AI BASED DISCOURSE FOR BANKING INDUSTRY

PROJECT BASED LEARNING (NALAIYA THIRAN)

ON

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

Submitted by

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BONAFIDE CERTIFICATE

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INTERNAL EXAMINER   **EXTERNAL EXAMINER**

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ABSTRACT:

Customers are less satisfied with the prompt services provided by the banks. They also feel that guidance to use the bank's products and services is not adequately explained. When they ask for information or report any issues, the process is not easy. On the other hand, handling millions of customers with limited bank employees is a tedious process. The bank employees are also exhausted to answer to the same repetitive questions for a long time. The customers are comfortable with the answers, and the bank employees are also tired of the same routine of giving the same answers to different customers. This unpleasant situation will weaken the relationship between the banks and the customers. This paper will discuss how AI-induced chatbots improve customer interaction and how chatbots play an essential role in customer relationship management in the banking industry. The AIinduced chatbot certainly enhances the customer relationship with the banks In the existing solution the chatbots produce a response delay which is the major challenge for the banking industry to serve the needs of the customers on time. While a delayed (as opposed to instant) response time positively influences novice users' social presence perceptions, the effect is negative for experienced users. Further, we find that social presence mediates the effect of chatbot response time on usage intentions, and that this mediation is moderated by prior chatbot experience such that the indirect effect of a delayed response time on usage intentions is positive for novice users and negative for experienced users**.**

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CHAPTER 1

1. INTRODUCTION

In the existing solution the chatbots produce a response delay which is the major challenge for the banking industry to serve the needs of the customers on time.While a delayed (as opposed to instant) response time positively influences novice users' social presence perceptions, the effect is negative for experienced users. Further, we find that social presence mediates the effect of chatbot response time on usage intentions, and that this mediation is moderated by prior chatbot experience such that the indirect effect of a delayed response time on usage intentions is positive for novice users and negative for experienced users.

1.1 Project Overview

1. Industries are forced to evolve and update their practices due to technological advancesand the contemporary market. The banking sector is one of the most developed sectors and is always lookingfor the latesttechnological solutions that improve its efficiency.
2. 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.
3. 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 Sales force. This resultsin a potential growth rate of118% which indicates the demand in the industry.
4. A smart chatbot takes a query from the user in natural language and gives the appropriateresponse for the same. This paper aims to discuss the relevance of chatbots in the bankingsector and explore how chatbots can be implemented using natural language processingtechniques that can be used in the banking industry.

1.2Purpose

1. The main purpose of the chatbot is to provide the customers with all the

information possible regarding any banking queries.It is built to be the overallvirtual assistant that can facilitate customersto ask banking- related questions without visiting the bank or calling up customer service centers as well as providingthem with relevant suggestions. Hence it essentially tries to eliminatethe purpose of visiting a banking for basic queriesand procedures.

2. The main purpose of chatbots in banking is providing a better customer experience. However, they also help the staff and prevent stressful situations that arise from direct communication with clients.

3. The core purpose of banking chatbots is to provide the customers with prompt service and to improve the operational efficiency of the bank and its employees. Besides, Conversational AI in banking also assists the staff to distribute their workload.

4. Chatbots allow businesses to connect with customers in a personal way without the expense of human representatives. For example, many of the questions or issues customers have been common and easily answered. That's why companies create FAQs and troubleshooting guides.

2. LITERATURE SURVEY

Title	Keywords	Problem Definition	Methodology	Input Parameter	Result
A model to develop chatbots for assisting the teaching and learning process	Chatbots, extra school tool, middleschool, teaching and learning process	A model for a chatbot assisting the teaching and learning process in middle school	Google cloud technologies, firebase and dialog flow, MySQL database, Natural language processing	Student asking queries	Student asking queries corresponding solution
Toward a chatbot for financial sustainability	Chatbot,artificial intelligent,financial sustainability,telemarketting,web, model,voice recognition and conversion model,	Bank revenues through customer age classification and indicate the new product-oriented fund or housing subscription savings are more suitable can be indicated.	Artificial intelligent,NLP,speech recognition technology,big data analysis.	Customer name and age,bank detail,help key feature,graphic information	Indicate that new productoriented fund or housing subscription saving are more suitable for purchase through customer services than through chatbot.

Role of ai-induced chatbot in enhancing customer relationship management in the banking industry	Artificial Intelligence, Banking, Chatbot, Customer Experience, Customer Relationship Management	This paper will discuss how AI-induced chatbots improve customer interaction and how chatbots play an essential role in customer relationship management in the banking industry	Data-driven chatbots are the latest one based on the text dataset, especially conversation, which learns to deliver answers from the documents' content, namely, man to man conversation, man to bot conversation, and other forms of human conversations.	Send Timely Alerts &Notifications	banking institutions should utilize this latest development to enhance customer service and customer loyalty.
Chatbot for college management system using AI	1.NLP 2.sentiment analysis 3.synsets 4.word net	Use can be ask the question any college related activites throw the chatbot without physically available to the college for inquiry. The system analysis the question and answer to student	1.Artificial intelligent 2.oerter stemmer algorithm 3.NLP	User login and complaint, chat Bot responding system, answer the complaint.	Complaint and queries regarding the electronic and answer the complaint.

Table 2.1 LITERATURE SURVEY

2.1 Existing problem

In the existing solution the chatbots produce a response delay which is the major challenge for the banking industry to serve the needs of the customers on time. While a delayed (as opposed to instant) response time positively influences novice users' social presence perceptions, the effect is negative for experienced users. Further, we find that social presence mediates the effect of chatbot response time on usage intentions, and that this mediation is moderated by prior chatbot experience such that the indirect effect of a delayed response time on usage intentions is positive for novice users and negative for experienced users.

2.2 References

- ➤ MEGANATHAN KUMAR SATHEESH et al.: ROLE OF AI-INDUCED CHATBOT IN ENHANCING CUSTOMER RELATIONSHIP MANAGEMENT IN THE BANKING INDUSTRY DOI: 10.21917/ijms.2020.0185
- ➤ A Model to Develop Chatbots for Assisting the Teaching and Learning Process. Sensors 2022, 22, 5532. https://doi.org/10.3390/s22155532
- ➤ https://www.sciencedirect.com/science/article/pii/S2666920X21000278?via%3Dihub
- ➤ https://www.sciencedirect.com/science/article/pii/S1071581922001252?via%3Dihub
- ➤ https://www.mdpi.com/2071-1050/13/6/3173
- ➤ https://www.researchgate.net/publication/361265184_Consumers%27_behavior_in_conversational_commerce_marketing_based_on_messenger_chatbots
- ➤ https://www.researchgate.net/publication/327667155_ChatBot_For_College_Management_System_Using_AI
- ➤ https://www.sciencedirect.com/science/article/pii/S2772442522000296?via%3Dihub
- ➤ https://www.sciencedirect.com/science/article/pii/S2405844022010398?via%3Dihub+

2.3 Problem Statement Definition

➤ The first step in the problem-solving process is to determine what the problem actually is. This is an important step because you can waste time solving the wrong problem. Do not assume automatically you know what the problem is, because it may not be apparent.

➤ The problem statement is a structured set of statements that describe the purpose of an effort in terms of what problem it's trying to solve.

