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Department of Electronics and Communication Engineering
IBM NALAIYA THIRAN
PROJECT REPORT

TITLE : AI based discourse for Banking Industry
DOMAIN NAME : Artificial Intelligence
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TEAM MEMBER NAME : Santhosh D
Siva R
Surya S
MENTOR NAME : Mahesh Kumar K

CONTENTS

1. INTRODUCTION

1. Project Overview
2. Purpose

2. LITERATURE SURVEY

1. Existing problem
2. References
3. Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

1. Empathy Map Canvas
2. Ideation & Brainstorming
3. Proposed Solution
4. Problem Solution fit

4. REQUIREMENT ANALYSIS

1. Functional requirement
2. Non-Functional requirements

5. PROJECT DESIGN

1. Data Flow Diagrams
2. Solution & Technical Architecture

3. User Stories

6. PROJECT PLANNING & SCHEDULING

1. Sprint Planning & Estimation

2. Sprint Delivery Schedule

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

1. Feature 1

2. Feature 2

8. RUNNING THE APPLICATION

9. RESULTS

1. Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Output Screenshots

GitHub & Project Demo Link

1.INTRODUCTION

Digital technologies are connecting billions of consumers and allow the deployment of low cost connected devices in every business sector. The current generation is adjusted to the digital environment and naturally expects services and products to meet the current digital technology standards. Further, investments into digital technologies and businesses have risen and are rewarded by the public markets (PWC Editorial, 2016). Artificial intelligence (AI) technologies are part of this development and the banking sector is hereby deemed to see a major impact. According to a report by Accenture, a global management consulting and professional services company, four out of five bankers assume that AI is going to revolutionise the way banking is executed. The report suggests that artificial intelligence will affect banking by enhancing the customer experience. Banking products and service may become increasingly personalised giving customers the impression that their banking institutes know their specific habits and needs (Accenture, 2016). But the introduction of AI technologies comes with potential challenges and risks. Banks are processing highly sensitive data. Thus, privacy and data security concerns are essential elements of the process.

1.1. Project Overview

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

1.2.PURPOSE

The main purpose of this project is to build a chatbot using watson's assistant that helps banks for automating business processes such as customer service by providing Accurate, Easy, and Interactive banking transactions. The other significant purpose of the project is as follows:

- To ensure easier banking process.
- To minimize the time consumption.
- To has 24*7 accesses to the bank

2.LITERATURE SURVEY

Banks are constantly forced to transform their operations in order to stay relevant complex and competitive sector. To do so, the key is in maintaining customer loyalty which includes addressing the aspects of customer trust, satisfaction, commitment and perceived value [1]. Constant improvements on customer service and the use of advanced technologies can redefine the processes of banking services as proven by Google and Facebook. Yet, many conventional banking services providers fail to provide the needed flexibility and innovative capabilities. Hence, FinTech's are deemed as the more viable breakthrough to conventional banking service sectors [2].

Conventional banking sectors will hence need to gradually employ the use of AI to retain public trust and remain competitive. The definition of AI encompasses numerous sub-fields with various emphases based on the corresponding historical and technical origins. This study defines artificial intelligence as how to make computers do things at which, at the moment, people are better. Adaptability to environments and behaviours remains a particular human quality, but it is now gradually being substituted by machine learning. machine learning entails the capability of systems or applications to learn minus any explicit programming [5]. AI engines are now being offered by all major software providers including Amazon, IBM Watson and Microsoft Azure. Many of the providers in turn enjoy the same market visibility as the start-ups.

REFERENCES

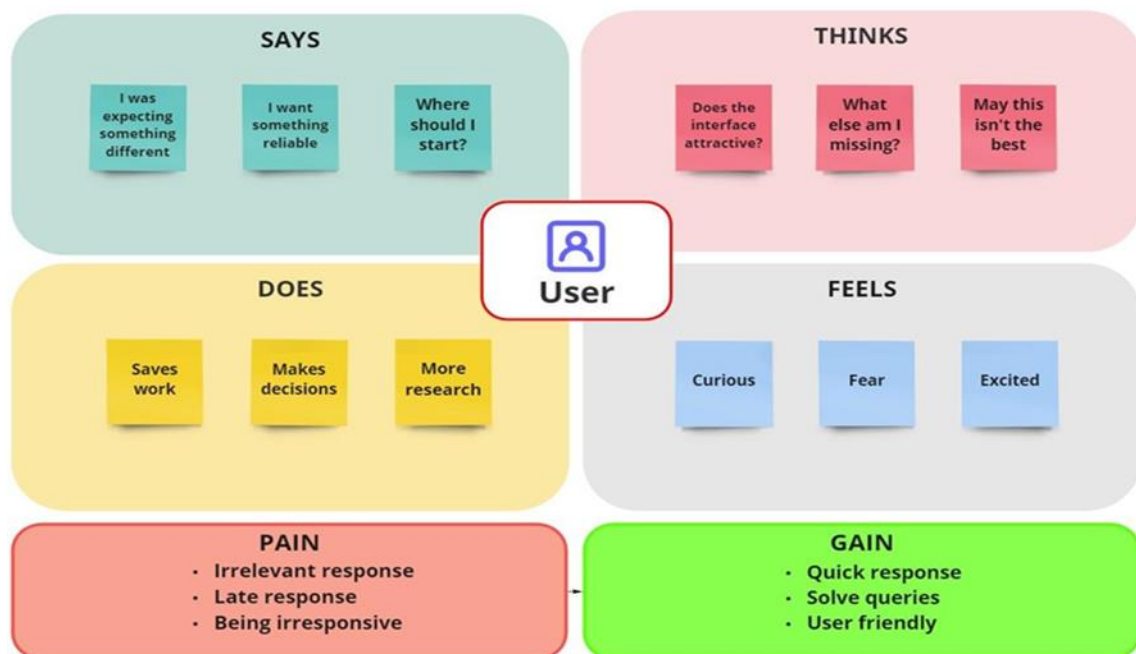
- [1] Ansari A, Riasi A. Modelling and evaluating customer loyalty using neural networks: Evidence from start-up insurance companies. *Future Business Journal*. 2016 Jun 1;2(1):15- 30.
- [2] Inn, L., “Fintech: Ecosystem and Business Models”, *Advanced Science and Technology Letters*, Vol. 142, UNESST, 2016, pp. 57-62
- [3] Etlinger S. *The Conversational Business: How chatbots will reshape digital experiences*. Altimeter Group-Research Reports. 2017:1-29.
- [4] Sauerland, A., “Von der robotergestützten Beratung bis zum Cognitive Banking, Finanzierung Leasing Factoring (FLF), Heft 4/2017, 2017, p. 180
- [5] Chollet F. *Fundamentals of machine learning*. In *Deep Learning with Python 2017*. Manning Publications Co

