

SACS MAVMM Engineering College



AI-BASED DISCOURSE FOR BANKING INDUSTRY

DONE BY

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ABSTRACT

A chatbot can be described as software that can chat with people using artificial intelligence. This software is used to perform tasks such as quickly responding to users, informing them, helping to purchase products, and providing better service to customers. In this

paper, we present the general working principle and the basic concepts of artificial intelligence based chatbots and related concepts as well as their applications in various sectors such as telecommunication, banking, health, customer call centers, and ecommerce. Additionally, the results of an example chatbot for donation services developed for telecommunication service providers are presented using the proposed architecture.

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

AI chatbots use natural language processing (NLP) and machine learning to understand the context and intent of a user's query pattern and to create connections between different queries that are asked in various ways to provide a better response.

1.2 PURPOSE

- Improve customer engagement and brand loyalty
- Generate leads and satisfy customers
- Reduce costs and boost operational

2. LITERATURE SURVEY

1. THE INFLUENCE OF AI IN BANKING AND HOW AI IS CHANGING MODERNDAY BANKS.

International Journal of Management (IJM)

Volume 11, Issue 6, June 2020, pp. 577-585, Article ID: IJM_11_06_049

DOI: 10.34218/IJM.11.6.2020.049

Citation:

Kaur, Navleen&Sahdev, Supriya & Sharma, Dr. (2020). Banking 4.0: -The Influence of Artificial Intelligence on the Banking Industry & How AI is Changing the Face of Modern Day Banks. INTERNATIONAL JOURNAL OF MANAGEMENT. 11. 577-585. 10.34218/IJM.11.6.2020.049

. Artificial intelligence (AI), from time to time called machine intelligence is a simulation of human intelligence in machines. It is the intellect exhibited by machines, in contrast to the natural knowledge demonstrated by humans. , AI is progressing at a rapid pace. Artificial intelligence consists of generally two fundamental ideas. First, it involves studying human brains like how their thought process works, and second, it helps represent those processes through machine learning. Artificial Intelligence in finance is more than about chatbots. Artificial Intelligence has taken over numerous sectors including the banking industry. The principal thought behind this investigation was to comprehend the impact of AI on present-day banking. This research mainly focuses on the concept of AI in the field of banking, how it has brought revolutionary changes in banking, and its impact on human manpower. As we are aware that humans tend to commit errors, but the world is evolving so does innovations, there is a lack of skilled talents required to handle automation.

2. ARTIFICIAL INTELLIGENCE IN INDIAN BANKING SECTOR: CHALLENGES AND OPPORTUNITIES

Dr.C.Vijai. St. Peter's Institute of Higher Education & Research

Citation: Vijai, C.. (2019). ARTIFICIAL INTELLIGENCE IN INDIAN BANKING SECTOR: CHALLENGES AND OPPORTUNITIES. International Journal of Advanced Research. 7. 1581-1587. 10.21474/IJAR01/8987.

Artificial Intelligence (AI) is a fast-developing technology across the world. The banking sector is becoming one of the first adopters of Artificial Intelligence. Banks are exploring and implementing technology in various ways. Artificial Intelligence is getting better and smarter day by day. In this paper, we will discuss how Artificial

Intelligence is used in the Indian banking sector, what are the benefits, and what are the Challenges facing India 's Artificial Intelligence. Development that Artificial Intelligence offers FinTech and the different ways in which it can improve the operations of the Indian banking sector.

3. A STUDY ON ARTIFICIAL INTELLIGENCE (AI) IN BANKING AND FINANCIAL SERVICES

DR M.G.R Research Institute

This paper focuses on artificial intelligence (AI) in the Banking and financial services in Chennai to oversee the application of artificial intelligence methodology in the banks as well as responses from the clients or consumers. Banks and other financial institutions can mine the financial transaction data generated by the proliferation of digital payments and banking to better monitor, predict and respond to consumer behavior. To identify the information used in the banking and financial services, the data is collected from secondary sources based on the literature review. A structured questionnaire is framed to collect the primary data of customers have about AI applications. Findings: the result of the study is that private banks and private financial institutions are using various AI services for the customer's benefit so that customers are satisfied with their services in addition to that financial services to improve services more effective manner because some of them are dissatisfied with the banking services. The result also suggested that the customers have more commitment from representatives to the banking and financial services by giving development of innovative preparation to improve the AI procedures in the workplace.

4. USE OF ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN IN THE BANKING SECTOR:

A Study of Scheduled Commercial Banks in India

Galgotia's College of Engineering and Technology; The Nainital Bank Ltd.; Corporate Office of Bank of Baroda - The Nainital Bank Ltd., Ex-Branch Head

Artificial Intelligence (AI) is rapidly transforming the global financial services industry. Artificial Intelligence studies the thought processes of human beings and it deals with representing those processes via machines (like computers, robots, etc.) On the other side, Block-chain Technology is a technology in which digital

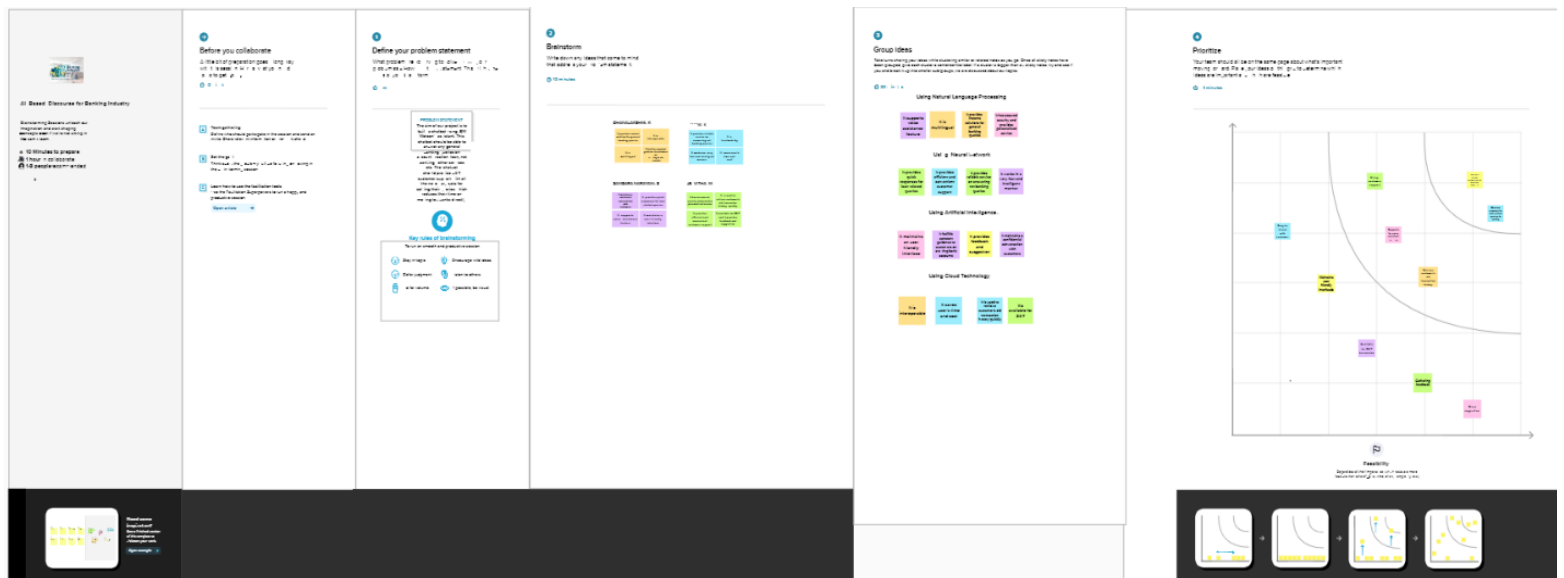
information is stored in a publicly shared database. This technology got famous mainly after introducing the first cryptocurrency which is Bitcoin. The study was conducted to know the importance of using Artificial Intelligence and Block Chain, especially in Banks to reduce the dependency on the human element.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



3.3Proposed Solution

PROBLEM STATEMENT

In today's trend, with automation, the banking world is slowly getting self-service oriented to cater to the needs and demands of digital-savvy customers. Normally, retail banking customers often have to endure long turnaround times to have their queries resolved and perform certain services. Therefore, including chatbots in the financial industry is a remarkable phenomenon to decrease the overall banking task to a great extent. Large banks are struggling to catch up with, compared to their new-generation peers, in today's competitive banking landscape

1.WhomWho does the problem affect?

One of the options that banks have is to leverage a technology based on AI chatbots. AI chatbots communicate with humans in a very natural form to resolve their queries and assist them as required. The core purpose of banking chatbots is to provide customers with prompt service and to improve the operational efficiency of the bank and its employees.

2. What is the issue?

Normally, retail banking customers often have to endure long turnaround times to have their queries resolved and perform certain services. Large banks are struggling to catch up with, compared to their new-generation peers, in today's competitive banking landscape. One of the options that banks have is to leverage a technology based on AI chatbots. AI chatbots communicate with humans in a very natural form to resolve their queries and assist them as required. The core purpose of banking chatbots is to provide customers with prompt service and to improve the operational efficiency of the bank and its Employees.

3. What are the boundaries of the problem?

The boundaries will be based on the user's account details and previous transactions. The system also keeps track of the payments, balances, credit, and debit.

4. When does the issue occur?

Due to hectic schedules, people hesitate to stand in long queues and complete their banking operations. Thus, people prefer mobile banking, net banking, and trend chatbot banking. With the help of a chatbot for banking, customers can perform any financial transaction without much hassle through text or voice. Additionally, due to chatbots, customer satisfaction has improved a lot.

5. Where is the issue occurring?

Services these days are pretty slow and even unpleasant sometimes as people are relatively more prone to misunderstanding and mistakes than chatbots. So, in such a scenario, a conversational AI chatbot can help you provide exceptional customer services as it is available 24/7, never forgets anything, never gets sick, and never gets unproductive. An AI chatbot for banks can be installed to complete daily operations and enhance the customer experience in the digital banking sector.

6. Why is it important that we fix the problem?

Such as community or regional banks, stay and thrive in the business. When the pandemic started, the waiting time in call centers was horrible as nobody expected this to happen, and several customers faced financial concerns with furloughs and layoffs.