➤ In order to guide the customers throughout all the financialservices provided by the bank,an intelligent systemhas to be introduced to provide people with the best solutionpossible. The users arebank customers who need a service, available 24/7, to clear all their queries and guide them throughthe various bankingprocesses. So, an enhanced and smarter way of interaction with the customershasto 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 betweenthe user and the bank.It is built to be the overallvirtual assistant that can facilitate customersto ask banking- related questions without visiting the bank or calling up customer service centre's as well as providing them with relevantsuggestions.
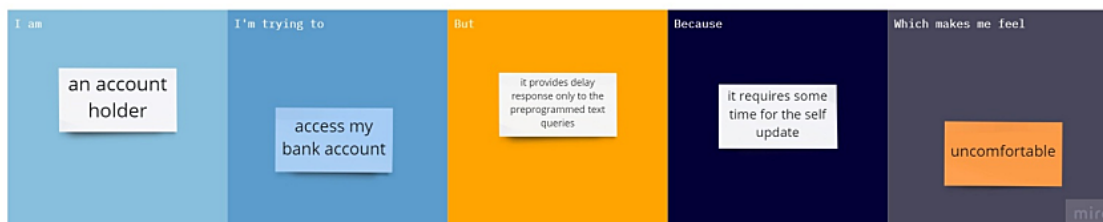
Fig 2.1 Problem Statement

CHAPTER 3

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

➤ An empathy map is a collaborative visualization used to articulate what we know about a particular type of user. It externalizes knowledge about users in order to 1) create a shared understanding of user needs, and 2) aid in decision making.

➤ An empathy map helps to map what a design team knows about the potential audience. This tool helps to understand the reason behind some actions a user takes deeply. This tool helps build Empathy towards users and helps design teams shift focus from the product to the users who are going to use the product.
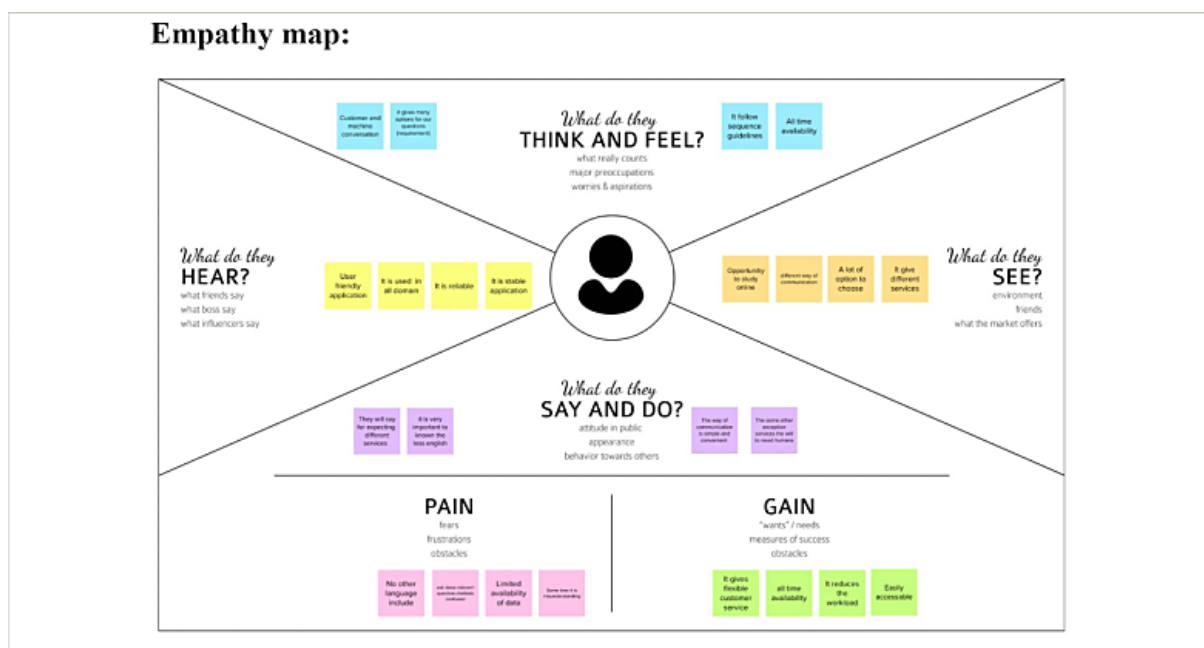
Fig: 3.1 empathy map

Source:
https://app.mural.co/invitation/mural/aichatbotforbankingindustry3733/1661419833787?
Sender=u18601c8be4ea48569db74064&key=3602040a-af15-4214-b32aa64c11ae967a

3.2 Ideation & Brainstorming

1. Brainstorming is an activity that will help you generate more innovative ideas. It's one of many methods of ideation—the process of coming up with new ideas—and it's core to the design thinking process.
2. Brainstorming refers to a problem-solving technique used by teams or individuals. In this process, participants generate various ideas or solutions, then begin discussing and narrowing them down to the best options
3. Frequently asked question to store in database and counting update to add the queries corresponding answer. If customer asked frequently question can be find and to feed in the database after include a voice in chatbot.
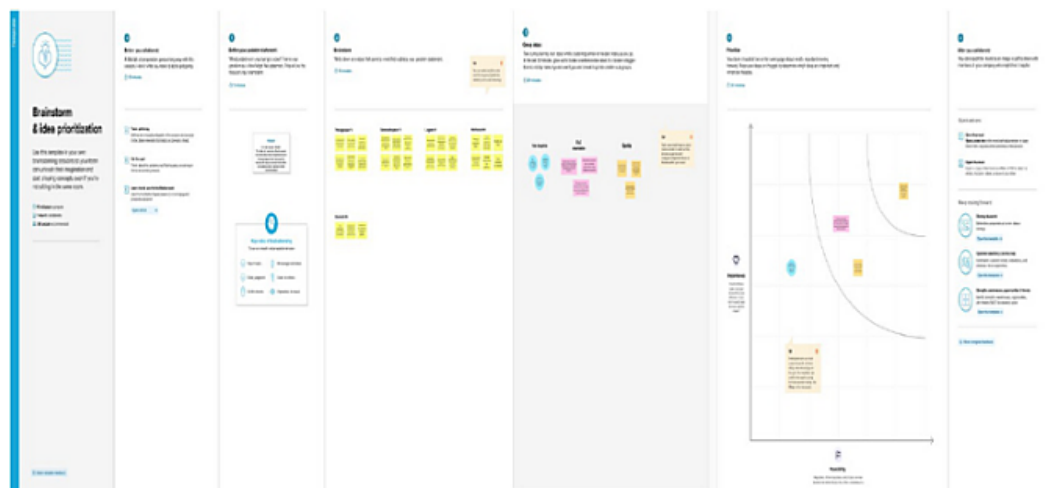
Fig 3.2 2Ideation & Brainstorming

SOURSE:

https://app.mural.co/invitation/mural/aichatbotforbankingindustry3733/166142 019 3240?sender=u18601c8be4ea48569db74064&key=23c9dae4-e287-4839-a50bb7f890920bf

3.3 Proposed Solution

1. The purpose of this tool is to provide a structured process for identifying a problem, understanding the root causes, ascertaining solution steps, and progress monitoring.

2. With a solution template, you can organize development content that you want to reuse for customer-specific solutions. Solution templates enable you to easily start the development of customer-specific solutions, for example, for a specific industry.

Proposed Solution Template:

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

S.NO	Parameter	Description
1.	Problem Statement (Problem to be solved)	I am an account holder I am trying to access my bank account service but it provides delay response only because preprogrammed text queries which makes me feel uncomfortable To overcome the problem of late responses of text messages being given to the customers, we include voice feature in our chatbot.
2.	Idea / Solution description	AI based cloud service with interaction voice response enabled chatbot
3.	Novelty / Uniqueness	Cloud service using Voicebot to make the chatbot interactive
4.	Social Impact / Customer Satisfaction	The customer has been satisfied with the accurate and required answer immediately. Our Chatbot gives the usage of banking facility to all customers who are all lived in distributed location. Specifically, the rural and Illiterate customers can access all banking information and guidance.

