

# AI BASED DISCOURSE FOR BANKING INDUSTRY

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# 1. INTRODUCTION

## 1.1 PROJECT OVERVIEW

Industries are forced to evolve and update their practices due to technological advances and the contemporary market. The banking sector is one of the most developed sectors and is always looking for the latest technological solutions that improve its efficiency. Net banking websites are complex and involve navigating through a lot of pages to find the information you need. Bank staff undergoes a lot of stressful situations when communicating with clients directly. Such situations can be avoided gracefully by using chatbots. Only 32% of companies in the finance industry currently use AI chatbots, and 37% are planning to start using them within 18 months said a report from Salesforce. This results in a potential growth rate of 118% which indicates the demand in the industry. A smart chatbot takes a query from the user in natural language and gives the appropriate response for the same. This paper aims to discuss the relevance of chatbots in the banking sector and explore how chatbots can be implemented using natural language processing techniques that can be used in the banking industry. Artificial Intelligence in Banking accelerates digitization in end-to-end banking and finance processes. By implementing the power of data analytics, intelligent ML algorithms, and secure in-app integrations, AI applications optimize service quality and help companies identify and combat false transactions. Nearly 40% to 50% of financial and banking service providers are using AI in their processes to harness the power of next-generation AI capabilities. The companies believe that AI is the future of banking sector which can perform a range of banking operations in faster, easier, and more secure ways. [Machine Learning](#), predictive analytics, and voice recognition tools are all increasing the value of digital banking services. [AI Chatbots](#), facial recognition banking apps, and fraud detection systems and applications are all a few best examples of AI in banking and finance industry.

## 1.2 PURPOSE

Abstract Artificial intelligence (AI) is now widely acknowledged as one of the most important digital transformation enablers across a significant number of industries. Artificial intelligence (AI) has the potential to facilitate enterprises. become more imaginative, versatile, and adaptable than they have ever been. AI is already being applied to enhance productivity and competitiveness while also driving digital transformation in a range of organizations. AI is supporting banks in upgrading their operations across the board, from accounting to sales to contracts and cybersecurity.

## 2. LITERATURE SURVEY

**Title:** Intelligent chatbot for banking system

**Authors:** Mr.Anikat dole, Mr.Hrushikesh sansare, Mrs.Sprooha Athalye **YEAR:** 2015

An intelligent chat bot will be used to give information or answers to any question asked by user related to bank. Our Intelligent system will first take input from bank customer. This input will be taken as voice or written format. According to input, intelligent system will processes the query and give response to user. An artificial intelligence is most important and helpful part of our project. This system will be available on web. Our system will represent the design and development of an intelligent chat bot. It will present a technology demonstrator to verify a proposed framework required to support such a bot (a web service). While a black box approach is used, by controlling the communication structure, to and from the web-service, the web-service allows all types of clients to communicate to the server from any platform. The service provided will be accessible through a generated interface which allows for seamless XML processing; whereby the extensibility improves the lifespan of such a service.

**TITLE:** Ai based chatbot for human assistance

**AUTHOR:** Sanchit Singhal, Vatsal Garg, Harsh khatter. **YEAR:**2020

Chatbot is an implementation of Artificial Intelligence technology which is used to interact with the human beings and make them feel like they are talking to the real person and the chatbot helps them to solve their queries. A chatbot can provide 24\*7 customer support so that the customer may have

the good service experience by any organization. The user is providing the input to the chatbot first and then the same input will process further, and this input can be in the form of text or voice. This response can be in any format like text format or a voice output. This chatbot is built using Dialogue Flow (Google-owned) and it can be accessible through mobile phones, laptops, and portable devices. Chatbots such as Facebook bot, WeChat bot, Hike bot called Natasha, etc. are available in the market and will respond based on their local databases. This chatbot uses unification of emerging technologies like Machine learning and Artificial Intelligence. The motive of this Chatbot system is to support and scale businesses and maintain relations with customers. The main aim of this chatbot is to enhance the customer support experience so that the customer can get support at any time, at any place and on any device in a very less time.

**TITLE:** Artificial intelligence based chatbot

**AUTHOR:** Tushar Gaikwad **YEAR:** 2018

A Chat-bot is computer program which conduct a conversation via auditory or textual method. A Chatbot are software agent that interacts with the user for conversation. Chatbot typically serve text based user interface allow input from user and receive text as well as auditory from output. Information of chatbot are stored in database which is consist database who provide by owner of shop and requirement of user. This system will be provided answers to the query of the user very effectively. User just must put their requirement to the chatbot which is used for conversation. The system will use the AI algorithm to give appropriate answer to the user. If the answer is invalid then system declares answer is invalid. This invalid answer can be deleting or modified to by admin. One of the most popular engines are used for regular expression base natural language processing engine called verbot. This makes it easy designer chat-bot & automates conversation with user.

**TITLE:** Approaches towards building a banking assistant system.

**AUTHOR:** M.S.Shetty, Rajni pamnani. **YEAR:** 2017

Banking process has been very complicated since years. People often want to enquire about bank's policies on the bank counter and since the policies are sometimes confusing, it takes time for them to understand the policy and thus, the process. This paper presents two approaches one using Natural Language Processing techniques and other using AIML, a popular language for building chatbots for building banking assistant which can solve people's queries and also carry out certain banking tasks, thus avoiding loss of efficiency and loss of precious time of the people. The paper is aimed at

providing interface to the users which enables communication for solving their queries and completing their tasks, thus saving their time and reducing any possible confusion

**TITLE:** Banking with a chatbot.

**AUTHOR:** Monica anetta, Ibolya vizali. YEAR: 2021

The implementation of chatbot technology is evolving rapidly in the banking industry. yet customer acceptance is behind. The aim of the present paper is to identify factor that influence customer perceived privacy risk and awareness of the service. The sample contains 287 respondents, out of whom 24% have previously used a chatbot. Awareness of the service has an effect on perceived ease of use, perceived privacy risk and it indirectly affects usage intention of banking chatbots through perceived usefulness and perceived compatibility has an effect on both perceived ease of use and perceived usefulness. perceived ease of use and perceived privacy risk show no effect on usage intention.