CUSTOMER PROBLEM STATEMENT:

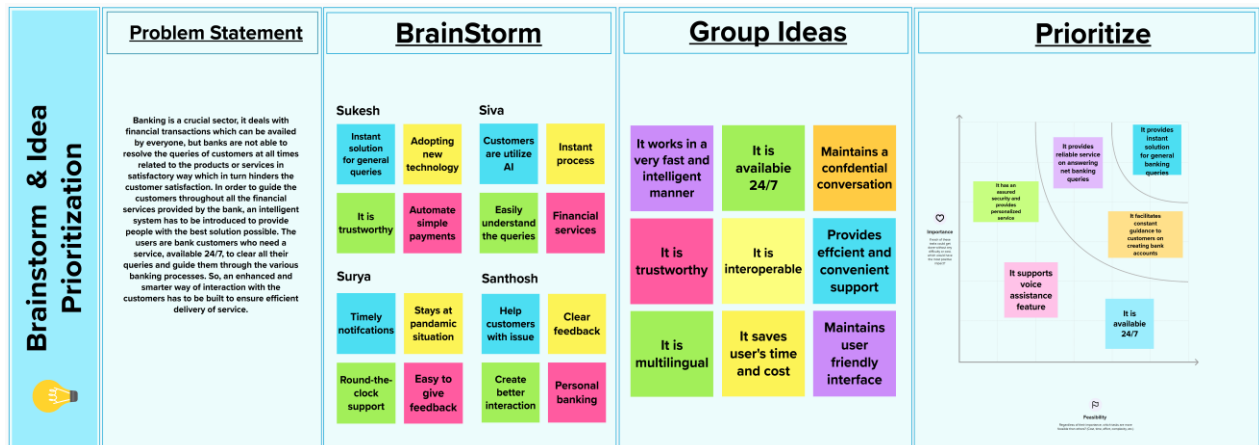
Banking is a crucial sector, it deals with financial transactions which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way which in turn hinders the customer satisfaction. In order to guide the customers 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 need a service, available 24/7, to clear all their queries and guide them through the various 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, a 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.

3.IDEATION & PROPOSED SOLUTION:

3.1. EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTORMING:



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, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way which in turn hinders the customer satisfaction. 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 need a service, available 24/7, to clear all their queries and guide them through the various banking processes.
2.	Idea / Solution description	Customers need to visit banks frequently for simple queries. Banks are not able to answer huge volumes of customers queries efficiently. We have an idea to solve customers who have queries related to banking or trying to use various services of the bank
3.	Novelty / Uniqueness	When the customer is unable to visit a bank, it addresses the queries of customers immediately.
4.	Social Impact / Customer Satisfaction	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. It is user friendly.

5.	Business Model (Revenue Model)	Cost effective. It addresses the queries of customers immediately and effectively in a costefficient manner.
6.	Scalability of the Solution	Artificial intelligence mimics the human brain in order to make chatting with the chatbot.

3.4 PROBLEM SOLUTION FIT:

1. CUSTOMER SEGMENTS > Loans > Bank Account > Money Transfer	6. CUSTOMER CONSTRAINS > Difficult to find answer in website > Unsupported application > Install Bank apps and with proper internet	5. AVAILABLE SOLUTIONS > Locking or resetting cards > Solve queries through email
2. PROBLEMS / PAINS > Visit bank and wait for long time to solve customer queries > Bank employees are not available at every time > Bank employees are not feel free to talk	9. PROBLEM ROUTE CAUSE > Customers don't want to visit bank every time for bank > Customers want to know their queries status immediately > Privacy of customer data	7. BEHAVIOUR > Late and irresponsible response from bank > Waiting more time on bank issues creates disappointment
3. TRIGGERS > Bank need to work fast with technology > 24*7 Assistance 4. EMOTIONS > Before : Long waiting time (time waste) with irritation > After : Feel comfortable with bank	10. SOLUTION > Using Artificial intelligence with IBM Watson assistant to mimic human conversation in the proposed model to analyze customer data accurately and improve quality of service > Chatbot helps more in quires section and solve customer issues	8. CHANNEL OF BEHAVIOUR > Online : Trustworthy customer support from chatbot > Offline : Conversation among customers

miro

4.REQUIREMENT ANALYSIS:

4.1FUNCTIONAL REQUIREMENT:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR - 1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR - 2	User Confirmation	Confirmation via Email Confirmation via OTP
FR - 3	Analysing the User Data	Analysing through the registered form by user and providing the LOS or no need of LOS.