5.	Business Model (Revenue Model)	The customer problem can quick to provide a solution. They can be saving a time. So automatically our business increased.
6.	Scalability of the Solution	It is highly scalable because we provided solution to overcome the problem of late responses being given to the customers because of text messages ,we included voicebot

Table 3.1 Proposed Solution

3.4 Problem Solution fit:

1. The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem.
2. Problem-Solution Fit - this occurs when you have evidence that customers care about certain jobs, pains, and gains. At this stage you've proved the existence of a problem and have designed a value proposition that addresses your customers' jobs, pains and gains.

1. CUSTOMER SEGMENTS	6. CUSTOMER LIMITATIONS	5. AVAILABLE SOLLUTIONS
While there are numerous companies suggesting that chatbots have helped them save a substantial amount of money, in the end, what matters is how well the bot is able to manage and engage customers. The key here is not only to save money but to provide a seamless and personalized customer experience.	Chatbot is efficient in answering direct questions. They are also equipped to answer questions one by one. If the customer asks multiple questions in a single breath, the answers are likely to be inaccurate and incomplete.	• Answer Basic Questions • Provides On-time Notifications and Reminders • Provides Complete Account Details • Resolve Urgent Issues on Priority
2.PROBLEMS / PAINS • Only it gives answers to pre-defined questions • Some time it is misunderstanding • Delay response	**9.PROBLEM ROOT/CAUSE** Connections go down, people speak in unique manners, and sometimes the chatbots can't understand them, whether text-based or voice	**7.BEHAVIOR** **Understand, act and respond**. In the first step, the chatbot processes what the user sends. Then, it acts according to a series of algorithms that interpret what the user said. And finally, it picks from a series of appropriate responses
3.TRIGGERS TO ACT Welcome message" sends a message immediately after a customer subscribes to a chatbot."Standard reply" sends a message when no keywords are recognized in a subscriber's message. **4. EMOTIONs** • Provided Actionable Insights to Increase Customer Engagement • Identified the inefficiencies in chatbot conversational flow	**10.YOURS SOLUTION** Banking chatbots are emerging as the preferred customer support platform. It is useful for financial service providers because they facilitate a 2-way communication with machines using natural language commands	**8. CHANNELS OF BEHAVIOR** ONLINE: These bots **make customer interactions smoother and more consistent** in a number of ways: They can be engaged seamlessly across most channels. OFFLINE: We can provide this service via SMS.

Fig 3.3 Problem Solution fit

4. REQUIREMENT ANALYSIS

1. Solution Requirements are identified before the technical solution is selected and/or designed. They describe the characteristics of a solution (functional and non-functional) that meet business requirements and stakeholder requirements.

2. A solution requirement is aimed at the concerns of the people who will build and deliver the solution. It tells those people what the functional and non-functional requirements for the solution will be and how the solution will deliver on the business and stakeholder requirements. Solution Requirements – Describe the features, functions, and characteristics of a product, service, or result that will meet the business and stakeholder requirements.

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR NO:	Functional Requirement (Epic)	User Story / Task
FR-1	Create IBM Services	User can enable a service to Create IBM Service
FR-2	Chatbot knowledge creation	User can be add a chatbot skill
FR-3	Creating Savings account action	User can be add for savings account action
FR-4	Creating Current account action	User can be add for current account action
FR-5	Creating Loan account action	User can be add for general query action
FR-6	Creating a general query action	User can be add for loan account action
FR-7	Creating a Net banking action	User can be add for net banking

FR NO:		Action
		action
FR-8	Interactive web page create	User can be looking interactive web page create
FR-9	Chatbot integrate on website using flask	User can be Chatbot include on website

Table 4.1 Functional requirement

4.2 Non-Functional requirements:

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

FR NO:	Non-Functional Requirement	Description
NFR-1	Usability	The human work will reduce for chatbot becomes. So It is also to improve customer experience, financial companies are using chatbot to automate the majority of their duties, including addressing client complaints, responding to inquiries and resolve the problem.
NFR-2	Security	The most important part of banking is the security and privacy of customer data. We must make sure that only your bank may access the information collected from customers. The customer data will stored in encrypted format in database. We can use simple encryption algorithm
NFR-3	Reliability	The most important part of banking is the security and privacy of customer data. We must make sure that only your bank may access the information collected from customers.

NFR-4	Performance	The chatbot's speed should be quicker than the time it would take a human to write the response.
NFR-5	Availability	Anytime and anywhere of the day or night, they should be on call and prepared to respond to queries.
NFR-6	Scalability	The chatbot can easy to add extra quires corresponding answer any time easy to customized using IBM Watson service

Table 4.2 Non-Functional requirements

5. PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an information system (as shown on the DFD flow chart Figure modeling its process aspects. Often it is a preliminary step used to create an overview of the system that can later be elaborated

Example: (Simplified)
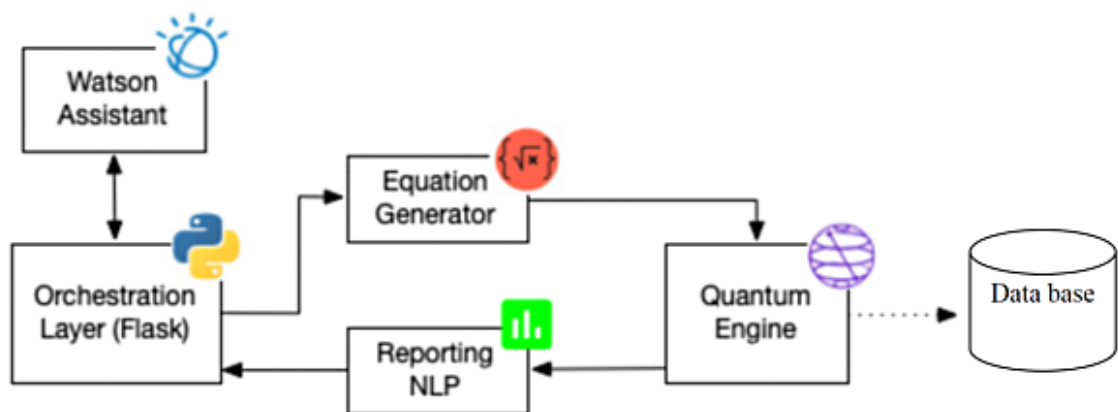
Fig 5.1 DFD Level 0 (Industry Standard)
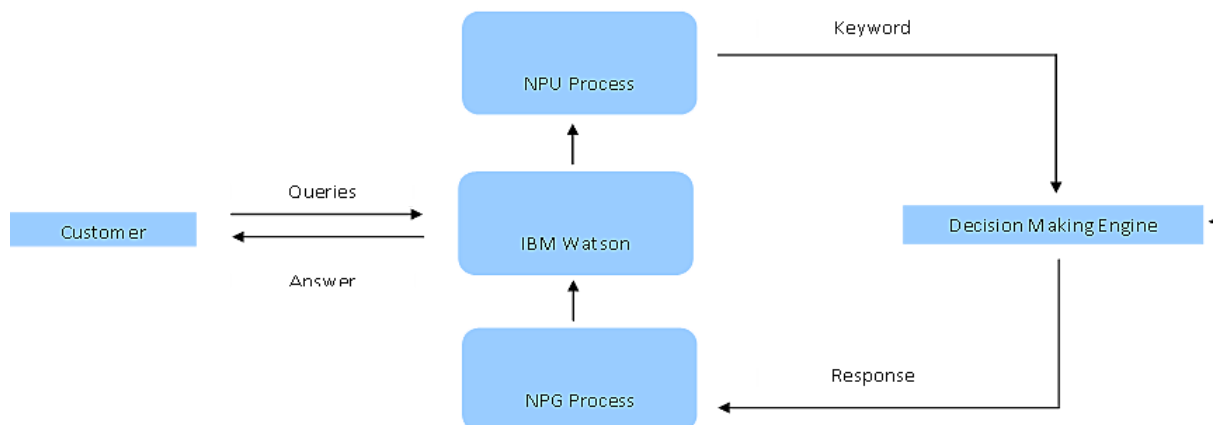
Fig 5.2 Data Flow Diagrams

