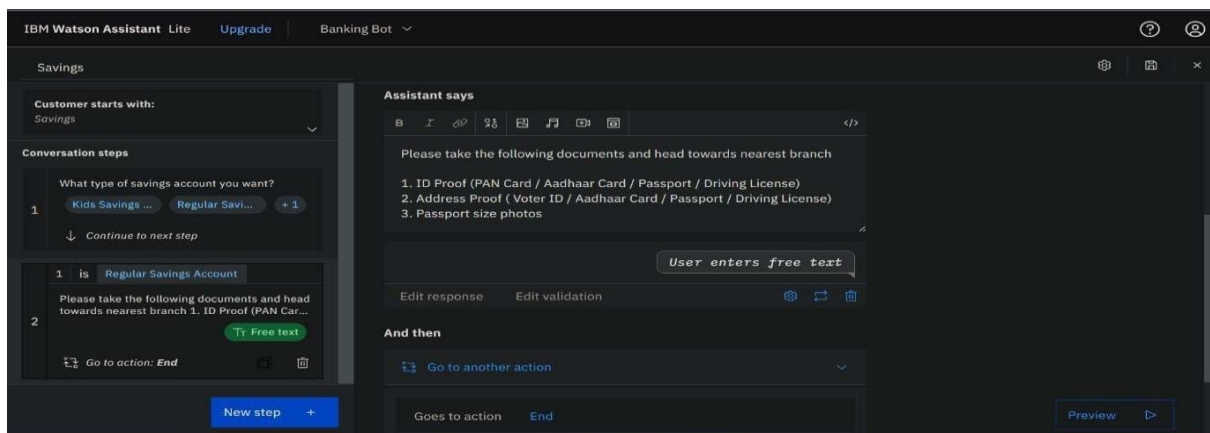
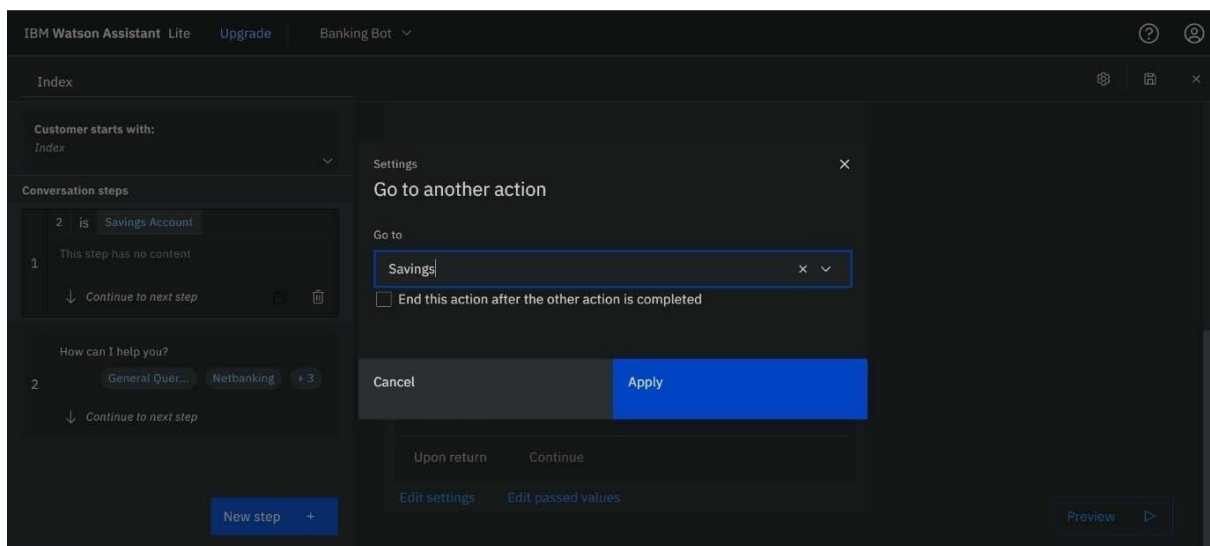
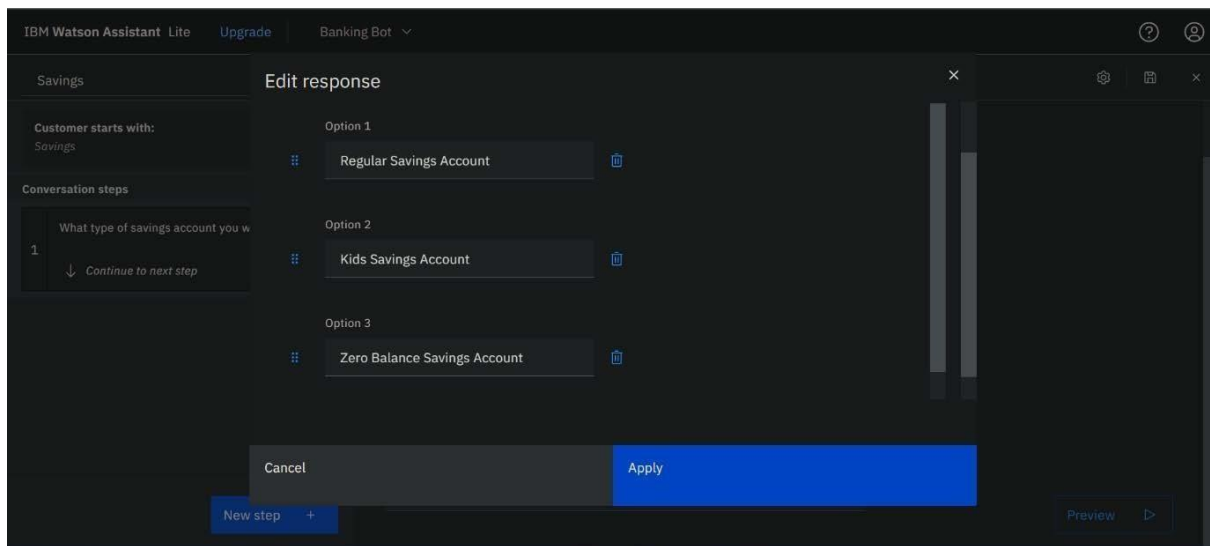
Chatbot Skills Creation:

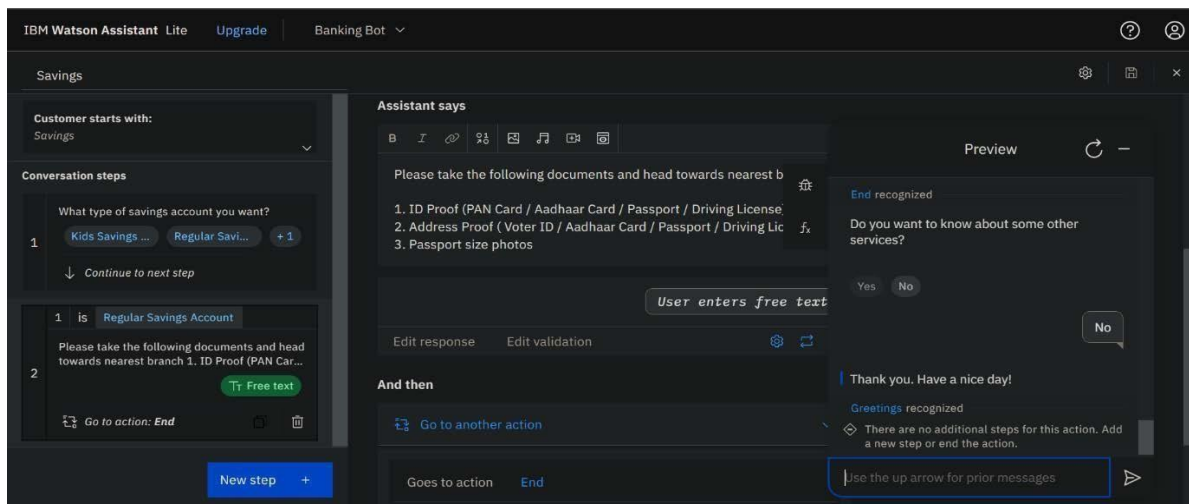
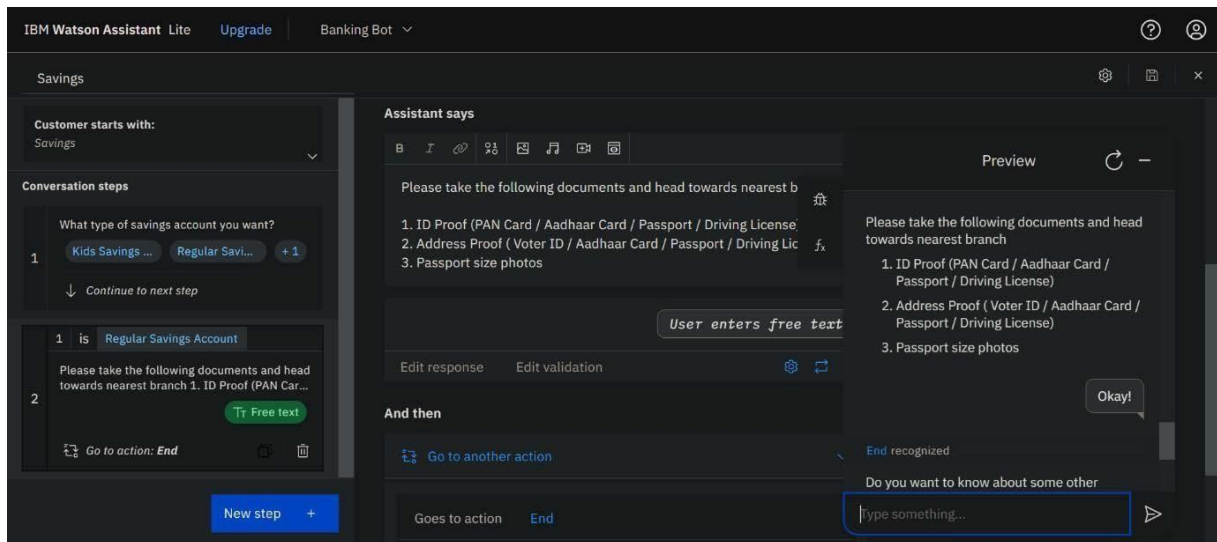
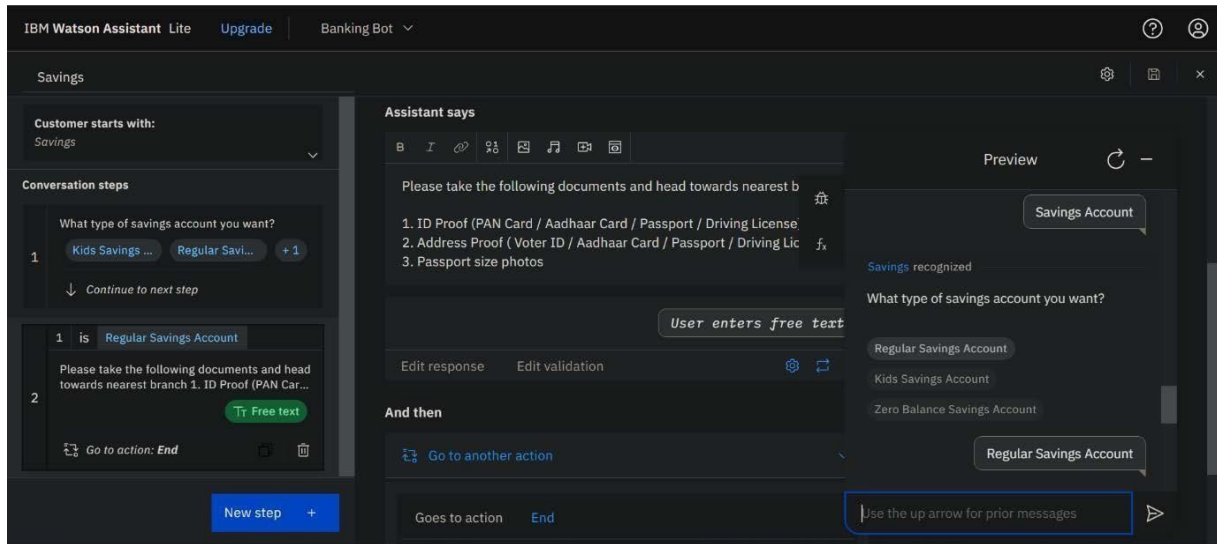


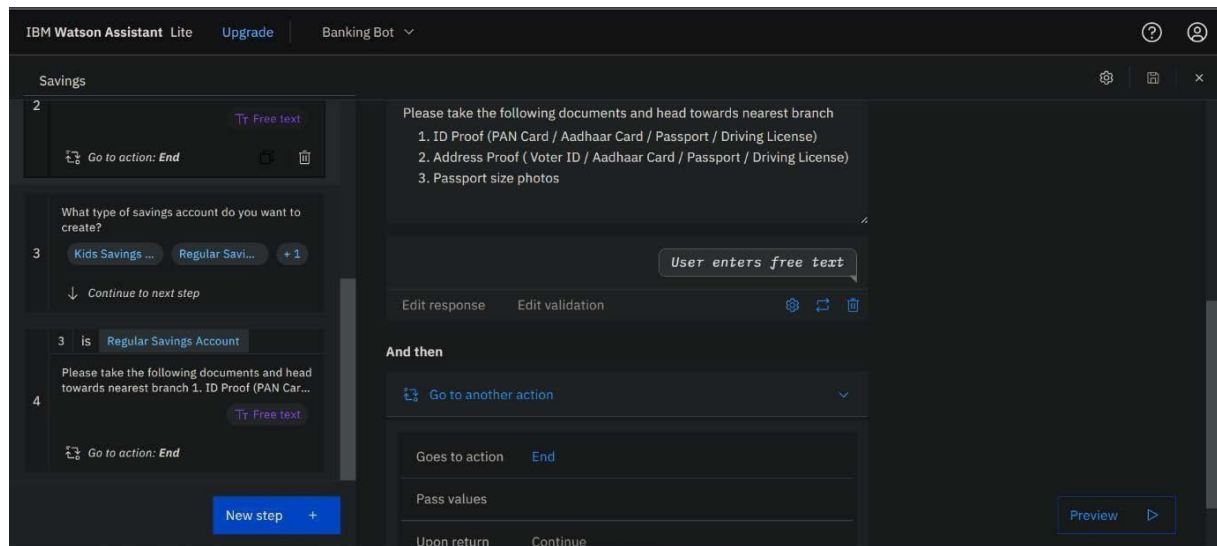




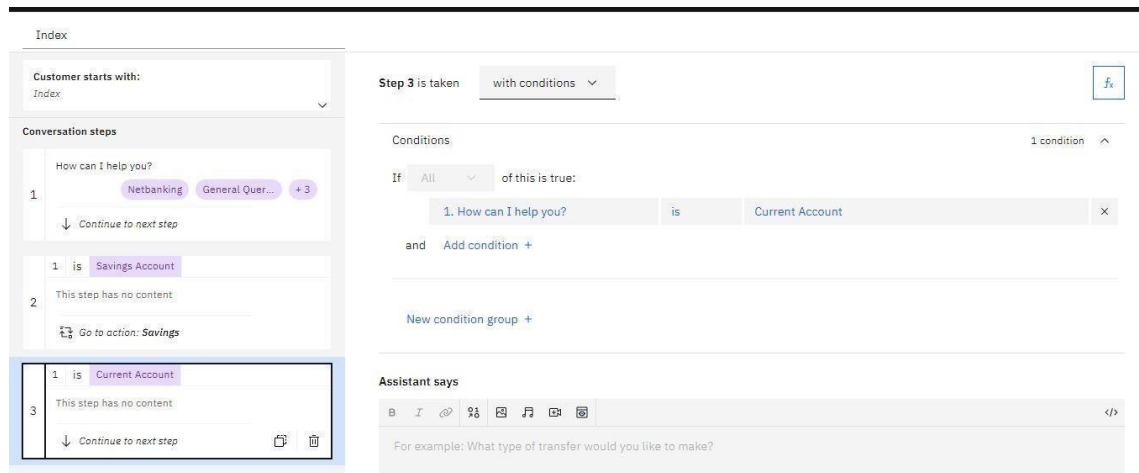
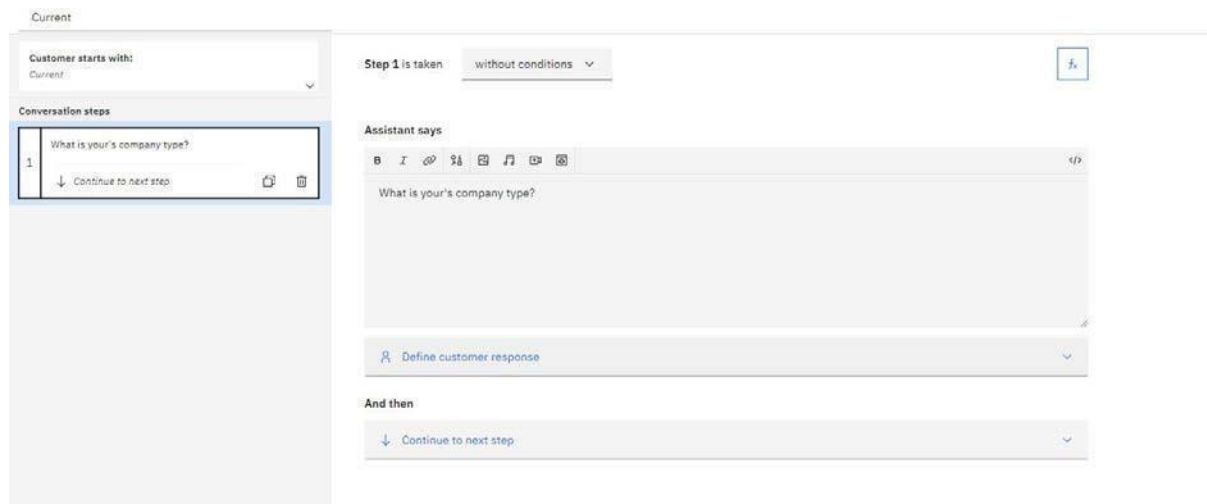
Creating Savings Account Action:







Creating Current Account Action:



Current

Customer starts with:
Current

Conversation steps

1

What is your's company type?

Proprietorship Partnership

Continue to next step

2

1 is Proprietorship

Please take the following documents and approach the closest branch:
 1. Income tax returns of...

Continue to next step

Step 2 is taken

with conditions

fx

Conditions

1 condition

If All of this is true:

1. What is your's company type? is Proprietorship

and Add condition +

New condition group +

Assistant says

Please take the following documents and approach the closest branch:

1. Income tax returns of proprietor for last 3 years

2. Company Agreement

3. Pan card

Current

Customer starts with:
Current

Conversation steps

1

What is your's company type?

Proprietorship Partnership

Continue to next step

1 is Proprietorship

Please take the following documents and approach the closest branch:
 1. Income tax returns of...

Free text

Go to action: End

1 is Partnership

3

Please take the following documents and approach the closest branch:
 1. Income tax returns of...

Continue to next step

Step 3 is taken

with conditions

fx

Conditions

1 condition

If All of this is true:

1. What is your's company type? is Partnership

and Add condition +

New condition group +

Assistant says

Please take the following documents and approach the closest branch:

1. Income tax returns of proprietor for last 3 years

2. Company Agreement

3. Pan card for both partners

1 is Proprietorship

2

Please take the following documents and approach the closest branch:
 1. Income tax returns of...

Free text

Continue to next step

New condition group +

Assistant says

Please take the following documents and approach the closest branch:

1. Income tax returns of proprietor for last 3 years

2. Company Agreement

3. Pan card

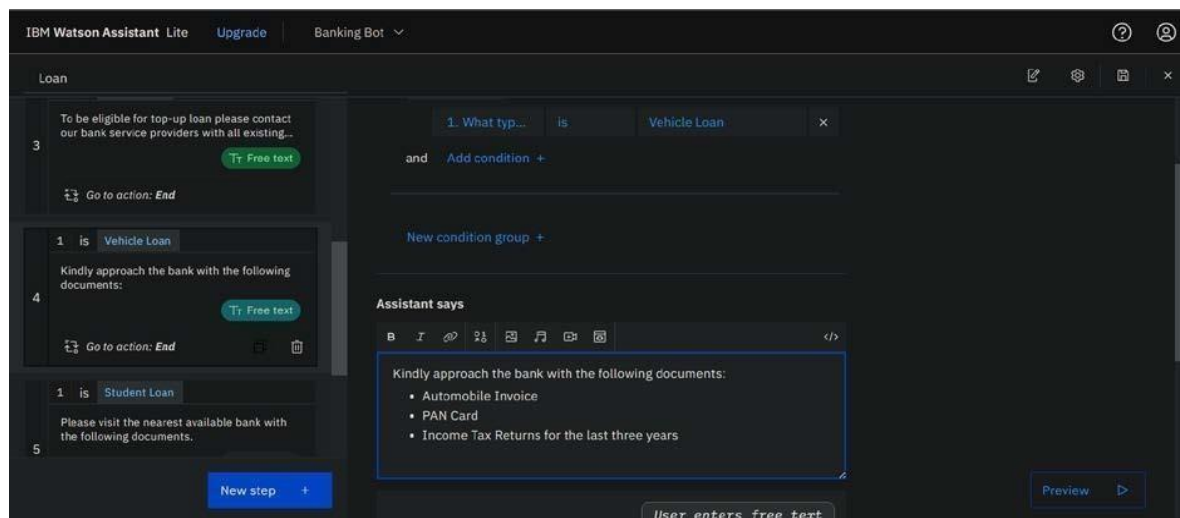
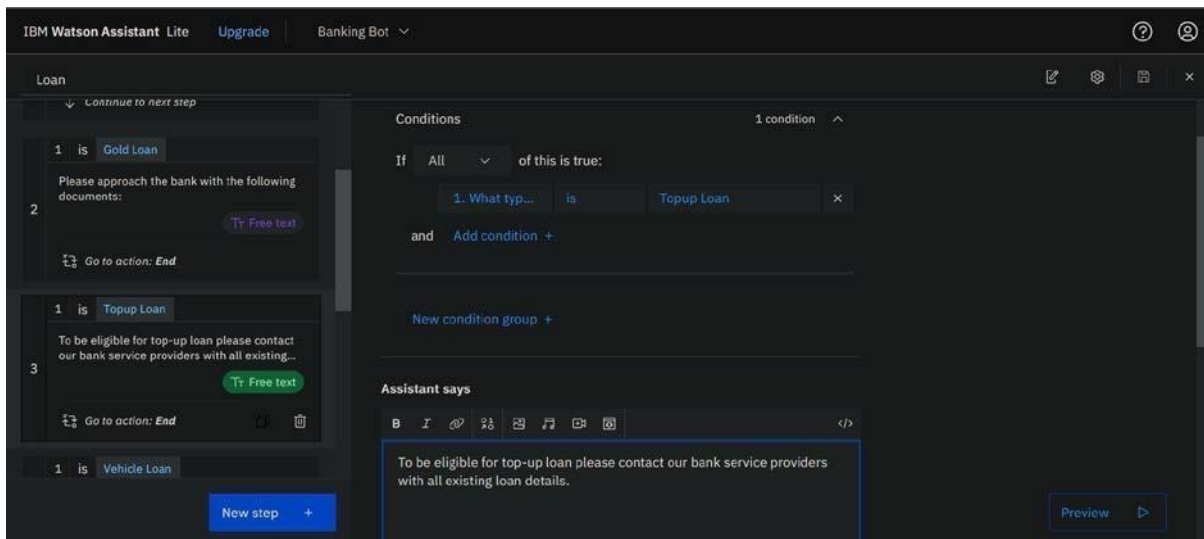
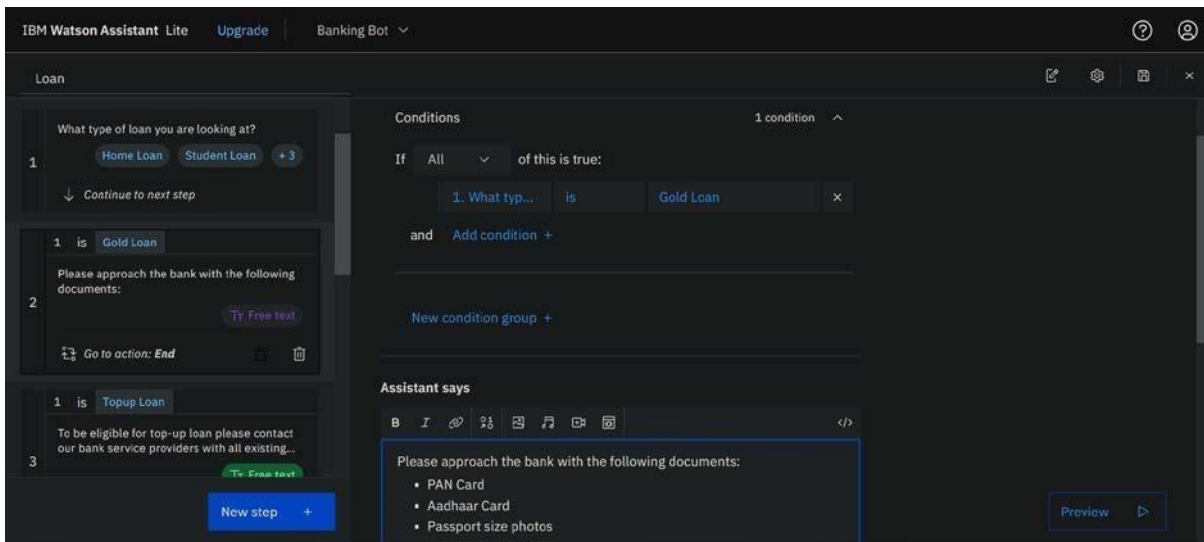
User enters free text