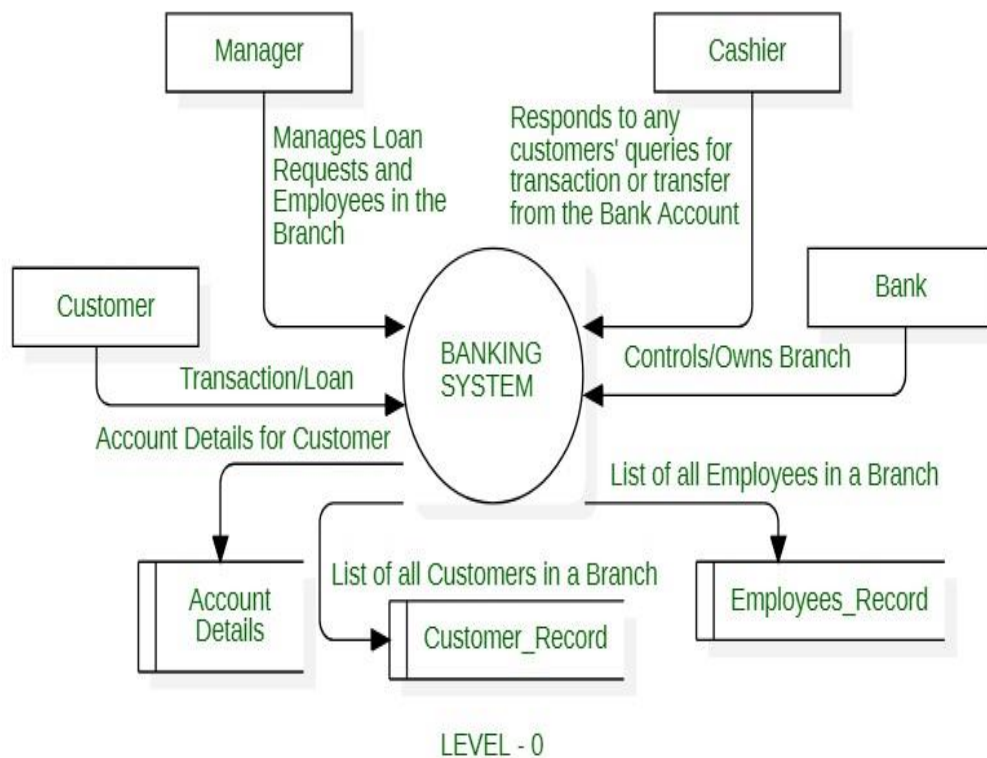
FR - 4	Display the Data	Dashboard display the process and update
FR - 5	Savings Account Related Actions	Used to see the type of Savings Account Creation Details, Interest Rate, Minimum Balance, Debit Card, Credit Card.
FR - 6	Queries Related Actions	Bank Working Days, List of Branches, Storage Locker Facility
FR - 7	Net Banking	Login Steps, Change Net Banking Password, Daily Limit

4.2. NON-FUNCTIONAL REQUIREMENT:

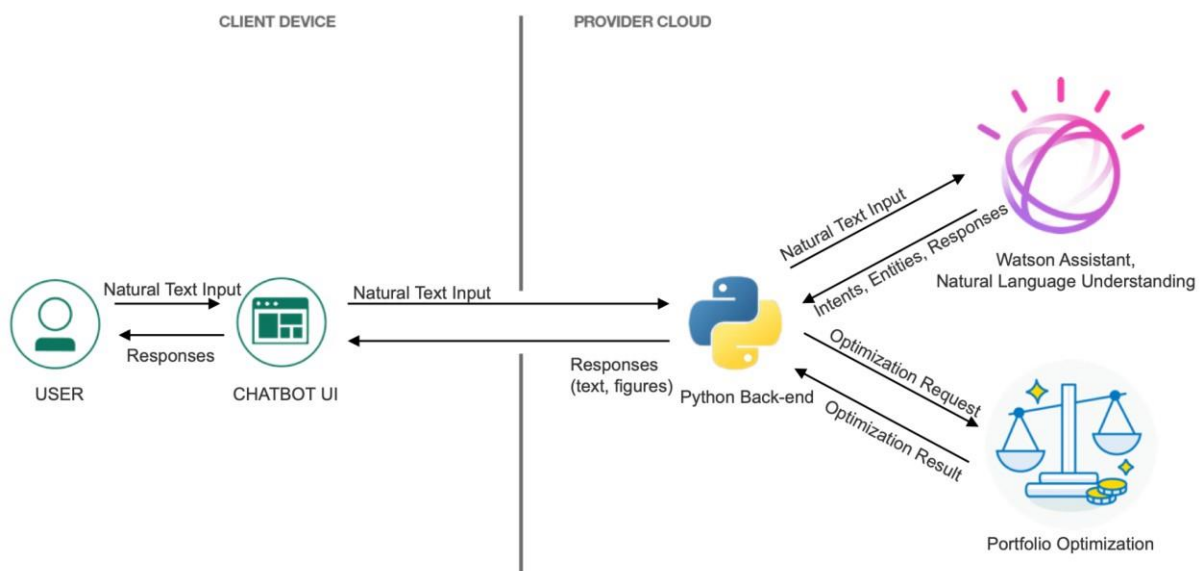
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	It is very user-friendly application as we are using the visualizations techniques for easy understanding of the LOS
NFR-2	Security	We can secure the patients data with appropriate caution and take smart decisions. Restrict Access to Data and Applications.
NFR-3	Reliability	Chatbots are trained very well using AI to provide solutions for the popular and frequently asked questions, thereby providing the best suited service quickly. Thus, AI Chatbots has a reliable end-user experience.
NFR-4	Performance	AI Chatbots is a great way to overcome the limitation of workload of humans. There can be multiple instances of a single chatbot inquiring different people at the same time. Such chatbots work in real time with no need for the customers to wait
NFR-5	Availability	AI Chatbots provides 24/7 service to clear all customer queries and guide them through all the