Thus, it became difficult to meet ends to pay a mortgage payment. Along with high call volume, several financial institutions also face limited staff issues in the call center due to the requirement of social distancing. Besides, due to the sudden upsurge in Coronavirus, the FinTech industry was struggling with the transition of settling their employees to take up calls from home. To cope with all these struggles, many organizations have deployed chatbots in banking to help enhance the breadth of customer service. To overcome all these, we are in need to use chatbots integrated with AI.

SOLUTION

1. Storing the customer conversation.
2. Providing interest-related advice.
3. Helping to lock the account during theft-related situations
4. Creating a new account based on the customer's preference
5. Provides Omnichannel support
6. Make the Chatbot Understand the Natural and Vernacular Language.
7. Providing assistance over net banking-related issues
8. Detailed and personalized conversations with the chatbot user
9. Providing Round-the-clock support.
10. make the chat bot understand the natural and vernacular language
11. Automated notification and reminder are sent to customers regarding their interest and payment regarding

UNIQUENESS

1. Provide financial insights (Like sharing financial advice and money-saving tips)
2. Quick location-based information (For instance, if a user asks for the nearest ATM, a banking chatbot can ask the user to enter the name of the place they're looking for or enable their GPS)

3. Generate automatic query mail after confirmation by the client and send it through the client's email to the bank.
4. Voice Bots
5. Chatbots Automating Payments.

CUSTOMER SATISFACTION

Customer satisfaction is achieved by the fulling the following needs:

1. Process Automation
2. AML Pattern Detection
3. Forgery detection
4. Customization according to the user
5. Actions are taken immediately according to the complaint given
6. Error Detection
7. Getting easily used to the chatbots.
8. Receiving easy updates.
9. Handle Risk Management
10. Predictive Analytics and wealth management for clients
11. More accurate and faster
12. Keep Track of all Bank details

3.4 Problem Solution Fit

1. CUSTOMER SEGMENT <ul style="list-style-type: none"> - Bank Account Holders - Net Banking Users - Loan borrowers 	5. AVAILABLE SOLUTION <p><u>Support through Email:</u> takes moretime to solve and take action against filed customer queries.</p> <p><u>HDFC EVA:</u> provides fast and efficient support but the framework is difficult for users.</p>	9. ROOT/CAUSE <ul style="list-style-type: none"> - To avoid visiting the bank every time for bank-related functions. - To achieve 24/7 customer service - Might have worries under their Account Privacy
2.PROBLEMS / PAINS <ul style="list-style-type: none"> - Customer should manually visit the bank for creating an Account and also for solving banking queries which consumes much time. - Banks cannot be available 24/7 - Not being able to provide a personalized experience 	6. CUSTOMER STATE LIMITATION <ul style="list-style-type: none"> - Customer should hold a Bank Account - Customer should have an email account as well as an active phone number and government ID proof. - Mobile Phone and laptop with active Internet Connection - Customer should have installed Banking Application 	10. YOUR SOLUTION <p>To build an effective and efficient banking chatbot using AI and IBM WATSON to provide an easy framework to them on all banking related queries such as account creation, queries related accounts, loan, net banking in a safe and secured manner and consider customer privacy and make available banking features 24*7 to them.</p>
3. TRIGGERS TO ACT <p>Banking customers want to make their life easier, and save time from manual banking.</p> <p>Online transactions provide convenience for both customers and business owners because it would allow an instant process of payment verification and don't need to manually send proof of their payment.</p>	7. BEHAVIOUR <ul style="list-style-type: none"> -Late response from bank disappoints customers. - Bank Consumes more time for providing banking functionalities to customers. - Standing in long queues to resolve any banking queries which is time consuming. 	
4. EMOTIONS <p><u>BEFORE:</u> Customers feel stressed through manual banking and all queries aren't satisfied.</p> <p><u>AFTER:</u> Customers feel smart through the use of this effective chatbot and feel the personalized experience.</p>	8. CHANNELS OF BEHAVIOUR <p><u>ONLINE:</u> Can sort all customer queries through chatbot from anywhere in the world</p> <p><u>OFFLINE:</u> Physical presence is required for getting queries sorted</p>	

4. REQUIREMENT ANALYSIS

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<ul style="list-style-type: none">• Answering user queries• GUI friendly
NFR-2	Security	<ul style="list-style-type: none">• Encryption• Prevent unauthorized access• Provide details only with respect to their account• No human intervention hence better security.• Protect sensitive data access from illegal users
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Greetings	<ul style="list-style-type: none">• To introduce the functions of the bot with a pop-up message that greets the user and gives instructions.
FR-2	Account creation	<ul style="list-style-type: none">• Explain about how to create a bank account: documents required, procedure etc.
FR-3	Support Provided	<ul style="list-style-type: none">• FAQ's• Queries related to net banking loan Savings account creation Checking balance of the account
FR-4	Feedback	<ul style="list-style-type: none">• To improve quality of the bot• A separate form to collect feedback from customers

Non-functional Requirements:

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

NFR-3	Reliability	<ul style="list-style-type: none">• 24X7 access• More accurate• Fast response• Availability
NFR-4	Performance	<ul style="list-style-type: none">• Accuracy• Personalized• Instant response
NFR-5	Availability	<ul style="list-style-type: none">• Available around the clock• Functions even during holidays
NFR-6	Scalability	<ul style="list-style-type: none">• To help business growth and scale with ease and best in terms of profit.• IBM Watson Assistant also produces quick and accurate responses and meets customer's expectations.• It introduces deep and broad perspectives in the bank's global features.

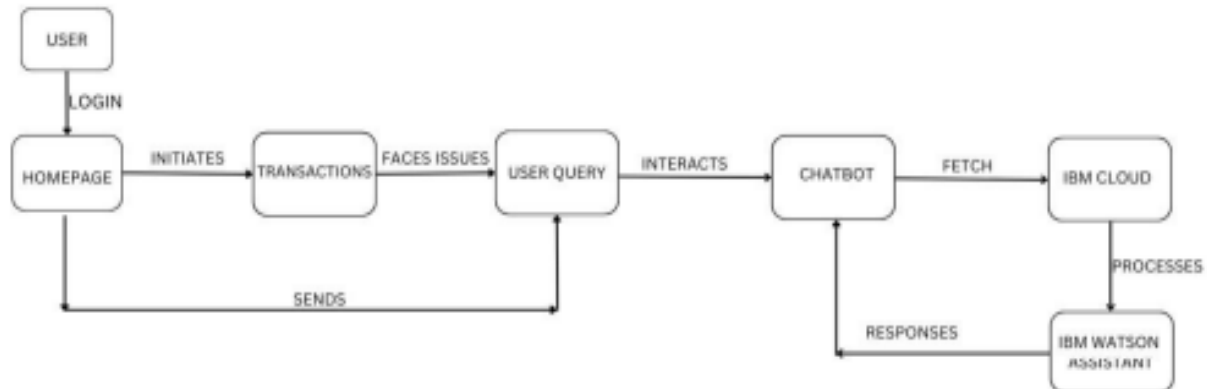
5. PROJECT DESIGN

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.

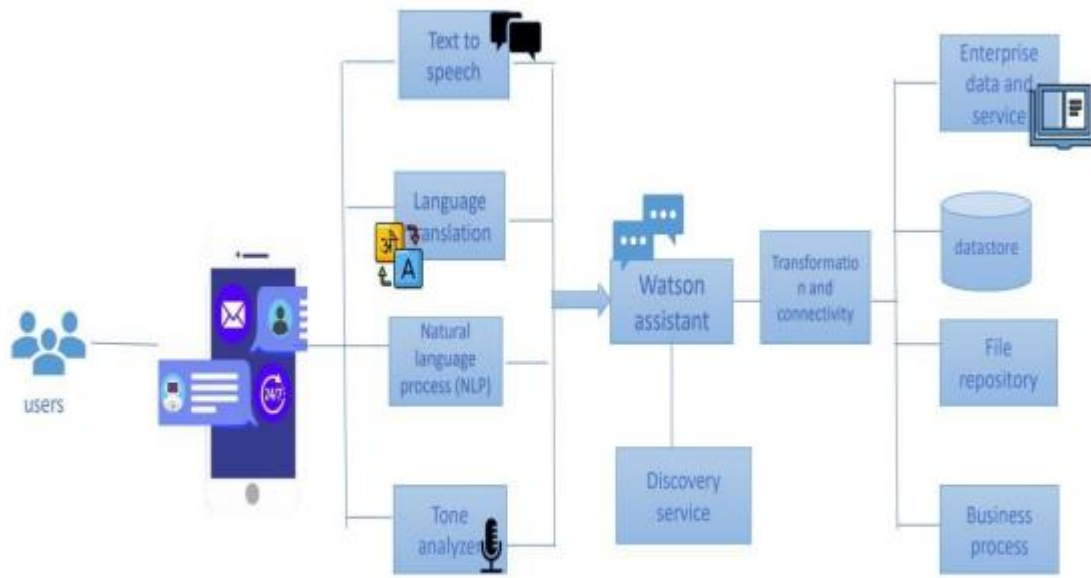
Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyze an existing system or model a new one.

Like all the best diagrams and charts, a DFD can often visually “say” things that would be hard to explain in words, and they work for both technical and nontechnical audiences, from developers to CEO



5.2 Solution & Technical Architecture

Solution Architecture:



S. No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS
2.	Messaging Interface	To integrate the chatbot in another interface	Whatsapp, Facebook, Bank Website
3.	Supervised Learning	Human interference,when you want to improve its conversation flow, add new intents or enrich its knowledge base.	Entity, Intent
4.	API Integration	To integrate chatbot with third-parties via web services	REST APIs
5.	Natural Language Processing	Automatically understand the language of the user.	API.AI
6.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7.	Fluid Conversations	Interactive FAQ	QNAmaker from Microsoft
8.	External API-1	To integrate the services of the bank	Corresponding bank's API
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud	Local, Cloud Foundry, Kubernetes, etc.