5.2 Solution & Technical Architecture

Technical Architecture:
The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2
Example: Order processing during pandemics for offline mode
Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/
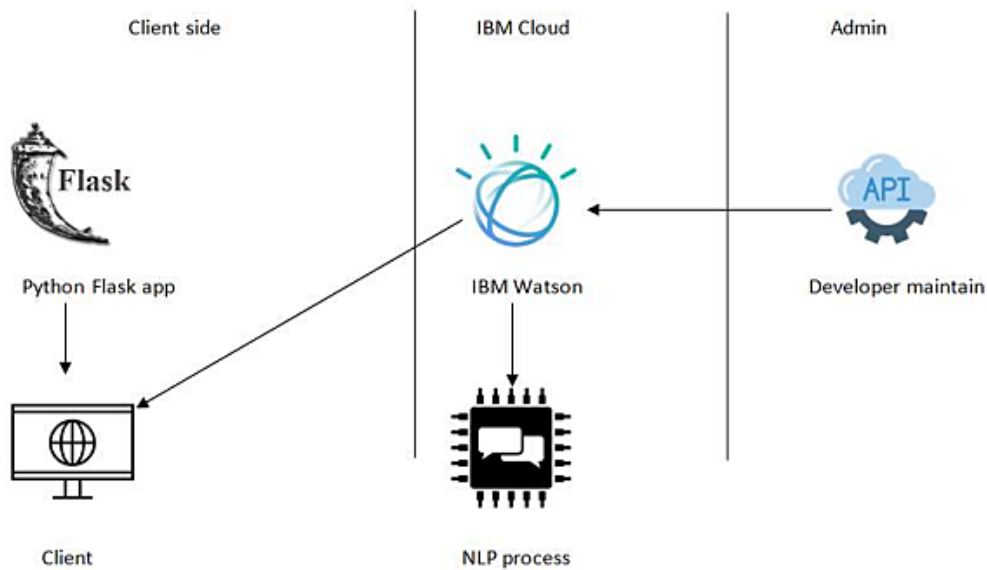
Fig 5.3 Solution & Technical Architecture

5.3User Stories

User story number	User Story
USN-1	User can enable a service to Create IBM Service
USN-2	User can be add a chatbot skill

USN-3	User can be add for savings account action
USN-4	User can be add for current account action
USN-5	User can be add for general query action
USN-6	User can be add for loan account action
USN-7	User can be add for net banking action
USN-8	User can be looking interactive web page create
USN-9	User can be Chatbot include on website

Table 5.1 User Stories

CHAPTER 6

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

A project plan template is a document that creates a standard format for a project plan. Typically, it contains a list of the essential elements of a project, such as stakeholders, scope, timelines, estimated cost and communication methods. The project manager typically lists the information based on the assignment.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Create IBM Services	USN-1	User canenable a service to Create IBMService	5	Highest	Thiyagarajan V
Sprint-1	Chatbot knowledge creation	USN-2	User can be add a chatbotskill	5	High	Deenadhayalan V
Sprint-1	Creating Savings account action	USN-3	User canbe add for savings accountaction	5	High	Logesh R
Sprint-1	Creating Current account action	USN-4	User canbe add for current account action	5	High	Hariharan M
Sprint-2	Creating Loan account action	USN-5	User can be add for general query action	7	Low	Thiyagarajan V
Sprint-2	Creating a general queryaction	USN-6	User can be add for loanaccount action	7	Medium	Deenadhayalan V
Sprint-2	Creating a Net banking action	USN-7	User canbe add for net bankingaction	6	Medium	Logesh R
Sprint-3	Interactive web pagecreate	USN-8	User canbe late	20	High	Hariharan M

Sprint-4	Chatbot integrate on website using flask	USN-9	User can be Chatbot include on website	20	High	Thiyagarajan V

Table 6.1 Sprint Planning

Estimation:

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planed)	StoryPoints Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	5 Days	01 Nov 2022	05 Nov 2022	20	05 Nov 2022
Sprint-2	20	5 Days	06 Nov 2022	10 Nov 2022	20	10 Nov 2022
Sprint-3	20	5 Days	11 Nov 2022	15 Nov 2022	20	15 Nov 2022
Sprint-4	20	5 days	16 Nov 2022	19 Nov 2022	20	19 Nov 2022

Table 6.2 Estimation

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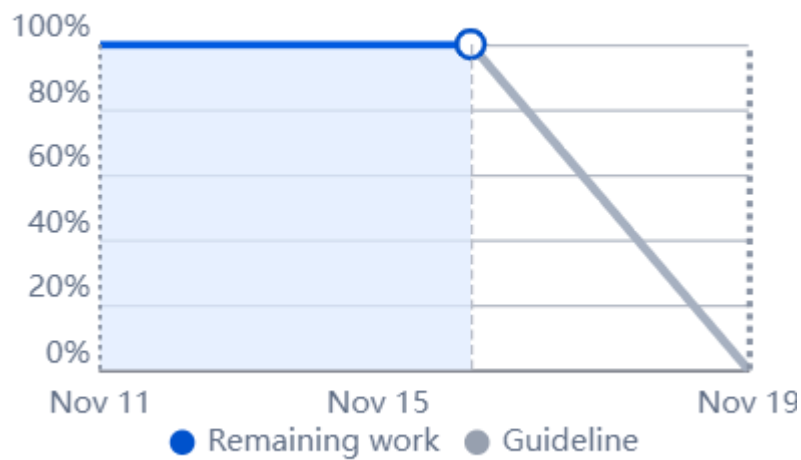
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Fig 6.1 Burndown Chart

