Project Documentation

Date	19 November 2022
Team ID	PNT2022TMID22390
Project Name	AI based Discourse For Banking Industry
Maximum Marks	10 Marks

Project Report Format

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1. INTRODUCTION

1.1 Project Overview

In this project, we will be building a chatbot using Watson's assistant.

- To work with Watson Assistant
- Create skills in Watson Assistant
- Use Entities, Intents, Dialogues
- Deploy skill to generate a preview link

1.2 Purpose

Creating a web page and integrating the chatbot to the webpage. This chat should have the following capabilities:

- The Bot should be able to guide a customer to create a bank account.
- The Bot should be able to answer loan queries.
- The Bot should be able to answer general banking queries.
- The Bot should be able to answer queries regarding net banking.

2. LITERATURE SURVEY

2.1 Existing problem

The user is a bank customer who needs 24/7 service to clear all his queries and guide him through all the banking processes. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient delivery of service. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank.

2.2 References

1. Ryoji Kashiwagi, “Utilization of artificial intelligence in finance”(2005).

2. Geeta Narula, Rakhi Narula,” The Impact of Chat-Bots on the Banking Experience” (2021).

3. Mehmet Ates,” Artificial Intelligence In Banking - A Case Study About The Introduction Of A Virtual Assistant Into Customer Service”(2017).

4. Andrew Ng ,“What artificial intelligence can do and can‘t do right now”(2016).

5. Mohamed Hussain Thowfeek, “Drivers Of Artificial Intelligence In Banking Service Sectors”(2020).

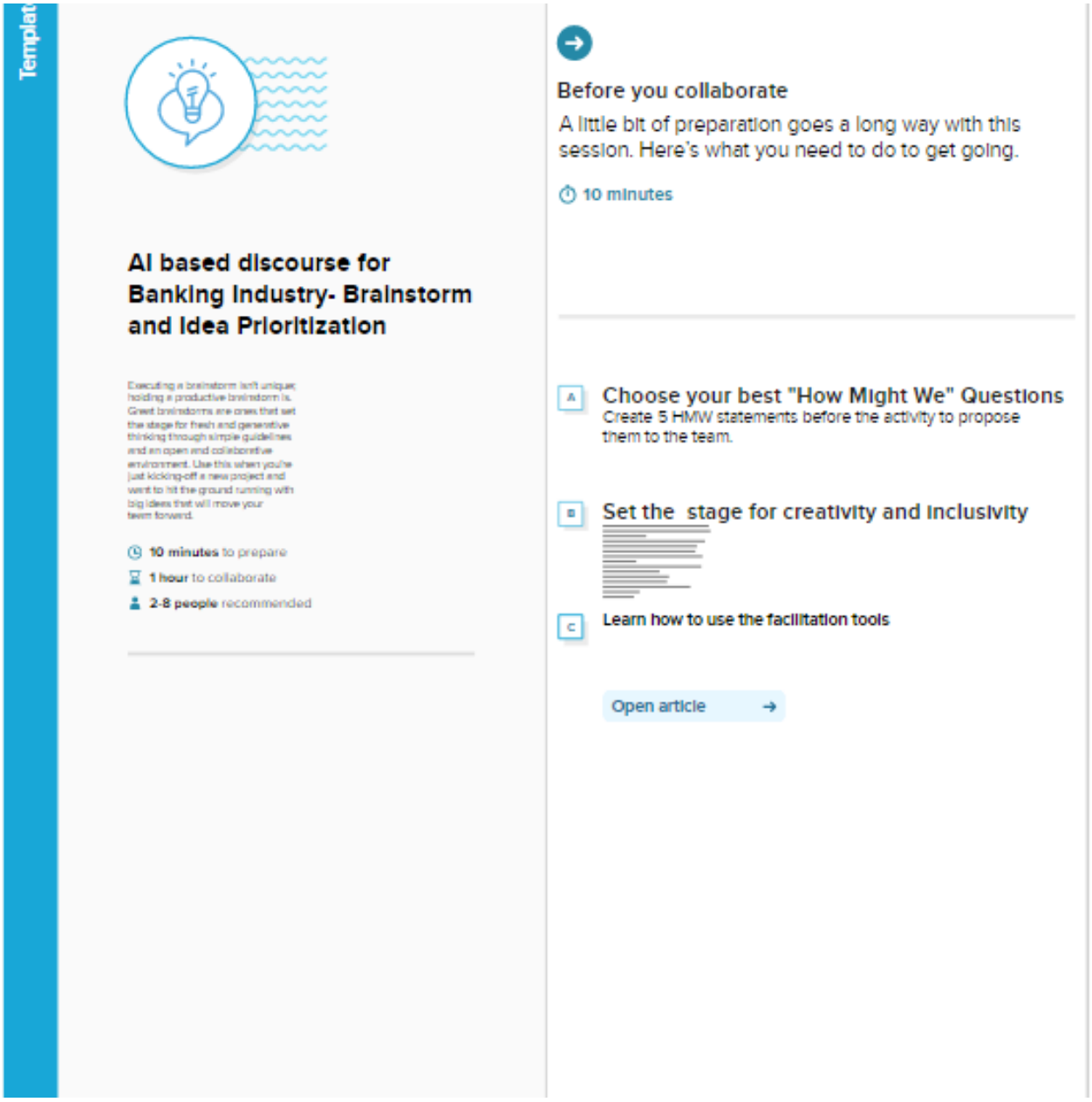
2.3 Problem Statement Definition

With our idea we are going to create a bot . The bot should be able to guide a customer to create a bank account and should it be able to answer the loan queries . Our project is capable of multiple language credit and speech recognition.

3. IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas

3.2 Ideation and Brainstorming



1

Problem statement

Unavailability of chat bots that are interactive enough to navigate the user to do whatever they want. Need for a more User-friendly interface. The main aim of the project is to develop a smart AI chat-bot for Banking Industry.

⏱ 5 minutes

QUESTION

How might we ensure 24*7 chatbot facility?

QUESTION

How might we ensure privacy of customers?

QUESTION

How might we ensure proper interpretation of messages by the chatbot?

QUESTION

How might we increase customer satisfaction on

QUESTION

How might we provide personalized service to customers?

2

Brainstorm solo

Have each participant begin in the "solo brainstorm space" by silently brainstorming ideas and placing them into the template. This "silent-storming" avoids group-think and creates an inclusive environment for introverts and extroverts alike. Set a time limit. Encourage people to go for quantity.

⏱ 10 minutes

SAMPATH

- Provides Omnichannel support
- Storing the customer conversation
- Available 24/7
- Reduce workload
- Improve facilities for future

PRAMODH ARJUN

- Full screen Window
- OTP Enable
- Providing details of the current account details
- Creating the new account based on the customer preference

VISHNU

- Transfer Money
- Tackling Suspicious Activities
- Track Transactional History
- Connect with bank staffs
- Simple Interface

JASWANTH REDDY

- Suggestion and feedback
- Less Process Time
- Change of Themes
- Providing interest related advice
- Giving simple solutions
- Better Scalability

SHRI RAM

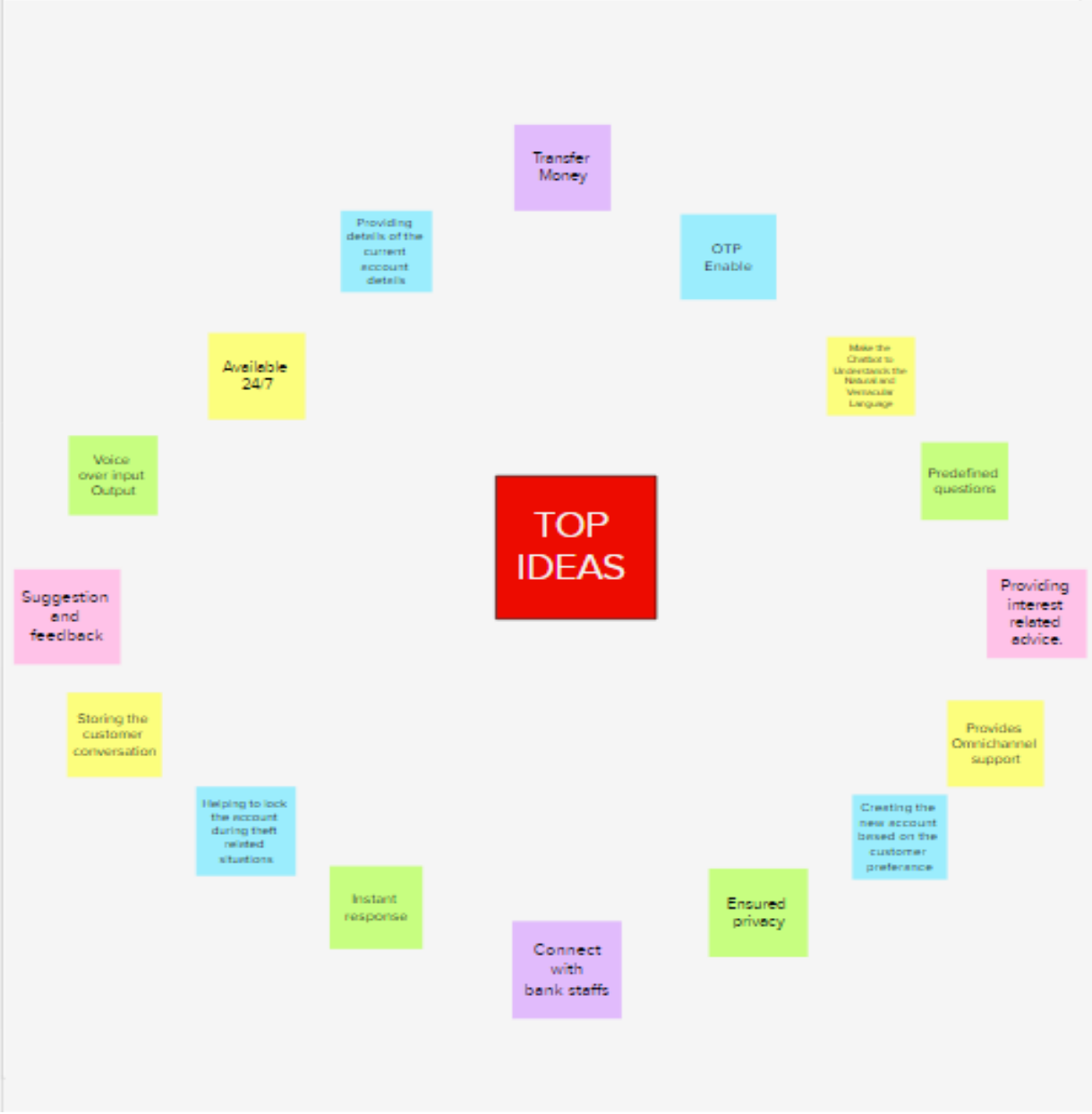
- Voice over input Output
- Ensured privacy
- Instant response
- Predefined questions
- Providing Round-the-clock support