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	IBM Watson Assistant	NLP, ML
2.	Security Implementations	Use of firewalls.	Fortinet FortiGate
3.	Scalable Architecture	3 – tier, Micro-services	Docker and Kubernetes
4.	Availability	use of load balancers, distributed servers etc.	Nginx
5.	Performance	Number of requests per sec, use of Cache	AppDynamics

5.3 User Stories

User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile/Web user)	Bot Preview	USN-1	As a user, I can see the chatbot preview to ask inquiries, which includes a message box where I can type queries	I can access the chatbot's message box.	High	Sprint-1
		USN-2	As a user, I can view the Frequently Asked Questions (FAQ)	I get access to the Frequently Asked Questions (FAQ).	High	Sprint-1
	Updates	USN-3	As a user, I can see the updates and search for further information about them.	I can able to view and access the updates.	Medium	Sprint-2
Administrator	Edit Options	USN-4	As an admin, I can add / edit greeting messages, FAQs to the Bot.	I can access to add options like greeting messages, etc.	High	Sprint-1

		USN-5	As an admin, I have the authority to provide ideas and alternatives to the Bot.	I can deliver ideas and alternatives.	Medium	Sprint-2
		USN-6	As an admin, I can make a post regarding new updates.	I can post new updates.	Medium	Sprint-2
Developer	Support	USN-7	As a developer, I can implement Bot for bank conveniently using IBM Watson Assistant.	I can easily access Watson Assistant.	High	Sprint-1
	Upcoming Features	USN-8	As a developer, I can implement new features for the Bot.	I can able to perform new features to the bot.	Medium	Sprint-2
	Design	USN-9	As a developer, I can create as well as design the chatbot's UI.	I can design the chatbot's UI.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint-3	Integrate With Flask Webpage	USN-9	As an admin, I will integrate with the Flask webpage using Python code following the establishment of Assistant.	5	High	Yamini Dhanalakshmi
Sprint-3	Bot Preview	USN-10	As an admin, I employ HTML code to design the front-end of the website.	5	High	Sangara Narayani Yamini
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4	Bot Preview	USN-11	As a user, I can view the bot preview, and it has a user-friendly UI.	2	High	Yamini Dhanalakshmi
Sprint-4	Run The Application	USN-12	An admin can also access the bot at any time.	2	High	Sangara narayani Dhanalakshmi
Sprint-4	Ask Queries	USN-13	As a user, I can see the bot preview asking for guidance to create a saving bank account.	2	Medium	Yamini Sangara Narayani
Sprint-4		USN-14	As a user, I can see the bot preview asking for guidance to create a current bank account.	2	Medium	Jeevitha Yamini
Sprint-4		USN-15	As a user, I can type loan-related queries.	2	Medium	Yamini Dhanalakshmi
Sprint-4		USN-16	As a user, I can type general banking queries.	2	Medium	Yamini Dhanalakshmi
Sprint-4		USN-17	As a user, I can type net-banking queries.	2	Medium	Sangara Narayani Jeevitha
Sprint-4	Customer Support	USN-18	As a user, I can receive contact information from customer care executive through the bot.	2	Medium	Yamini Jeevitha
Sprint-4	Run The Application	USN-19	A user can access the bot at any time.	2	High	Dhanalakshmi Sangara Narayani

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Create IBM Service	USN-1	As an admin, I must create the required IBM service, Watson Assistant.	2	High	Dhanalakshmi Jeevitha
Sprint-1	Chatbot Skill Creation	USN-2	As an admin, I can add welcoming messages, customer care executive contact information to the bot.	3	Medium	Sangara Narayani Yamini
Sprint-1	Creating Saving Account Action	USN-3	As an admin, I can add a response to create a new saving account.	5	High	Sangara Narayani Dhanalakshmi
Sprint-1	Creating Current Account Action	USN-4	As an admin, I can add a response to create a new current account.	5	High	Yamini Jeevitha
Sprint-1	Greeting Message	USN-5	As a user, I can receive welcoming messages from the bot.	2	Low	Jeevitha Sangara Narayani
Sprint-2	Creating Loan Account Action	USN-6	As an admin, I can add a response to create a new loan account.	5	High	Yamini Jeevitha
Sprint-2	Creating General Query Action	USN-7	As an admin, I can insert responses to general banking queries.	5	High	Dhanalakshmi Jeevitha
Sprint-3	Creating Net-Banking Action	USN-8	As an admin, I can insert responses to net-banking queries.	5	High	Jeevitha Dhanalakshmi

Project Tracker, Velocity & Burndown Chart: (4 Marks)

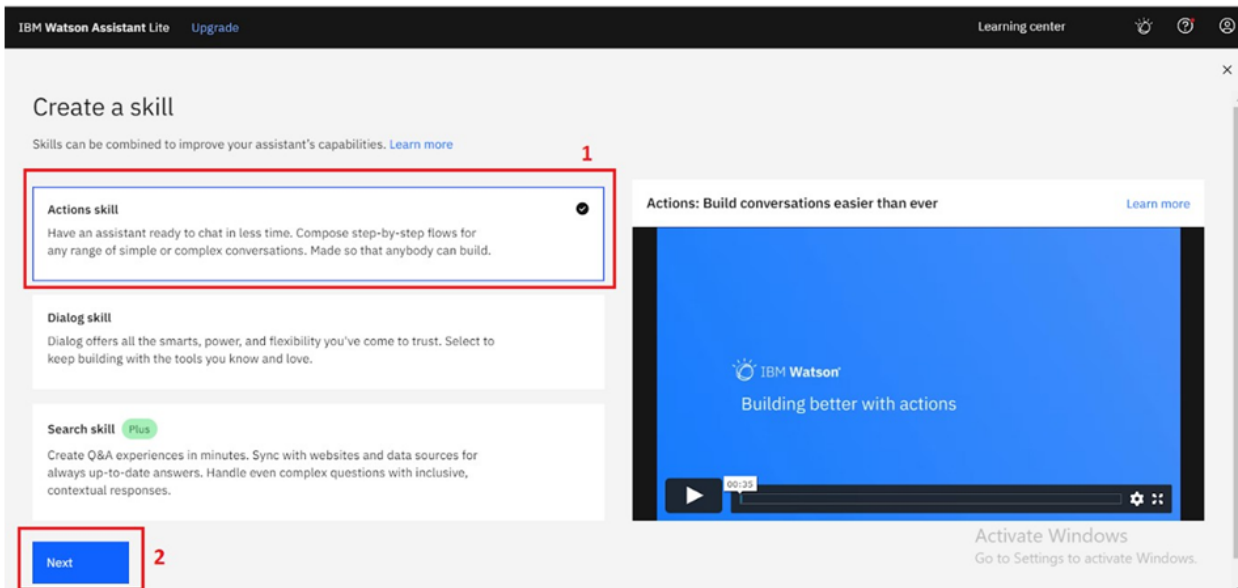
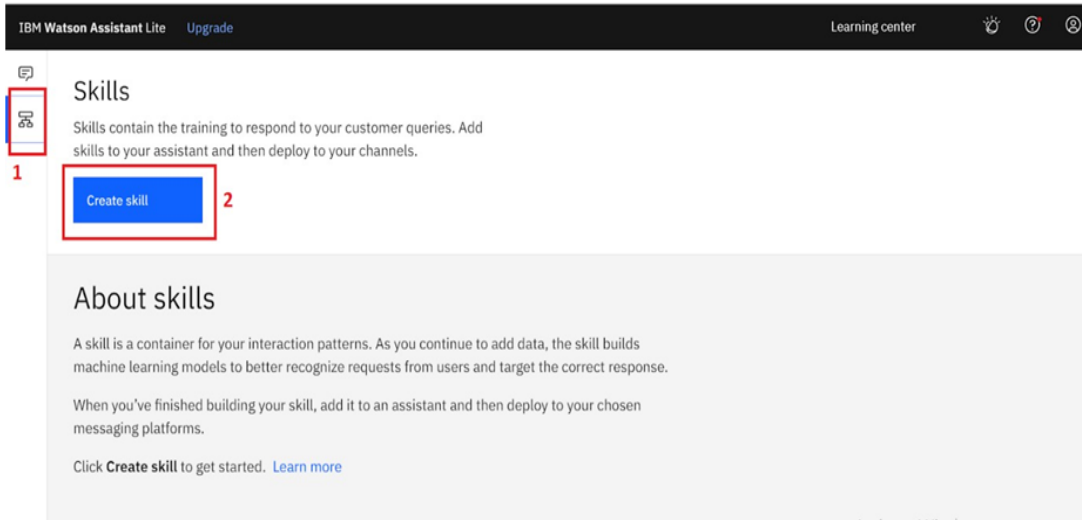
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	17	6 Days	24 Oct 2022	29 Oct 2022	17	01 Nov 2022
Sprint-2	10	6 Days	31 Oct 2022	05 Nov 2022		
Sprint-3	15	6 Days	07 Nov 2022	12 Nov 2022		
Sprint-4	18	6 Days	14 Nov 2022	19 Nov 2022		

7. CODING & SOLUTIONING (Explain the features added in the project along with code) 7.1 Feature 1

Creating Skills & Assistant for Chatbot

We define the actions and steps of the chatbot. Assistant is used to integrating the actions defined.

1. Click on the Skills tab and click on create skills.



2. Enter the action skill name (Chat Bot) and click on create skills

IBM Watson Assistant Lite Upgrade Learning center

Create an Actions skill

Skills can be combined to improve your assistant's capabilities. [Learn more](#)

Create skill Use sample skill Upload skill

Name 1

Bot

Name your skill; for example, Account application or Personal banking.