6.3 Reports from JIRA
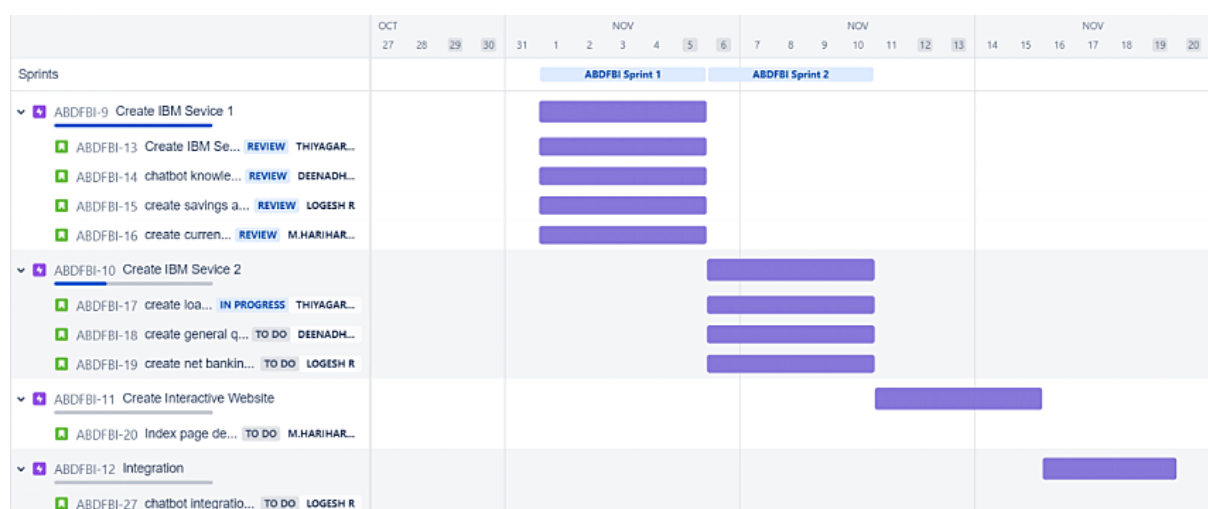
Fig 6.2 Reports from JIRA

CHAPTER 7

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

7.1 Feature

CreateIBM Service
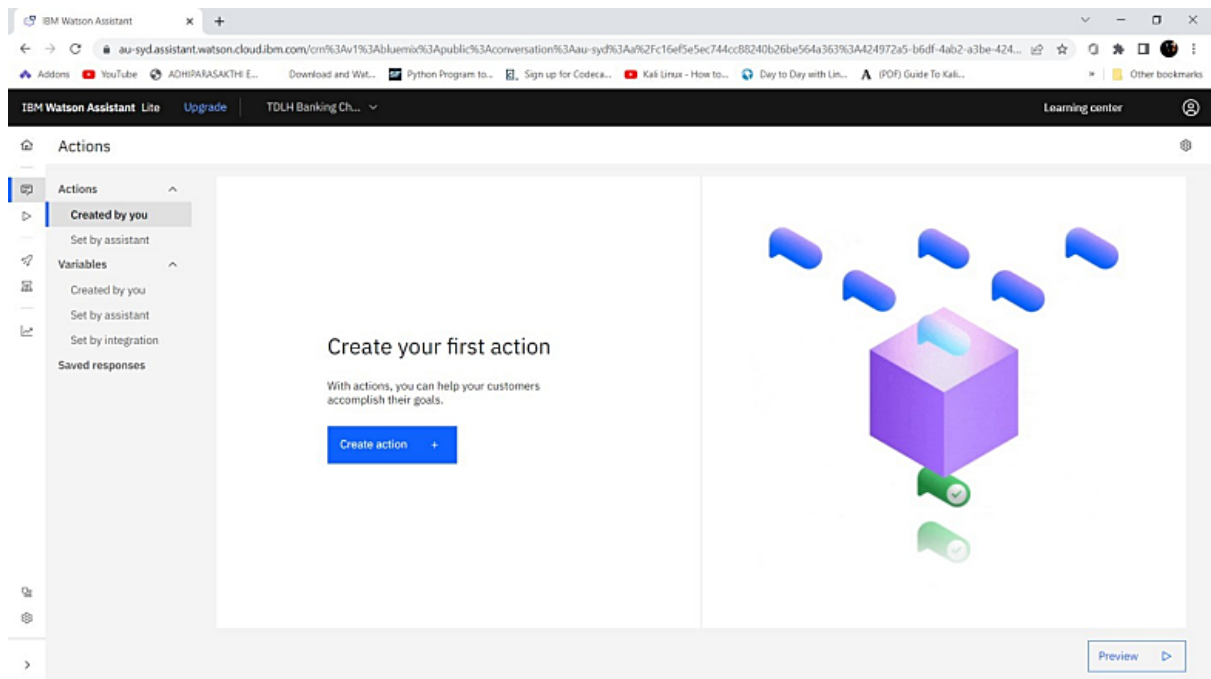
Chatbot knowledge chatbot
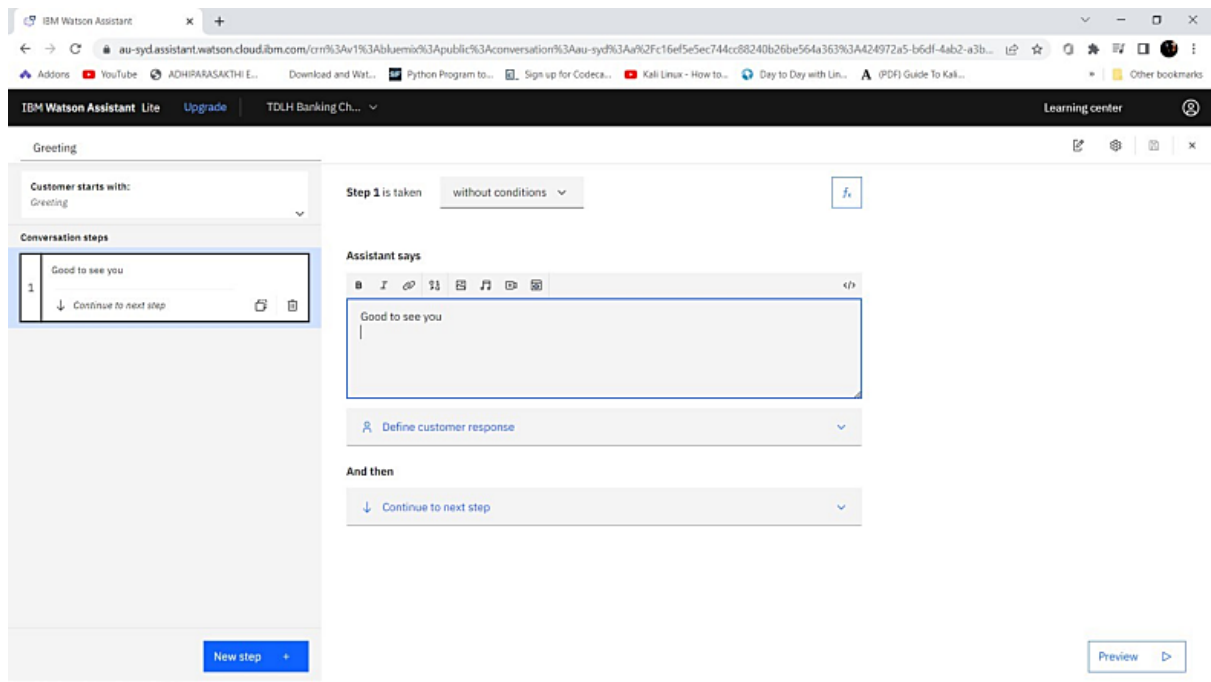
Create savings account action
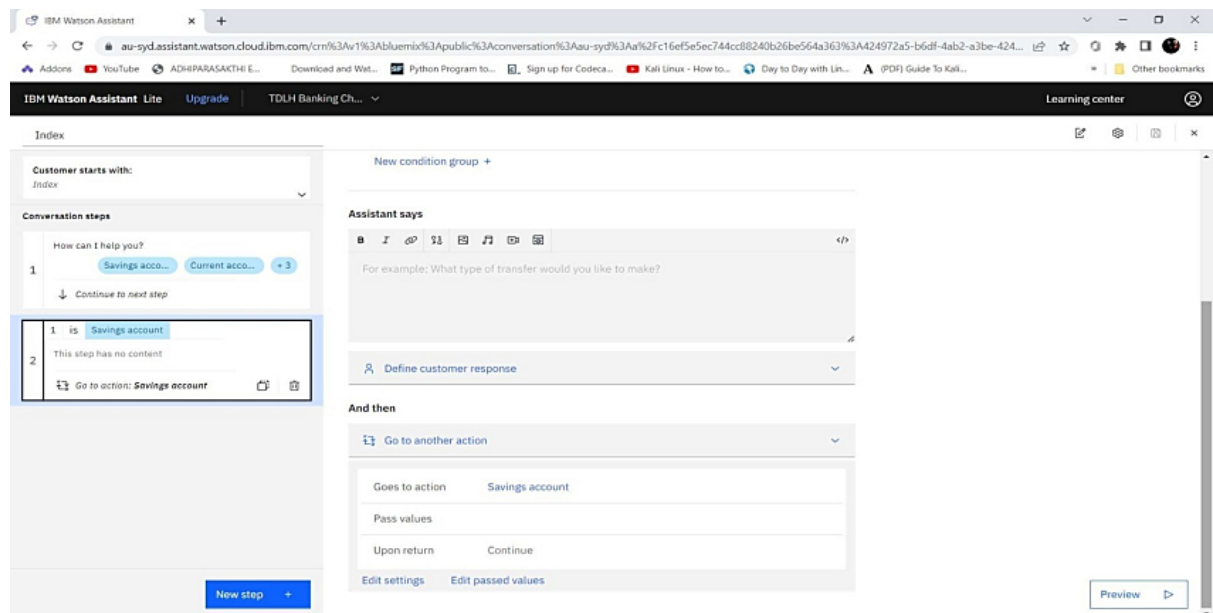
Fig 7.1 Feature