**TITLE:** Conversation to automation in banking through chatbot.

**AUTHOR:** Shasha Fathima suhel, Vinod kumar sukhla, Sonali vyas. YEAR: 2020

Artificial Machine Intelligence is a very complicated topic. It involves creating machines that are capable of simulating knowledge. This paper examines some of the latest AI patterns and activities and then provides alternative theory of change in some of the popular and widely accepted postulates of today. Based on basic A.I. (Artificial Intelligence) structuring and working for this, System-Chatbots are made (or chatter bots). The paper shows that A.I is ever improving. As of now there isn't enough information on A.I. however this paper provides a new concept which addresses machine intelligence and sheds light on the potential of intelligent systems. The rise of chatbots in the finance sector is the latest disruptive force that has changed the way customers interact. In the banking industry, the introduction of Artificial Intelligence has driven chatbots and changed the face of the interaction between bank and customers. The banking sector plays an important role in development into any country.

**TITLE:** Modern development trends of chatbots using Artificial intelligence.

**AUTHOR:** Julija skrebeca, Paula kalniete. YEAR:2021

Artificial Intelligence-powered chatbots can work as intelligent teaching systems, for providing a personalized way of learning for students. Chatbot reviews student's responses and his learning progress. One of the most convenient features of chatbots is the opportunity to send lecture materials

in the form of messages to students as if it is just a chat with a friend. Apart from personalized chatbot usage in the studying process, it can be used to streamline business processes, e.g., such as sales.

## **2.1 EXISTING PROBLEM**

A chatbot enables a user to simply ask questions in the same manner that they would respond to humans. The most well-known chatbots currently are voice chatbots: Siri and Alexa. A bot is trained on and according to the training, based on some rules on which it is trained, it answers questions. It is called a rule-based approach. The language by which these bots can be created is Artificial Intelligence Markup Language (AIML). It is a language based on XML which allows the developer to write the rules which the bot will follow. These existing systems require much technology to integrate and require a lot of data to be fed for training which makes the process slower.

## **2.2 REFERENCES**

1. <https://www.financialdirector.co.uk/2019/10/03/ai-for-financial-directors-and-cfos/>
2. Aazhvaar, V. (2019). ARTIFICIAL INTELLIGENCE IN INDIAN BANKING SECTOR: CHALLENGES AND OPPORTUNITIES. *International Journal of Advanced Research*, April 7(5), 1581-1587.
3. Alam, M., & Khokhar, R. (2006). Impact of Internet on Customer Loyalty in Swedish Banks. *J. Econ. Psychol.* Apr 7;16:311-29.
4. Ardito, L., Petruzzelli, A. M., Panniello, U., & Achille, C. (2019). Towards Industry 4.0. *Business Process Management Journal*, Bradford Vol. 25, Iss. 2, pp: 323-346.
5. Awad, R. (2011). Considerations on Cloud Computing for CPAs. *The CPA Journal*, New York Vol. 81, Iss. 9, Sep pp: 11-12.
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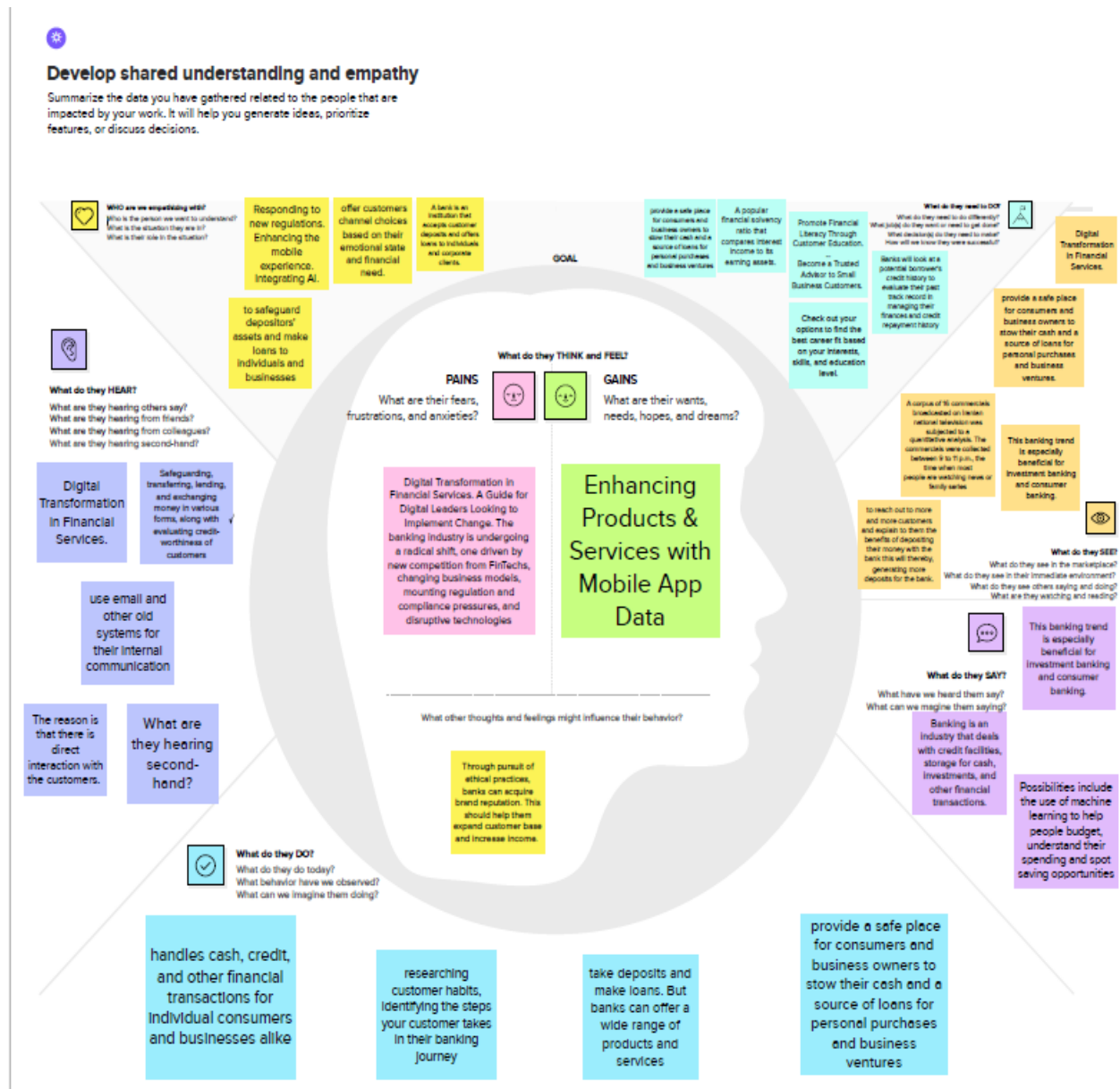
## 2.3 PROBLEM STATEMENT DEFINITION

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. To overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. It is built to be the overall virtual assistant that can facilitate customers to ask banking- related questions without visiting the bank or calling up customer service centres as well as providing them with relevant suggestions.