3

Brainstorm as a group

Have everyone move their ideas into the "group sharing space" within the template and have the team silently read through them. As a team, sort and group them by thematic topics or similarities. Discuss and answer any questions that arise. Encourage "Yes, and..." and build on the ideas of other people along the way.

20 minutes

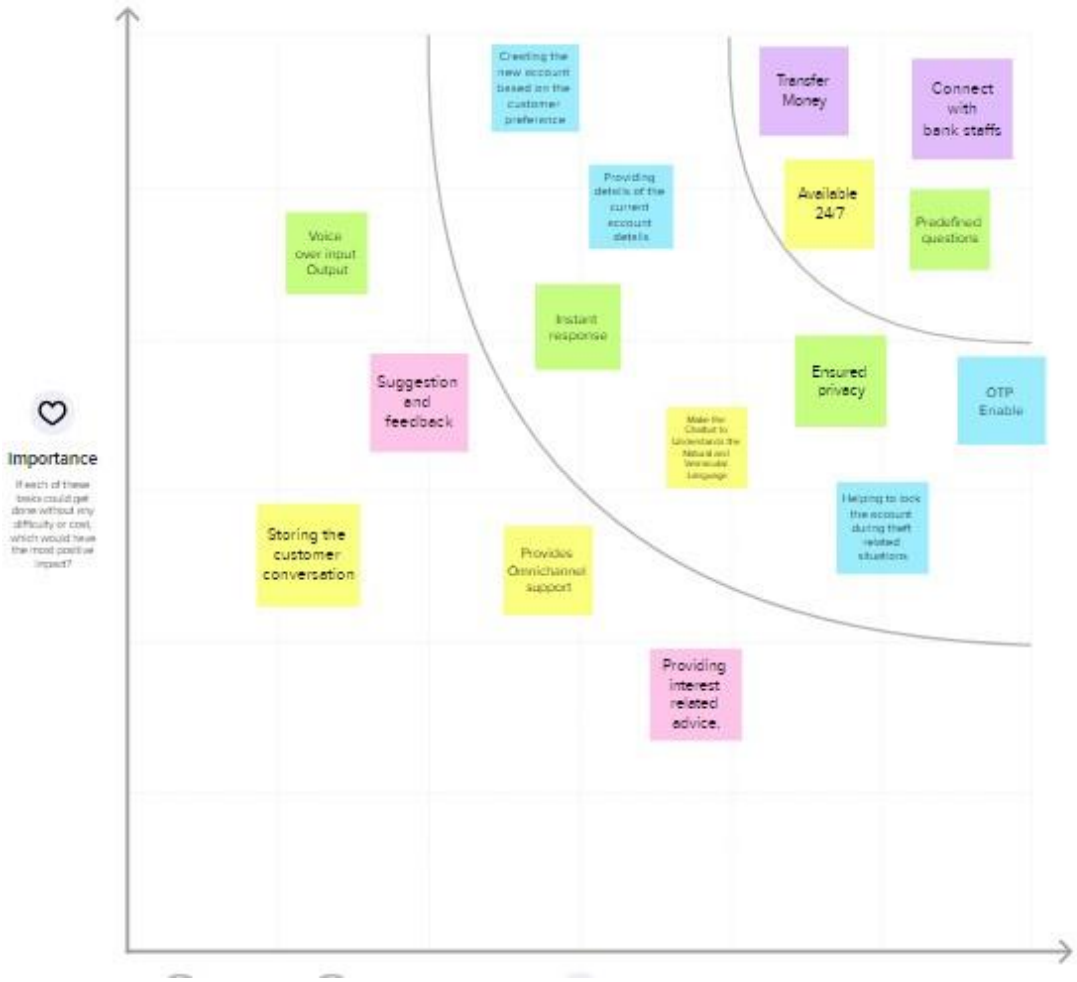


4

Prioritization

The top ideas has been priritized by our team based on importance and feasibility.

20 minutes

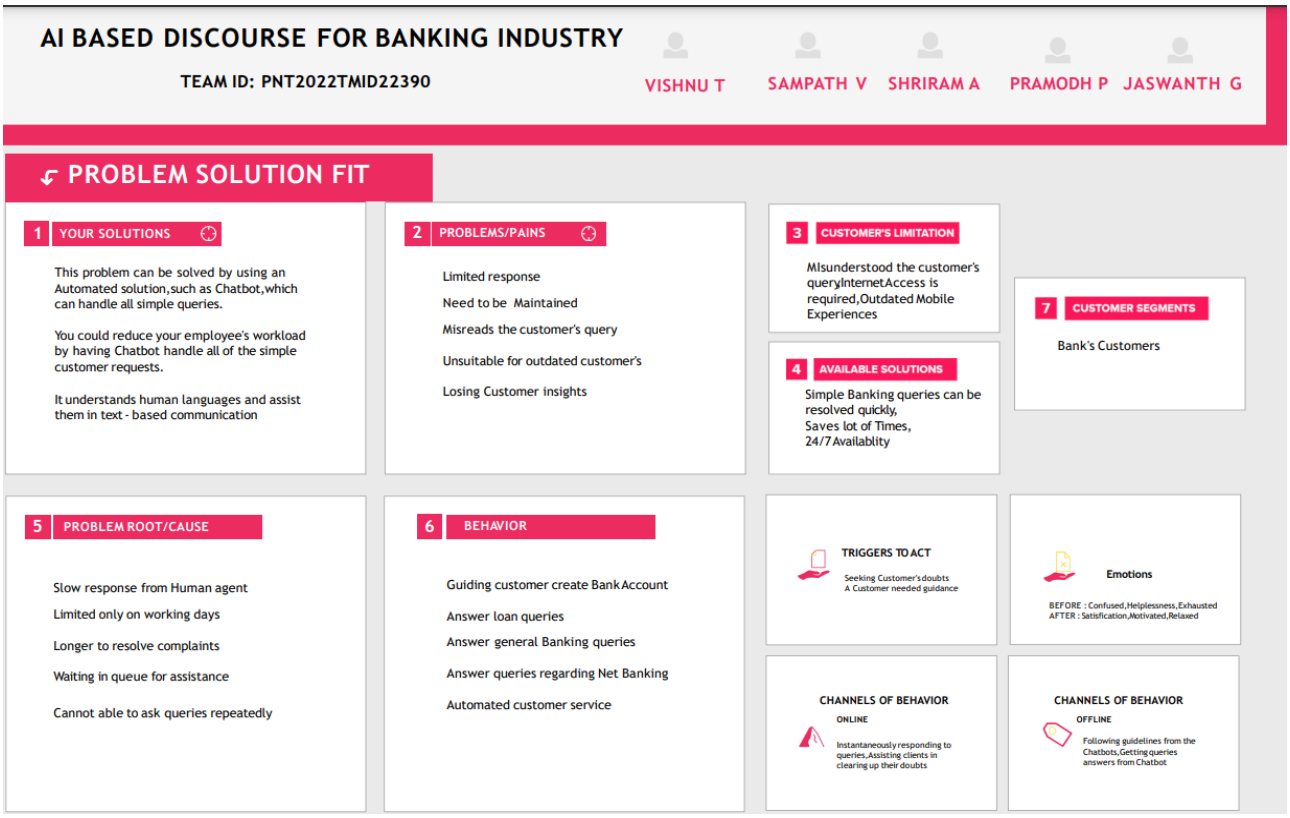


3.3 Proposed Solution

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	In chatbot to avoid the language barriers for the user/customers who can ask bank related questions like to create a bank account, able to answer loan queries, able to answer general banking queries, and also able to answer queries regarding net banking.
2.	Idea / Solution description	To avoid the language barriers, we can create a Chatbot that can respond according to the user/customers languages all over the world.
3.	Novelty / Uniqueness	-create a virtual keyboard with popular and continental languages. -automated smart responses and achieve marketing goals efficiently. -Handling more unique and complex queries. - Connect people globally due to its versatility with multiple languages.
4.	Social Impact / Customer Satisfaction	-can easily communicate with the banking industry. -provide 24/7 support. -analyze customer data and improve services.
5.	Business Model (Revenue Model)	-Most of the chatbot can respond only for English and Hindi but we can add the continental languages. -fits into a packet. -uncomplicated Interface.
6.	Scalability of the Solution	-Consume time. -able to communicate. -it can be used by customers all over the world.