7.2 Feature

Creating Loan account action
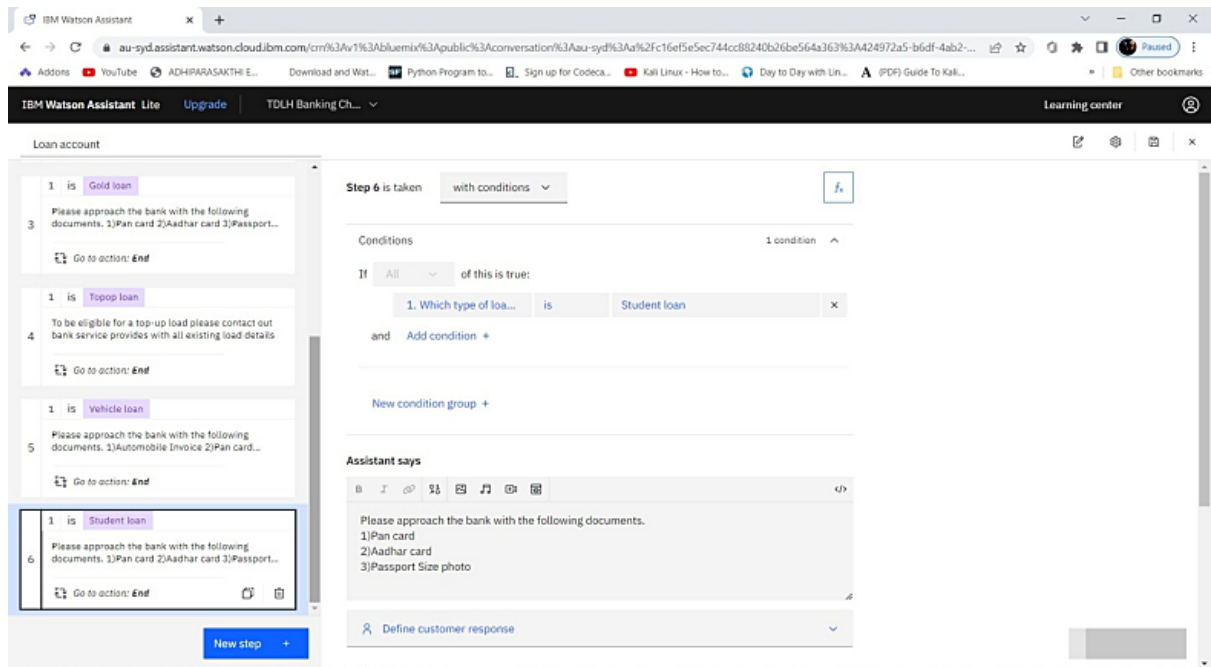
Creating a general query action
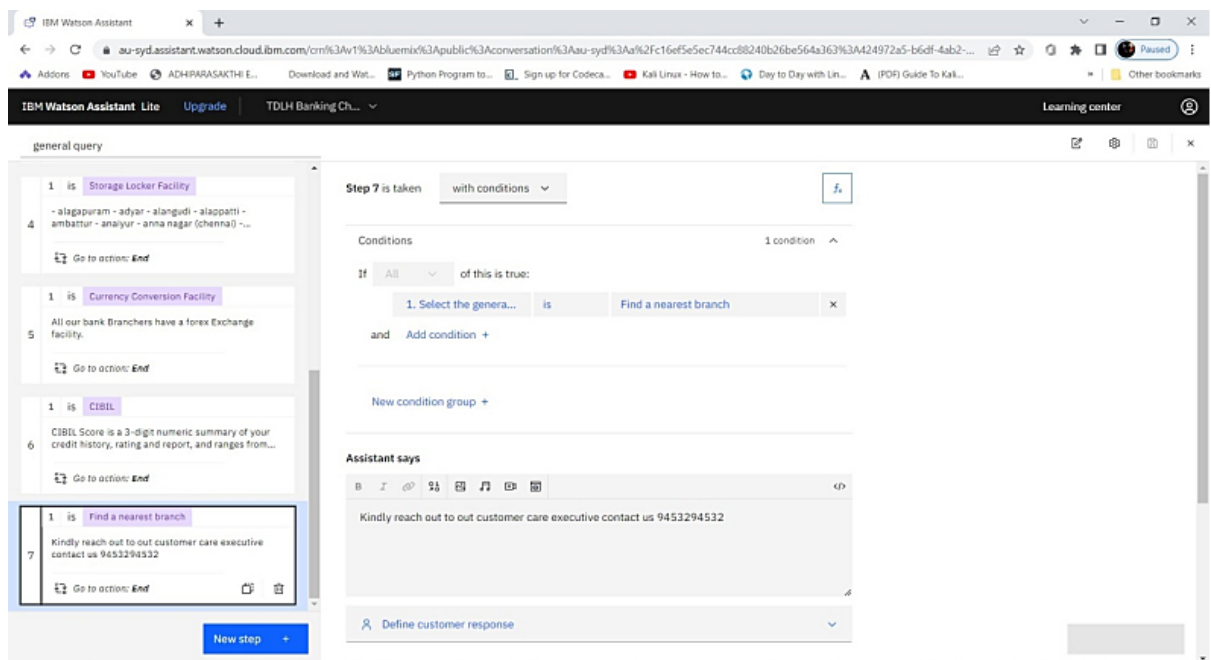
Creating a Net banking action
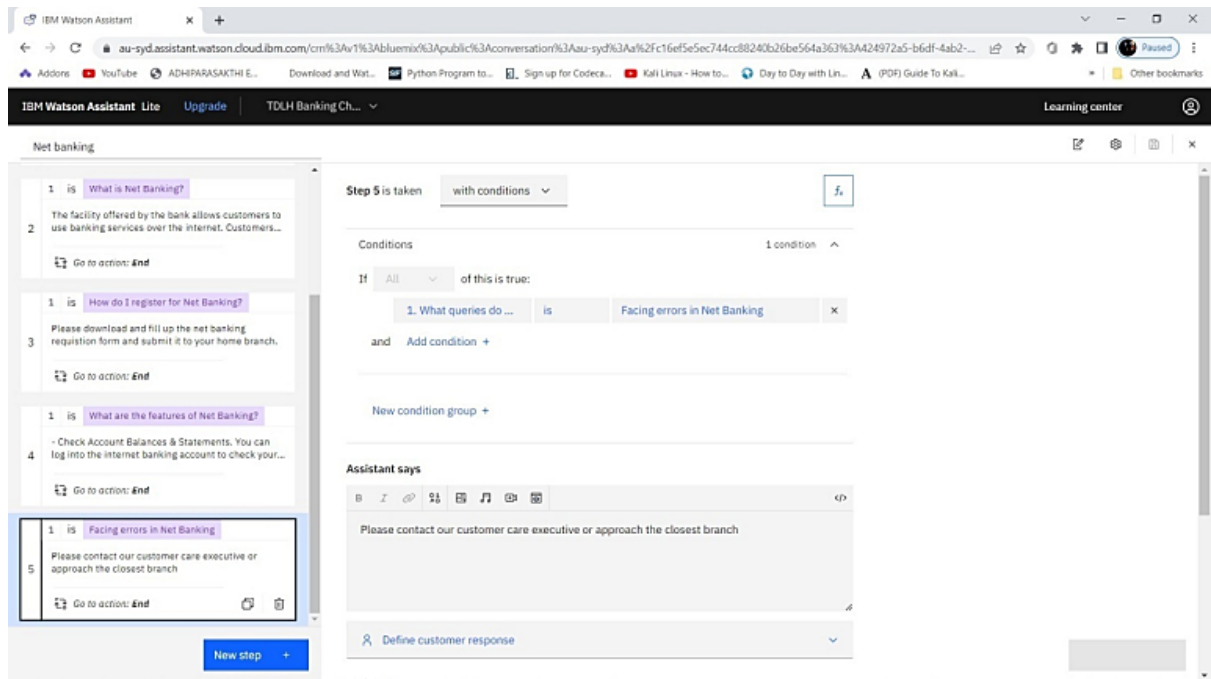
End Greeting
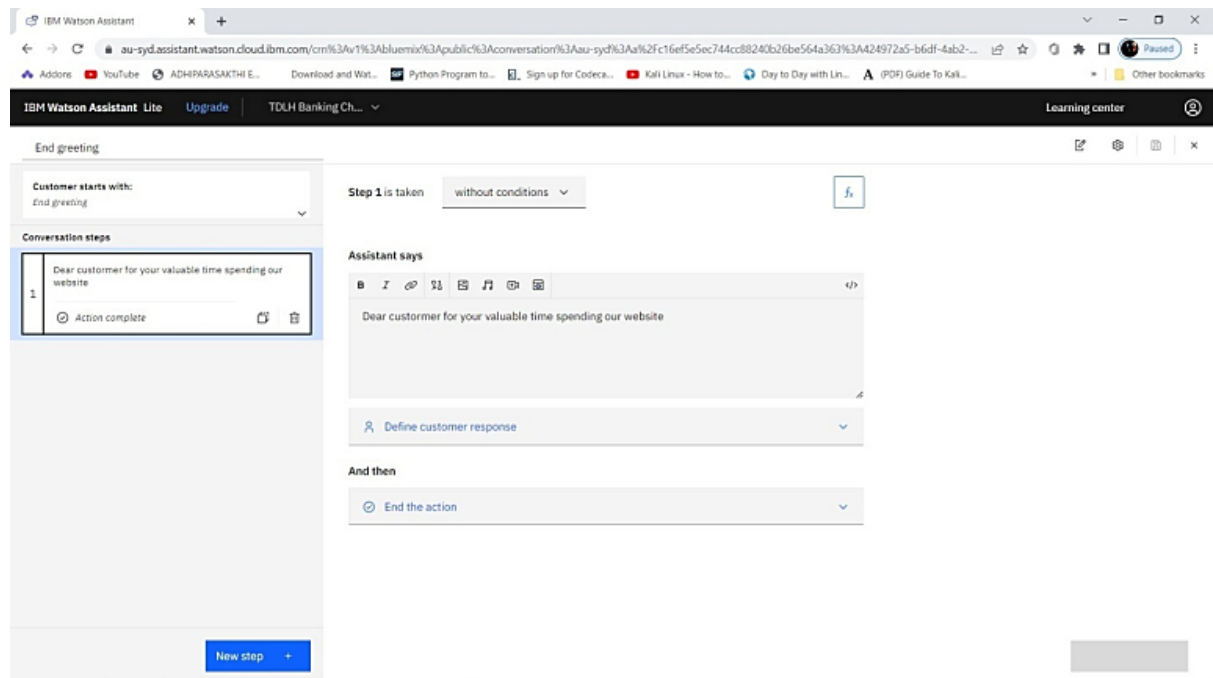
Fig 7.2 Feature