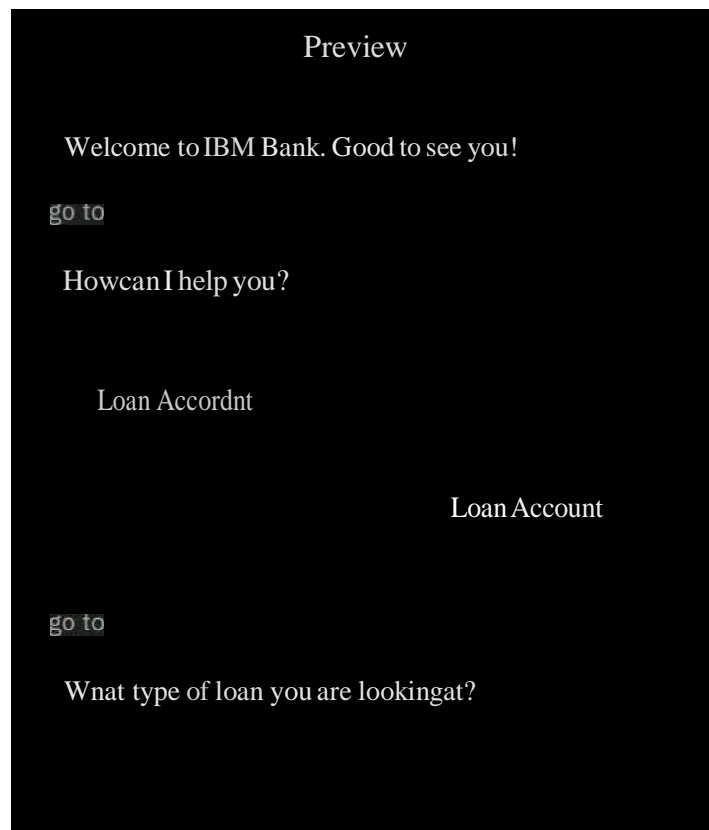
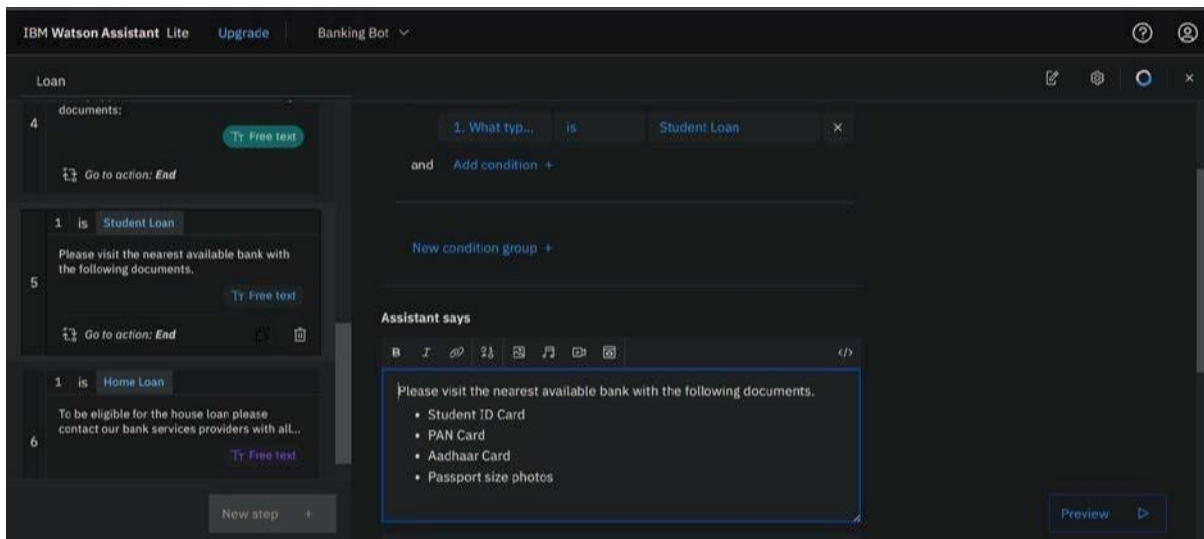
7.2 FEATURE 2

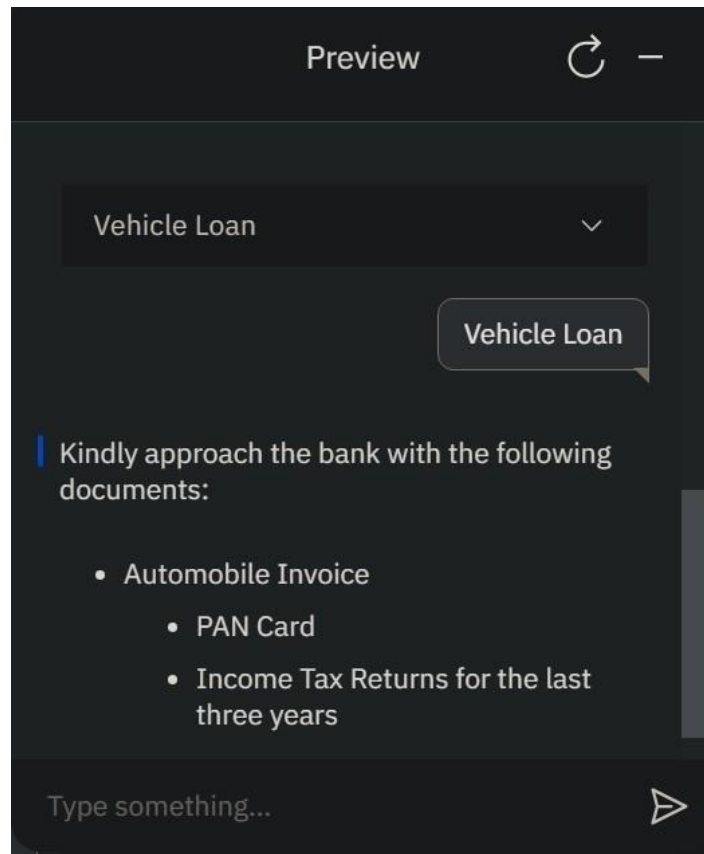
Creating Loan Account Actions:

The screenshot shows the IBM Watson Assistant interface for a 'Banking Bot'. The main panel displays a 'New action' dialog. The 'Customer starts with:' field is set to 'Loan'. The 'What does your customer say to start this interaction?' field is empty. The 'Cancel' and 'Save' buttons are visible at the bottom of the dialog. The left sidebar shows the 'Conversation steps' section with a single step labeled '1' and a 'Continue to next step' button. The top bar includes 'IBM Watson Assistant Lite', 'Upgrade', and 'Banking Bot'.

