PROJECT REPORT
AI BASED DISCOURSE FOR BANKING INDUSTRY

Team ID: PNT2022TMID22969
TEAM MEMBERS:

P A AAKASH CHANDHA   [TL] – 913119104002

S J VASANTH RAM   [TM1] -913119104118

S HARISH KUMAR   [TM2] – 913119104030

V S SANDEEP SRINIVAS   [TM3] – 913119104083

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INTRODUCTION:

1.1 Project Overview:

ü 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.

ü 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.

ü 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.

ü 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.

1.2 Purpose:

ü Banks are quickly incorporating **chatbots** into their operations to improve efficiency. Bots are assisting banks in interacting with clients at all stages of the

ü customer life cycle. Using the services of an AI chatbot creation firm may offer you compelling reasons to use chatbots and make your website/app a modern classic.

ü **Chatbots for digital banking** services are here to stay, and banks would be unable to function without them. Taking control of the situation now is the best course of action. Contact a reputable financial software development firm to save hours each day that can be spent on more productive tasks.
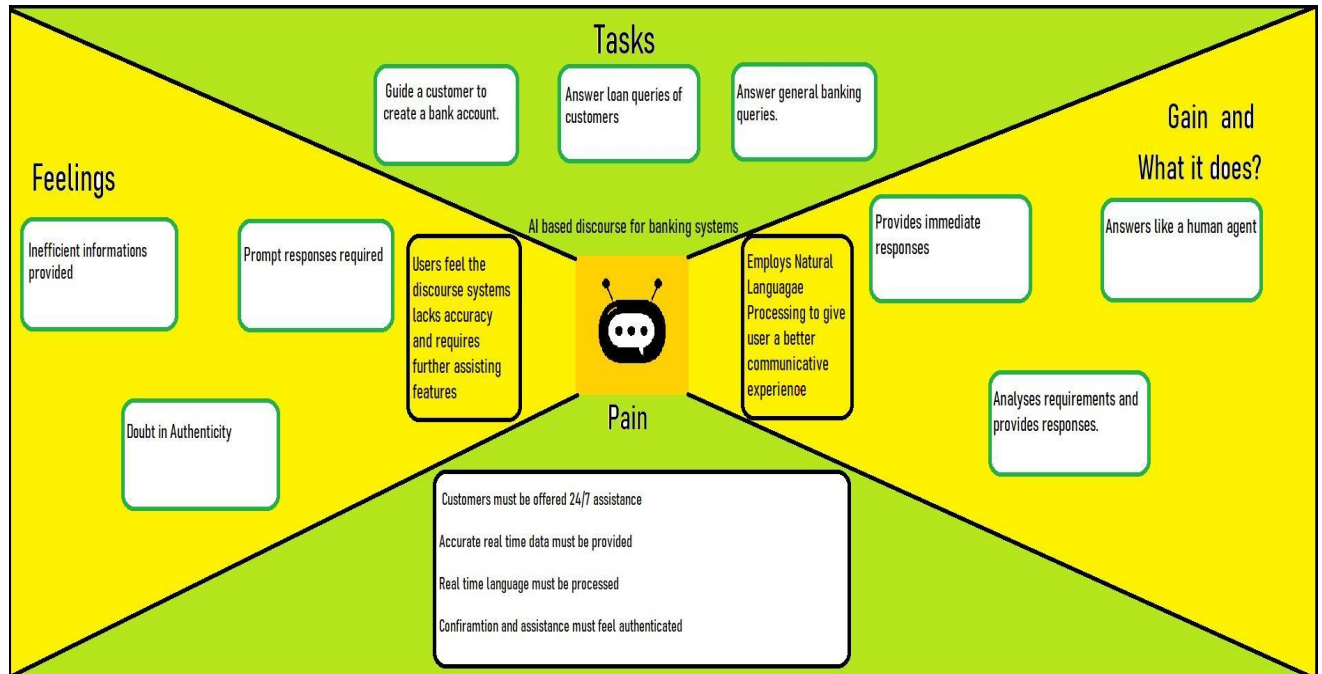
2. LITERATURE SURVEY:

S.no	Title	Author	Abstract
1.	**BANKING WITH A CHATBOT – A STUDY ON TECHNOLOGY ACCEPTANCE**	**Mónika-Anetta** **Ibolya VIZELI** **ZSUZSA SĂPLĂCAN**	**The implementation of chatbot technology is evolving rapidly in the banking industry, yet customer acceptance is behind. The aim of the present paper is to identify the factors that influence consumers' intention to use chatbot technology applied in the banking industry. previously used a banking chatbot.**
2.	**Banking Chatbot (B-bot)**	**Dr. C. Punitha Dr.S.Geetha,** **N. Nagalakshmi** **S. Karthiga** **V. Suvedha**	**Chatbots square measure intelligent systems that perceive a user's tongue queries and respond consequently during a conversation, that is the focus of this study. It's an additional sort of a virtual assistant, folks want they're talking with a real person.**
3.	**CHATBOTS IN BANKING INDUSTRY: A CASE STUDY**	**Dr. Shalini Sayiwal**	**Conversational Banking is a smarter way to retain the loyal customers by offering them a quick response to their queries. Technology has helped humans to evolve from the Stone Age to the modern digital era.**

4.	Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language	Sasha Fathima Suhel Vinod Kumar Shukla Sonali Vyas Ved Prakash Mishra	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.
5.	Artificial intelligence in banking A case study of the introduction of a virtual assistant into customer service	Mehmet Ates	The usage of artificial intelligence in banking is an important theme within entrepreneurial research. The purpose of the study was to analyse the motivations, challenges and opportunities for Swedish banking institutes to implement artificial intelligence based solutions into their customer service process.
6.	Intelligent Chat Bot for Banking System	Mr. Aniket Dole Mr. Hrushikesh Sansare , Mr. Ritesh Harekar , Mrs. Sprooha Athalye	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.

3. IDEATION & PROPOSED SOLUTION

This map is created with view of the project in user's perspective, to find pain & gain points and to summarize it with a list of problem statements.

3.1 EMPATHY MAP CANVAS

Tasks

Guide a customer to create a bank account.

Answer loan queries of customers

Answer general banking queries.

Gain and
What it does?

Feelings

Inefficient informations provided

Prompt responses required

Users feel the discourse systems lacks accuracy and requires further assisting features

AI based discourse for banking systems

Employs Natural Languagae Processing to give user a better communicative experience

Provides immediate responses

Answers like a human agent

Analyses requirements and provides responses.

Doubt in Authenticity

Pain

Customers must be offered 24/7 assistance

Accurate real time data must be provided

Real time language must be processed

Confiramtion and assistance must feel authenticated

3.2 IDEATION & BRAINSTORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome

Brainstorm

Ideas of the team

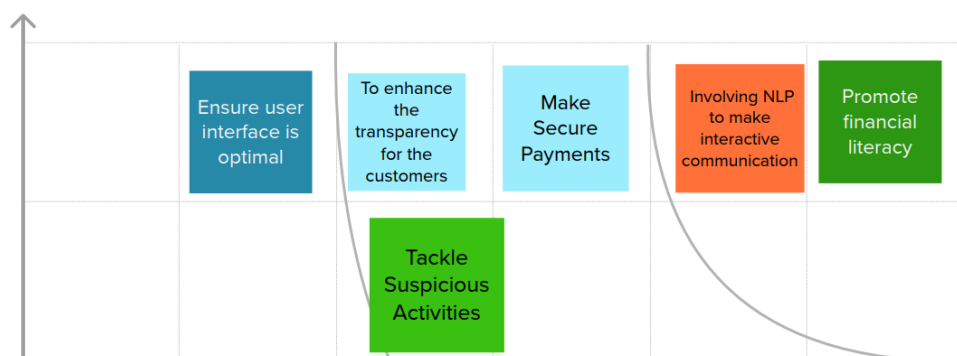◷ Implementable ideas raised in the brainstorming session

Aakash Chandha

Making it easy for the users to communicate	Involving NLP to make interactive communication	Make all necessary details readily available
Make Contextual Data a Core Component of Your Customer Service Strategy.	Utilise Watson assistants full potential	Give the customer a sense of self servicing
Promote financial literacy	Develop a Truly Omnichannel Customer Experience	Provide installment alert calls using AI

Vasanth Ram

To avoid confusion for the customers	To enhance the transparency for the customers	Better Risk Mitigation
Tackle Suspicious Activities	Customer Support with just One Tap	Easy & Uncomplicated Lead Generation
Make Secure Payments	Use deep learning models to track user queries and solve them	help with non complex and urgent issues

Prioritize

Priority based assembling done of all the presented ideas

◷ Graph format representation

	Ensure user interface is optimal	To enhance the transparency for the customers	Make Secure Payments	Involving NLP to make interactive communication	Promote financial literacy
		Tackle Suspicious Activities			

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Banking is a crucial sector, it deals with financial transactions which can be availed by everyone. In order to guide the customers through various such banking process an intelligent system must be designed
2.	Idea / Solution description	To Create an intelligent assistant like a mobile application or web application to guide the customers in their issues. Using IBM Watson assistant.
3.	Novelty / Uniqueness	This is a unique idea as there are numerous banking assistants now but they lack in specific skills which makes the customer not fond of using them. This should be avoided
4.	Social Impact / Customer Satisfaction	Customers will be highly satisfied as while designing an interactive system, the assistant is very interactive with the customer which gives the customer a sense of satisfaction.
5.	Business Model (Revenue Model)	This is customer query and response service. While our bank is providing excellent customer service 24/7, customers will be drawn to it and the bank will gain a very large customer base with a huge money flow
6.	Scalability of the Solution	The solution is highly scalable as the ability of the agent can be increased multiple fold. It can be commercially sold or distributed to other banks.

3.4 PROBLEM SOLUTION FIT

1. CUSTOMER SEGMENT(S)
CS

Our customers are bankers who need a intelligent system for handling customer queries

6. CUSTOMER CONSTRAINTS
CC

Customer constraints include ambiguity in information, unavailability of agents and many other 24/7 service issues

5. AVAILABLE SOLUTIONS
AS

Which solutions are available to the customers when they face the problem

There are a lot of chatbots available presently. People have tried appointing real time customer agents but there are a lot issues

2. JOBS-TO-BE-DONE / PROBLEMS

Effectively handle financial queries

Use local and natural human like conversation

Ensure user interface is optimal

9. PROBLEM ROOT CAUSE
RC

The problem mainly is because that since the element of money is involved customers feel pretty unreliable using a digital agent for transactions.

7. BEHAVIOUR
BE

i.e. directly related: find the right solar panel installer, calculate
The customer visits their bank branch every time they have some issue or query

3. TRIGGERS
TR

Fancy user interface and comfortable transfer and updating of information is the only trigger that we can account here

10. YOUR SOLUTION
SL

There are a lot of banking bots owned by banks. We can use the already available user information and design an intelligent agent for delivering a perfect discourse system

8. CHANNELS of BEHAVIOUR
CH

8.1 ONLINE
Customers try the website of the bank and try calling the customer support people. They try raising queries if a terminal is present

4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS:

Following are the functional requirements of the proposed solution.

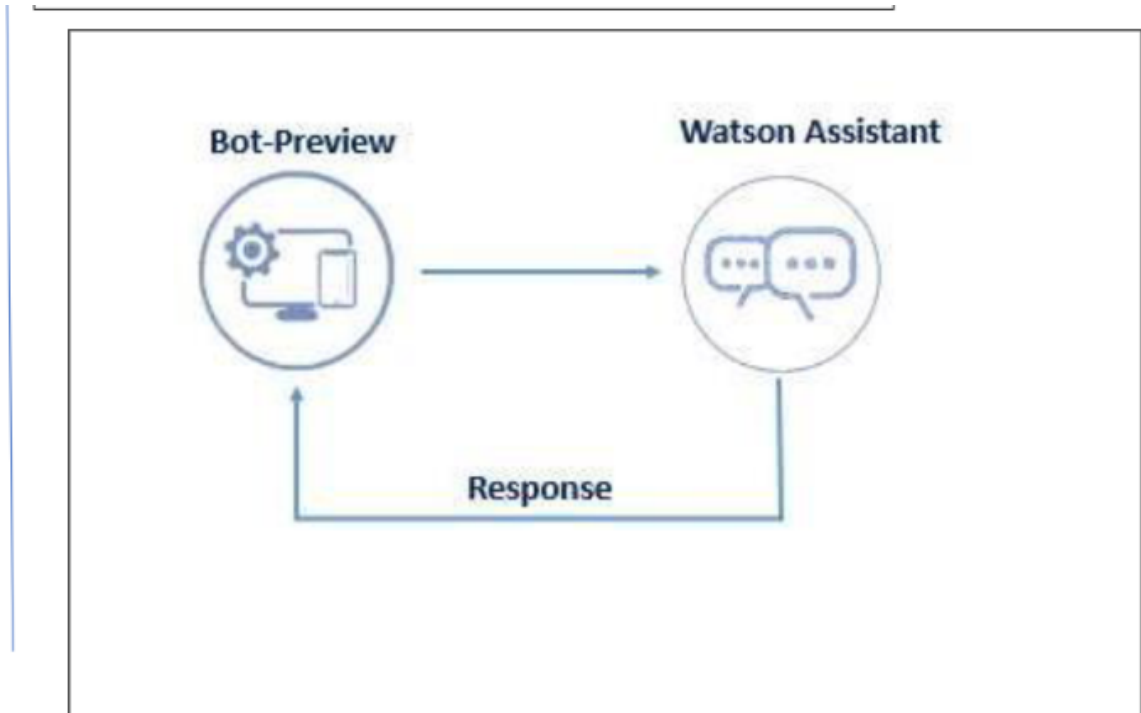| FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration/Login	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Query formation	A valid API query is a single URL parameter containing one sentence that is a question in standard English
FR-4	Admin functions	Encoding and decoding data, tokenization, wordnet model, Feedback system.
FR-5	Response generation	The server will reply with either data or an error.The client will be able to parse the JSON and determine if there was an error
FR-6	Delivering response to user	This unit will generate a generic answer sentence using the input.

4.2 NON-FUNCTIONAL REQUIREMENTS:

Following are the non-functional requirements.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Providing assistance over net banking related issues, detailed and personalized conversation with chatbot user.
NFR-2	Security	Helping to lock the account during theft related situations.
NFR-3	Modularity	The system will be designed in such a way that the algorithms will be able to be easily swapped out.
NFR-4	Performance	Never forgets anything, never gets sick, never gets unproductive. AI chatbot is installed for daily operations and enhance customer experience in digital banking sector.
NFR-5	Availability	Provide exceptional customer services available 24/7. Providing round the clock support.
NFR-6	Scalability	Can be increased and decreased according to the usage or number of requests.

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.
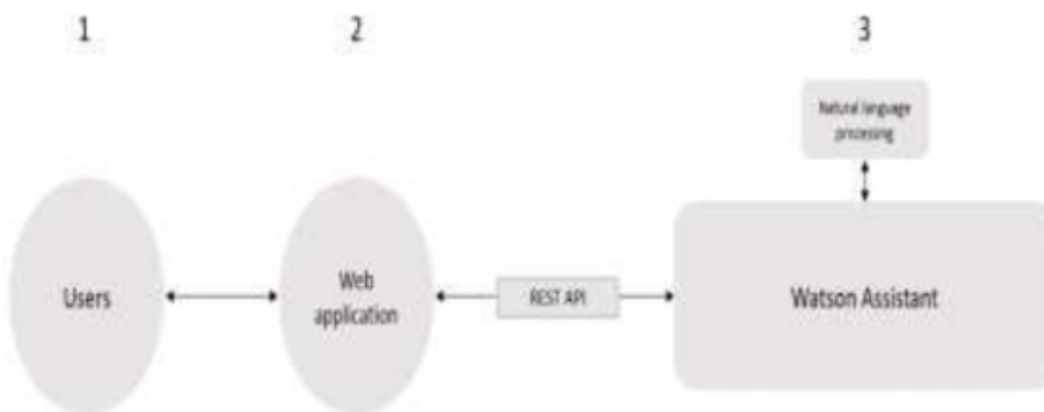
5.2 SOLUTION & TECHNICAL ARCHITECTURE

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority
Customer (Mobile user)	Download the database	USN-1	As a user, I can register for the application by entering my email, and password, and confirming my password.	I can access my account / dashboard	High
	Register	USN-2	As a user, I can register for the application by entering my email, and password, and confirming my password.	I can receive a confirmation email & click confirm	High
	Login	USN-3	As a user, I will receive a confirmation email once I have registered for the application	I can register & access the dashboard with Facebook Login	Low
	Querying	USN-4	User query with a chatbot for clarifications.		Medium
Customer (Web user)	The functional requirements are same as a mobile user	Same as a mobile user	Same as a mobile user	Same as a mobile user	High when compared to mobile users

6. PLANNING & SCHEDULING

6.1 SPRINT PLANNING

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	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

6.2 SPRINT DELIVERY SCHEDULE

| 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	Aakash Chandha, Vasanth Ram
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	Aakash Chandha, Vasanth Ram
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	Aakash Chandha, Vasanth Ram
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	Sandeep Srinivas, Harish Kumar

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	Aakash Chandha, Vasanth Ram
Sprint-2		USN-6	Building action and Adding responses to Loan Queries/As a user, I can see a Chatbot which helps in Loan related Queries.	5	High	Aakash Chandha, Vasanth Ram
Sprint-3	Testing & Deployment Phase-I	USN-7	Testing the chatbot performance with the trained banking functionalities or conversations/As a user, I can know the chatbots performance level	10	High	Sandeep Srinivas, Harish Kumar
Sprint-3		USN-8	Integration of Flask webpage with the chatbot assistant to provide a framework/As a user, I can see a webpage to access the chatbot.	10	High	Aakash Chandha, Vasanth Ram
Sprint-4	Deployment Phase-II & Model Improvement	USN-9	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.	15	High	Aakash Chandha, Vasanth Ram
Sprint-4		USN-10	Improving the model efficiency whenever needed/As a user, I can see new updated chatbot in Future days.	5	Moderate	Aakash Chandha, Vasanth Ram

6.3 REPORTS FROM JIRA

BURNTDOWN GRAPH
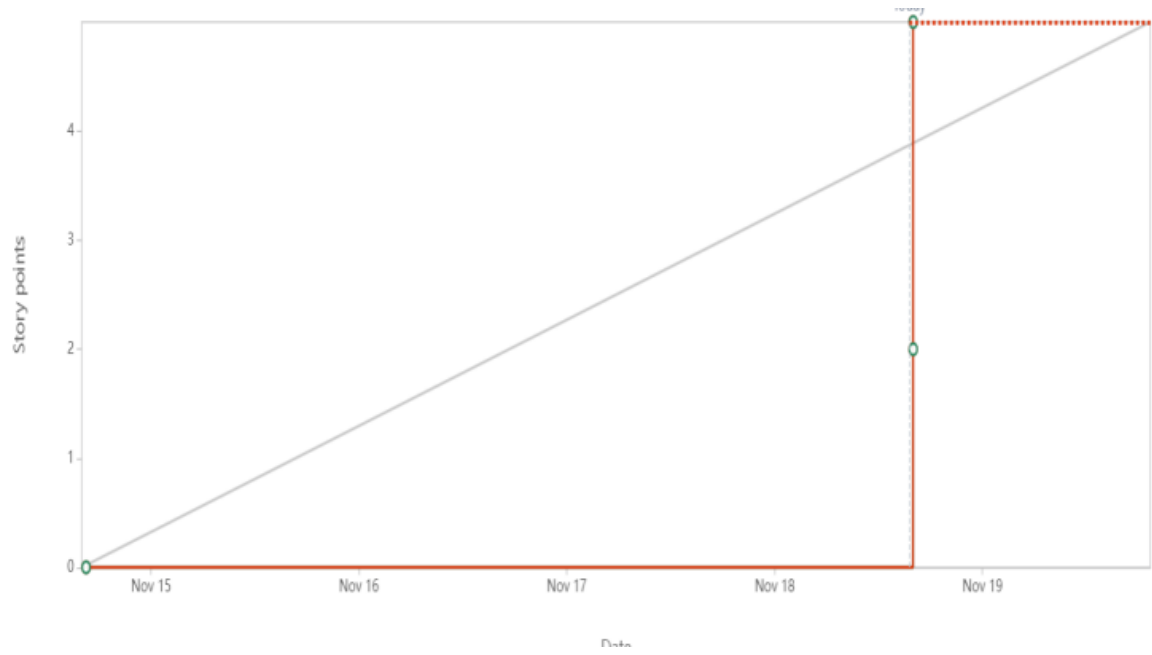
CUMULATIVE FLOW DIAGRAM

VELOCITY REPORT

CA1 Sprint 2
Commitment: 0
Completed: 5
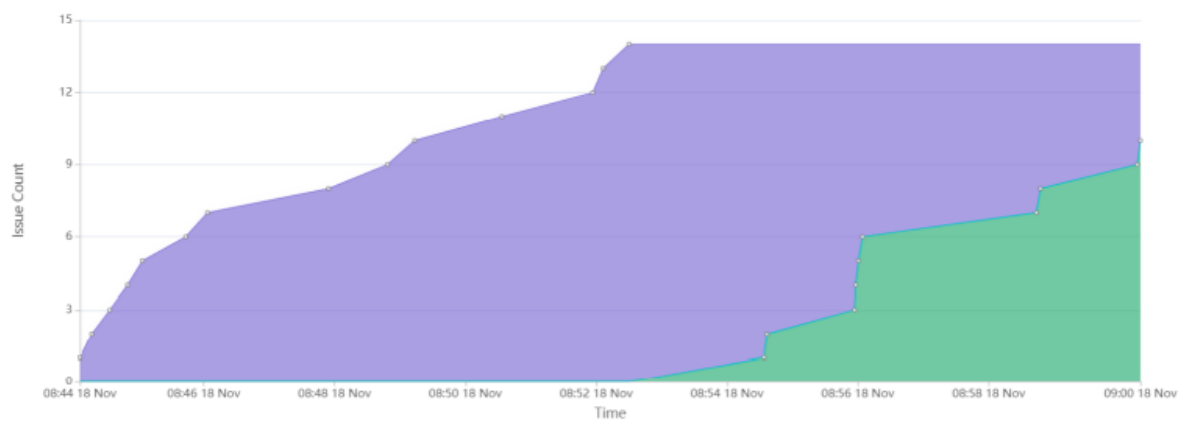
Sprint	Commitment	Completed
CA1 Sprint 1	0	5
CA1 Sprint 2	0	5
CA1 Sprint 3	0	5
CA1 Sprint 4	0	5

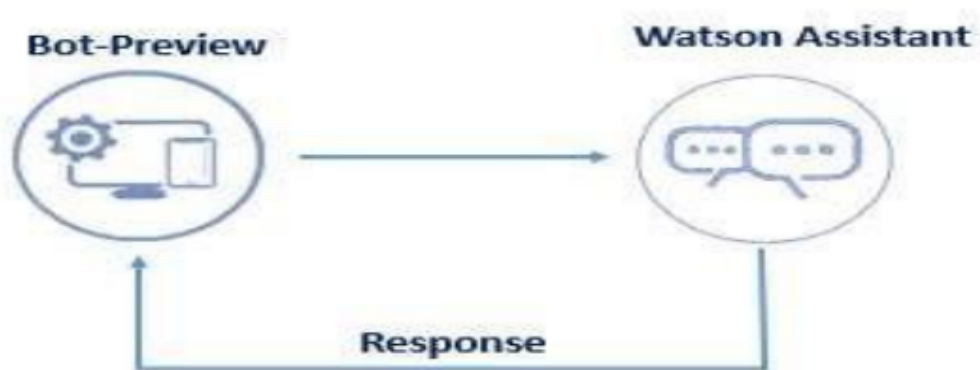# 7. CODING & SOLUTIONING

7.1 THEORETICAL ANALYSIS:

Services Used:

- IBM Watson Assistant

Block diagram:

Hardware / Software designing:

To complete this project, you should have the following software and packages.

Softwares:

- Visual studio code
- IBM Watson studio

Packages:

Python Flask

7.2 FLOWCHART:

To accomplish the above task, you must complete the below activities and tasks:

- Create IBM Services.
- Creating skills & Assistant for Chatbot.
- Creating Want to take a loan account action.
- Creating Queries regarding Loan account action.
- Creating a See how I can help you action.
- Creating a Python code with Flask.
- Create HTML web page.
- Integrate the Watson Chatbot with web page.

7.3 APPLICATIONS:

- Banking chatbots have all the data to predict the spending habits of customers and help them keep their finances on track.

8.TESTING

8.1 Test Cases

8.2 User Acceptance Testing

9. RESULTS

9.1 Performance Metrics

10. ADVANTAGES & DISADVANTAGES:

Advantages:

- Round-the-clock service.
- 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.
- Needs additional measures to protect identities.

11. APPENDIX:

Create IBM Service

In this activity, you will be creating the Necessary IBM service. The following are the service that you have to create.

- Watson Assistant

Creating Skills & Assistant For Chatbot

Skills are nothing but actions and steps. Steps are the subset of actions where conversations are built and Assistant is used to integrate skills.

A default template chatbot is created. Need to add actions.

Creating Want to take Loan Action

Create a new action Want to take Loan action.

Add steps in Loan action.

Creating Queries regarding loan Action

Create a new **Action** Queries regarding loan action.

Add steps in Queries regarding Loan action.

Creating See how I can help you Action

 Create a new action See how I can help you action.

Add steps in See how I can help you action.

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

Creating Assistant & Integrate With Flask Web Page

You will be creating a banking bot in this activity that has the following capabilities

1. The Bot should be able to guide a customer to create a bank account.
2. The Bot should be able to answer loan queries.
3. The Bot should be able to answer general banking queries.
4. The Bot should be able to answer queries regarding net banking.
5. With the help of this bot, you can get all the required details related to banking.

Let us build our flask application which will be running in our local browser with a user interface.

In the flask application, users will interact with the chatbot, and based on the user queries they will get the outcomes.

Build Python Code

1: Importing Libraries

The first step is usually importing the libraries that will be needed in the program.

Importing the flask module into the project is mandatory. An object of the Flask class is our WSGI application. Flask constructor takes the name of the current module (__name__).

```
app.py > ...
1    from flask import Flask,render_template
```

2: Creating our flask application and loading

```
app=Flask(__name__,template_folder='template')
```

3: Routing to the Html Page

Here, the declared constructor is used to route to the HTML page created earlier.

The '/' route is bound with the bot function. Hence, when the home page of a web server is opened in the browser, the HTML page will be rendered.

```
def Chatbot():
    return render_template('Chatbot.html')
```

Main Function

This is used to run the application in localhost.

```
if __name__ =='__main__':
    app.run(debug=True)
```
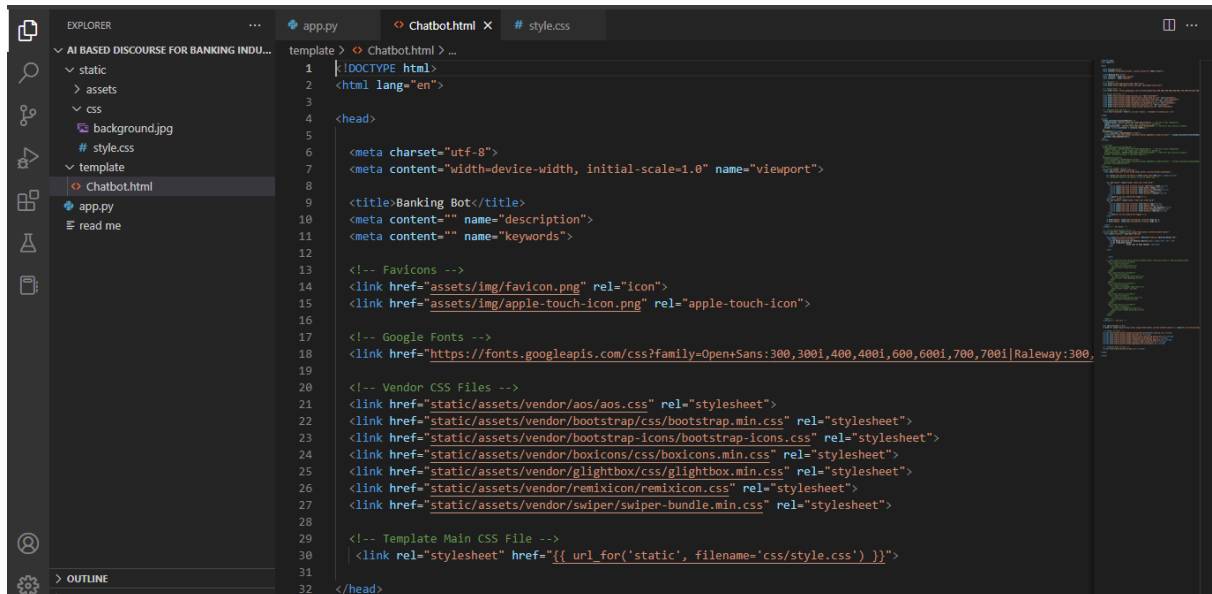
Build HTML Code

- 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.
- A simple HTML page is created. Auto-generated source code from IBM Watson Assistants is copied and pasted inside the body tag
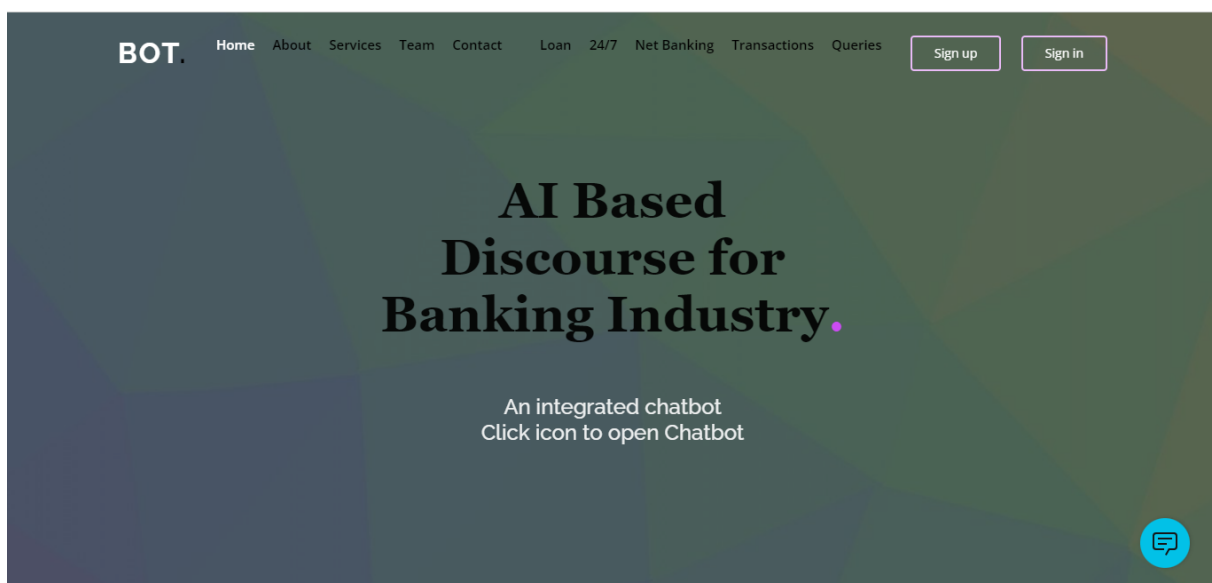
Run The Application

- Open the anaconda prompt from the start menu.
- 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/
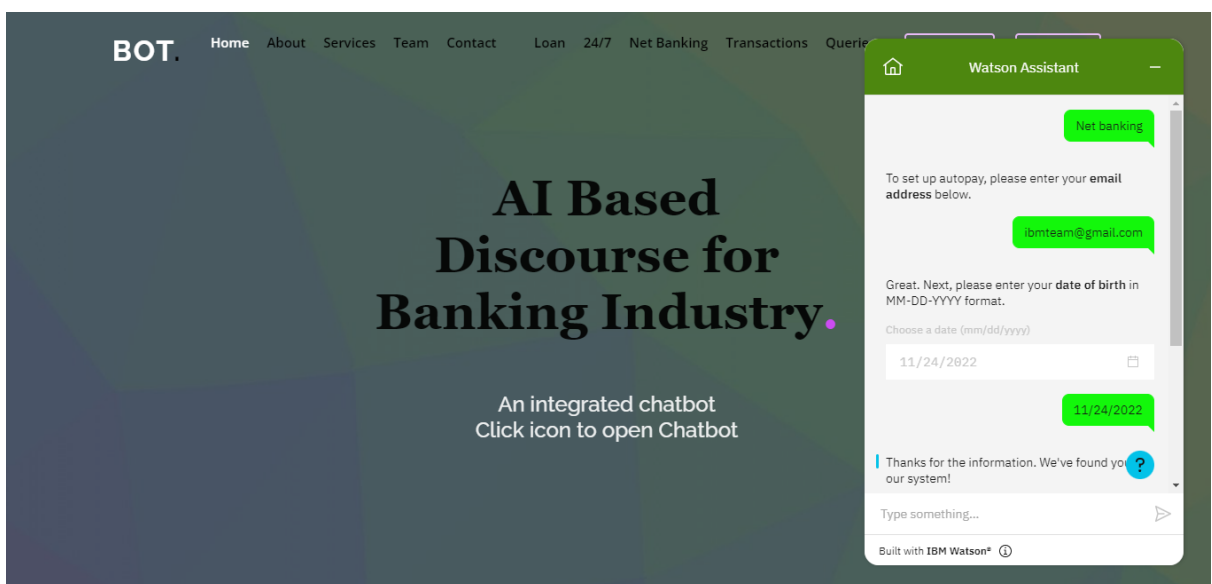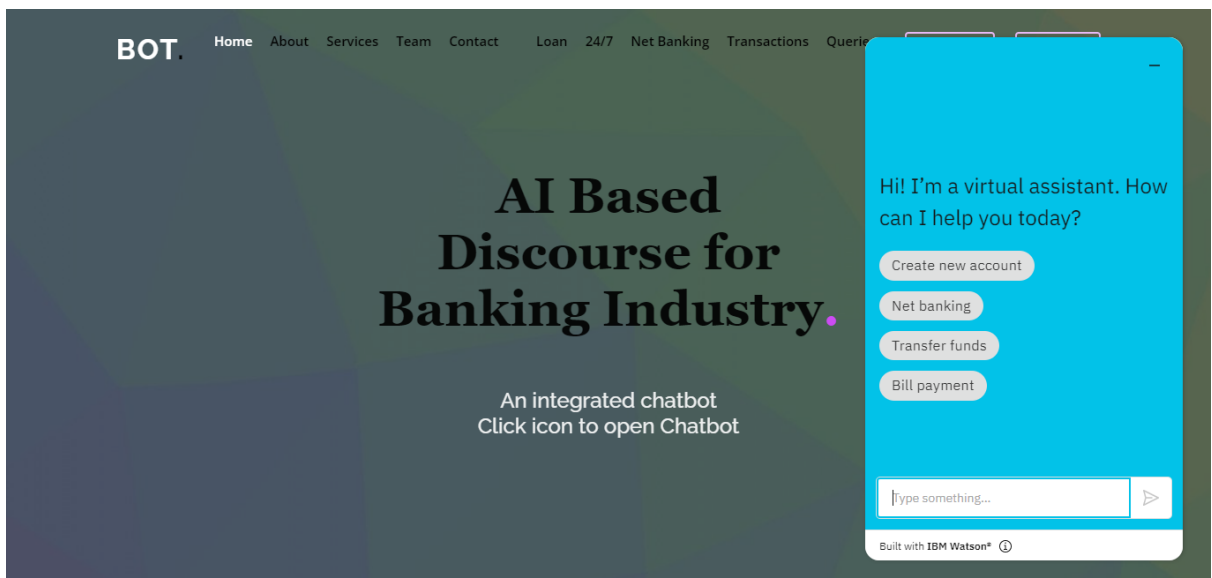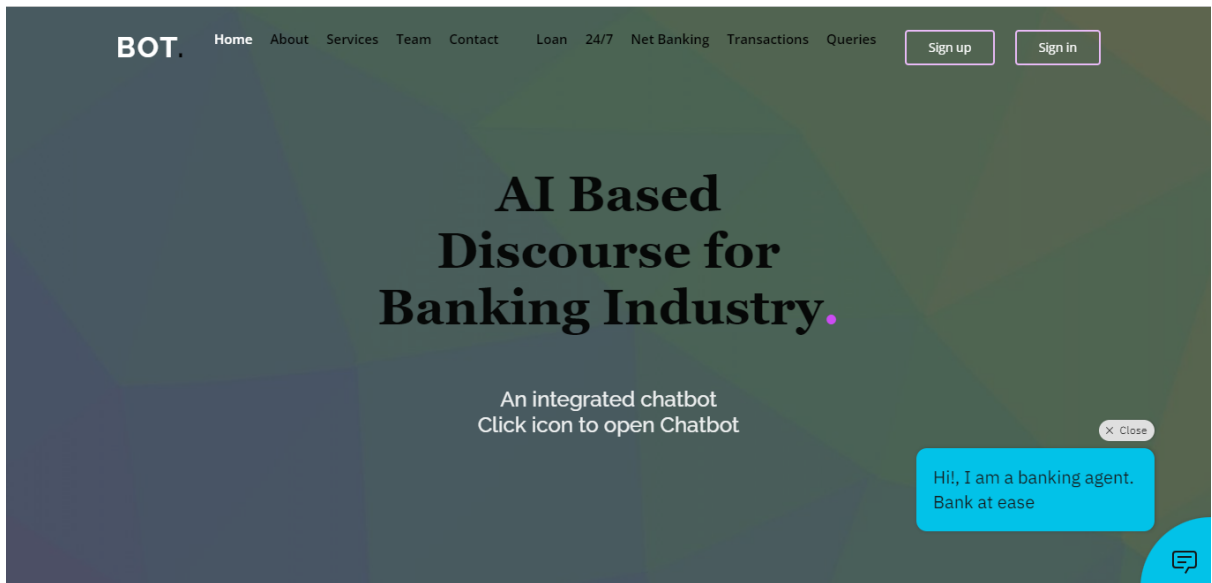- Copy that localhost URL and open that URL in the browser. It does navigate me to where you can view your web page.
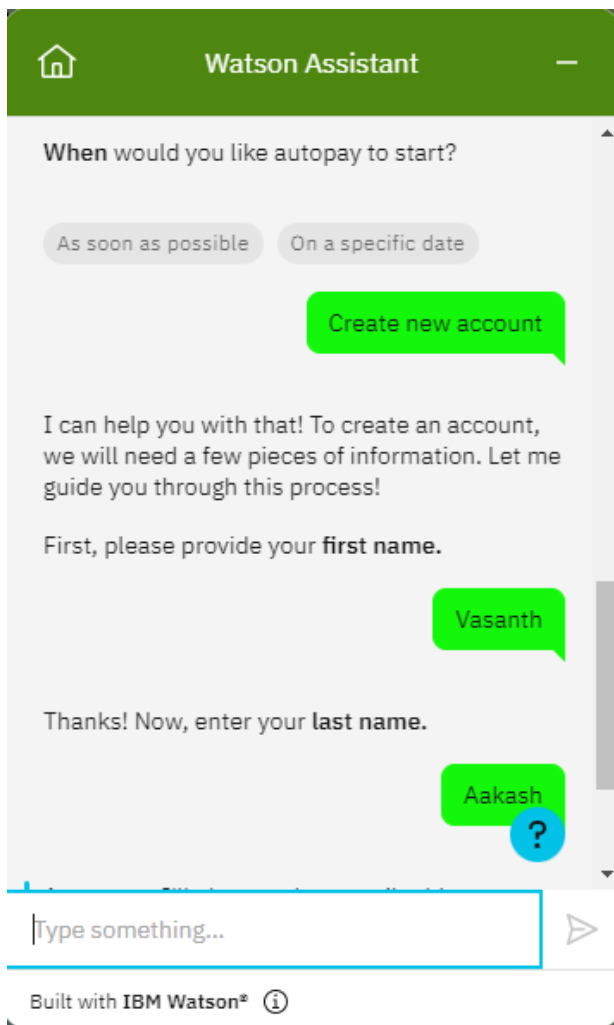
Source Code:

OUTPUT:

BOT.
Home | About | Services | Team | Contact | Loan | 24/7 | Net Banking | Transactions | Queries | Sign up | Sign in

AI Based
Discourse for
Banking Industry.

An integrated chatbot
Click icon to open Chatbot

✕ Close

Hi!, I am a banking agent. Bank at ease

BOT.
Home | About | Services | Team | Contact | Loan | 24/7 | Net Banking | Transactions | Queries

AI Based
Discourse for
Banking Industry.

An integrated chatbot
Click icon to open Chatbot

Hi! I'm a virtual assistant. How can I help you today?

Create new account
Net banking
Transfer funds
Bill payment

Type something...

Built with **IBM Watson®** ⓘ

BOT.
Home | About | Services | Team | Contact | Loan | 24/7 | Net Banking | Transactions | Queries

AI Based
Discourse for
Banking Industry.

An integrated chatbot
Click icon to open Chatbot

🏠 Watson Assistant —

Net banking

To set up autopay, please enter your **email address** below.

ibmteam@gmail.com

Great. Next, please enter your **date of birth** in MM-DD-YYYY format.

Choose a date (mm/dd/yyyy)

11/24/2022 📅

11/24/2022

Thanks for the information. We've found you in our system! ?

Type something...

Built with **IBM Watson®** ⓘ

BANKING CHATBOT:

PROJECT:

https://youtu.be/tu7eaAeDEeI

REFERENCE:

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