CHAPTER 8

8. TESTING

8.1 Test Cases

S.NO :	Test case ID	Test data	Expected result	Status
1.	Action_TC_OO1	Hi	Good to see you How can I help you? Select an action (Drop down list)	Pass
2.	Action_TC_OO2	Hello	Good to see you How can I help you? Select an action (Drop down list)	Pass
3.	Action_TC_OO3	Regular Savings Account	Greater! Please take the following documents and head towards the nearest branch 1) Aadhar card 2) Pan Card 3) Passport Size Photos Do you want to know about some	Pass

			other services? Yes/No	
4.	Action_TC_OO4	Kids Savings Account	Awesome! Please take the following document and head towards the nearest branch 1) Aadhar Card 2) Pan Card 3) Passport Size Photos 4) Guardians Aadhar Card Do you want to know about some other services? Yes/No	Pass

5.	Action_TC_OO5	Zero Balance Account	Amazing! Please take the following documents and head towards the nearest branch 1) Aadhar Card 2) Pan Card 3) Passport Size Photos Do you want to know about some other services? Yes/No	Pass
6.	Action_TC_OO6	Proprietorship	Awesome! Please take the following document and head towards tbe nearest branch 1) Aadhar Card 2) Pan Card 3) Passport Size Photos 4) Guardians Aadhar Card Do you want to know about some other services?	Pass

			Yes/No	
7.	Action_TC_OO7	Partnership	Please take the following Documents and approach the closest branch 1)Income Tax returns and proprietor for the last 3 years 2) company Agreement 3) Pan card on both partners Do you want to know about some other services? Yes/No	Pass

8.	Action_TC_OO8	House Loan	To be eligible for a house loan please contact out bank service provides with all existing loan details Do you want to know about some other services? Yes/No	Pass
9.	Action_TC_OO9	Gold Loan	Please approach the bank with the following documents. 1) Pan card 2) Aadhar card 3) Passport Size photo Do you want to know about some other services? Yes/No	Pass

10.	Action_TC_OO10	What is net banking	The facility offered by the bank allows customers to use banking services over the internet. Customers need not visit their bank's branch office to avail each and every small service Do you want to know about some other services? Yes/No	Pass
11.	Action_TC_OO10	How to register net banking?	Please download and fill up the net banking requisition form and submit it to your home branch. Yes/No	Pass
12.	Action_TC_OO12	yes	How can I help you? Select an action (Drop down list)	Pass
13.	Action_TC_OO13	no	Thank you have a nice day	Pass
14.	Action_TC_OO14	http://127.0.0.1:5000/	Properly Load a website	Pass

Table 8.1 Test Cases

8.2 User Acceptance Testing

Test Scenarios
1 Verify user is able to see login page
2 Verify user is able to login to application or not?
3 Verify user is able to navigate to create your account page?
4 Verify user is able to recovery password
5 Verify login page elements
Search
1 Verify user is able to search by entering keywords in search box
2 Verify user is able to see suggestions based on keyword entered in search box
3 Verify user is able to see related auto suggestions displaying based on keyword entered in search box
4 Verify user is able to see no matches found message when no results are matching with entered keyword
5 Verify user is able to see seach detailed page when nothing entered in textbox

Fig: User Acceptance Testing

CHAPTER 9

9. RESULTS

9.1 Performance Metrics

Model Performance Testing:
Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Confidence Score (Only Yolo Projects)	Class Detected - Confidence Score -	2.3 sec Fully loaded

Table 9.1 Performance test

Ref link:https://github.com/IBM-EPBL/IBM-Project-353-1658297245/blob/main/Final%20Deliverables/Performance%20Testing/GTmetrix-report-tdlh.herokuapp.com-20221118T162438-MmQL2ESX.pdf

CHAPTER 10

10. ADVANTAGES & DISADVANTAGES

These advantages are given below:

1. Answer Basic Questions
2. Provides On-time Notifications and Reminders
3. Provides Complete Account Details
4. Resolve Urgent Issues on Priority
5. It gives flexible customer service
6. All time availability
7. It reduces the workload
8. Easily accessible

These Disadvantages are given below:

1. Only it gives answers to pre-defined questions
2. Some time it is misunderstanding
3. Delay response
4. No other language include
5. Ask deep relevant questions chatbot confused

CHAPTER 11

11.1 CONCLUSION

The solution to almost all the querying applications has become chatbot for assistance and resolving. We believe that the same technology can be in banking queriesas it was meant for thatpurpose. Though the bot would not be able to solve or satisfy all the queries for customer, it can certainly resolve issues that the user might be facing often and help the banking sectors maintain great relationships with their customers.