3.4 Problem Solution Fit



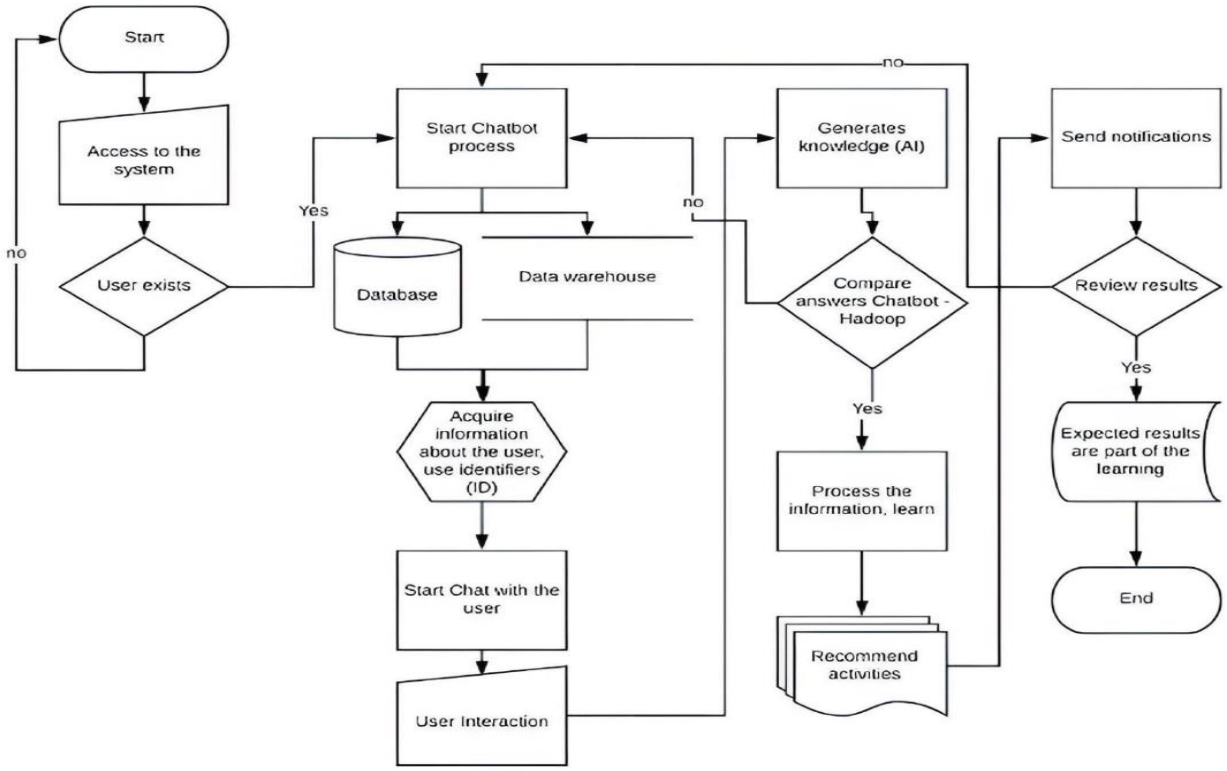
4. Requirement Analysis

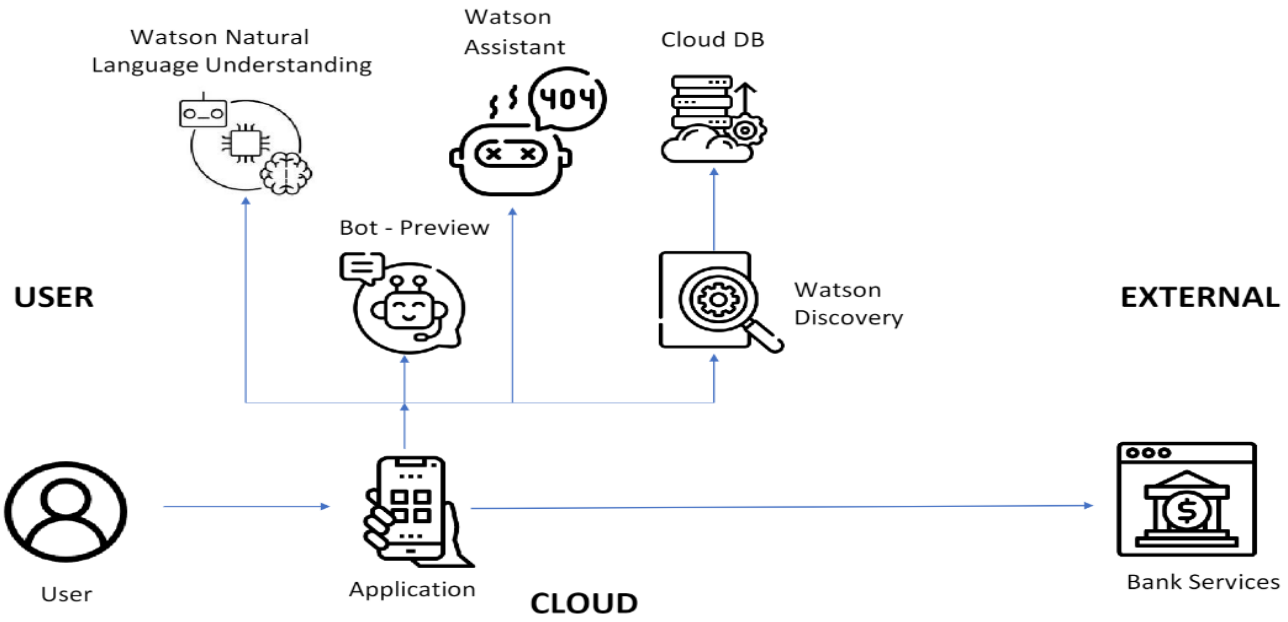
4.1 Functional Requirements

FR No.	Functional Requirement (Epic)
FR-1	User Registration
FR-2	User Confirmation
FR-3	Greeting
FR-4	Help support
FR-5	Set Remainder
FR-6	Announcement
FR-7	Events