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.


### 3. IDEATION & PROPOSED SOLUTION

### 3.1 Empathy Map Canvas



## 3.2 Ideation & Brainstorming

Temp



### 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

How might we [your problem statement]?



**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.

8

2

## Brainstorm

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

10 minutes

### TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

### GOWTHAM

so a training or trail session will give more clarity

They should tirelessly work round the clock and are available 24\*7\*365

Resolve Urgent Issues on Priority

Should be able to recognise a decent amount of accents and voices

It should be able to understand the goals of the customer

Can be made available in other platforms too so that customers would be able to connect across other platforms they use

### PRADEEP

more than one chat box should be available at bank so that customer can save their time

It can have versatile features

It provides On-time Notifications and Reminders

It can be multilingual

The chatbot developed should be well informed about all the rules and inform the customers during important procedures

Immediately address the issue

### HARIHARAN

should be easy to use even for the customers that dont have prior experience with chatbox

Quicker help across the platform

Chatbots Will be More Human-like

There should be a backup for the chat box in case it hangs up or get crashed

It provides Complete Account Details to the clients

Ability to provide unbiased finance or banking related advice when requested

### AKASH

chatbots can be trained to answer FAQ's

For technical terms, a side panel can act as dictionary of sorts.

Fast and clear Responses

Easily Understandable replies

Quicker access

Can be safer to use

3

## Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

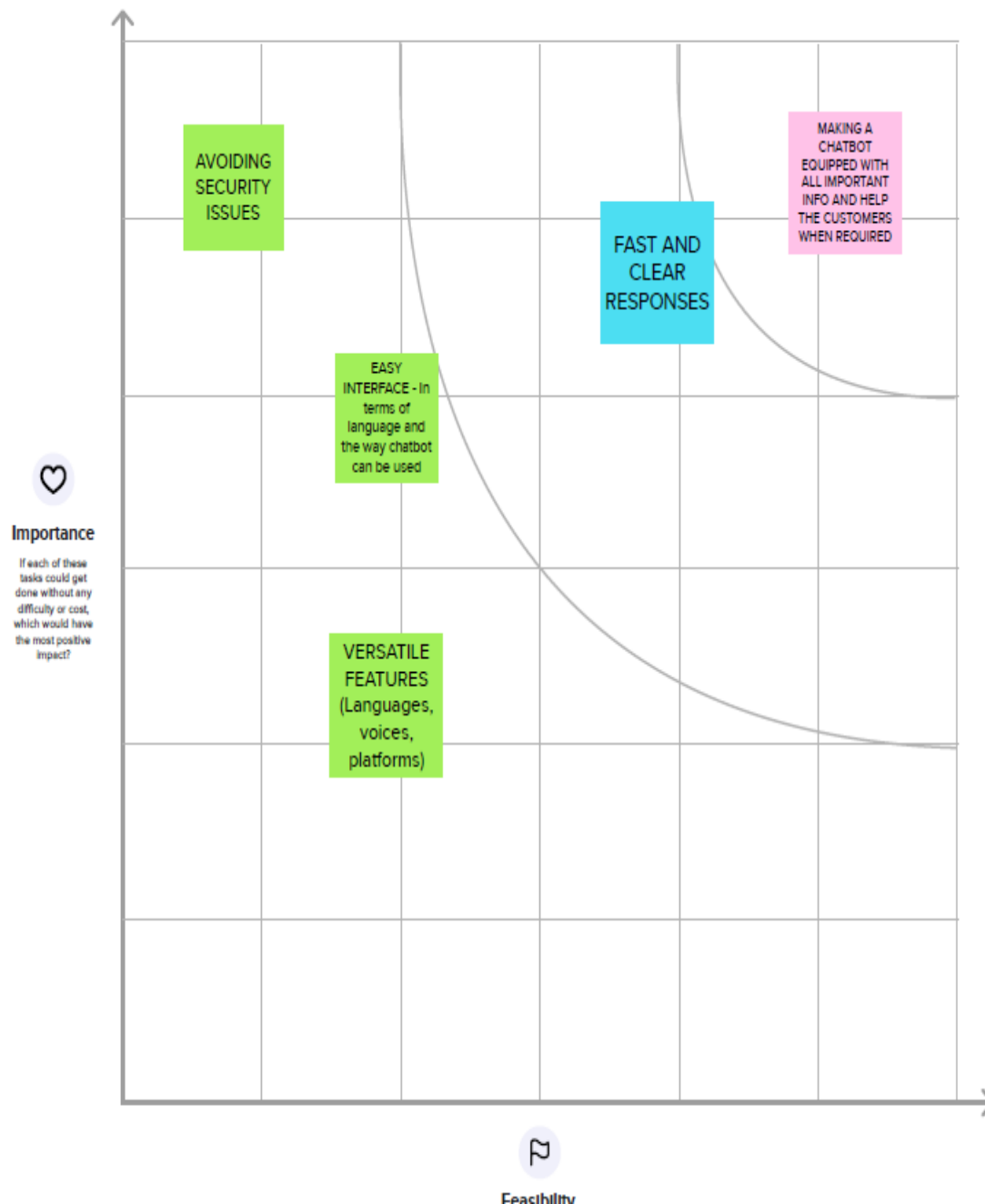


4

## Prioritize

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

🕒 20 minutes



### 3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
•	Problem Statement (Problem to be solved)	Digital banking sector can be deployed to accomplish several tasks and improve the customer experience.
•	Idea / Solution description	1. Rising customer expectations 2. Disintermediation 3.Increasingly human like formats.
•	Novelty / Uniqueness	Adopt a holistic,data driven approach to understanding how customers engage with the bank.
•	Social Impact / Customer Satisfaction	It set a high bar for speed safety and amicable service supported by frictionless end to end customer journeys.
•	Business Model (Revenue Model)	To estimate that these integrated networks will generate approximately 60 trillion dollars in global annual revenues by 2025.
•	Scalability of the Solution	1. Increased access and scale 2.Higher efficiencies 3.New value propositions 4.More convenience

### 3.4 Problem Solution fit

#### Problem-Solution Fit

Define CS, fit into CL	<b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span> <ul style="list-style-type: none"> <li>Wishes to create bank Account</li> <li>Existing customer who would like to know more bank features like Credit/Debit Card, loans, Fund transfer and bill payment.</li> </ul>	<b>6. CUSTOMER LIMITATIONS</b> <span>CL</span> <small>EG. BUDGET, DEVICES</small> <ul style="list-style-type: none"> <li>Network Connection required</li> <li>Safety and privacy concerns</li> <li>Cannot be used offline</li> <li>Technical Issues</li> </ul>	<b>5. AVAILABLE SOLUTIONS</b> <span>AS</span> <small>PLUSES &amp; MINUSES</small> <ul style="list-style-type: none"> <li>Internet Banking</li> <li>Phone Banking</li> <li>24/7 Support</li> <li>Resetting</li> </ul>	Explore AS, differentiate
	<b>2. PROBLEMS / PAINS + ITS FREQUENCY</b> <span>PR</span> <ul style="list-style-type: none"> <li>Bot to guide to create bank account</li> <li>Bot to answer queries.</li> <li>Customer gets struck during transaction: Bot addresses the reason and guide them with solution</li> <li>User don't have knowledge of credit card policy: Bot guides them with required plans and policies</li> </ul>	<b>9. PROBLEM ROOT / CAUSE</b> <span>RC</span> <ul style="list-style-type: none"> <li>Banking can be a complicated task which needs user guidance and support that may led to need of huge <u>man power</u> and long processing time.</li> <li>Lack of communication between customers and bank managers</li> </ul>	<b>7. BEHAVIOR + ITS INTENSITY</b> <span>BE</span> <ul style="list-style-type: none"> <li>Verifying recent transactions</li> <li>Checking Bank balances</li> <li>Reporting fraud</li> <li>Payment Updates</li> <li>Chatbot works effectively in all scenarios</li> </ul>	
Focus on PR, tap into BE, understand RC	<b>3. TRIGGERS TO ACT</b> <span>TR</span> <ul style="list-style-type: none"> <li>Easy Notifications</li> <li>24x7 assistance</li> <li>Easy User Interface</li> </ul>	<b>10. YOUR SOLUTION</b> <span>SL</span> <p>Provide Customer Support through AI based Chatbot which handles customer queries and supports 24 x 7. Which basically improves customer experiences and contribute to direct revenue.</p>	<b>8. CHANNELS of BEHAVIOR</b> <p>ONLINE</p> <p>Provide complete user support with good user interface experience and response to all queries.</p>	Identify strong TR & EM
	<b>4. EMOTIONS</b> <small>BEFORE / AFTER</small> <ul style="list-style-type: none"> <li>Before: Frustrated, Confused</li> <li>After: <u>Flexible</u>, at ease</li> </ul> <span>EM</span>		<p>OFFLINE</p> <p>Chatbot cannot be accessed offline.</p> <span>CH</span>	



## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement:

Visual studio code

IBM Watson studio

Flask

### 4.2 Non-Functional requirements:

Scalability

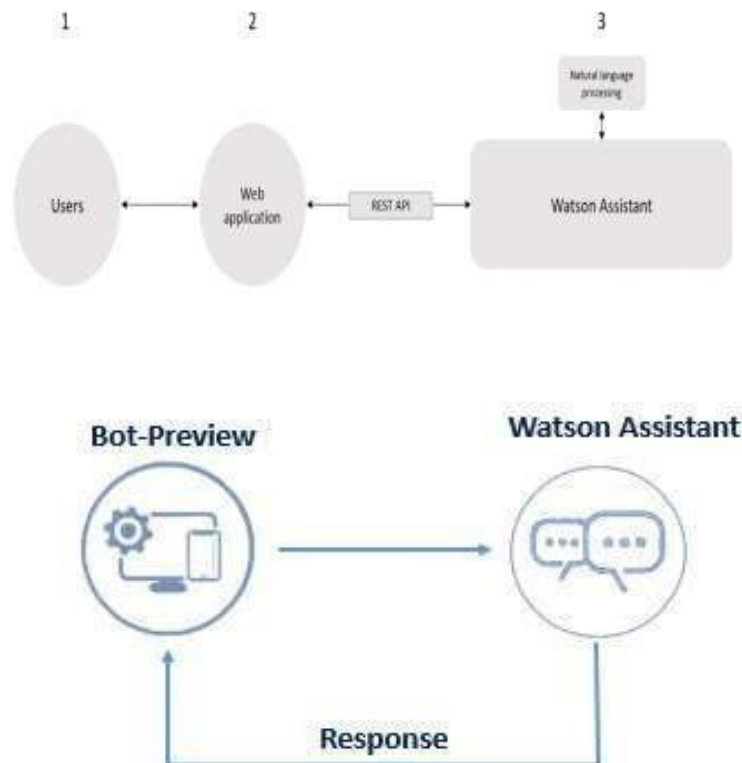
Availability

Compatibility

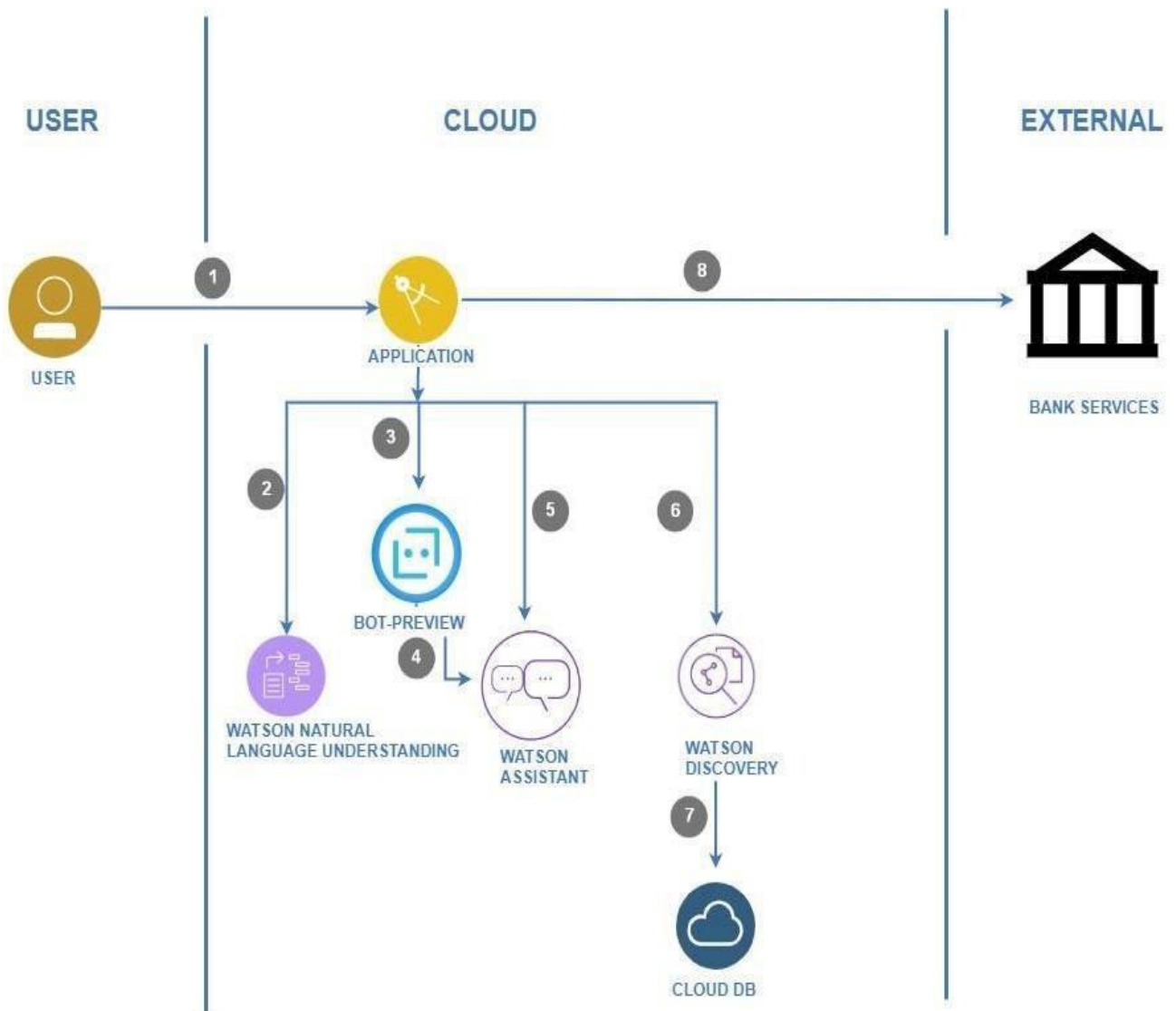
Reliability

## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams



## 5.2 Solution & Technical Architecture



## 5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobil or web user)	Current Account related actions	USN-12	As a user, I want choose the Type of Company to know the information on documents to be submitted for creating current account	I can access my account / dashboard	High	Sprint-1
		USN-13	As a user, I want to receive details about the actions taken on my account.	I can receive information	High	Sprint-1
		USN-14	As a user, I want to get procedure and know about maintaining the account	I can get procedure and help.	Low	Sprint-2
	Net Banking related actions	USN-15	As a user, I want to know about maintaining the net banking account and its facilities	I can clear my queries regarding netbanking.	Medium	Sprint-3
		USN-16	As a user, I want to know about creating an account.	I can create an account for netbanking.	High	Sprint-3
		USN-17	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	I can clear my queries regarding netbanking.	Low	Sprint 3
		USN-18	As a user, I want to select types of fund transfers to get details regarding different services available in net banking	I can select types of fund transfers to get details regarding different services available in net banking	Low	Sprint 3

Administrator	Chatbot related actions	USN-19	As an admin, I want to change responses to queries and modify them.	I can change responses to queries and modify them.	Low	Sprint 1
		USN-20	As an admin, I want to modify the UI and other options based on the feedback received from the user.	I can modify the UI and other options based on the feedback received from the user.	High	Sprint 1

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Building of Assistant	USN-1	Creation of Banking Chatbot or Assistant using IBM Watson Assistant/ As a user, I can see a Banking Assistant.	12	High	Gowtham, Pradeep
Sprint-1		USN-2	Understanding Customer's Banking Related Queries and skills/ As a user, I can see a Chatbot with Banking skills.	8	Moderate	Gowtham

Sprint-2	Modelling of Assistant	USN-3	Building action and Adding responses to Account Creation/As a user, I can see a Chatbot which helps to create an account	5	High	Hariharan, Akash
Sprint-2		USN-4	Building action and Adding responses to Banking related queries/As a user, I can see a Chatbot which helps to solve the banking queries	5	High	Pradeep, Hariharan
Sprint-2		USN-5	Building action and Adding responses to Net Banking/As a user, I can see a Chatbot which helps to access Net Banking	5	High	Gowtham
Sprint - 2	Chatbot Skills Creation	USN-6	As a user, I will see the Chatbot having banking-related skills.	5	High	Pradeep
Sprint - 3	Creating Saving Account Action	USN-7	As a user, I can converse with the chatbot regarding saving account-related queries.	6	High	Akash
Sprint - 3	Creating Loan Account Action	USN-9	As a user, I can converse with the chatbot regarding loan account-related queries.	8	Moderate	Gowtham
Sprint - 3	Testing & Deployment Phase-I	USN-10	Testing the chatbot performance with the trained banking functionalities or conversations/As a user, I can know the chatbots performance level	15	High	Pradeep, Gowtham, Hariharan, Akash

Sprint -4	Creating GeneralQuery Action	USN-11	As a user, I can converse with the chatbot regarding general queries.	7	Moderate	Gowtham, Hariharan
Sprint -4	Creating Net BankingAction	USN-12	As a user, I can converse with the chatbot regarding net banking-related queries.	5	Low	Akash
Sprint -4	Creating Assistant &Integrate With Flask Web Page (BuildPython Code)	USN-13	As a user, I can see a flask web page for bank.	4	High	Gowtham
Sprint -4	Build HTML Code	USN-14	As a user, I can web pages integrated with a chatbot.	3	Low	Pradeep, Hariharan
Sprint -4	Run The Application	USN-15	As a user, I can communicate with the chatbot 24*7.	5	Moderate	Gowtham, Pradeep, Akash
Sprint -4	Deployment Phase-II& Model Improvement	USN-16	Deployment of AI based chatbot for banking Industry or Running the Chatbot service/As a user, I can see and use a 24*7 banking chatbot. Improving the model efficiency whenever needed/As a user, I can se	12		Hariharan, Gowtham
Sprint -4		USN-17	Improving the model efficiency whenever needed/As a user, I can see new updated chatbot in Future days.	5		Akash, Pradeep

## 6.2 Sprint Delivery Schedule

Sprint	Total Story Poins	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

## 7. CODING & SOLUTIONING

## 7.1 Feature 1

Skills created:

IBM Watson Assistant

Life

Upgrade

Banking Bot

Learning center

Actions

Actions

Created by you

Set by assistant

Variables

Created by you

Set by assistant

Set by integration

Saved responses

Search

Filter

New action

Name	Last edited	Examples Count	Status
End	4 days ago	1	✓
End Greeting	4 days ago	3	✓
Current	4 days ago	2	✓
Query	4 days ago	1	✓
Loan	4 days ago	1	✓
Greeting	5 days ago	4	✓
Netbanking	4 days ago	1	✓
savings	5 days ago	1	✓
Index	4 days ago	1	✓

Items per page: 50

Showing 1–9 of 9 actions

1 of 1 pages

## Greetings action

The screenshot shows the IBM Watson Assistant interface for the 'Greetings' action. The top navigation bar includes 'IBM Watson Assistant Lite', 'Upgrade', 'Banking Bot', and 'Learning center'. The left sidebar shows the 'Greetings' action selected. The main area is divided into two panels. The left panel, titled 'Conversation steps', shows a single step with the text 'Good to see you' and a 'Go to action: Index' button. The right panel, titled 'Customer starts with:', provides instructions on how to enter phrases that a customer might use to start the conversation. It includes a text input field labeled 'Enter a phrase' and a list of example phrases: 'Hey', 'Hi', 'Hello', and 'Greeting'. A 'Total: 4' indicator is shown next to the input field. A 'Preview' button is located at the bottom right of the interface.