11.2 FUTURE SCOPE

The futureof project lies entirely on how the customers get benefitted from the interaction and the interface. We would have to make improvements in the bot to make it as user-friendly as possible.

The followingareas could have a serious impact on our scope:
   a. Support for multiple languages
   b. Voice and videoinstructions

CHAPTER 12

12. APPENDIX Source Code GitHub & Project Demo Link

Git hub source code link:https://github.com/IBM-EPBL/IBM-Project-353-1658297245/blob/main/Final%20Deliverables/final%20code.zip
Project Demo link:https://www.youtube.com/watch?v=JDRLMlzs3KQ

Project Files and Folder Structure

```
TDLH Help & Support
├── app.py
├── feedback.py
├── requirements.txt
└── Key
    └── key.json
templates
└── index.html
static
├── styles.css
└── assets
    └── img
        ├── team
        │   ├── 1.jpg
        │   ├── 2.jpeg
        │   ├── 3.jpeg
        │   └── 4.jpeg
        ├── header-bg.jpg
        └── map-image.png
```
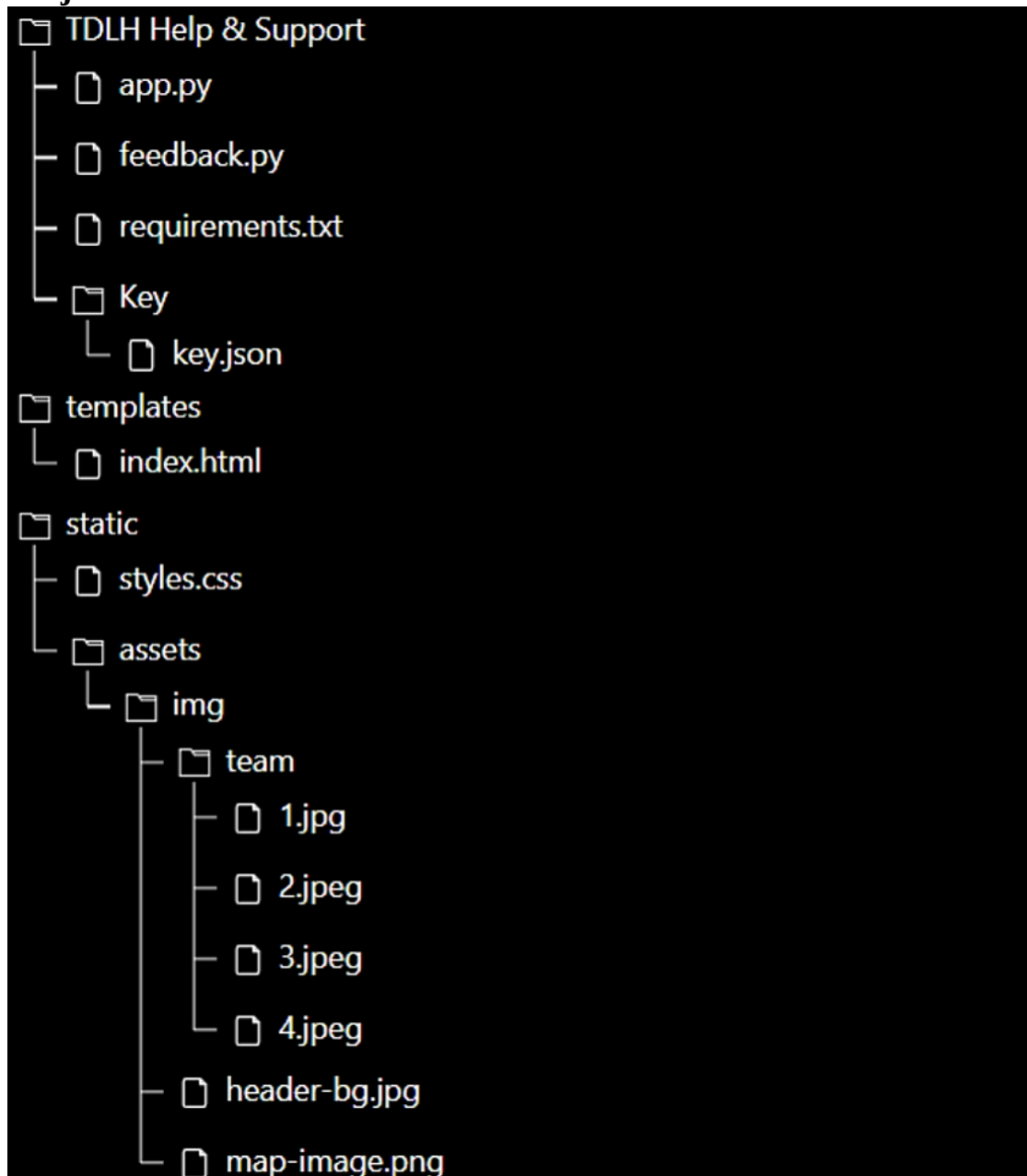
Fig: 12.1 Project structure

Source code

app.py

```python
from flask import Flask, render_template,url_for,request,redirect
import feedback
app = Flask(__name__)
@app.route('/', methods=['POST','GET'])
def Home():
  return render_template('index.html',status='')

@app.route("/Submit", methods=['POST','GET'])
def Submit():
   if request.method == 'POST':
      name = (request.form['name'])
      email = (request.form['email'])
      phone_number = (request.form['phone_number'])
      feedback = (request.form['feedback'])
      Feedback.submit(name,email,phone_number,feedback)
      return render_template('index.html',status='Form submission successful!')
   else:
     return render_template('index.html',status='')
if __name__ == '__main__':
   app.run(debug=True,port=5000)
```

feedback.py

```python
import pyrebase

def submit(name,email_id,phone_number,message):
  firebaseconfig={
   'apiKey': "AIzaSyATsq89CuDuLCt7ccZSTZs11sHO3OR7PAc",
  'authDomain': "tdlh-banking-feedback.firebaseapp.com",
   "databaseURL":"https://tdlh-banking-feedback-default-rtdb.firebaseio.com",
  'projectId': "tdlh-banking-feedback",
  'storageBucket': "tdlh-banking-feedback.appspot.com",
  'messagingSenderId': "336462584761",
  'appId': "1:336462584761:web:0a185c120d1fb303fe7468",
  'measurementId': "G-8F8FJRHXCK",
  "serviceAccount": "Key/key.json"
   }
```

```
firebase=pyrebase.initialize_app(firebaseconfig)
#auth=firebase.auth()
db=firebase.database()
feedback={'Name': name,'Phone Number': phone_number,'Email
Id':email_id,'Feedback': message}
db.push(feedback)
```

requirements.txt
emails==0.6
Flask==2.2.2
gcloud==0.18.3
googleapis-common-protos==1.57.0
gunicorn==20.1.0
Jinja2==3.1.2
numpy==1.23.4
pandas==1.5.1
Pillow==9.2.0
Pyrebase4==4.5.0
requests==2.27.1
scikit-learn==1.1.3
scipy==1.9.3
seaborn==0.12.1
secure-smtplib==0.1.1
sklearn==0.0.post1
virtualenv==20.16.6

styles.css

Link:
https://github.com/Thiyagarajan2001/TDLH_source/blob/main/static/styles.css

map-image.png & header-bg.jpg

Link:https://github.com/Thiyagarajan2001/TDLH_source/tree/main/static/asset
s/img

static/assets/img/team/1.jpg & static/assets/img/team/2.jpeg & static/assets/img/team/3.jpeg & static/assets/img/team/4.jpeg

Link:https://github.com/Thiyagarajan2001/TDLH_source/tree/main/static/assets/img/team