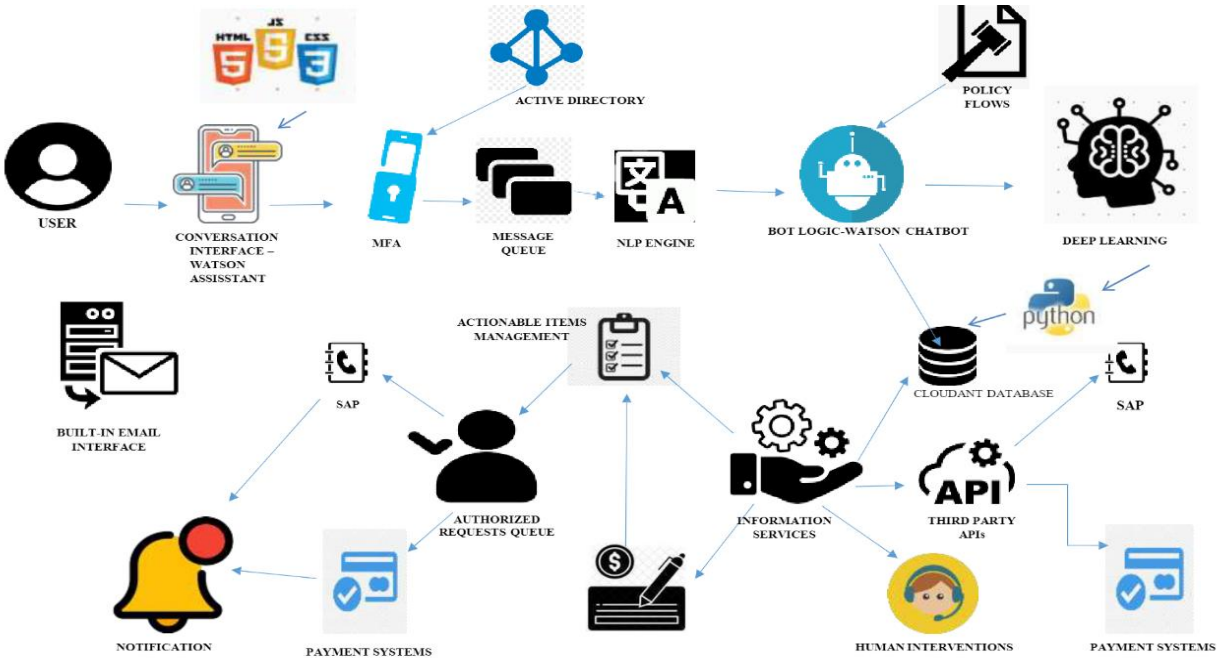
5. Project Design

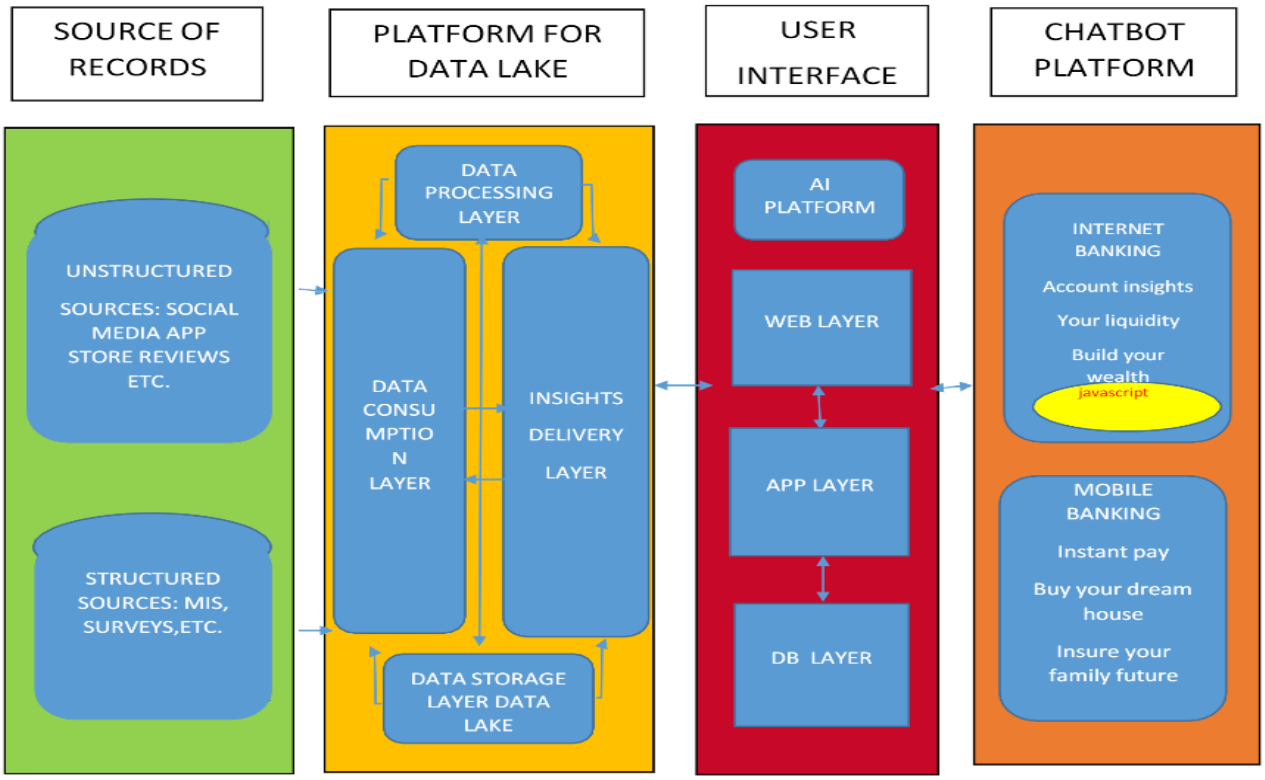
5.1 Data Flow Diagrams





5.2 Solution and Technical Architecture




SOURCE OF RECORDS
PLATFORM FOR DATA LAKE
USER INTERFACE
CHATBOT PLATFORM
UNSTRUCTURED
SOURCES: SOCIAL MEDIA APP STORE REVIEWS ETC.
STRUCTURED SOURCES: MIS, SURVEYS,ETC.
DATA PROCESSING LAYER
DATA CONSU MPTIO N LAYER
INSIGHTS DELIVERY LAYER
DATA STORAGE LAYER DATA LAKE
AI PLATFORM
WEB LAYER
APP LAYER
DB LAYER
INTERNET BANKING
Account insights
Your liquidity
Build your wealth
javascript
MOBILE BANKING
Instant pay
Buy your dream house
Insure your family future

5.3 User Stories

User Story Number	User Story / Task
USN-1	As a user, I can see a Watson Assistant.
USN-2	As a user, I will see the Chatbot having banking-related skills.
USN-3	As a user, I can converse with the chatbotregarding saving account-related queries.
USN-4	As a user, I can converse with the chatbot regarding current account-related queries.
USN-5	As a user, I can converse with the chatbotregarding loan account-related queries.

User Story Number	User Story / Task
USN-6	As a user, I can converse with the chatbotregarding general queries.
USN-7	As a user, I can converse with the chatbotregarding net banking-related queries.
USN-8	As a user, I can see a flask web page for bank.
USN-9	As a user, I can web pages integrated with a chatbot.
USN-10	As a user, I can communicate with the chatbot24*7.

6.PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Create IBM Service	USN-1	As a user, I can see a Watson Assistant.	1	Medium	Sampath V
Sprint-1	Chatbot Skills Creation	USN-2	As a user, I will see the Chatbot having banking-related skills.	1	High	Vishnu T
Sprint-2	Creating Saving Account Action	USN-3	As a user, I can converse with the chatbotregarding saving account-related queries.	2	Medium	Pramodh Arjun
Sprint-2	Creating Current Account Action	USN-4	As a user, I can converse with the chatbot regarding current account-related queries.	2	High	Vishnu T
Sprint-3	Creating Loan Account Action	USN-5	As a user, I can converse with the chatbotregarding loan account-related queries.	2	Medium	Jaswanth Reddy

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Creating General Query Action	USN-6	As a user, I can converse with the chatbotregarding general queries.	2	Medium	Shri Ram
Sprint-3	Creating Net Banking Action	USN-7	As a user, I can converse with the chatbotregarding net banking-related queries.	2	High	Vishnu T
Sprint-4	Creating Assistant & Integrate With Flask Web Page (Build Python Code)	USN-8	As a user, I can see a flask web page for bank.	1	Medium	Sampath V
Sprint-4	Build HTML Code	USN-9	As a user, I can web pages integrated with a chatbot.	1	Medium	Pramodh Arjun
Sprint-4	Run The Application	USN-10	As a user, I can communicate with the chatbot24*7.	1	Medium	Jaswanth Reddy

6.2 Sprint Delivery Schedule:

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

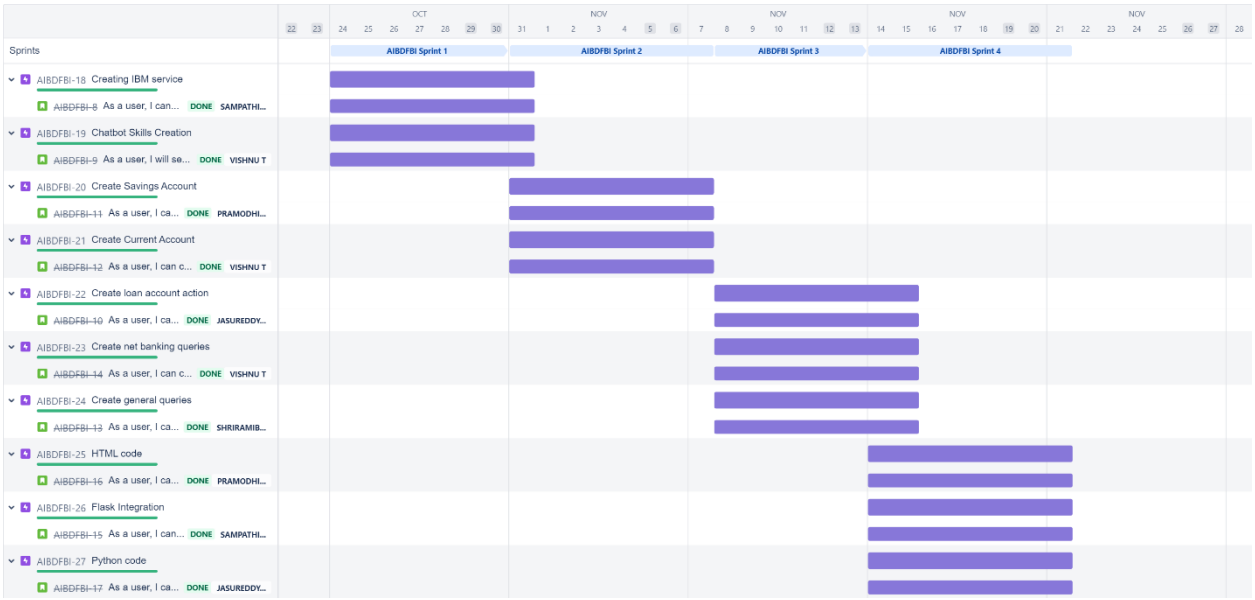
Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) periteration unit (story points per day)