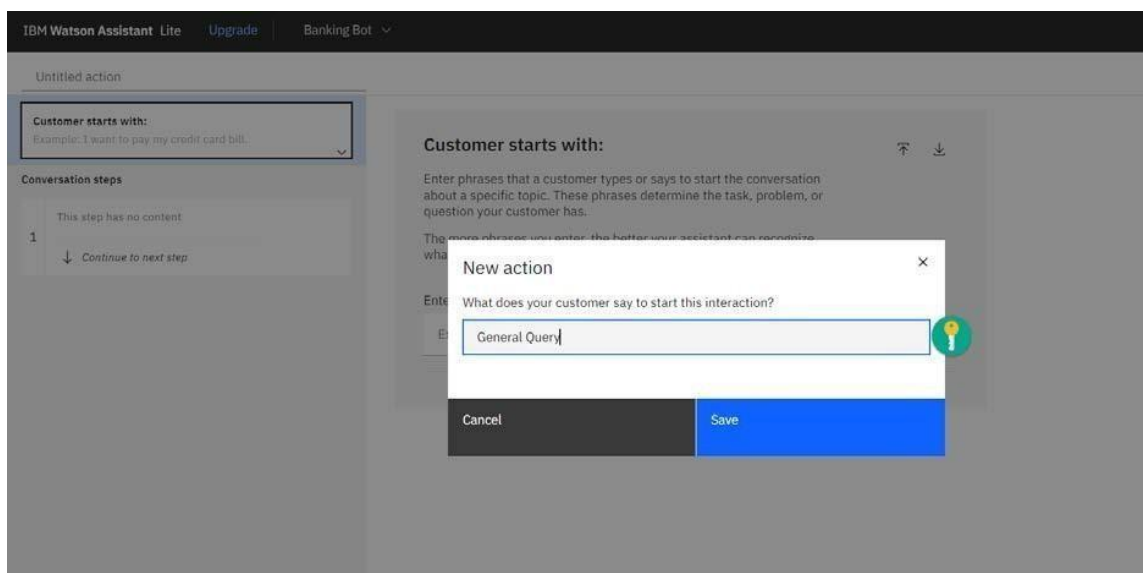
The screenshot shows the IBM Watson Assistant interface for a 'Banking Bot'. The main panel displays an 'Edit response' dialog. The 'Type: Option' field is set to 'Option 1'. The 'What type of loan you are looking at?' field is empty. The 'Cancel' and 'Apply' buttons are visible at the bottom of the dialog. The left sidebar shows the 'Conversation steps' section with a single step labeled '1' and a 'Continue to next step' button. The top bar includes 'IBM Watson Assistant Lite', 'Upgrade', and 'Banking Bot'.

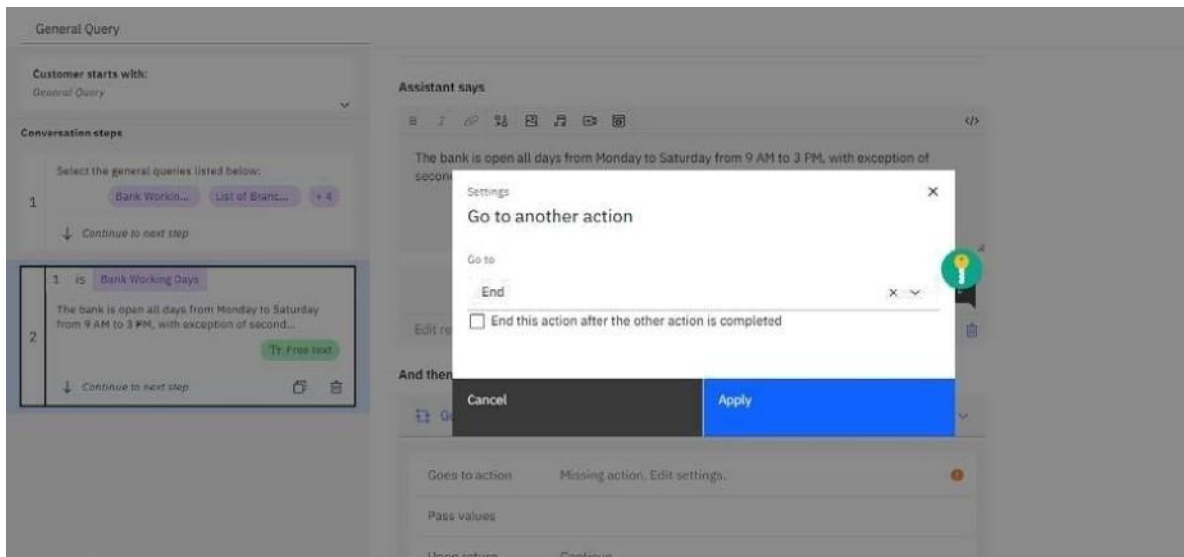






Creating General Query Action:





General Query

Customer starts with:
General Query

Conversation steps

Select the general queries listed below:

1

Continue to next step

1 is Bank Working Days

The bank is open all days from Monday to Saturday from 9 AM to 3 PM, with exception of second...

2

Free text

Go to action: End

1 is List of Branches

ADYAR,ALWARPET,ANNA NAGAR,AYANAVARAM,ASHOK NAGAR,EGMORE,RAMAPURAM,KK...

3

Free text

Go to action: End

New step +

Step 3 is taken with conditions

Conditions 1 condition

If All of this is true:

1. Select the genera... is List of Branches

and Add condition +

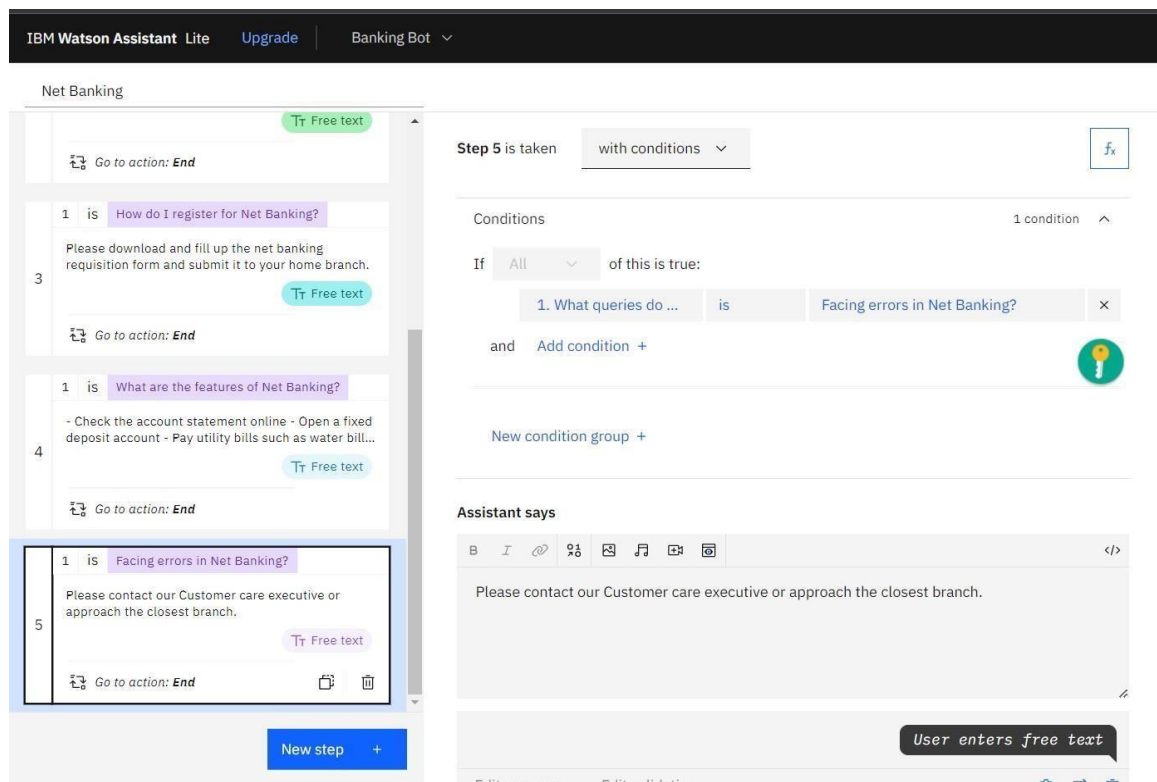
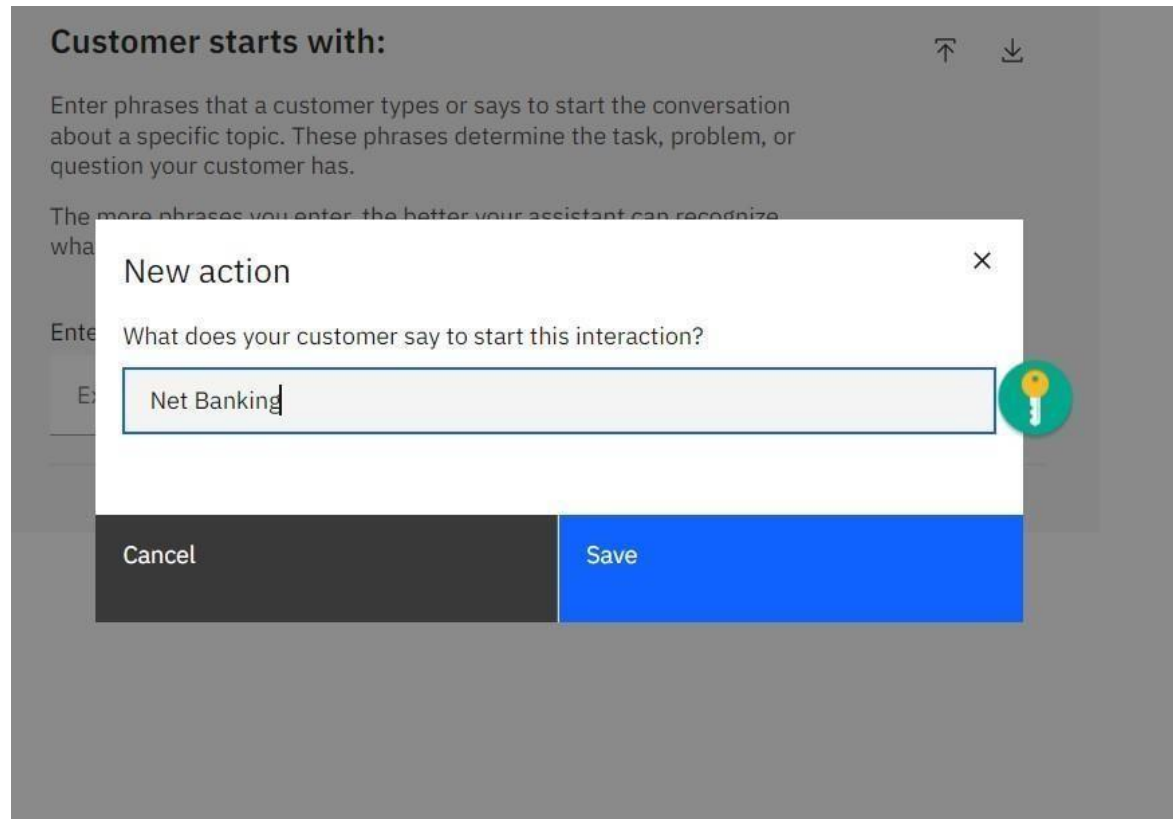
New condition group +

Assistant says

ADYAR,ALWARPET,ANNA NAGAR,AYANAVARAM,ASHOK NAGAR,EGMORE,RAMAPURAM,KNAGAR,KARAPAKKAM,KOYAMBEDU,WEST MAMBALAM

User enters free text

Creating Net banking Action:



Net Banking

Customer starts with: Net Banking

Conversation steps

What queries do you have regarding Net banking?

1 What is Net B... How do I regi... + 2

Continue to next step

1 is What is Net Banking?

The facility offered by the bank allows customers to use banking services over the internet. Customers ne...

2 Free text

Go to action: End

1 is How do I register for Net Banking?

Please download and fill up the net banking requisition form and submit it to your home branch.

3 Free text

Go to action: End

New step +

Step 3 is taken with conditions

Conditions 1 condition

If All of this is true:

1. What queries do ... is How do I register for Net Banking?

and Add condition +

New condition group +

Assistant says

Please download and fill up the net banking requisition form and submit it to your home branch.

User enters free text

Current

Customer starts with: Current

Conversation steps

What is your's company type?

1 Proprietorship Partnership

Continue to next step

1 is Proprietorship

Please take the following documents and approach the closest branch: 1. Income tax returns of...

2 Free text

Go to action: End

1 is Partnership

Please take the following documents and approach the closest branch: 1. Income tax returns of...

3 Free text

Continue to next step

1. What is your's company type? is Partnership

and Add condition +

New condition group +

Assistant says

Please take the following

1. Income tax returns
2. Company Agreement
3. Pan card for both

Go to action: End

Go to another action

Go to: End

End this action after the other action is completed

Cancel Apply

And then

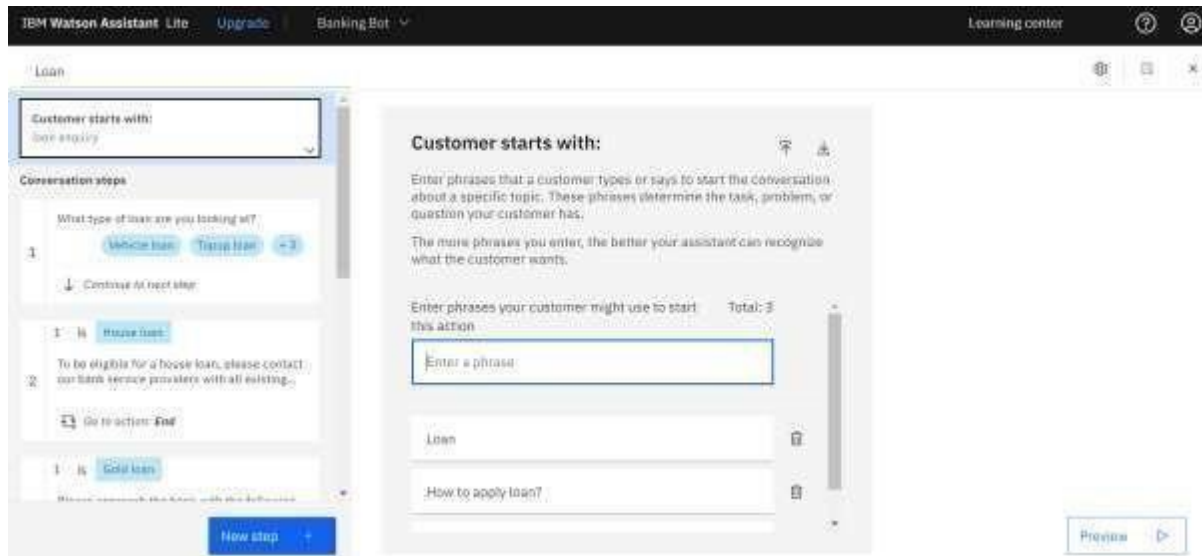
Go to another action

Goes to action Missing action. Edit settings.

7.3 FEATURE 3

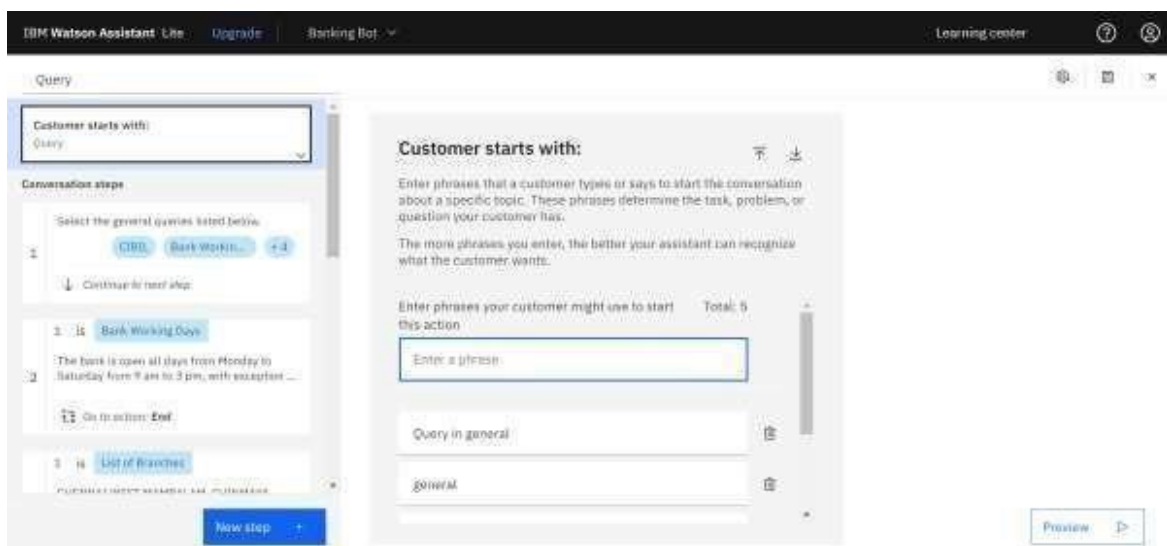
Creating Loan Account Action

Loan action is created with the necessary steps.



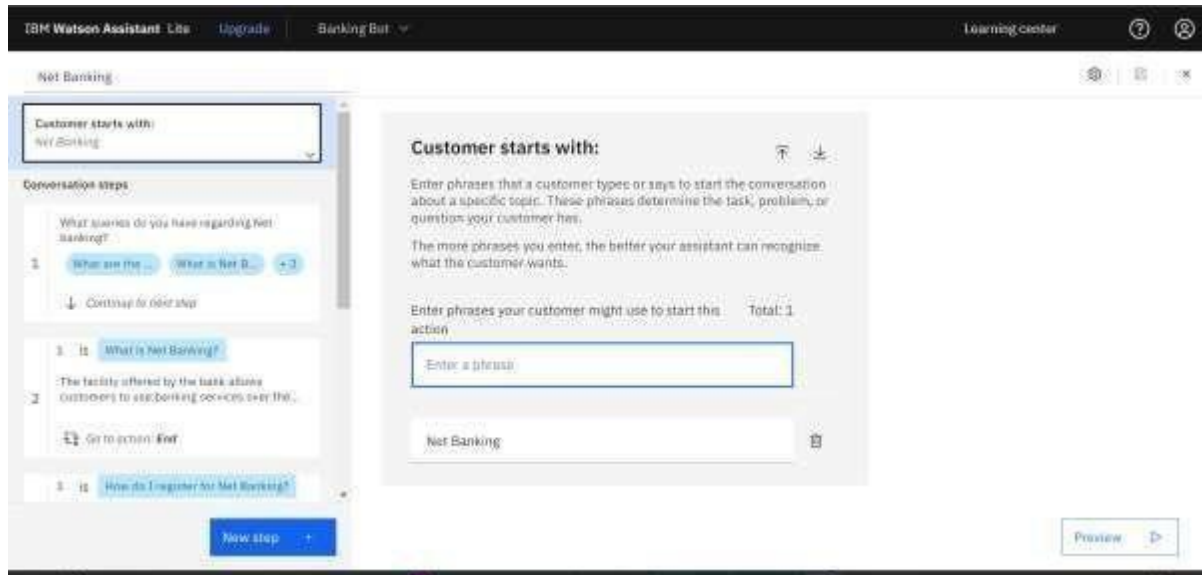
Creating General Query Action

General query action is created with the necessary steps.



Creating Net Banking Action

Net banking action is created with the necessary steps.



In addition to this greeting, end greeting ,index and end actions are also created.

Name	Last edited	Status
Current	2 days ago	✓
Index	2 days ago	✓
Register	3 days ago	✓
Greeting	2 days ago	✓
End Greeting	2 days ago	✓

New action

Name	Last edited	Status
Net Banking	3 minutes ago	<div></div>
End	2 days ago	<div></div>
Loan	2 days ago	<div></div>
Query	a few seconds ago	<div></div>
Savings	16 minutes ago	<div></div>
Current	2 days ago	<div></div>

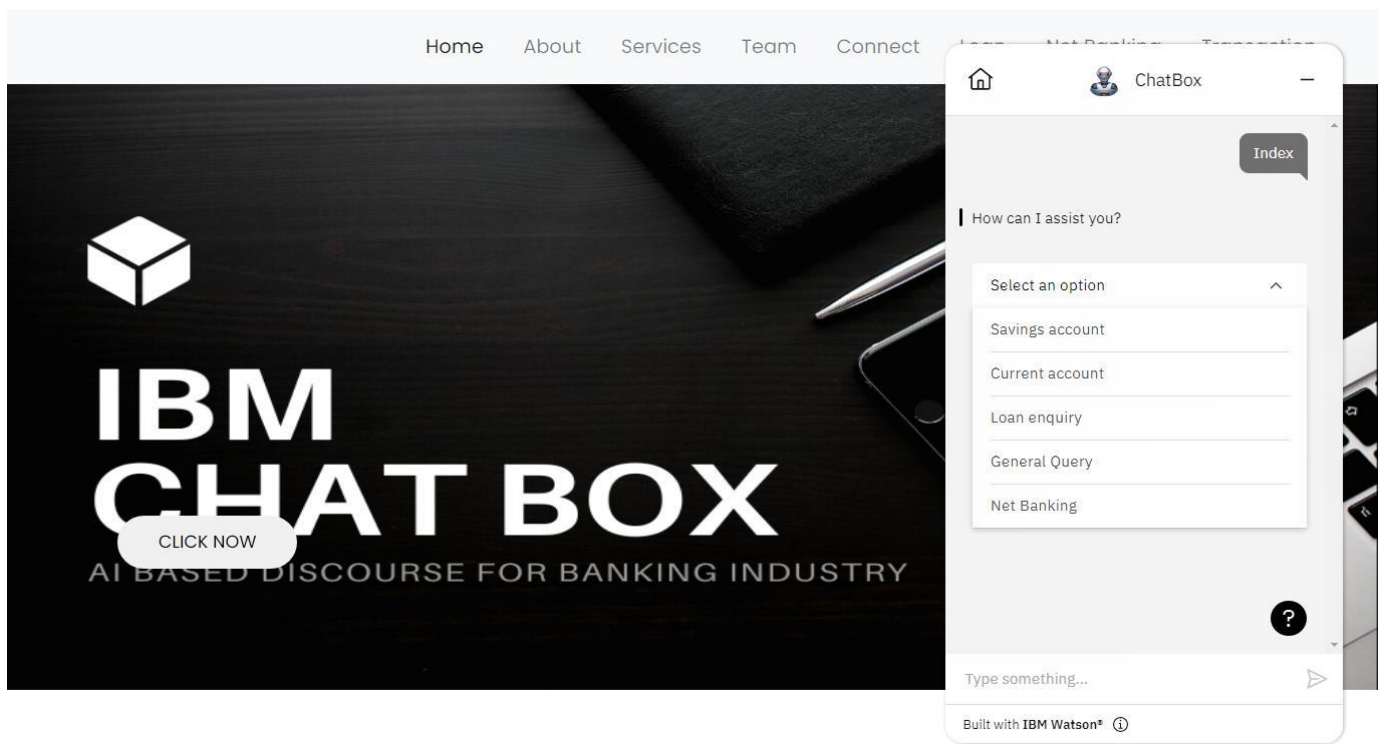
Items per page: 50

Showing 1–10 of 10 actions

1

1 of 1 pages

CHAPTER-9 RESULTS



CHAPTER-9 ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- Advanced Data Analytics
- Scam Recognition
- Enhanced Banking Services
- Better Customer Support

DISADVANTAGES:

- Unemployment
- Distribution of Power
- Bad Calls
- Highly Expensive

CHAPTER-8 CONCLUSION

The financial products and services of banks do not differ in the eyes of a customer and thus the customer does not see a value in choosing a specific bank. During this unspecified phase the risk that the customer base might switch to another bank is high. Swedbank already stated that the company is concerned about new digital competitors, which provide additional value through financial services for customers. The usage of artificial intelligence technologies provides an opportunity for banks to stay competitive by differentiating themselves while at the same time save costs. Online channels are increasingly becoming the preferred way for customers to communicate with their banking institutes. The current experience of communicating through a chatbot could be enhanced by the utilization of advanced robot advisory services. Sven Magg (2017) pointed out that large progress in AI is expected within the processing of natural voice input. Customer service and advisory could be done utilizing a voiced AI based system, which is able to recognize and answer via natural communication. In an ideal scenario, the system could recognize the phone number of the client greet by his or her name.

Multiple privacy and security concerns exist among customers. AI system are required to process large amounts of data in order to function properly. With data sets available online the risk for data theft or data exploitation increases. Additionally, the lawmaking process is lacking behind the technological progress with the consequence that existing regulations are not addressing all legal aspects of innovative digital technologies, such as AI assistants. This grey area might lead to uncertainty, which in return could restrain the innovative progress. Within the decision making process AI systems have both strong opportunities and challenges. On one hand computer systems are not vulnerable to emotional influences or selfish motivations, thus their decisions are

solely based on logical reasoning. On the other hand computer systems operate as they are programmed. This means, that there is a risk that private interests of third parties can be deceived into the software making the computer system biased. Within this matter artificial neural networks provide a security by design approach, due to naturally running within a black box, in which the internal processes are not easily revealed (Sven Magg, 2017).

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CHAPTER-9 FUTURE SCOPE

- The impact of digital technology can be seen in almost all industries, and it is not only redefining industries but also changing the way businesses operate. Presently, every sector is evaluating options and adopting ways to compete in this tech-driven world.
- Nowadays, every country is stepping ahead in terms of digitalization, and this is the reason the number of customers is continuously rising in the banking sector.
- The primary aim of Artificial Intelligence in the banking industry is to assist the customers by keeping their preferences as a priority. Additionally, Artificial Intelligence plays a vital role in ensuring make that customers are happy with the services offered by the bank.
- Digital Wallets: No doubt, the invention of digital wallets has taken the trend of digital money to the next level. If we talk about the specialty of these wallets, customers can buy any item online by simply entering their mobile number or OTP
- Interactive Voice Response System (IVRS): An interactive voice response system (IVRS) helps the bank to interact with their customers. The main aim of this application is to give a pleasant banking experience to the customers by providing relevant answers to their queries.

CHAPTER-12 APPENDIX

12.1 SOURCE CODE

APP.PY

```
from flask import Flask, render_template

app = Flask(__name__, template_folder="template")

@app.route("/")
def Chatbot():
    return render_template("index.html")

if __name__ == "__main__":
    app.run(debug=True)
```

INDEX.HTML

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

<head>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <title>Chatbot for banking</title>
  <link rel="stylesheet" href="https://unpkg.com/aos@next/dist/aos.css" />
  <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css">
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.3.1/jquery.min.js"></script>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"></script>
  <script src="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>
  <script src="https://use.fontawesome.com/releases/v5.0.8/js/all.js"></script>
  <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/animate.css/4.1.1/animate.min.css">
  <link href="{{ url_for('static',filename='css/style.css') }}" rel="stylesheet">
</head>

<script>
  window.watsonAssistantChatOptions = {
    integrationID: "e48d9cdc-6859-4056-9ded-1ee3c1aa3eac", // The ID of this integration.
    region: "us-south", // The region your integration is hosted in.
    serviceInstanceID: "9e288577-875c-4c10-90bc-ea9c5c400f9f", // 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>

<nav class="navbar navbar-expand-md navbar-light bg-light sticky-top">
    <div class="container-fluid">

        <div class="collapse navbar-collapse" id="navbarResponsive">
            <ul class="navbar-nav ml-auto">
                <li class="nav-item active">
                    <a class="nav-link" href="#">Home</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">About</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Services</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Team</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Connect</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Loan</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Net Banking</a>
                </li>
                <li class="nav-item">
                    <a class="nav-link" href="#">Transaction</a>
                </li>
            </ul>
        </div>
    </div>
</nav>

<!-- Image Slider -->

```

```

<div class="carousel-inner">
  <div class="carousel-item active">
    
    <button class="click-btn">CLICK NOW</button>
  </div>
</div>
</div>
</div>
</div>
</div>
</div>

<script src="https://unpkg.com/aos@next/dist/aos.js"></script>
<script>
  AOS.init();
</script>

</body>

</html>

```

STYLE.CSS

```
@import url('https://fonts.googleapis.com/css?family=Poppins:400,500,700');
```

```

html,
body {
  height: 100%;
  width: 100%;
  font-family: 'Poppins', sans-serif;
  color: #222;
}

```

```

.navbar {
  padding: .8rem;
}

```

```

.navbar-brand img {
  width: 150px;
  height: 70px;
}

```

```

}

.navbar-nav li {
  padding-right: 20px;
}

.nav-link {
  font-size: 1.1em !important;
}

.carousel-inner img {
  width: 100%;
  height: 100vh;
}

.carousel-caption {
  position: absolute;
  top: 50%;
  transform: translateY(-50%);
}

.carousel-caption h1 {
  font-size: 500%;
  text-transform: uppercase;
  text-shadow: 1px 1px 10px #000;
}

.carousel-caption h3 {
  font-size: 200%;
  font-weight: 500;
  text-shadow: 1px 1px 10px #000;
  padding-bottom: 1rem;
}

.btn-primary {
  background-color: #6648b1;
  border: 1px solid #564d7c;
}

.btn-primary:hover {
  background-color: #563d7c;
}

```



```
border: 1px solid #563d7c;
}
```

```
.jumbotron {
padding: 1rem;
border-radius: 0;
}
```

```
.padding {
padding-bottom: 2rem;
}
```

```
.welcome {
width: 75%;
margin: 0 auto;
padding-top: 2rem;
}
```

```
.welcome hr {
border-top: 2px solid #b4b4b4;
width: 95%;
margin-top: .3rem;
margin-bottom: 1rem;
}
```

```
.fa-code {
color: #e54d26;
}
```

```
.fa-bold {
color: #563d7c;
}
```

```
.fa-css3 {
color: #2a63af;
}
```

```
.fa-code,
.fa-bold,
.fa-css3 {
font-size: 4em;
}
```

```

    margin: 1rem;
}

.fun {
    width: 100%;
    margin-bottom: 2rem;
}

.gif {
    max-width: 100%;
}

.social a {
    font-size: 4.5em;
    padding: 3rem;
}

.fa-facebook {
    color: #3b5998;
}

.fa-twitter {
    color: #00aced;
}

.fa-google-plus-g {
    color: #dd4b39;
}

.fa-instagram {
    color: #517fa8;
}

.fa-youtube {
    color: #bb0000;
}

.fa-facebook:hover,
.fa-twitter:hover,
.fa-google-plus-g:hover,
.fa-instagram:hover,

```

```

.fa-youtube:hover {
  color: #d5d5d5;
}

footer {
  background-color: #3f3f3f;
  color: #d5d5d5;
  padding-top: 2rem;
}

.click-btn {
  position: absolute;
  bottom: 110px;
  left: 100px;
  z-index: 1000;
  outline: none;
  border: none;
  border-radius: 100px;
  padding: 10px 35px;
  transition: all 0.1s ease-in;
  border: solid 2px rgba(255, 255, 255, 0);
}

.click-btn:hover {
  padding: 10px 40px;
  background-color: #000;
  color: white;
  border: solid 2px white;
}

hr.light {
  border-top: 1px solid #d5d5d5;
  width: 75%;
  margin-top: .8rem;
  margin-bottom: 1rem;
}

footer a {
  color: #d5d5d5;
}

```

```
hr.light-100 {  
  border-top: 1px solid #d5d5d5;  
  width: 100%;  
  margin-top: .8rem;  
  margin-bottom: 1rem;  
}
```

```
.footer-image img {  
  width: 150px;  
  height: 60px;  
}
```

```
/*---Media Queries ---*/  
@media (max-width: 1500px) {  
  .carousel-inner img {  
    width: 100%;  
    height: 550px;  
  }  
}
```

```
@media (max-width: 992px) {  
  .social a {  
    font-size: 4em;  
    padding: 2rem;  
  }  
}
```

```
.carousel-inner img {  
  width: 100%;  
  height: 400px;  
}  
}
```

```
@media (max-width: 768px) {  
  .carousel-caption {  
    top: 45%;  
  }  
}
```

```
.carousel-caption h1 {  
  font-size: 350%;  
}
```

```
.carousel-caption h3 {  
  font-size: 140%;  
  font-weight: 400;  
  padding-bottom: 0.2rem;  
}
```

```
.carousel-caption .btn {  
  font-size: 95%;  
  padding: 8px 14px;  
}
```

```
.display-4 {  
  font-size: 200%;  
}
```

```
.display-4 {  
  font-size: 200%;  
}
```

```
.social a {  
  font-size: 2.5em;  
  padding: 1.2rem;  
}
```

```
.carousel-inner img {  
  width: 100%;  
  height: 100%;  
}  
}
```

```
@media (max-width: 576px) {  
  carousel-caption {  
    top: 40%;  
  }  
}
```

```
.carousel-caption h1 {  
  font-size: 250%;  
}
```

```
.carousel-caption h3 {
```

```

    font-size: 110%;
}

.carousel-caption .btn {
    font-size: 90%;
    padding: 4px 8px;
}

.carousel-indicators {
    display: none;
}

.display-4 {
    font-size: 160%;
}

.social a {
    font-size: 2em;
    padding: 1.7rem;
}

.carousel-inner img {
    width: 100%;
    height: 100%;
}
}

/*---Firefox Bug Fix ---*/
.carousel-item {
    transition: -webkit-transform 0.5s ease;
    transition: transform 0.5s ease;
    transition: transform 0.5s ease, -webkit-transform 0.5s ease;
    -webkit-backface-visibility: visible;
    backface-visibility: visible;
}

/*--- Bootstrap Padding Fix ---*/
[class*="col-"] {
    padding: 1rem;
}

```

}

/*

Extra small (xs) devices (portrait phones, less than 576px)

No media query since this is the default in Bootstrap

Small (sm) devices (landscape phones, 576px and up)

@media (min-width: 576px) { ... }

Medium (md) devices (tablets, 768px and up)

@media (min-width: 768px) { ... }

Large (lg) devices (desktops, 992px and up)

@media (min-width: 992px) { ... }

Extra (xl) large devices (large desktops, 1200px and up)

@media (min-width: 1200px) { ... }

*/

12.2 GITHUB & DEMO VIDEO LINK

DEMO VIDEO LINK :

https://drive.google.com/file/d/1IYF2hm50iWo9j9lCn8kZajQhLCtVQth9/view?usp=share_link

GITHUB LINK : <https://github.com/IBM-EPBL/IBM-Project-33765-1660226593>