Description (optional)

Add a description for this skill

Language ⓘ

English (US)

Create skill 2

3. To create a new action click on Create a new action button.

IBM Watson Assistant Lite Upgrade Learning center

Bot System is trained

Actions

- Created by you
- Set by assistant

Variables

- Created by you
- Set by assistant
- Set by integration

Saved responses

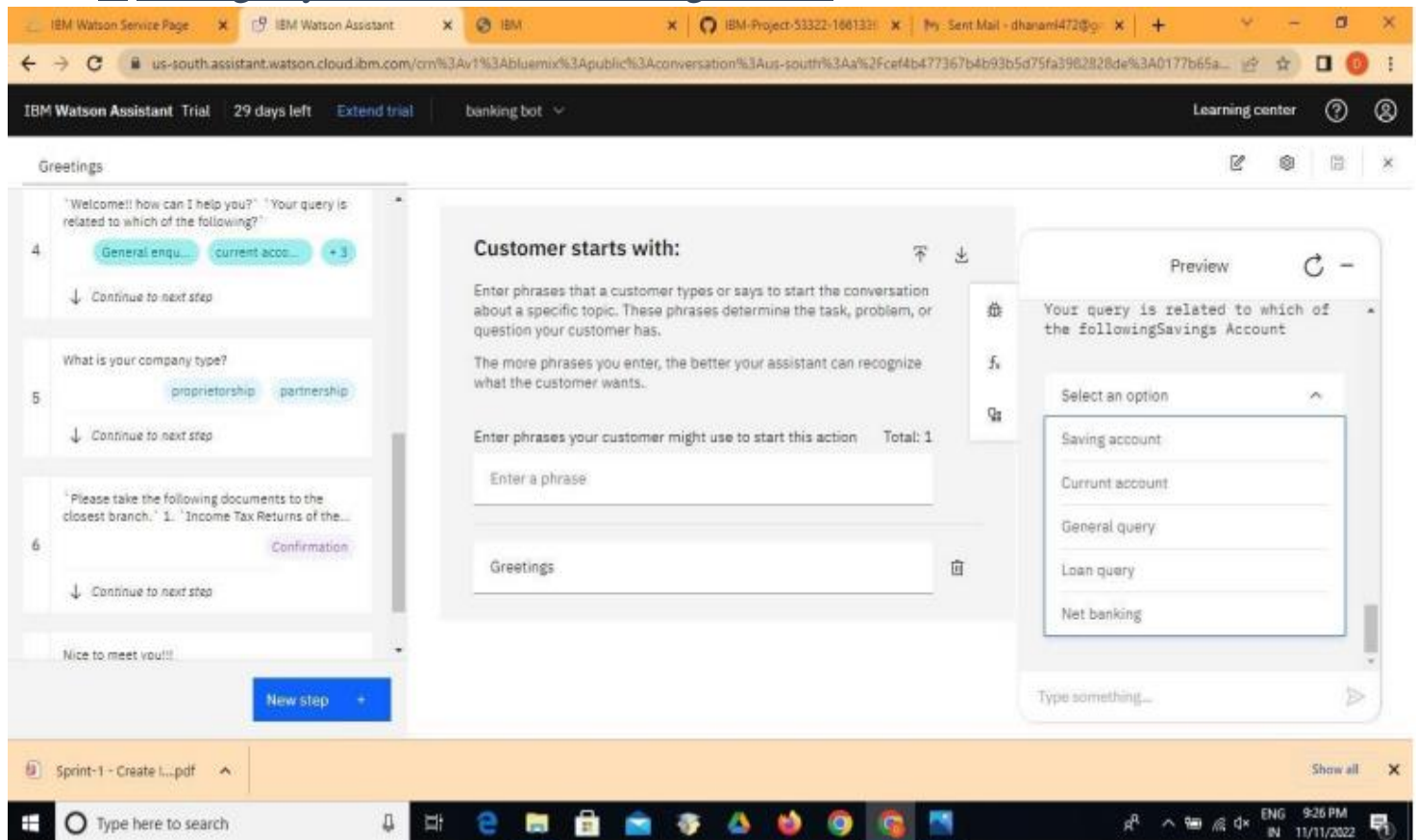
Create your first action

With actions, you can help your customers accomplish their goals.

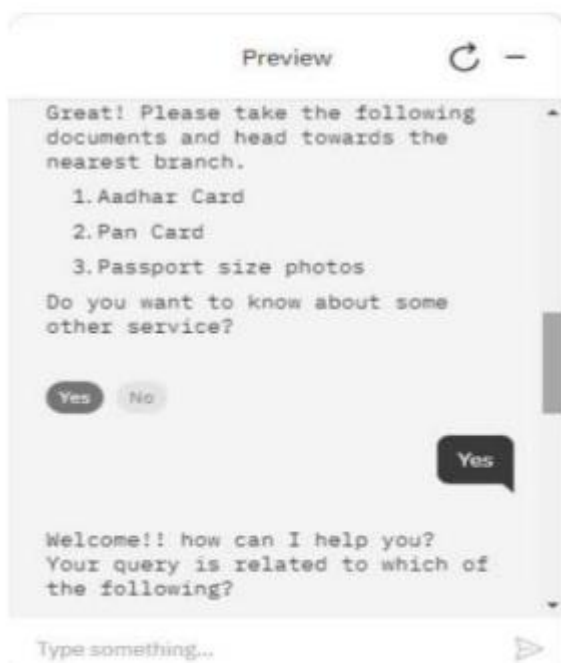
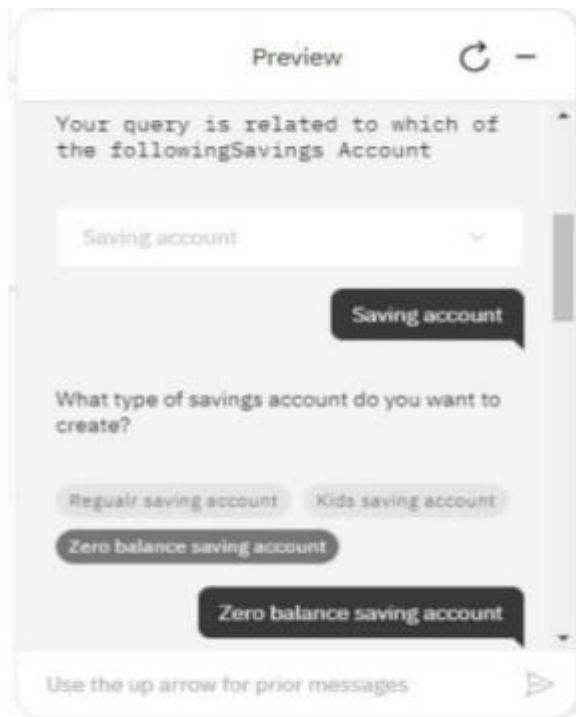
Create a new action +

Savings Account:

1. Listing keywords to initiate savings action

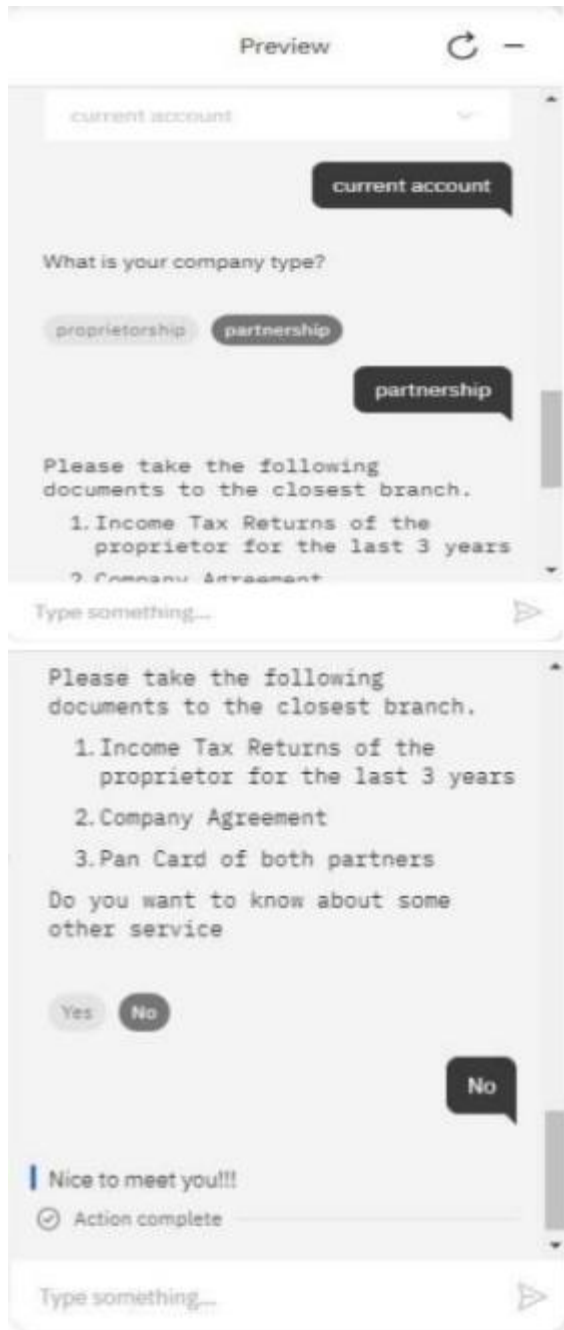


2. Providing guidelines and information according to the option selected by the user



Current Account

When a user enters keywords related to the current account this action gets initiated. Current account action provides the customer with the following options to get a bank statement, Update contact detail



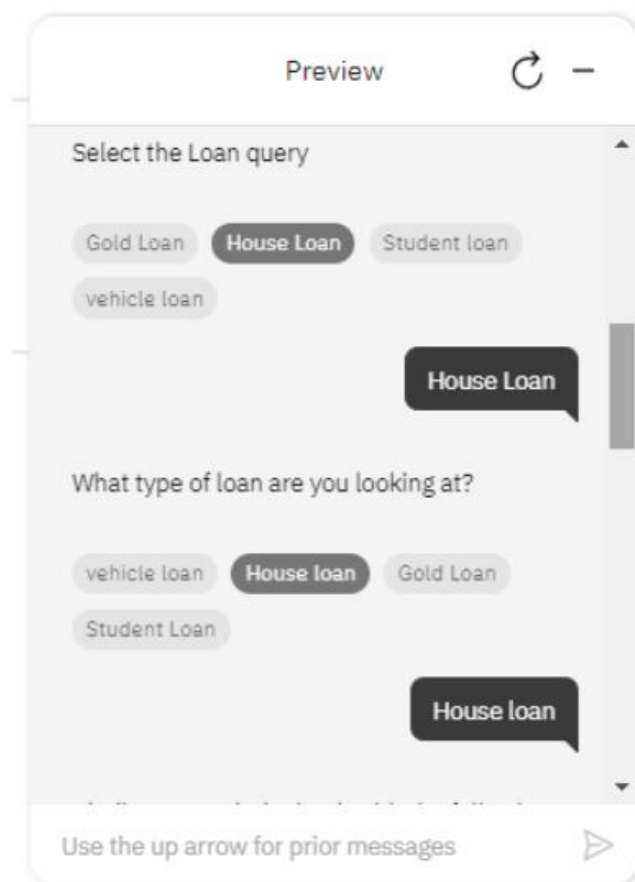
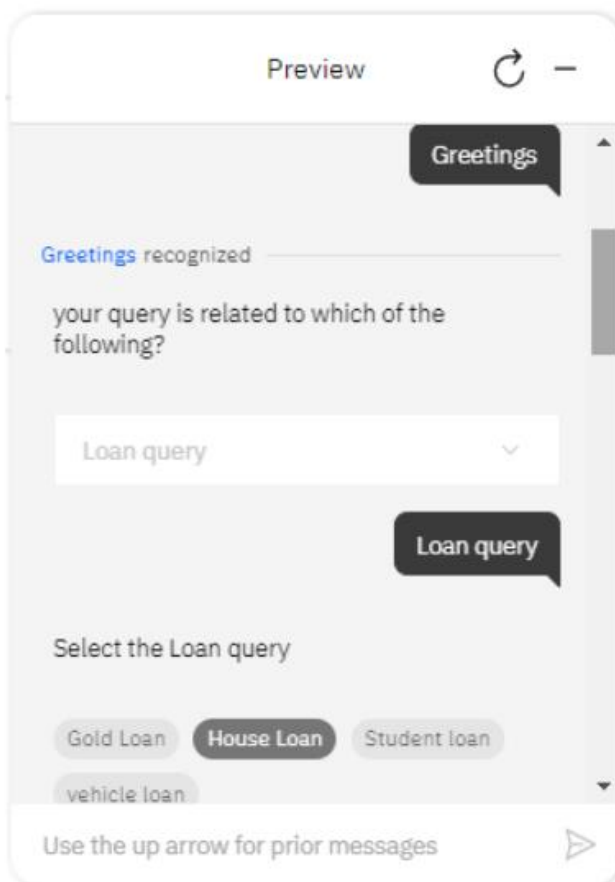
Loan Enquiry

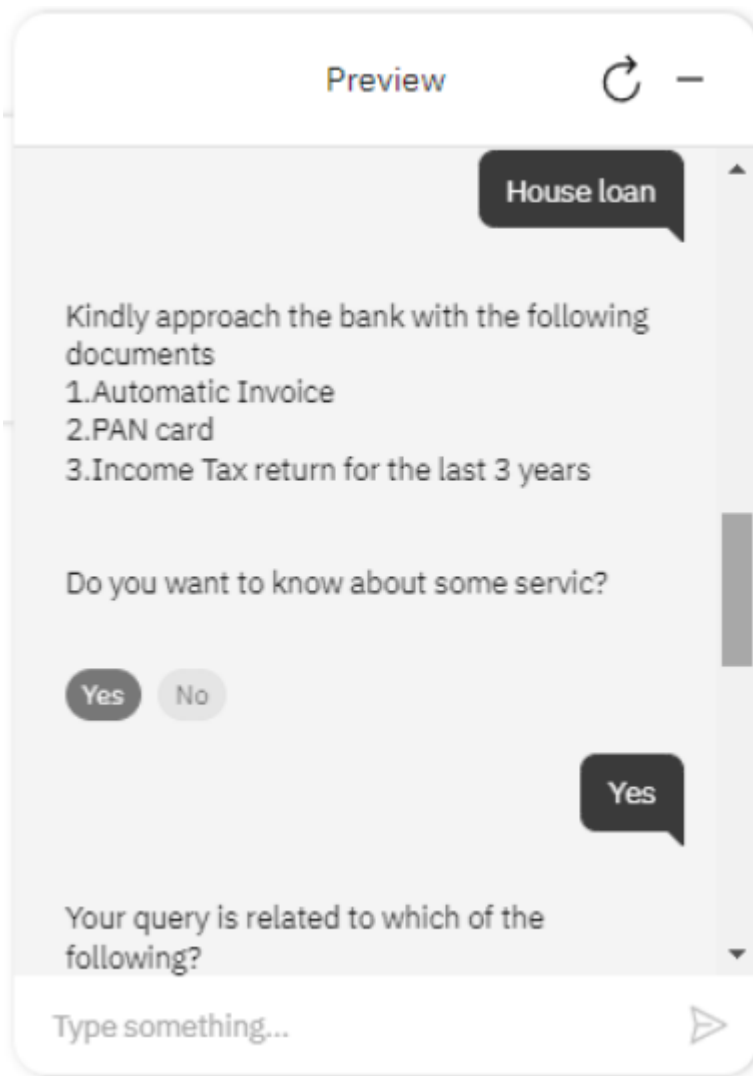
When a user enters keywords related to a loan this action gets initiated.

Create a General query and Loan account action

The screenshot displays the IBM Watson Assistant interface for configuring a 'Greetings' action. The top navigation bar includes 'IBM Watson Assistant Trial', '29 days left', 'Extend trial', 'banking bot', and 'Learning center'. The main workspace is divided into three panels:

- Left Panel (Conversation steps):** Shows a sequence of steps for the 'Greetings' action. Step 1 is titled 'Your query is related to which of the following Savings Account' and includes buttons for 'Saving account', 'Net banking', and '+ 3'. Step 2 is titled 'What type of savings account do you want to create?' and includes buttons for 'Regular savin...', 'Kids saving a...', and '+ 1'. A 'New step +' button is at the bottom.
- Center Panel (Customer starts with):** Provides instructions for defining phrases that start the conversation. It includes a text area for 'Enter phrases your customer might use to start this action' and a 'Total: 1' indicator. Below this is a list of phrases, with 'Greetings' currently selected.
- Right Panel (Preview):** Shows a simulated conversation flow. It starts with the prompt 'Your query is related to which of the following Savings Account' and a 'Select an option' dropdown menu. The menu lists 'Saving account', 'Currunt account', 'General query', 'Loan query' (which is highlighted), and 'Net banking'. The bottom of the preview shows a text input field with the placeholder 'Type something...'.





General Enquiry

When the user gives keywords other than account and loan details, this action is initiated we provide immediate solutions related to Bank working days

- List of Branches
- Storage Locker Facilities

General query

Preview

↻ -

General query

▼

General query

select the general query listed below

List of branches

Bank Work days

Storage Locker Facility

Currency Conversation facility

Bank Work days

The bank is open all days from Monday to Saturday from 9.00am to 3.00 pm except 2nd

Type something...

➤

Preview

↻ -

General query

Bank Work days

The bank is open all days from Monday to Saturday from 9.00am to 3.00 pm except 2nd saturday.

Do you want to know about other service?

Yes

No

No

Have a great day!!

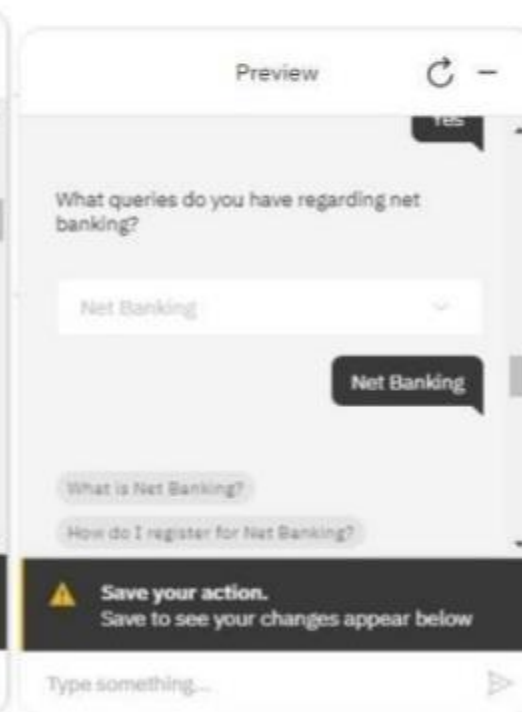
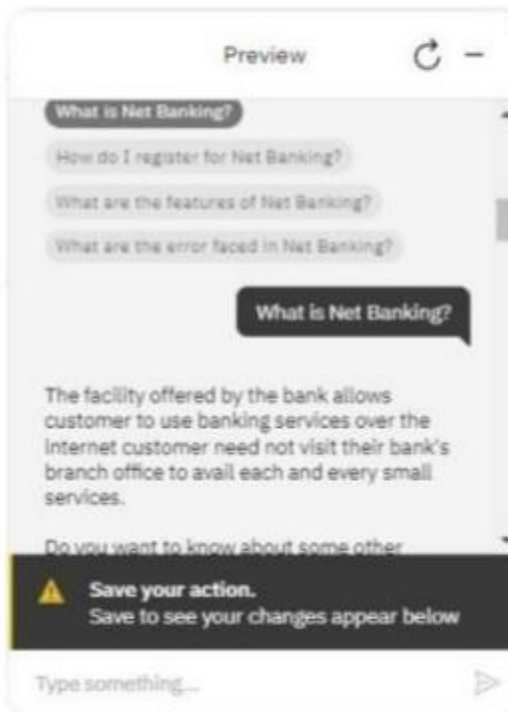
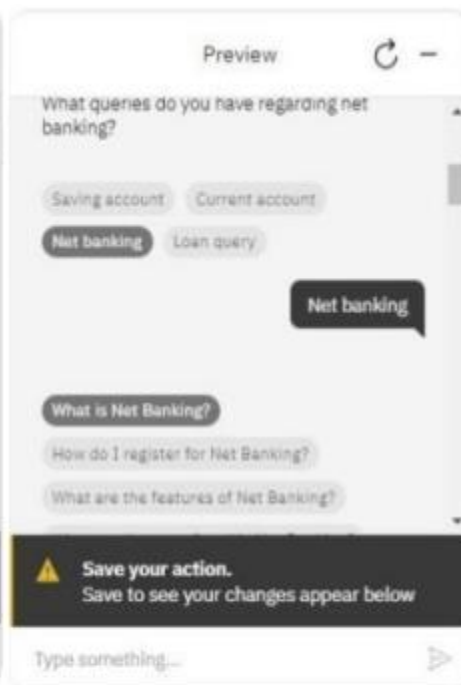
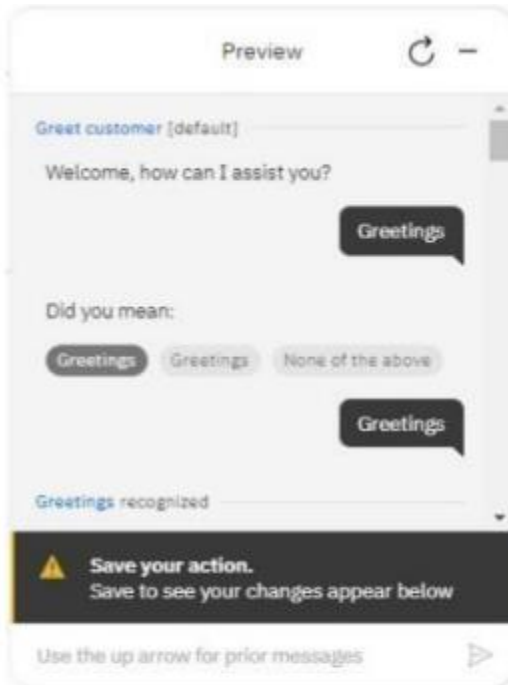
🕒 Action complete

Use the up arrow for prior messages

➤

Net Banking

When a user enters keywords related to online transactions or net banking, this action gets initiated. We provide solutions for the following.



Preview



How do I register for Net Banking?

What are the features of Net Banking?

What are the error faced in Net Banking?

How do I register for Net Banking?

Please download and fill up the Net Banking requisition form and submit it to your home branch

Do you want to know about some other services?



Save your action.

Save to see your changes appear below

Use the up arrow for prior messages



Preview



What are the features of Net Banking?

What are the error faced in Net Banking?

What are the features of Net Banking?

1. Check the account statement online
2. Open a fixed deposit account
3. Pay utility bills such as water bills and electricity bills
4. Make merchant payment
5. Transfer funds



Save your action.

Save to see your changes appear below

Type something...



Preview



Please contact the customer care Executives and approach the closest branches

Do you want to know about some other services?

Yes

No

No

🕒 Action complete

Greetings ended



Save your action.

Save to see your changes appear below

7.2 FEATURE 2

Built HTML Code

- We use HTML to create the front-end part of the web page. Here, we have created 1 HTML page-Chatbot.html
- Chatbot.html displays the home page which integrates with Watson Assistant.

```
Chat bot - Notepad
File Edit Format View Help
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title>Keep your money secure with our bank</title>
<link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">
<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkVYIK3UENzmM7KCKRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtV3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmY1"
crossorigin="anonymous"></script>
</head>
<style type="text/css">
.dropdown-content {
display: none;
position: absolute;
```



```
min-width: 150px;
box-shadow: 10px 8px 16px 0px rgba(0,0,0,0.2);
z-index: 1;
}
.dropdown-content a {
float: none;
color: black;
padding: 12px 16px;
text-decoration: none;
display: block;
text-align: left;
}
.dropdown-content a:hover {
background-color: #ddd;
color: black;
}
.dropdown:hover .dropdown-content {
display: block;
}
.content{
background-image:"ss.png" width="100%" height="500"
background-position: center;
background-repeat: no-repeat;
height: 85vh;
min-width: 100%;
background-size: cover;
}
```

<

Windows (CRLF)

Ln 53, Col 1

100%



Type here to search

ENG
IN3:52
11/26/

```
}  
.info{  
top: 40%;  
position: absolute;  
background-color: #ff9900;  
border: 3px solid white;  
border-radius: 100px;  
border-top-left-radius: 0px;  
}  
.quote{  
font-size: 24px;  
}  
@media screen and (max-width: 600px) {  
.info {  
width:90%;  
top: 52%;  
position: absolute;  
}  
.quote{  
font-size: 15px;  
}  
.content{  
background-image:"back.png" width="50%" height="300"  
background-position: center;  
background-repeat: no-repeat;  
background-size: cover;  
}  
<
```




```
<a href="#">Transactions</a>
<a href="#">Loans</a>
<a href="#">Deposit</a>
<a href="#">Cards</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Balance Request</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Balance Checking</a>
<a href="#">Mini Statement</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Service Request</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Update Profile</a>
<a href="#">Saving and Current Account</a>
<a href="#">Debit and Credit Card</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Make Payments</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Bill Payments</a>
<a href="#">Money Transfer</a>
<a href="#">Card Payment</a>
</div>
</div>
```

<

Windows (CRLF)

Ln 130, Col 1

100%

```
<a href="#">Money Transfer</a>
```

```
<a href="#">Card Payment</a>
```

```
</div>
```

```
</div>
```

```
<li class="nav-item p-2 ml-2 bg-light" style="border-radius: 30px">
```

```
<span class="text-dark typewrite">&nbsp;&nbsp;&nbsp;<font color:"red">AI Chat Bot will Help You  
&#128071;&nbsp;&nbsp;&nbsp;</span></li></font>
```

```
</ul>
```

```
</div>
```

```
</nav>
```

```
</div>
```

```
<body>
```

```

```

```
</img></body>
```

```
<div class="content container">
```

```
<div class="col-sm-6 info p-4 p-3">
```

```
<center><b class="text-light quote"> <head>Money is Everything it can buy anything </head></b></center>
```

```
<marquee behavior="slide" direction="up" scrollamount="1" class="mt-2">
```

```
<center>
```

```
<p><font size=5>Keep your money safe our bank</p>
```

```
</font></center>
```

```
</marquee>
```

```
</div>
```

```
</div>
```

```
<script>
```

```
<
```

Windows (CRLF)

Ln 155, Col 1

100%



Type here to search

ENG 3:54
IN 11/26


```
Chat bot - Notepad
File Edit Format View Help

<center><b class="text-light quote"> <head>Money is Everything it can buy anything </head></b></center>
<marquee behavior="slide" direction="up" scrollamount="1" class="mt-2">
<center>
<p><font size=5>Keep your money safe our bank</p>
</font></center>
</marquee>
</div>
</div>

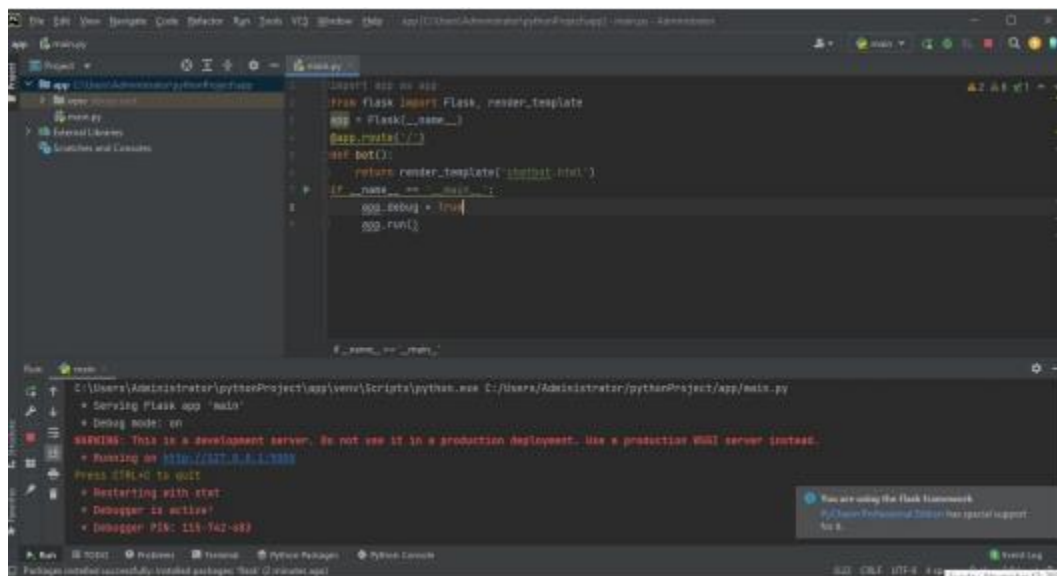
<script>
window.watsonAssistantChatOptions = {
integrationID: "508444e6-3d40-4b32-a4bc-75424ab2cd1c", // The ID of this
integration.
region: "au-syd", // The region your integration is hosted in.
serviceInstanceID: "6e1377cd-ed8b-4bd1-8137-5e10d7c41b74", // The ID of your
service instance.
onLoad: function(instance) { 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>
```

Run The Application

Run the application

- Navigate to the folder where your app.py resides.
- Now type the “python app.py” command.
- It will show the local host where your app is running on <http://127.0.0.1:5000/>
- Copy that localhost URL and open that URL in the browser. It does navigate me to where you can view your web page.

Then it will run on localhost:5000

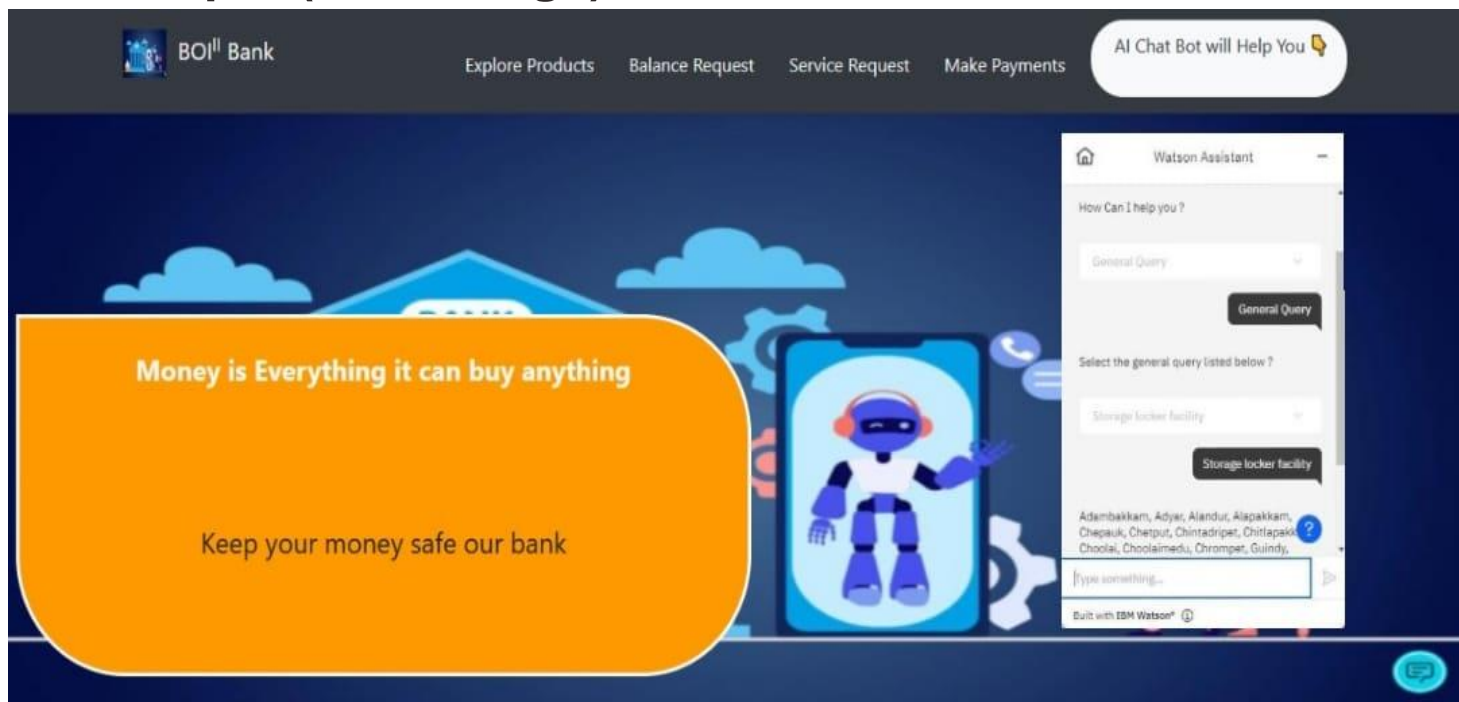


The image shows a VS Code editor with a Python Flask application. The file explorer on the left shows a project named 'app' with files 'main.py' and 'templates'. The main.py file contains the following code:



```
1 from flask import Flask, render_template
2 app = Flask(__name__)
3 @app.route("/")
4 def bot():
5     return render_template("chatbot.html")
6 if __name__ == "__main__":
7     app.run()
```

The terminal at the bottom shows the command 'python main.py' being executed. The output indicates that the Flask app is running on http://127.0.0.1:5000. A warning message states: 'WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.' The terminal also shows the debugger is active and the debugger PID is 115742-683.

Output (HTML Page):




Preview

Your query is related to which of the following Savings Account

Saving account



Saving account


What type of savings account do you want to create?

Regular saving account



Kids saving account

Zero balance saving account

Zero balance saving account

Use the up arrow for prior messages 

Preview

Great! Please take the following documents and head towards the nearest branch.

- 1.Aadhar Card
- 2.Pan Card
- 3.Passport size photos


Do you want to know about some other service?

Yes

No

Yes

Welcome!! how can I help you?
Your query is related to which of the following?

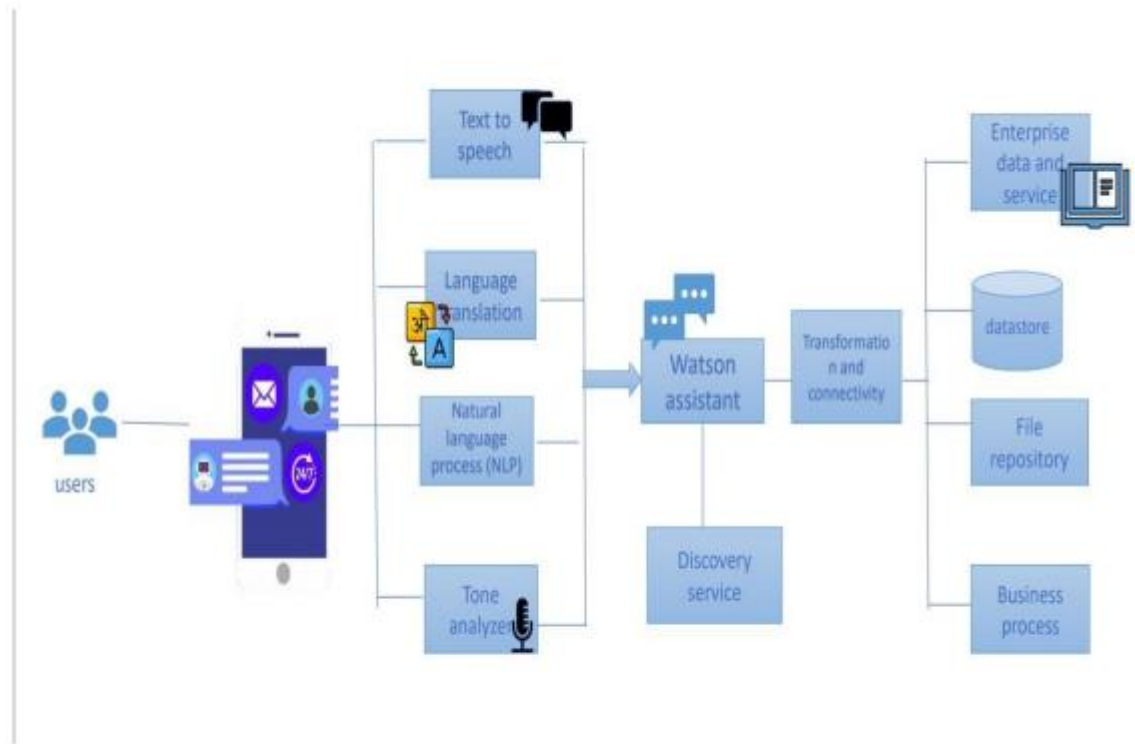
Type something... 

8. TESTING

8.1 TEST CASES

Consolidated view of user-bot interactions user enters the text and based on the keyword the comparison is made and the respective action is triggered.

Solution Architecture:



8.2 User Acceptance Testing

1. Purpose of Document

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

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

9.RESULTS

9.1 PERFORMANCE METRICS:

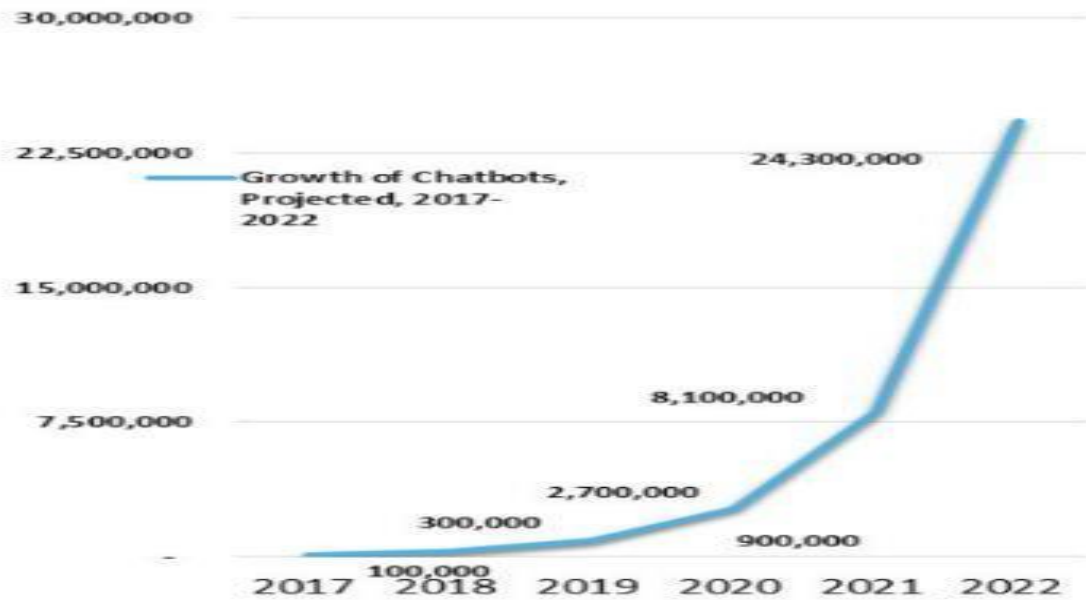


Fig 9.1 Projected Chatbot growth

In above graph, it is seen that during 2017-2022 the use of chatbots is way more popular in the industry. Organizations prefer chatbots due to the convenience that provides the customers with what it requires with ease and the ability to have less human workload and make the systems handle more and more work making it faster and better and more reliable

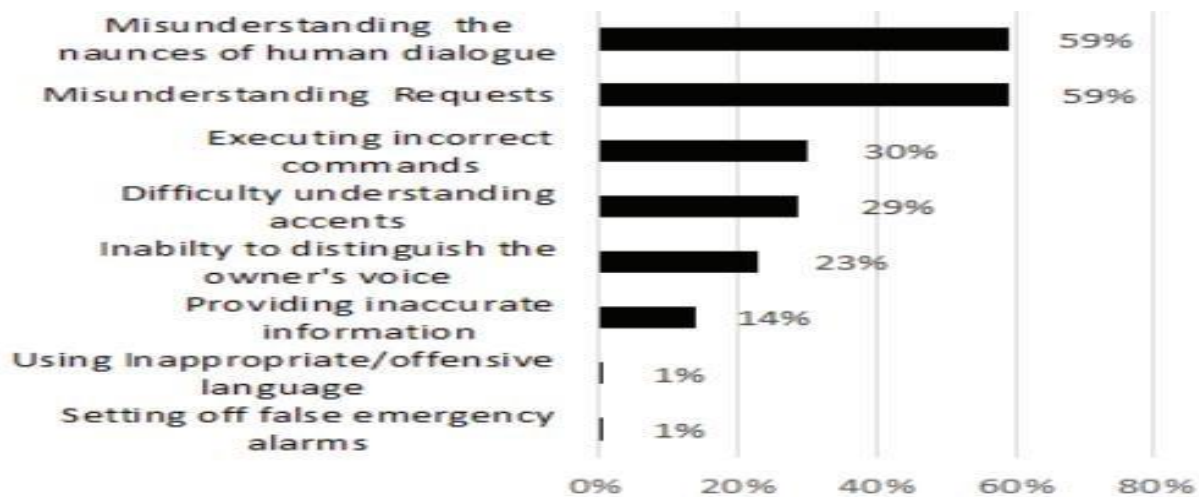


Fig 9.2 Errors organizations have encountered using chatbots

In Fig 9.2, it is seen that there is still a large scale of misunderstandings that occur in chatbots whether it be voice or text based and still require tons of additional information and requires further development and improvement to reduce these faults.

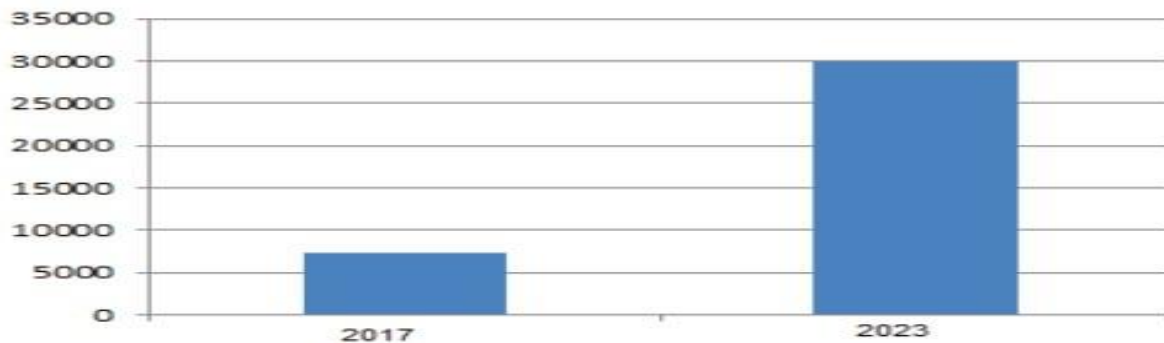


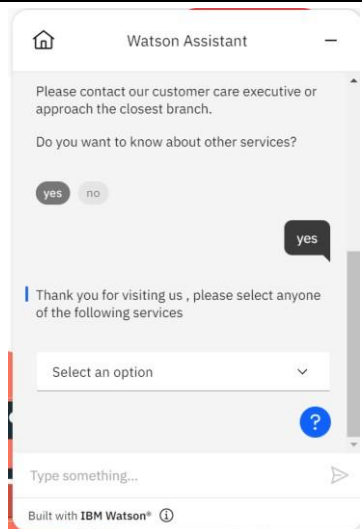
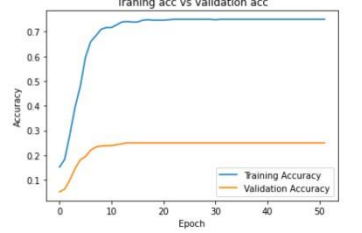
Fig 9.3. Growth on online banking (\$million) 2016-2023

In Fig 9.3 Online banking covers all sorts of transactions made online / internet for different purposes. To provide better customer services, it is the application of new technologies. The competition is largely driven by consumer satisfaction, higher interest rates, and technologically advanced design. High security vulnerability of data from consumers hinders development in the sector. Growth in mobile use, increased internet penetration among users, and increased development and growth of Asia-Pacific developing economies are some of the main factors that drive market growth.

Model Performance Testing:

The project team shall fill in the following information in the model performance testing template.

S. No.	Parameter	Values	Screenshot
1.	Model Summary	<p>The web application UI performs well in all types of browsers (such as chrome and edge.</p> <p>Customers' queries through the chatbot are handled with an accurate or the most relevant solution.</p>	

			
2.	Accuracy	<p>Training Accuracy - When the model application is tested with a training dataset, the training accuracy is calculated from 0.198 to 0.734. The overall model has a stable training accuracy of 0.734.</p> <p>Validation Accuracy - When the model application is tested with a testing dataset, the validation accuracy is calculated from 0.0562 to 0.2101. The overall model has a stable training accuracy of 0.2101.</p>	

10. ADVANTAGES

1. Availability

Chatbots are available 24×7 and can respond to your customers instantly. This means that whenever they message you for any reason, they'll be able to get a response immediately. As a result, they'll be satisfied with your brand and you, on the other hand, will be able to move them along your sales funnel.

2. More Engagement

Chatbots communicate with your website visitors and social media followers in real time. This is in stark contrast to other content of your brand that's usually consumed passively. Such engagement can keep people on your website for longer and help in driving sales and improve your SEO.

3. Data Collection

Chatbots can be a great way to collect your audience data. They can communicate with your audience and gather information such as their names, email addresses, and more. You can easily access these details by integrating the chatbot with your CRM. Additionally, you can ask customers about their preferences using the chatbots and accordingly customize your offerings to better suit their needs.

DISADVANTAGES

1.Data Security

When you collect your audience data, it's your responsibility to keep it secure. The data needs to be transmitted from the chatbot to your CRM in a secure manner. It must also be stored securely and only relevant data should be collected from your audience.

2.Inability to Understand Emotions

Chatbots are codes and hence, they find it difficult to ascertain the emotions of the user. As a result, they may not be able to understand if the user they are chatting with is happy, agitated, or sad. This might lead to the chatbot coming across as emotionally insensitive and it can harm your brand's reputation. To reduce the chances of such a situation, you should consider using chatbots that allow customer support agents to take over the conversation

11. CONCLUSION

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

12. FUTURE SCOPE

FORECASTS AND INSIGHTS

The share of banks that use AI solutions and chatbots in particular is constantly rising. As another factor, the use of smartphones and other smart devices is also a rapidly growing trend as a further development, chatbots will predict human behavior more accurately and use this information for self-learning. Security concerns regarding the use of chatbots in the banking industry will persist in the future. The need for wellprotected and reliable AI solutions will become a major driving force of digital technology development. The reason is simple: people will agree to share their private information and access their credit cards only with the most protected and trustworthy software solutions, including chatbots

APPENDIX

Source Code:

Chatbot.html:

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<title>Keep your money secure with our bank</title>
<link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">
<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-
KJ3o2DKtIkVYIK3UENzmM7KCKRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYl"
crossorigin="anonymous"></script>
</head>
<style type="text/css">
.dropdown-content {
display: none;
position: absolute;
```



Type here to search



```
min-width: 150px;
box-shadow: 10px 8px 16px 0px rgba(0,0,0,0.2);
z-index: 1;
}
.dropdown-content a {
float: none;
color: black;
padding: 12px 16px;
text-decoration: none;
display: block;
text-align: left;
}
.dropdown-content a:hover {
background-color: #ddd;
color: black;
}
.dropdown:hover .dropdown-content {
display: block;
}
.content{
background-image:"ss.png" width="100%" height="500"
background-position: center;
background-repeat: no-repeat;
height: 85vh;
min-width: 100%;
background-size: cover;
}
```

```
}  
.info{  
top: 40%;  
position: absolute;  
background-color: #ff9900;  
border: 3px solid white;  
border-radius: 100px;  
border-top-left-radius: 0px;  
}  
.quote{  
font-size: 24px;  
}  
@media screen and (max-width: 600px) {  
.info {  
width:90%;  
top: 52%;  
position: absolute;  
}  
.quote{  
font-size: 15px;  
}  
.content{  
background-image:"back.png" width="50%" height="300"  
background-position: center;  
background-repeat: no-repeat;  
background-size: cover;  
}  
<
```



```
}  
.dropdown-content {  
display: none;  
position: absolute;  
min-width: 200px;  
box-shadow: 10px 8px 16px 0px rgba(0,0,0,0.2);  
z-index: 1;  
}}  
</style>  
<body>  
<!--Navbar-->  
<div class="bg-dark text-light">  
<nav class="container navbar navbar-expand-lg navbar-dark bg-dark p-2">  
<p class="navbar-brand mt-2">  
&nbsp;   BOI<sup>II</sup> Bank </p>  
<button class="navbar-toggler" type="button" data-toggle="collapse" data?target="#navbarSupportedConte  
<span class="navbar-toggler-icon"></span>  
</button>  
<div class="collapse navbar-collapse"id="navbarSupportedContent">  
<ul class="navbar-nav ml-auto">  
<div class="dropdown">  
<li class="nav-item p-3 mt-2 dropbtn">Explore Products</li>  
<div class="dropdown-content bg-light text-dark">  
<a href="#">Accounts</a>  
<a href="#">Transactions</a>  
<a href="#">Loans</a>
```

```
<a href="#">Transactions</a>
<a href="#">Loans</a>
<a href="#">Deposit</a>
<a href="#">Cards</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Balance Request</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Balance Checking</a>
<a href="#">Mini Statement</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Service Request</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Update Profile</a>
<a href="#">Saving and Current Account</a>
<a href="#">Debit and Credit Card</a>
</div>
</div>
<div class="dropdown">
<li class="nav-item p-3 mt-2 dropbtn">Make Payments</li>
<div class="dropdown-content bg-light text-dark">
<a href="#">Bill Payments</a>
<a href="#">Money Transfer</a>
<a href="#">Card Payment</a>
```

```
<a href="#">Money Transfer</a>
```

```
<a href="#">Card Payment</a>
```

```
</div>
```

```
</div>
```

```
<li class="nav-item p-2 ml-2 bg-light" style="border-radius: 30px">
```

```
<span class="text-dark typewrite">&nbsp;&nbsp;&nbsp;<font color="red">AI Chat Bot will Help You  
&#128071;&nbsp;&nbsp;&nbsp;</span></li></font>
```

```
</ul>
```

```
</div>
```

```
</nav>
```

```
</div>
```

```
<body>
```

```

```

```
</img></body>
```

```
<div class="content container">
```

```
<div class="col-sm-6 info p-4 p-3">
```

```
<center><b class="text-light quote"> <head>Money is Everything it can buy anything </head></b></center>
```

```
<marquee behavior="slide" direction="up" scrollamount="1" class="mt-2">
```

```
<center>
```

```
<p><font size=5>Keep your money safe our bank</p>
```

```
</font></center>
```

```
</marquee>
```

```
</div>
```

```
</div>
```

```
<script>
```

```
<
```

Windows (CRLF)

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Type here to search



Chat bot - Notepad

File Edit Format View Help

```
<center><b class="text-light quote"> <head>Money is Everything it can buy anything </head></b></center>
<marquee behavior="slide" direction="up" scrollamount="1" class="mt-2">
<center>
<p><font size=5>Keep your money safe our bank</p>
</font></center>
</marquee>
</div>
</div>
```

```
<script>
window.watsonAssistantChatOptions = {
integrationID: "508444e6-3d40-4b32-a4bc-75424ab2cd1c", // The ID of this
integration.
region: "au-syd", // The region your integration is hosted in.
serviceInstanceID: "6e1377cd-ed8b-4bd1-8137-5e10d7c41b74", // 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>
```



App.py

```
import app as app

from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')

def bot():

    return render_template('chatbot.html')

if __name__ == '__main__':

    app.debug = True

    app.run()
```

Appendix

GitHub & Project Demo Link

GITHUB LINK: [LINK](#)

PROJECT DEMO LINK: [Link](#)