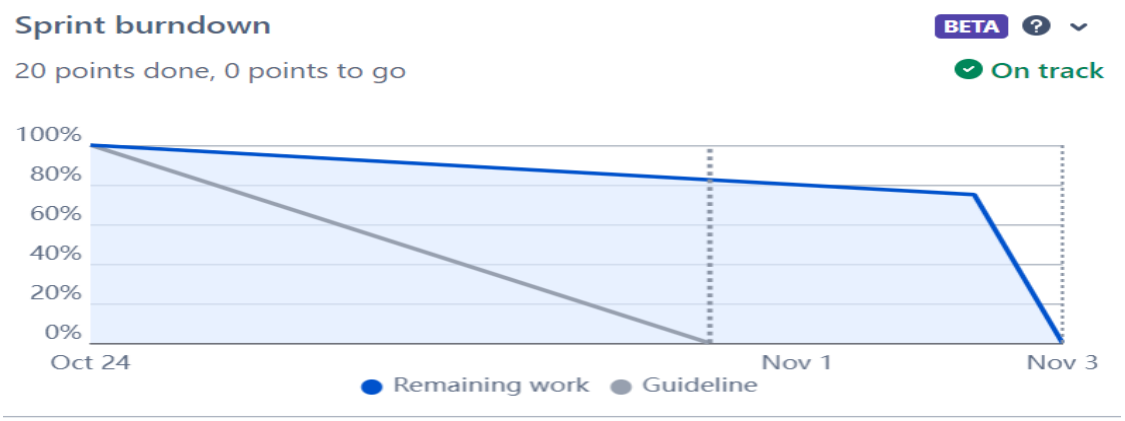
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

6.3 Reports from JIRA:

Sprint 1 to 4:

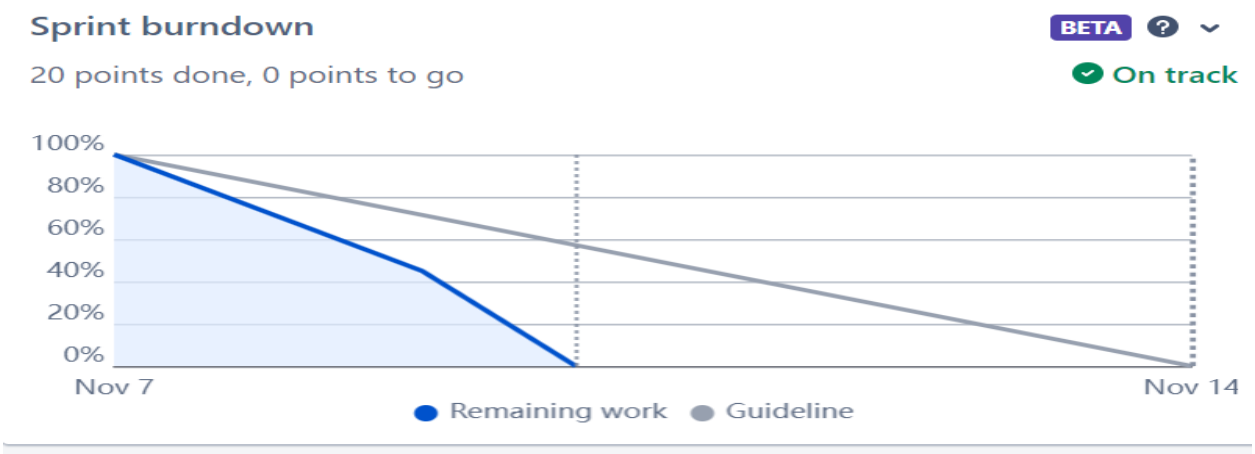


Sprint 1

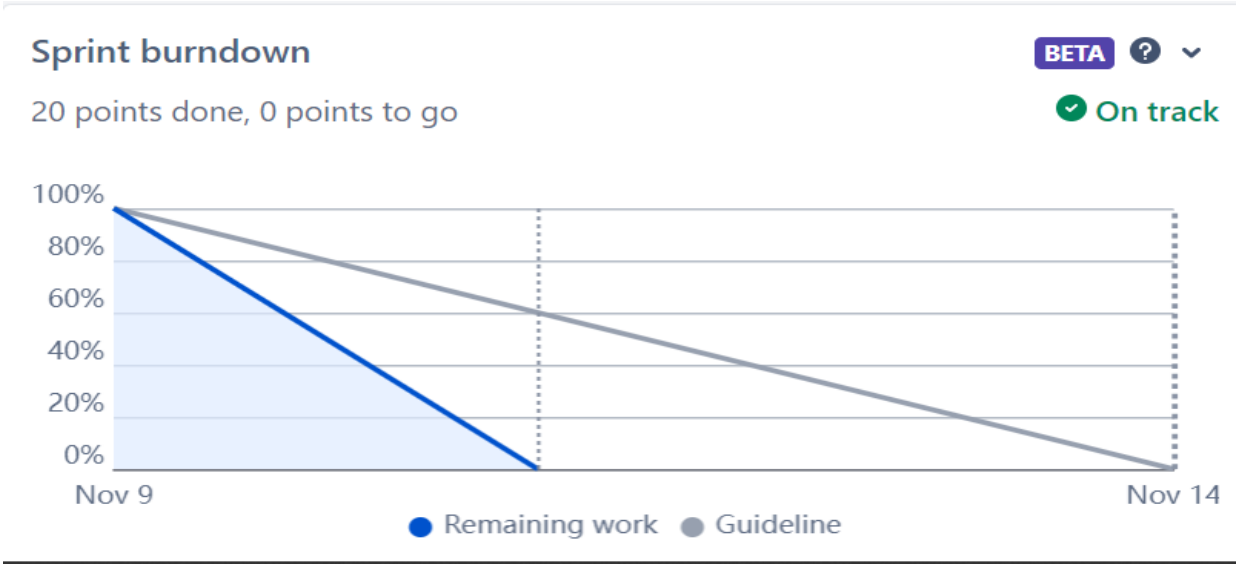


Sprint 2

Sprint 3



Sprint 4

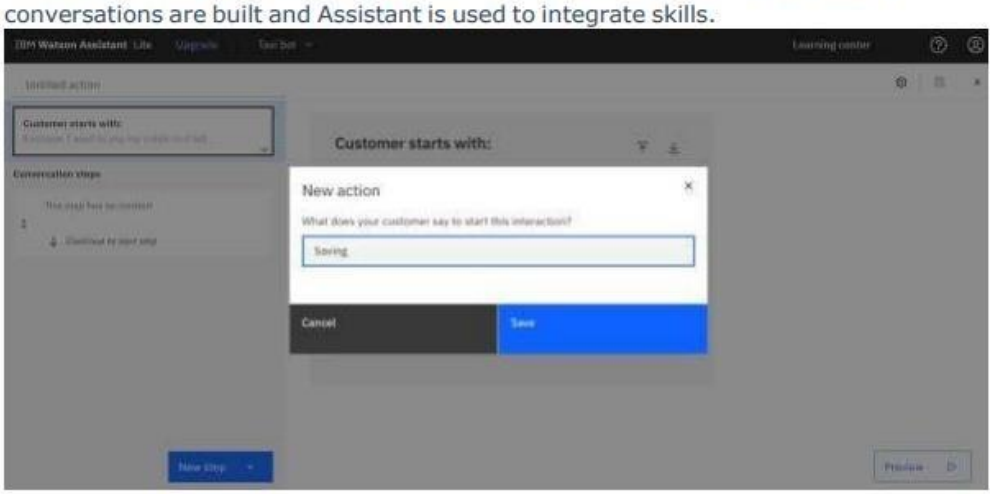


7.CODING & SOLUTIONING

7.1Feature 1

Creating Skills & Assistant For Chatbot

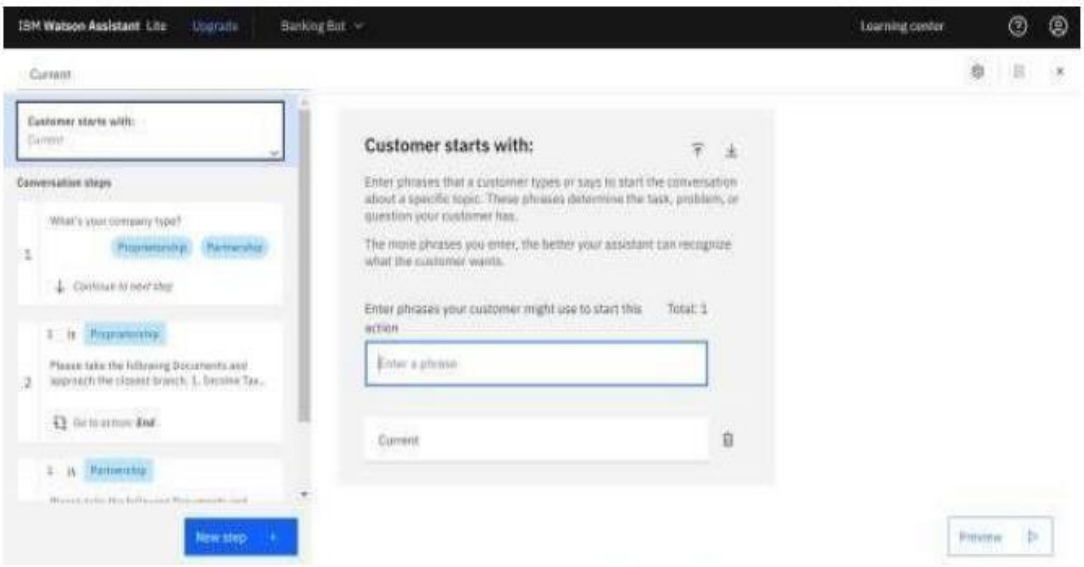
Skills are nothing but actions and steps. Steps are the subset of actions where conversations are built and Assistant is used to integrate skills.



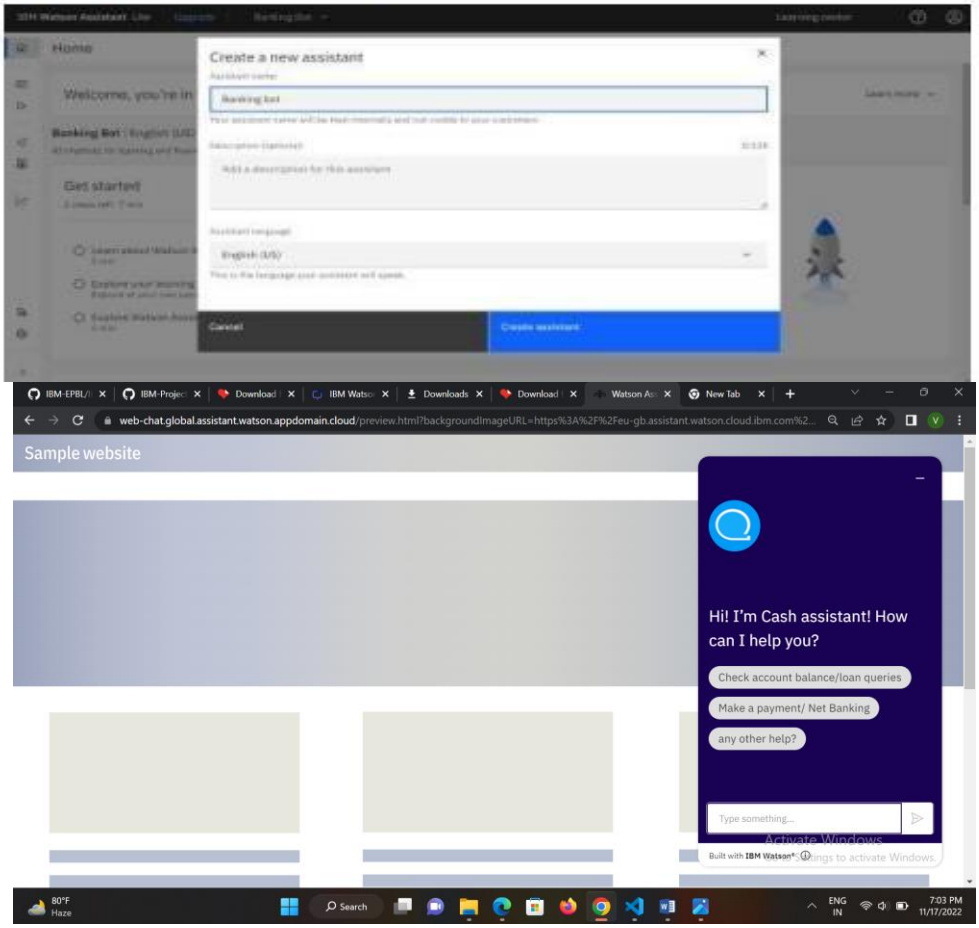
7.2Feature 2

Creating Current Account Action

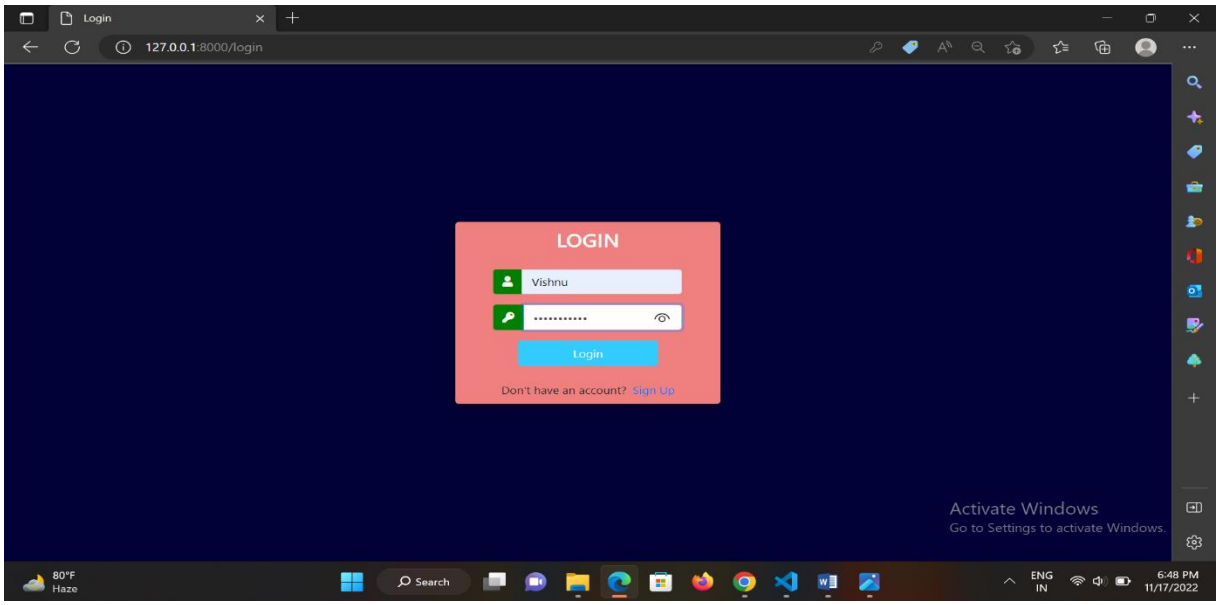
Add steps in savings action.