## 7.2 Feature 2

### 1.Savings action

The screenshot shows the IBM Watson Assistant interface for the 'savings' action. The top navigation bar includes 'IBM Watson Assistant Lite', 'Upgrade', 'Banking Bot', and 'Learning center'. The left sidebar shows the 'savings' action selected. The main area is divided into two panels. The left panel, titled 'Conversation steps', shows a multi-step conversation flow. Step 1 asks 'Which type of savings account do you want to create?' and lists options: 'Kids savings ...', 'Regular savin...', and '+1'. Step 2 shows a 'Regular savings account' selected, followed by a 'Great! Please take the following documents and head towards the nearest branch' message and a 'Tr Free text' input field. Step 3 shows a 'Kids savings account' selected, followed by an 'Awesome! Please take the following documents and head to nearest branch' message and a 'Tr Free text' input field. The right panel, titled 'Customer starts with:', provides instructions on how to enter phrases that a customer might use to start the conversation. It includes a text input field labeled 'Enter a phrase' and a list of example phrases: 'savings'. A 'Total: 1' indicator is shown next to the input field. A 'Preview' button is located at the bottom right of the interface.



## 2.Current account action

IBM Watson Assistant Life Upgrade Banking Bot

Learning center

Current

Customer starts with:  
Current

Conversation steps

1

What's your company type?

Partnership Proprietorship

Continue to next step

1

is Proprietorship

Please take the following documents and approach the closest branch

Tr Free text

Go to action: End

1

is Partnership

Please take the following documents and approach the nearest bank

Tr Free text

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action Total: 2

Enter a phrase

Current account

Current

Preview

## 3.Loan action

IBM Watson Assistant Life Upgrade Banking Bot

Learning center

Loan

Customer starts with:  
Loan

Conversation steps

1

What type of loan are you looking for?

Student loan Gold loan + 3

Continue to next step

1

is House loan

To be eligible for a house loan please contact our bank service providers with all existing loan details

Tr Free text

Go to action: End

1

is Gold loan

You can avail a gold loan easily from a bank either through online or offline. It requires document...

Tr Free text

Go to action: End

1

is Topup loan

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action Total: 1

Enter a phrase

Loan

Preview

## 4.General query action

The screenshot shows the IBM Watson Assistant interface for the 'General query' action. The top navigation bar includes 'IBM Watson Assistant', 'Life', 'Upgrade', 'Banking Bot', and 'Learning center'. The main interface is divided into two panels. The left panel, titled 'Query', contains a 'Customer starts with:' dropdown menu set to 'Query'. Below this is a 'Conversation steps' section with four steps: 1. 'List of branches' (with a '+ 4' button), 2. 'Bank working days', 3. 'List of branches' (with a '+ 2' button), and 4. 'Storage locker facility'. Each step includes a description and a 'Go to action: End' button. The right panel, titled 'Customer starts with:', contains a text area for entering phrases and a 'Query' input field. A 'Preview' button is located at the bottom right.

## 5.Netbanking action

The screenshot shows the IBM Watson Assistant interface for the 'Netbanking' action. The top navigation bar includes 'IBM Watson Assistant', 'Life', 'Upgrade', 'Banking Bot', and 'Learning center'. The main interface is divided into two panels. The left panel, titled 'Netbanking', contains a 'Customer starts with:' dropdown menu set to 'Netbanking'. Below this is a 'Conversation steps' section with four steps: 1. 'How do i regi...' (with a '+ 2' button), 2. 'What is net banking?', 3. 'How do i register for netbanking?', and 4. 'What are the features of netbanking'. Each step includes a description and a 'Go to action: End' button. The right panel, titled 'Customer starts with:', contains a text area for entering phrases and a 'Netbanking' input field. A 'Preview' button is located at the bottom right.

## 6.End action

## 8. TESTING

### 8.1 Test cases

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data
LoginPage_TC_OO1	Functional	Home Page	Verify user can see the Login/Sign up popup when user clicked on My account button	---	1.Enter URL and click go 2.Click on My Account dropdown button 3. Verify login/Signup popup displayed or not	-
LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Sign up popup	---	1.Enter URL and click go 2. User able to view chatbot icon	-
LoginPage_TC_OO3	Functional	chatbot	Verify user can chat with the application system	---	1.Enter URL (http://127.0.0.1:5000) and click go 2.User able to view chatbot icon 3.Chat with the bot 4.Type the query and get the answer	-

## 8.2 User Acceptance Testing

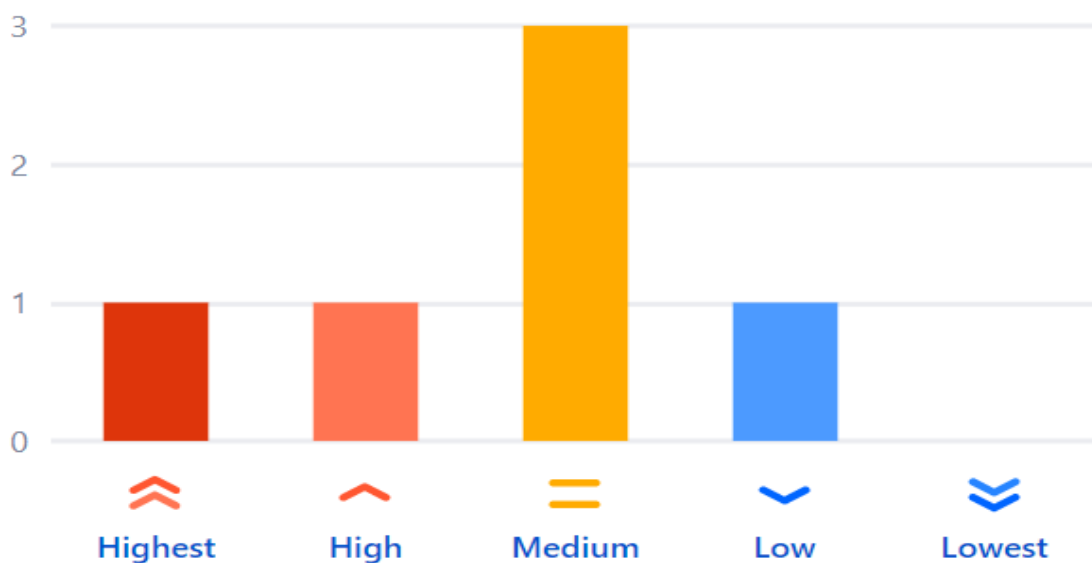
Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

## 9. RESULTS

### 9.1 Performance Metrics

#### Priority breakdown

Get a holistic view of how work is being prioritized within your project. To check if the team's focusing on the right work, [go to the list view](#).



## **10. ADVANTAGES & DISADVANTAGES**

### **ADVANTAGES:**

- Brand Consistency.
- Increased Productivity.
- Reduced Staffing Needs.
- Consistent Response Rate and Availability.
- Helps with Fraud Prevention.
- Chats can be saved.
- Lower costs.

### **DISADVANTAGES:**

- Questions must be programmed beforehand.
- Impersonal
- Must keep information up to date.
- Technology issues.

## **11. CONCLUSION**

Chatbots are becoming an integral part of the digital world. It is necessary that the customer needs are addressed as well as customers are satisfied through the business. Customer expectations are growing with increasing technological development. Customer satisfaction is very important to businesses and enterprises because if the customers are not satisfied with the service customers never return. More and more banks tend to integrate chatbots into their mobile apps. This is a convenient way to stay in touch with their clients and, at the same time, reduce the involvement of human personnel. According to estimations calculated by Juniper Research, in 2023, chatbot interactions will save 862 million hours for banks, which equals to \$7.3 billion cost savings worldwide. Security concerns regarding the use of chatbots in the banking industry will persist in the future. The need for well-protected and reliable AI solutions will become a major driving force of digital technologies development. The reason is simple: people will agree to share their private information and access to their credit cards only with the most protected and trustworthy software solutions, including chatbots.

## 12. FUTURE SCOPE

The share of banks that use AI solutions and chatbots is constantly rising. As another factor, the use of smartphones and other smart devices is also a rapidly growing trend. These two driving forces determine the near future of artificial intelligence assistants in the banking industry. More and more features like integrating with bank account and security is developed in future.

## 13. APPENDIX

### Source Code

#### PYTHON FLASK

```
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def bot():
    return render_template('chatbot.html')

if __name__ == '__main__':
    app.run()
```

## HTML CODE

```
<html>

<head>
<script>
  window.watsonAssistantChatOptions = {
    integrationID: "5308436f-fc25-4c3f-8abb-305916aba969", // The ID of this integration.
    region: "us-south", // The region your integration is hosted in.
    serviceInstanceID: "0e12d8d0-8932-4290-89ec-89d8761d091d", // 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>
  <base href="/">
  <title>Banking Services</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta property="og:image" content="conversation.svg" />
  <meta property="og:title" content="Conversation Chat Simple" />
  <meta property="og:description"
    content="Sample application that shows how to use the Conversation API to
identify user intents" />
  <link rel="shortcut icon" href="favicon.ico" type="image/x-icon">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css"
    integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcjlSAwiGgFAW/dAiS6jXm"
crossorigin="anonymous">
  <link rel="stylesheet" href="css/app.css">
  <style type="text/css">
    body {
      padding-top: 3.5rem;
    }
  </style>
</head>

<body>

  <nav class="navbar navbar-expand-md navbar-dark fixed-top bg-dark">
    <a class="navbar-brand" href="#">Banking Services</a>
    <button class="navbar-toggler" type="button" data-toggle="collapse" data-
target="#navbarsExampleDefault"
      aria-controls="navbarsExampleDefault" aria-expanded="false" aria-
label="Toggle navigation">
```

```

        <span class="navbar-toggler-icon"></span>
    </button>

    <div class="collapse navbar-collapse" id="navbarsExampleDefault">
        <ul class="navbar-nav mr-auto">
            <li class="nav-item active">
                <a class="nav-link" href="#">Home <span class="sr-
only">(current)</span></a>
            </li>
            <li class="nav-item">
                <a class="nav-link" href="#">About Us</a>
            </li>
            <li class="nav-item dropdown">
                <a class="nav-link dropdown-toggle" href="#"
id="dropdown01" data-toggle="dropdown"
                aria-haspopup="true" aria-
expanded="false">Services</a>
                <div class="dropdown-menu" aria-
labelledby="dropdown01">
                    <a class="dropdown-item" href="#">Banking</a>
                    <a class="dropdown-item" href="#">Investment</a>
                    <a class="dropdown-item" href="#">Home Loan</a>
                </div>
            </li>
        </ul>
        <form class="form-inline my-2 my-lg-0">
            <input class="form-control mr-sm-2" type="text"
placeholder="Search" aria-label="Search">
            <button class="btn btn-outline-success my-2 my-sm-0"
type="submit">Search</button>
        </form>
        <ul class="navbar-nav navbar-right">
            <li class="nav-item">
                <a class="nav-link" href="#">Login</a>
            </li>
            <li class="nav-item">
                <a class="nav-link" href="#">Register</a>
            </li>
        </ul>
    </div>
</nav>

<main role="main">

    <!-- Main jumbotron for a primary marketing message or call to action -->
    <div class="jumbotron">
        <div class="container">
            <h1 class="display-3">Welcome to Banking services</h1>
            <p>We provide extensive services from retail banking, investment,
home loan, auto loan and many more</p>
            <p><a class="btn btn-primary btn-lg" href="#" role="button">Learn
more &raquo;</a></p>
        </div>
    </div>

```



```

<div class="container">
  <!-- Example row of columns -->
  <div class="row">
    <div class="col-md-4">
      <h2>Banking</h2>
      <p>Banking services provide retail and online banking. It
offers all kinds of accounts from
checking, saving,
and bussiness accounts
</p>
<p><a class="btn btn-secondary" href="#"
role="button">View details &raquo;</a></p>
    </div>
    <div class="col-md-4">
      <h2>Investment</h2>
      <p>Banking services also provides investment opportunity to
clients. It has huge basket of
various stocks and bonds. </p>
<p><a class="btn btn-secondary" href="#"
role="button">View details &raquo;</a></p>
    </div>
    <div class="col-md-4">
      <h2>Loan</h2>
      <p>Banking services also helps you find loan for personal,
home and auto. We provide best rate
and beat the rate thats out in the market.</p>
<p><a class="btn btn-secondary" href="loan.html"
role="button">View details &raquo;</a></p>
    </div>
  </div>
  <hr>
</div> <!-- /container -->

</main>

<footer class="container">
  <p>&copy; Banking services 2019</p>
</footer>

<div id="contentParent" class="responsive-columns-wrapper">

  <div id="chat-column-holder" class="responsive-column content-column">
    <div class="chat-column">
      <div id="scrollingChat">
        <h4>Welcome to Banking Services.</h4>
      </div>
      <label for="textInput" class="inputOutline">
        <input id="textInput" class="input responsive-column"
class="form-control form-control-lg" placeholder="Type something" type="text"
onkeydown="/*globals CanvasJS */
ConversationPanel.inputKeyDown(event, this)">

```

```

        </label>
    </div>
</div>
</div>
<!-- Bootstrap core JavaScript
===== -->
<!-- Placed at the end of the document so the pages load faster -->
<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://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYI"
crossorigin="anonymous"></script>

<script src="js/modal.js"></script>
<script src="js/api.js"></script>
<script src="js/common.js"></script>
<script src="js/conversation.js"></script>
<script src="js/global.js"></script>
</body>

</html>

```

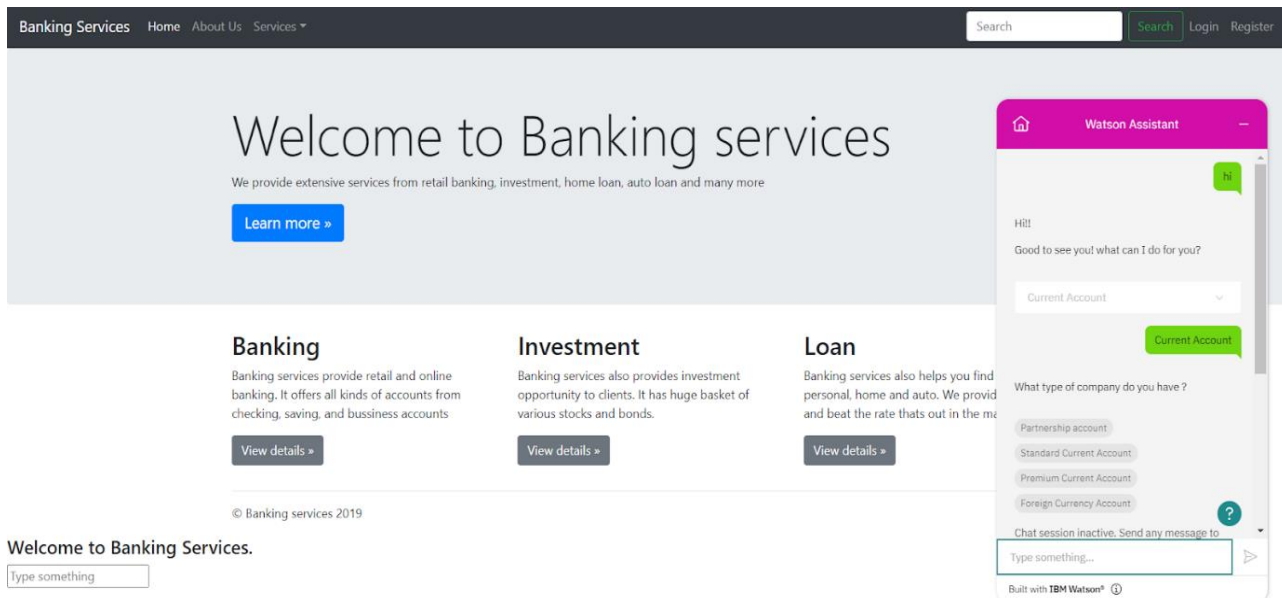
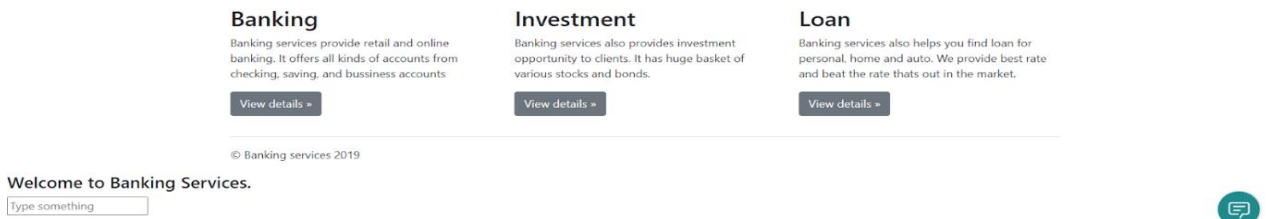
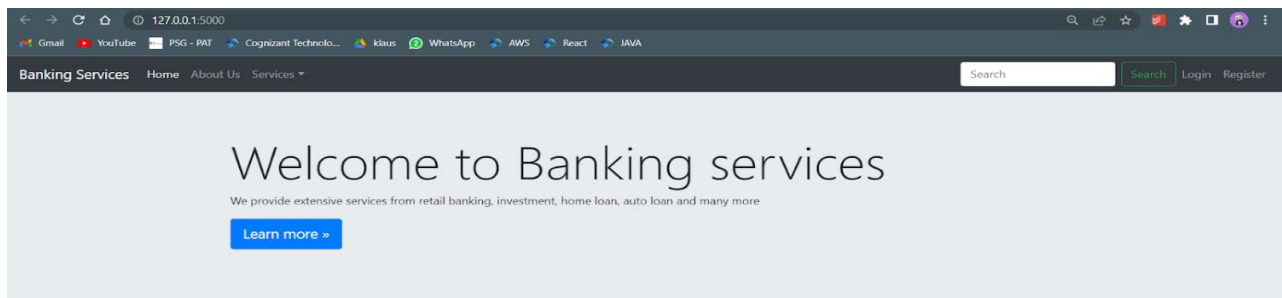
## RUN THE APPLICATION

```

(venv) PS C:\Users\Sukirthi.S.J\Desktop\BankingBot> python -m flask run
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit

```

If you copy paste the <http://127.0.0.1:5000> link on browser, you will see a website



**GITHUB AND DEMO LINK:**

**PROJECT DEMO LINK:** <https://youtu.be/Wgg1F7Ng0WM>

**GITHUB LINK** : <https://github.com/IBM-EPBL/IBM-Project-12853-1659496121>