5.PROJECT DESIGN:

5.1.DATA FLOW DIAGRAMS:



5.3. SOLUTION ARCHITECTURE:



5.3.USER STORIES:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	As a user, I can get the application completion status and files to be required to create the account.	I can receive completion status and create the account.	Low	Sprint - 2
Customer (Web user)	Registration	USN-1	As a web user, I can go through many social media websites, get the details and I can register for the application	I can access my application dashboard	High	Sprint - 1
		USN-2	As a user, I can get the details of the application through email.	I can receive confirmation email to link my application	Medium	Sprint – 1
	Login	USN-3	As a user, I can link my google account to register my application.	I can register my application.	High	Sprint – 1
	Dashboard	USN-4	As a user, I can manage and get a detailed view of the application	Any changes in the application comes to my knowledge while checking dashboard.	Low	Sprint - 2
Customer Care Executive	IBM Watson		AI based IBM Watson provides full support for the customer to guide and create new banking account	I can fill the respective details in the respective field	High	Sprint - 1
User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release

6.PROJECT PLANNING & SHEDULING

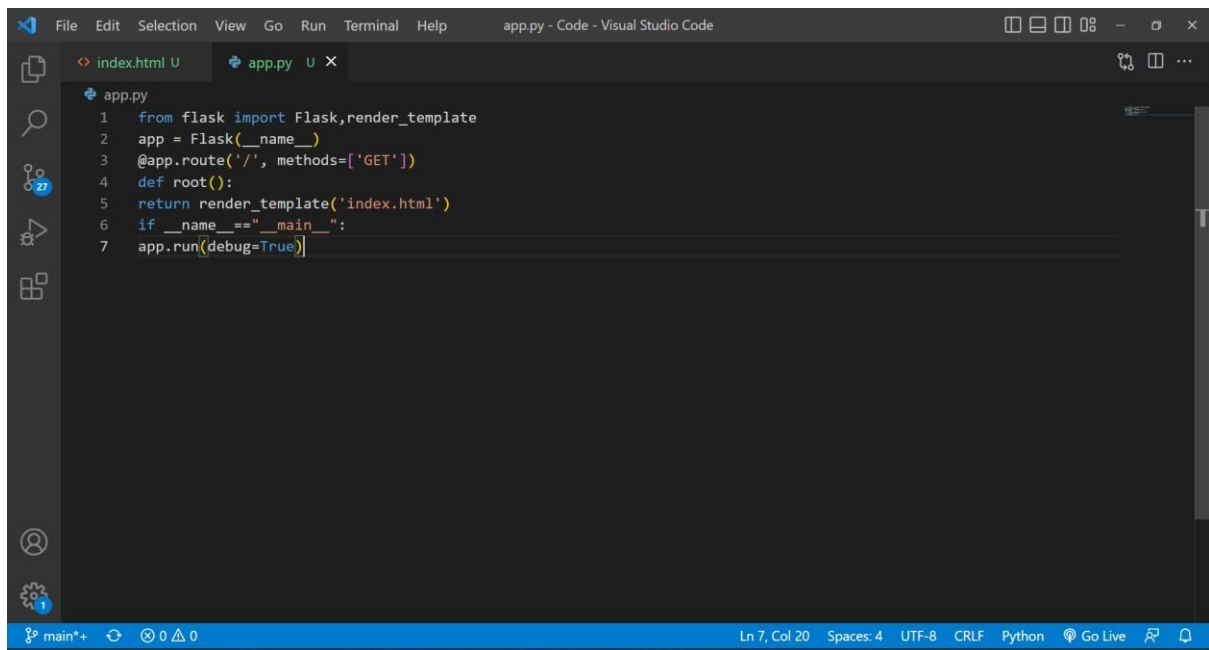
6.1. PROJECT PLANNING & ESTIMATION

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 view Watson's assistant.	1	High	Sukesh S Santhosh D
Sprint-1	Create Chatbot skills	USN-2	As a user, I can use a basic chatbot setup.	1	High	Surya S Siva R
Sprint-1	Creating Saving account action	USN-3	As a user, I can send queries related to Saving account creation and get relevant response from the chatbot.	2	Medium	Sukesh S Santhosh D
Sprint-1	Creating Current account action	USN-4	As a user, I can send queries related to Current account creation and get relevant response from the chatbot.	2	Medium	Surya S Siva R
Sprint-2	Creating Loan account action	USN-5	As a user, I can send queries related to Loan account creation and get relevant response from the chatbot.	2	Medium	Sukesh S Santhosh D
Sprint-2	Creating Net banking action	USN-6	As a user, I can send queries related to Net banking action and get relevant response from the chatbot.	2	Medium	Surya S Siva R
Sprint-2	Creating General Banking Query Action	USN-7	As a user, I can send General Banking queries and get relevant response from the chatbot.	2	Medium	Sukesh S Santhosh D
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Creating Assistant & Integrate With Flask Web Page (Build Python Code)	USN-8	As a user, I can view the chatbot integrated with Flask Web Page.	2	High	Surya S Siva R
Sprint-4	Build HTML Code	USN-9	As a user, I can view the chatbot integrated with a web page.	2	High	Sukesh S Santhosh D
Sprint-4	Run the Application	USN-10	As a user, I can send queries to the chatbot and get relevant responses 24*7	1	High	Surya S Siva R

7.CODING AND SOLUTION:

Build Python Code Main.py python file:

```
from flask import Flask,render_template app =  
Flask(__name__)  
@app.route('/', methods=['GET']) def root():  
return render_template('index.html') if  
__name__=="__main__":  
app.run(debug=True)
```

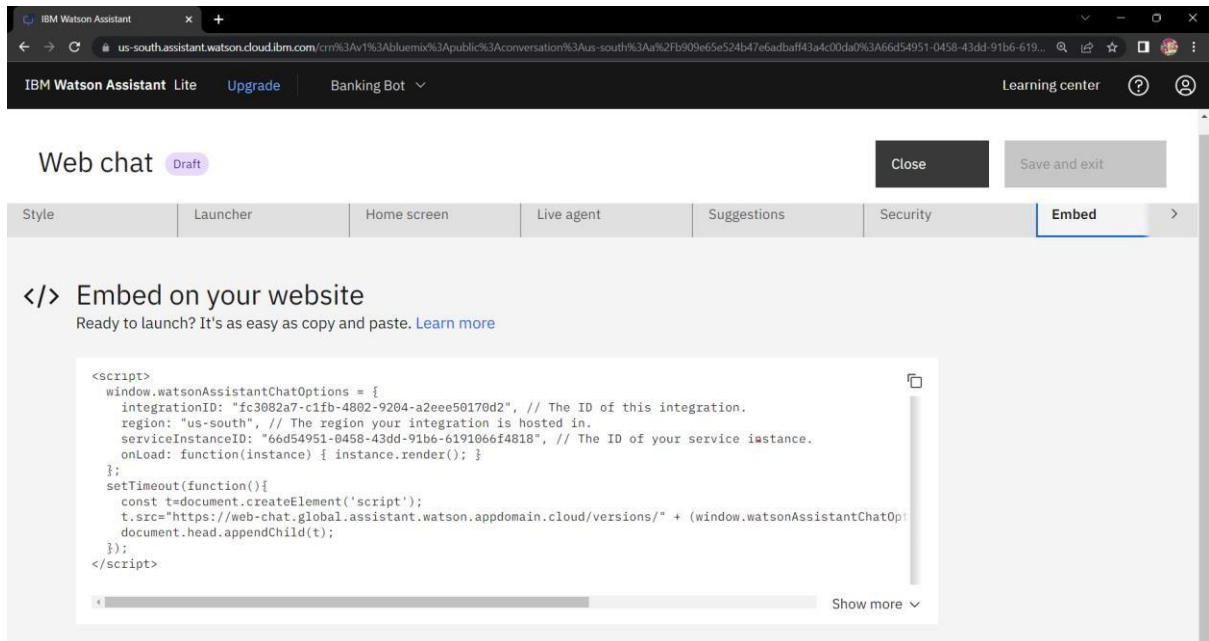
A screenshot of the Visual Studio Code editor interface. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, and Help. The title bar reads 'app.py - Code - Visual Studio Code'. The Explorer sidebar on the left shows two files: 'index.html' and 'app.py'. The main editor area displays the content of 'app.py', which contains the following Python code:

```
1 from flask import Flask,render_template  
2 app = Flask(__name__)  
3 @app.route('/', methods=['GET'])  
4 def root():  
5     return render_template('index.html')  
6 if __name__=="__main__":  
7     app.run(debug=True)
```

The status bar at the bottom indicates 'main*+', 'Ln 7, Col 20', 'Spaces: 4', 'UTF-8', 'CRLF', 'Python', 'Go Live', and a bell icon.

Build HTML Code:

Watson Assistant Integration Details



```
<script>  window.watsonAssistantChatOptions = {
  integrationID: "e9dc8346-7c82-45c0-b801-acece560ab06", // The ID of this integration.   region:
"us-south", // The region your integration is hosted in.
  serviceInstanceID: "dd5c877a-27a8-4d42-997d-a6fd376ec9aa", // 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>
```

Watson Assistant integrated in HTML code:

```
File Edit Selection View Go Run Terminal Help
index.html - Code - Visual Studio Code

index.html U X app.py U
index.html > html > body > div.topnav > a
1 <!doctype html>
2 <html lang="en">
3 <head>
4 <meta charset="utf-8">
5 <title>India Bank</title>
6 <base href="/">
7 <meta name="viewport" content="width=device-width, initial-scale=1">
8 <link rel="icon" type="image/x-icon" href="../static/favicon.ico">
9 </head>
10 <body>
11 <div class="topnav" role="banner">
12 <a class="active" href="#home">Home</a>
13 <a href="#services">Services
14 </a>
15 <a href="#news">News</a>
16 <a href="#contact">Contact</a>
17 <a href="#about">About</a>
18 </div>
19 <div>
20 <h1 style="text-align: center;font-size: 60px;color: white;">India Bank
21 </h1>
22 </div>
23 <app-root></app-root>
24 </body>
25 <script>
26 window.watsonAssistantChatOptions = {
27   integrationID: "e9dc8346-7c82-45c0-b801-acece560ab06", // The ID of this integration.
28   region: "us-south", // The region your integration is hosted in.
29   serviceInstanceID: "dd5c877a-27a8-4d42-997d-a6fd376ec9aa", // The ID of your service instance.
30   onload: function(instance) { instance.render(); }
31 };
32 setTimeout(function(){
33   const t=document.createElement('script');
34   t.src="https://web-chat.global.assistant.watson.appdomain.cloud/versions/" +
35   (window.watsonAssistantChatOptions.clientVersion || 'latest') + "/WatsonAssistantChatEntry.js";
36   document.head.appendChild(t);
37 });
```

CSS stylesheet

```
File Edit Selection View Go Run Terminal Help
index.html - Code - Visual Studio Code

index.html U X app.py U
index.html > html > body > div.topnav > a
39 <style>
40 @import url("https://fonts.googleapis.com/css2?family=Poppins&display=swap");
41 html,
42 body {
43   display: grid;
44   height: 100%;
45   width: 100%;
46   font-family: "Poppins", sans-serif;
47   background-image: url('https://images.thrillophilia.com/image/upload/s--bfQhmgUq--/c_fill,f_auto,fl_strip_profile,h_775,q_auto,w_1600/v1/images/photos/000/112/360/
48   original/1968804002_India Gate.jpg.jpg?1568804002');
49   /* background-repeat: no-repeat;
50   background-size: 100% 100%; */
51 }
52 .topnav {
53   overflow: hidden;
54   background-color: #333;
55   height: fit-content;
56 }
57 .topnav a {
58   float: left;
59   color: #f2f2f2;
60   text-align: center;
61   padding: 14px 16px;
62   text-decoration: none;
63   font-size: 17px;
64 }
65 .topnav a:hover {
66   background-color: #ddd;
67   color: black;
68 }
69 .topnav a.active {
70   background-color: #1877f2;
71   color: white;
72 }
73 </style>
74 </html>
```

Index.html HTML file:

```
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>India Bank</title>
<base href="/">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="icon" type="image/x-icon" href="../static/favicon.ico">
</head>
<body>
<div class="topnav" role="banner">
<a class="active" href="#home">Home</a>
<a href="#services">Services
</a>
<a href="#news">News</a>
<a href="#contact">Contact</a>
<a href="#about">About</a>
</div>
<div>
<h1 style="text-align: center;font-size: 60px;color:white;">India Bank
</h1>
</div>
<app-root></app-root>
</body> <script> window.watsonAssistantChatOptions = { integrationID: "e9dc8346-7c82-
45c0-b801-acece560ab06", // The ID of this integration. region: "us-south", // The region your
integration is hosted in.
serviceInstanceID: "dd5c877a-27a8-4d42-997d-a6fd376ec9aa", // 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>
<style>
@import url("https://fonts.googleapis.com/css2?family=Poppins&display=swap"); html, body {
display: grid; height: 100%;
```

```

width: 100%; font-family: "Poppins", sans-serif; background-image:
url('https://images.thrillophilia.com/image/upload/s-bfQhngUq--
/c_fill,f_auto,fl_strip_profile,h_775,q_auto,w_1600/v1/images/photos/000/112/3
60/original/1568804002_India_Gate.jpg.jpg?1568804002');
/* background-repeat: no-repeat; background-size: 100% 100%;
*/
}
.topnav { overflow: hidden;
background-color: #333;
height: fit-content;
}
.topnav a { float: left; color:
#f2f2f2; text-align: center;
padding: 14px 16px; text-
decoration: none; font-size:
17px;
}
.topnav a:hover { background-color:
#ddd; color: black;
}
.topnav a.active { background-color:
#1877F2; color: white;
}
</style>
</html>

```

8.RUN THE APPLICATION:

```

1  from flask import Flask,render_template
2
3  app = Flask(__name__)
4
5  @app.route('/', methods=['GET'])
6  def root():
7      return render_template('index.html')
8  if __name__=="__main__":
9      app.run(debug=True)

```

PROBLEMS OUTPUT DEBUG CONSOLE JUPYTER TERMINAL

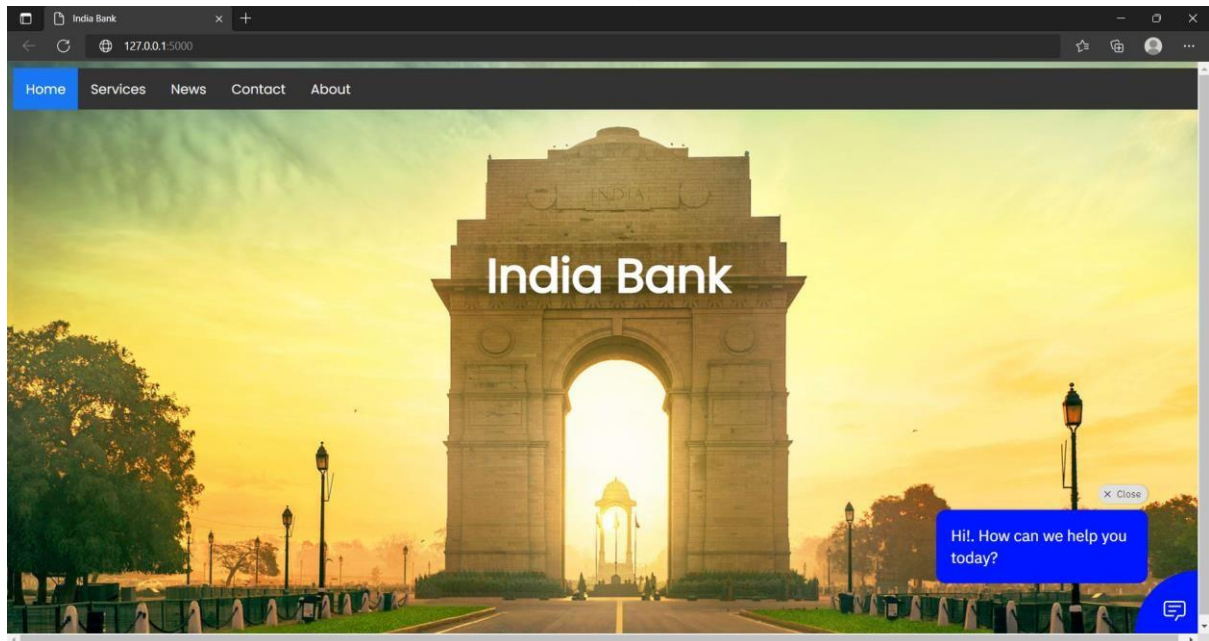
Windows PowerShell
 Copyright (c) Microsoft Corporation. All rights reserved.
 Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Asus\Documents\nalaya-thiran> & C:/Users/Asus/AppData/Local/Programs/Python/Python310/python.exe c:/Users/Asus/Documents/nalaya-thiran/bac
 kend/main.py
 * Serving Flask app 'main'
 * Debug mode: on
 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
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 132-580-233

powershell
 Python

9. RESULTS

Home Page:



10. ADVANTAGES AND DISADVANTAGES

ADVANTAGES

1. Round-the-clock support: Chatbots provide 24/7 client support, so existing and potential customers can try and solve their banking problems after work hours and on weekends. This ultimately also leads to better customer experience.
2. Enhanced productivity of bank personnel: Not all clients' problems require the help of a staff member. Artificial intelligence may successfully deal with minor issues leaving only the most urgent and complicated cases for the human approach.
3. More convenient mode of communication: Chatbots may combine various functionalities that would make them convenient for customers of different age groups.

DISADVANTAGES

1. Internet Issues: Chatbots will not work without the internet. If there is a network problem, chatbots may stop working and will not respond to client queries.
2. Requirement of technical knowledge: Users who make use of chatbots must know how to use chatbots. Otherwise, it is difficult to do interaction with chatbot.
3. Providing unexpected answers: Chatbots in some cases may get confused due to prolonged user inputs and may provide irrelevant answers.
4. Inability to interpret multiple queries: Chatbots can't understand multiple questions at a time if a user continuously posts queries to it. So, it is necessary for a user to post queries one-by-one.

11. CONCLUSION

Chatbots developed using AI are able to answer any frequently asked banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and

effectively in a cost-efficient manner. It eliminates the need for a massive customer care workforce and even reduces the workload of the bank employees whose efforts can be used elsewhere. AI Chatbots provides 24/7 service to clear all customer queries and guide them through all the banking processes. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. It is built to be the overall virtual assistant that can facilitate customers to ask banking-related questions without visiting the bank or calling up customer service centre as well as providing them with relevant suggestions.

12. FUTURE SCOPE

Chatbots help people obtain the information they need and solve their problems. The technology sector has seen a massive increase in AI development, which has led to the creation of chatbots that can help users easily find the information they need online. AI Chatbots effectively creates a strong brand image. They will continue to evolve and play an important role in customer service for businesses.

1. Bots for Internal Business Communications

Chatbots can be used for various purposes, including addressing common problems, communicating with employees, and finishing HR-related tasks and transactional functions. Chatbots for websites are acting as a guide to new employees through company protocols, recording answers for screen questions, and assisting with the onboarding process for new employees. Chatbots can save time for IT desk agents and help with more complicated issues.

2. Content Marketing

Chatbots can communicate with the target market by speaking with them in complete sentences with a natural and easy-going conversational flow. Some markets use these bots to serve customer service and retail, amongst others. Chatbots can segment consumers for future marketing campaigns. This can be incredibly useful for creating more accurate target marketing. Based on the information from dialogue with chatbots, marketers can use this information to help with personalizing brand content.

3. Social Media

Chatbots have better customer interaction rates on social media. Chatbot interactions increase consumer confidence in a brand or business. Customers are informed with daily or weekly announcements about deals, events, and promotions via social media. With time, it is used for voicing opinions, ordering products and services, offering reviews, and even getting in touch with businesses.

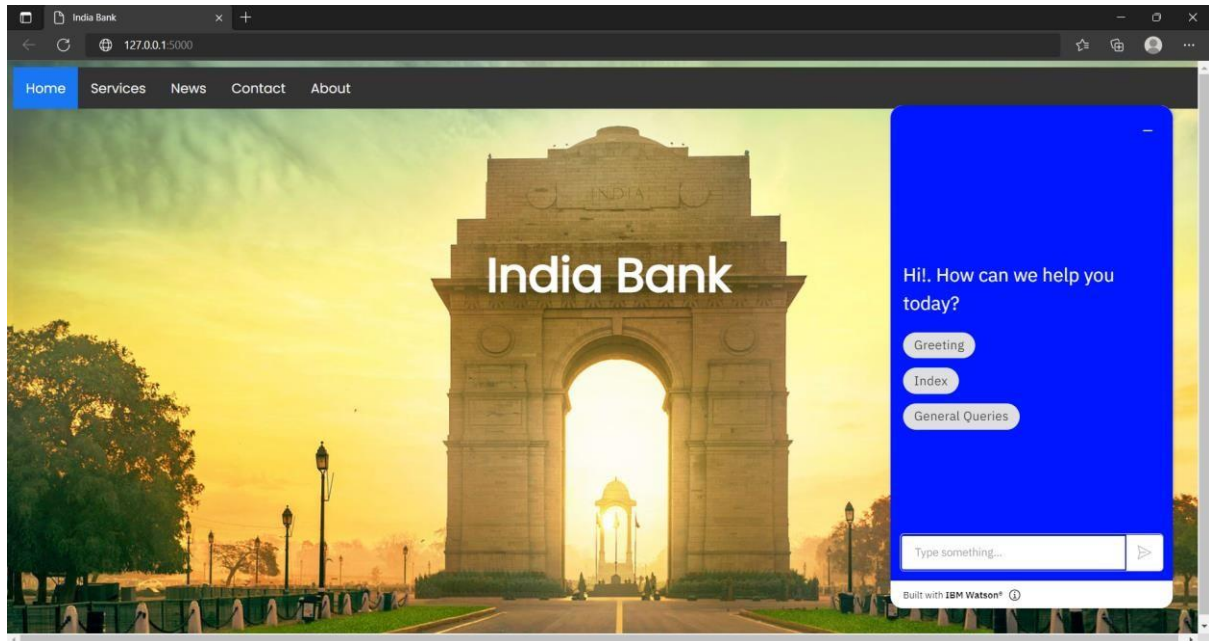
4. Use of AI in contact centres

AI chatbots without human involvement can handle simple requests such as changing a password, requesting a balance, scheduling an appointment, etc

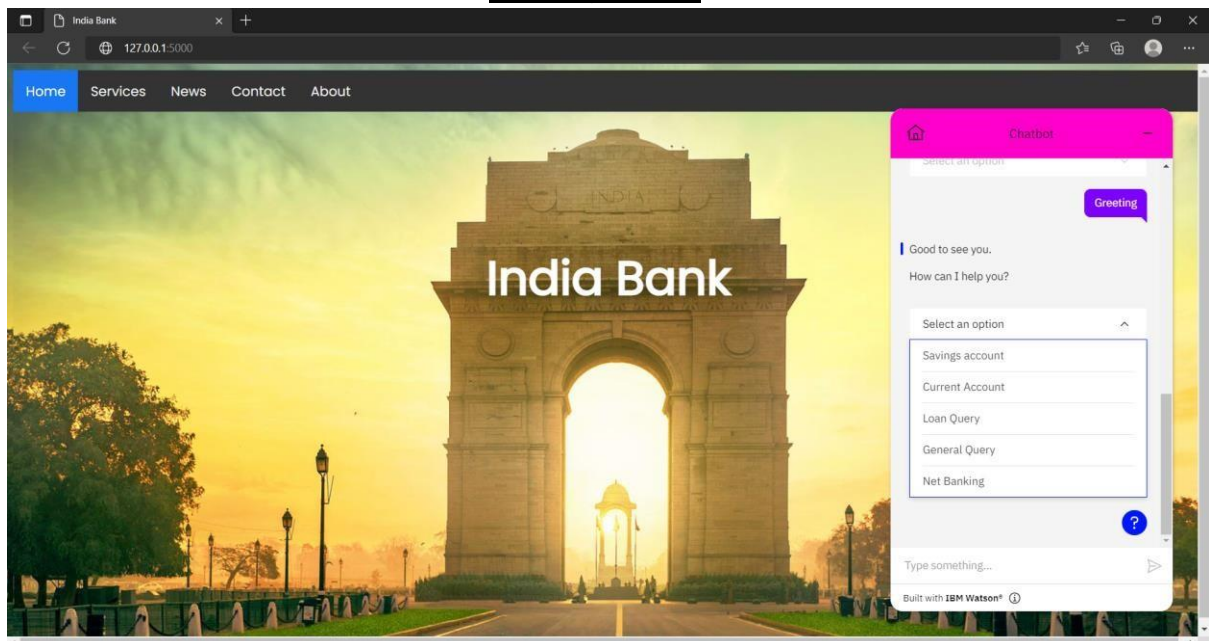
14. APPENDIX

OUTPUT:

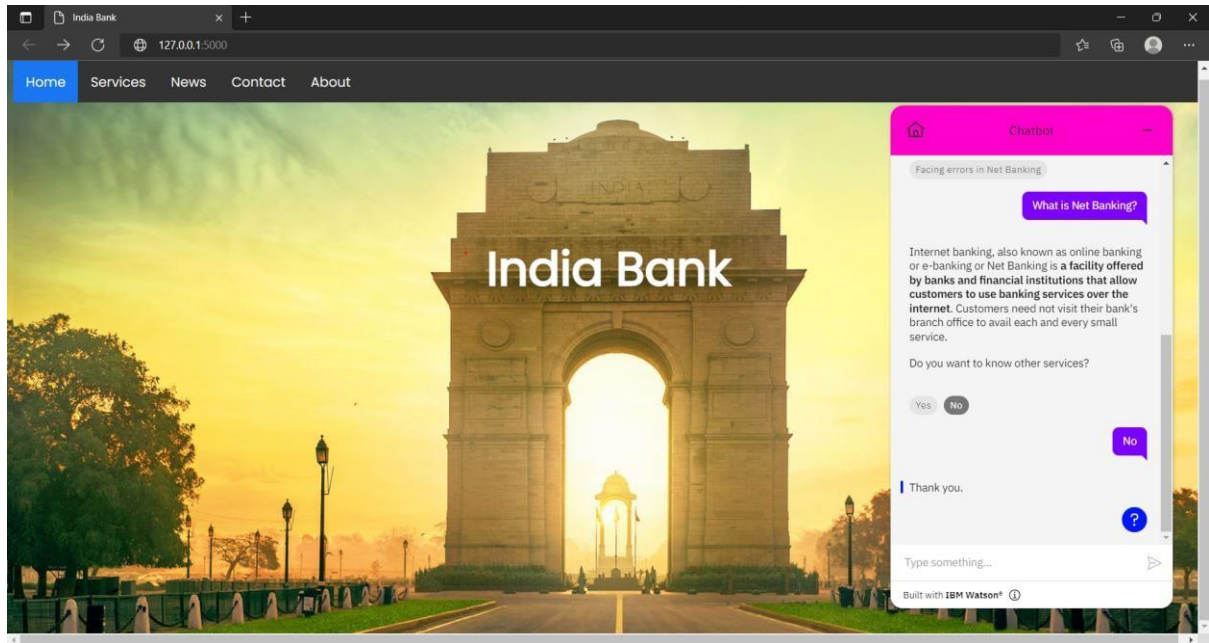
Watson Assistant home screen:



Greeting Action:



Query and End Greeting:



GITHUB link:

<https://github.com/IBM-EPBL/IBM-Project-41391-1660641717>

PROJECT DEMO VIDEO LINK

<https://youtu.be/0SaXd5ULuWg>