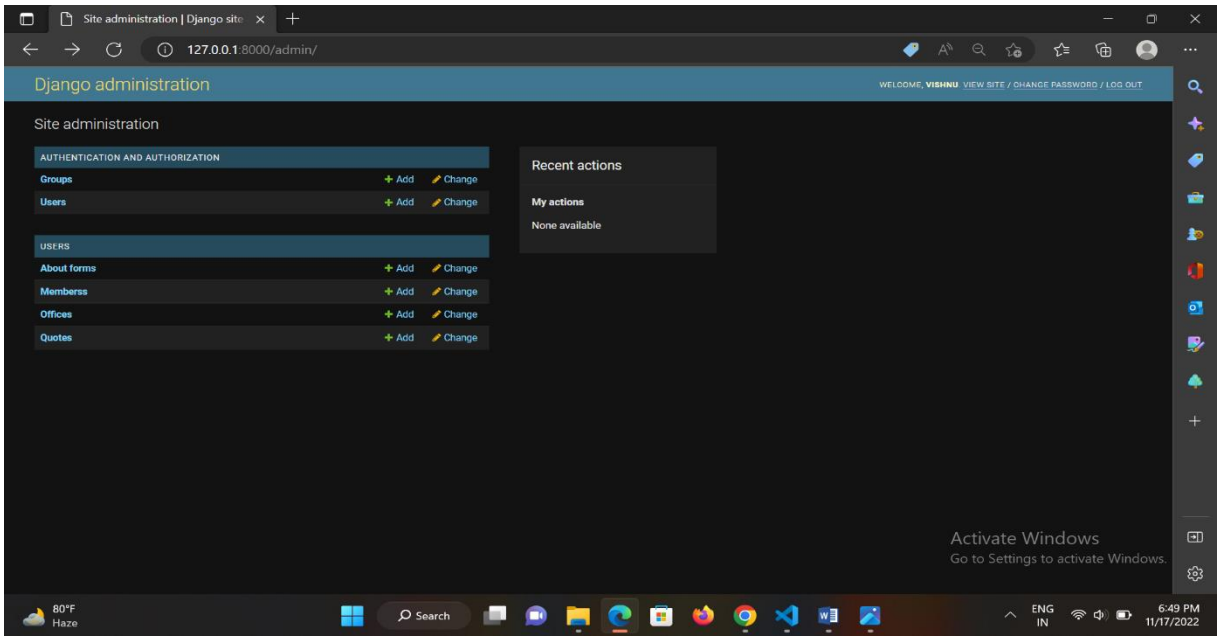


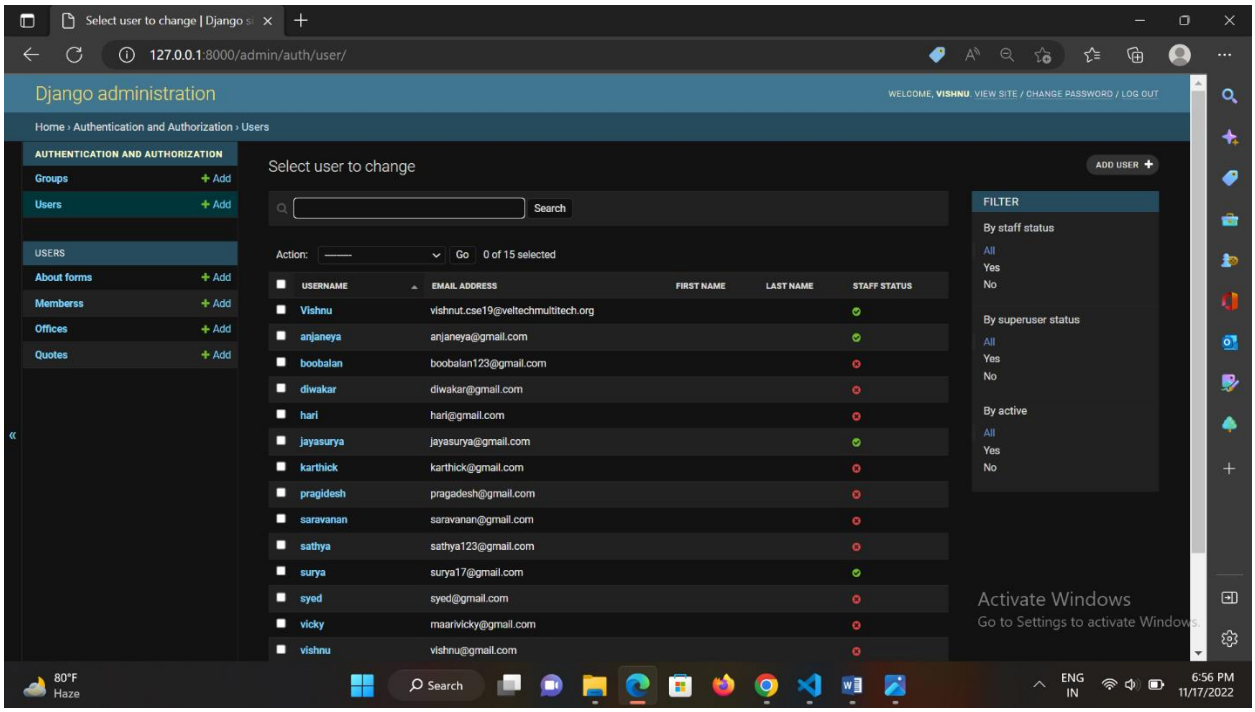
A default template chatbot is created. Need to add actions.



7.3 Database Schemas






Select user to change | Django
127.0.0.1:8000/admin/auth/user/
Django administration
WELCOME, VISHNU. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Authentication and Authorization › Users
AUTHENTICATION AND AUTHORIZATION
Groups + Add
Users + Add
USERS
About forms + Add
Memberss + Add
Offices + Add
Quotes + Add
Select user to change
ADD USER +
Search
Action: ------ Go 0 of 15 selected
USERNAME
EMAIL ADDRESS
FIRST NAME
LAST NAME
STAFF STATUS
Vishnu vishnut.cse19@veltechmultitech.org
anjaneya anjaneya@gmail.com
boobalan boobalan123@gmail.com
diwakar diwakar@gmail.com
hari hari@gmail.com
jayasurya jayasurya@gmail.com
karthick karthick@gmail.com
pragidesh pragadesh@gmail.com
saravanan saravanan@gmail.com
sathya sathya123@gmail.com
surya surya17@gmail.com
syed syed@gmail.com
vicky maarivicky@gmail.com
vishnu vishnu@gmail.com
FILTER
By staff status
All
Yes
No
By superuser status
All
Yes
No
By active
All
Yes
No
Activate Windows
Go to Settings to activate Windows.
80°F
Haze
Search
ENG
IN
6:56 PM
11/17/2022

8.TESTING

8.1Test Cases

	Test Scenarios
1	Verify user is able to see the chatbot icon when website is launched
2	Verify the UI elements in chatbot icon popup
3	Verify user is able to see the greeting from chatbot "Hi! I'm a Banking Bot. How can I help you today? Banking Enquiry Loan"
4	Verify user is able to type query in text field.
5	Verify user is able to get the response from chatbot
6	Verify user whether get the response if the user enter the wrong query also

	Search
1	ChatBot icon should display.
2	After 30 seconds Information about chatbot popup displayed
3	User should see the greeting message from chatbot
4	User able to type the query in text field.
5	Users get the response from chatbot.
6	Kindly reach out to our customer care executive. Contact Us @9999xxx999

8.2User Acceptance Testing

UAT Execution & Report Submission

a) ***Purpose of Document***

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

b) Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	1	0	0	0	1
Duplicate	3	1	0	1	5
External	1	3	0	1	5
Fixed	2	5	3	2	12
Not Reproduced	0	0	0	1	1
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals	7	9	3	5	24

C) Test Case Analysis

This report shows the number of test cases that have passed, failed, anduntested.

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	1	0	0	1
Client Application	1	0	0	1
Security	1	0	0	1
Outsource Shipping	0	0	0	0
Exception Reporting	1	0	0	1
Final Report Output	1	0	0	1
Version Control	1	0	0	1

8.3PERFORMANCE TESTING

Test Report

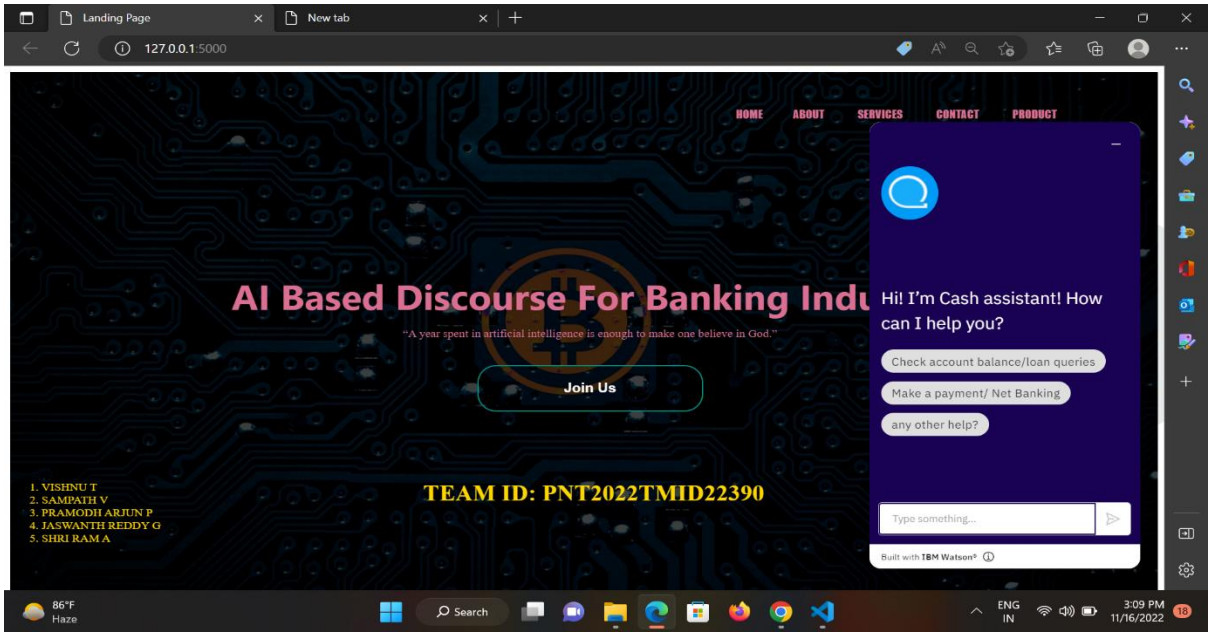
Test Cycle: System Test

EXECUTED	PASSED			130	
	FAILED			0	
	(Total) TESTS EXECUTED (PASSED + FAILED)				130
PENDING					0
IN PROGRESS					0
BLOCKED					0
(Sub-Total) TEST PLANNED (PENDING + IN PROGRESS + BLOCKED + TEST EXECUTED)					130

Functions	Description	% TCs Executed	% TCs Passed	TCs pending	Priority	Remarks
New Customer	Check new Customer is created	100%	100%	0	*High*	
Edit Customer	Check Customer can be edited	100%	100%	0	*High*	
New Account	Check New account is added	100%	100%	0	*High*	
Edit Account	Check Account is edit	100%	100%	0	*High*	
Delete Account	Verify Account is delete	100%	100%	0	*High*	
Delete customer	Verify Customer is Deleted	100%	100%	0	*High*	
Mini Statement	Verify Ministatement is generated	100%	100%	0	*High*	
Customized Statement	Check Customized Statement is generated	100%	100%	0	*High*	

9.RESULTS

9.1Performance Metrics



10 ADVANTAGES & DISADVANTAGES

ADVANTAGES

1. Chatbots have 24/7 Availability: Chatbots can be available to solve customer problems 24/7 whether it is day or night! They don't need to sleep after all! This is much more difficult to achieve using human customer service as it would require rotating teams that would be more complicated to manage as well.

2. Chatbots can gather Customer Insights: Companies thrive on customer data! The more data they have, the better they can cater to their customers and be much more successful. That's where chatbots can be a big help. Whenever you interact with any chatbots on a company page, you provide basic data such as user preferences, buying habits, sentiments, etc. which can then be analysed to understand market trends, operational risks, etc. And using this information, the company can solver customer issues much easier and create targeted products. This will help in increasing their customer loyalty!

DISADVANTAGES

1. Chatbots sound too Mechanical: Chatbots are not human and so obviously they cannot interact as a human with customers. They sound too mechanical and can only give answers to problems that they have been programmed with. They cannot answer a customer according to the context and they cannot show any emotions if needed. Chatbots also cannot maintain a natural-sounding conversation in-depth with customers and that is why they are only useful in solving basic queries. But this can create a disconnect with customers who prefer the human approach when solving their problems.

2. Chatbots can only handle basic Questions: Chatbot are still a basic Artificial Intelligence technology and so they can only answer the basic questions of customers and provide general information that is already available to them. They cannot solve complicated queries or answer out of script questions and companies need to have human customer service employees that can manage these for them. However, this is changing with time and currently, more and more advanced chatbots are entering the market.

11.CONCLUSION

In this paper we have provided a survey of relevant works of literature on the subject, and we have analysed the state of the art in terms of language models, applications, datasets used, and evaluation frameworks. We have also underlined current challenges and limitations, as well as gaps in the literature. Despite technological advancements, AI chatbots are still unable to simulate human speech. This is due to a faulty approach to dialogue modeling and a lack of domain-specific data with open access. For Information Retrieval chatbots, there is also a lack of a learnt AI model. There is still a gap to be closed in terms of applications between Industry models and current advancements in the sector. Large models necessitate a lot of computing power and a lot of training data. There is no universal framework for evaluating chatbots. Several models depend on human evaluation, yet human evaluation is expensive, time-consuming, difficult to scale, biased, and lacks coherence. A new, reliable automatic evaluation approach should be provided to overcome these restrictions.

12 FUTURE SCOPE

Chatbots are Now Based on Natural Language Processing(NLP)

The goal is to allow users and Artificial Intelligence to communicate naturally and understand complex requests. This would mean that customer service agents would be able to focus on other tasks while the AI takes care of customers' queries. Chatbots in finance, in the digital banking and healthcare industries might save more than 12 billion USD in a year by 2022. According to several estimates, financial organizations might save 2 trillion USD by 2030 by implementing artificial intelligence and cutting costs by 35%.In the digital banking business, banks with Chatbots can automate a variety of functions in addition to enhancing everyday operations and the universal consumer experience as fund transfer, Notifications & Alerts at the Right Time, Get help from a Customer Service Representative, simple lead generation.

13 APPENDIX

Source Code:

```
{% load static %}

<!DOCTYPE html>

<html lang="en">

<head>

   <meta charset="UTF-8">

   <meta http-equiv="X-UA-Compatible" content="IE=edge">

   <meta name="viewport" content="width=device-width, initial-
scale=1.0">

   <title>Landing Page</title>

   <link rel="stylesheet" href="{% static 'css/landingpage.css' %}">

   <style>

      body{
```

```
        background-attachment: fixed;

        overflow: hidden;



    }

    .banner{

        width: 100%;

        height: 100vh;

        background-image: linear-
gradient(rgba(0,0,0,0.75),rgba(0,0,0,0.75)),
url(static/img/background1.jpg);

        background-size: fixed;

        background-repeat: no-repeat;

        background-position: fixed;

        background-position: center;
```

```
}

.navbar{

    width: 85%;

    margin: auto;

    padding: 35px;

    display: flex;

    align-items: center;

    justify-content: space-between;

}

.logo{

    width: 120px;

    cursor: pointer;
```

```
    padding-left: -20px;

    background-color: black;

    background-blend-mode: multiply;

}



.navbar ul li{

    list-style: none;

    display: inline-block;

    margin: 0 20px;



}

.navbar ul li a{

    text-decoration: none;

    color: palevioletred;
```

```
    text-transform: uppercase;

    font-family:fantasy;



}



.navbar ul li a ::after{

    content: '';

    height: 3px;

    width: 100%;

    background: 009688;

    position: absolute;

    left: 0;

    bottom: -10;

    transition: 0.05;
```

```
}

.navbar ul li a :hover::after{

    width: 100%;



}

.content{

    width: 100%;

    position:absolute;

    top: 30%;

    transform: translateY(-50);

    text-align: center;

    color: palevioletred;

}
```

```
.content1{
    width: 100%;
    position:absolute;
    bottom: 50px;
    transform: translateY(-50);
    text-align: left;
    color: gold;
    padding-inline-start: 2px;
}

.content1 h1{
    width: 100%;
    position:absolute;
```

```
    bottom: 50px;

    transform: translateY(-50);

    text-align: center;

    color: gold;

    padding-inline-start: 2px;

}



.content h1{

    font-size: 50px;

    margin-top: 90px;

    line-height: 25px;

    font-family: 'Segoe UI', Tahoma, Geneva, Verdana, sans-serif;



}
```

```
button{
    width: 300px;
    padding: 20px 0;
    text-align: center;
    margin: 20px 10px;
    border-radius: 25px;
    font-weight: bold;
    border: 2px solid #009688;
    color: #fff;
    cursor: pointer;
    background: transparent;
    font-size: larger ;
    position: relative;
```

```
}

span{

    background: #e6ebea;

    width: 100%;

    height: 100%;

    border-radius: 25px;

    position: absolute;

    left: 0;

    bottom: 0;

    z-index: -12;

    transition: 0.4s;

    color: white;
```

```
        }
        button :hover span{
            width: 100%;
        }
        button:hover{
            border: none;
        }
    </style>
</head>
<body>
```

```
        <div class="banner">

            <div class="navbar">

                <img src="{% static 'static/img/logo.png'%}" class="logo"
alt="">

                <ul>

                    <li><a href="#" class="">Home</a</li>

                    <li><a href="#"class="">About</a></li>

                    <li><a href="#"class="">Services</a></li>

                    <li><a href="#"class="">Contact</a></li>

                    <li><a href="#"class="">Product</a></li>



                </ul>

            </div>
```

```
        <div class="content">
            <h1>AI Based Discourse For Banking Industry</h1>
            <p>“A year spent in artificial intelligence is enough to make one believe in God.”<span>—Alan Perlis</span></p>
            <div>
                <a href="{% url 'register' %}"><button type="button"><span></span>Join Us</button></a>
            </div>
        </div>
    <div>
        <div class="content1"><h1>TEAM ID: PNT2022TMID22390</h1>
            <ol>
                <li class="one">VISHNU T</li>
                <li class="two">SAMPATH V</li>
                <li class="three">PRAMODH ARJUN P</li>
```

```
                <li class="four">JASWANTH REDDY G</li>

                <li>SHRI RAM A</li>

              </ol>

            </div>

          </div>



          <script>

            window.watsonAssistantChatOptions = {

            integrationID: "77c74feb-c1a6-4cac-85ff-d19401c2d534", // The
ID of this integration.

            region: "eu-gb", // The region your integration is hosted in.

            serviceInstanceID: "2b994459-1a5a-45a0-8955-89a6fd927161",
// 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:

```
    from flask import Flask,render_template

    app = Flask(__name__)
```

```
@app.route('/Chatbot', methods =
['GET','POST'])

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

if__name__ == '__main__':
 app.run()
```

Django framework:

```
#!/usr/bin/env python
"""Django's command-line utility
for administrative tasks."""
import os
import sys



def main():
    """Run administrative
tasks."""

os.environ.setdefault('DJANGO_SETT
INGS_MODULE', 'Tesla.settings')
    try:
        from
django.core.management import
execute_from_command_line
    except ImportError as exc:
        raise ImportError(
            "Couldn't import
Django. Are you sure it's
installed and "
            "available on your
PYTHONPATH environment variable?
```

```
Did you "
            "forget to activate a
virtual environment?"
        ) from exc

execute_from_command_line(sys.argv
)



if __name__ == '__main__':
    main()
```

Github & project demo link: