

PROJECT REPORT

AI BASED DISCOURSE FOR BANKING INDUSTRY

Team ID: PNT2022TMID37046

Batch: B5-5M1E

TEAM LEADER:

Name: VISHNUVAITHEESWAR .R

Register Number: 212419104014

TEAM MEMBERS:

Name: SYED ABDUL
SATTAR

Register Number: 212419104013

Name: ARJUN

Register Number: 212419106001

Name: MADHUMITHA.S

Register Number: 212419104004

Name: SARAN.P.S

Register Number: 212419104009

CONTENTS

1. INTRODUCTION

Project Overview

Purpose

2. LITERATURE SURVEY

Existing problem

References

Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

Empathy Map Canvas

Ideation & Brainstorming

Proposed Solution

Problem Solution fit

4. REQUIREMENT ANALYSIS

Functional requirement

Non-Functional requirements

5. PROJECT DESIGN

Data Flow Diagrams

Solution & Technical Architecture

User Stories

6. PROJECT PLANNING & SCHEDULING

Sprint Planning & Estimation

Sprint Delivery Schedule

Reports from JIRA

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

Feature 1

Feature 2

Database Schema (if Applicable)

8. TESTING

Test Cases

User Acceptance Testing

9. RESULTS

Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code

GitHub & Project Demo Link

1. INTRODUCTION

Project Overview

This project, titled “AI Based Discourse for Banking Industry”, aims at providing a platform for customers to clarify their queries online regarding banking. This is achieved with the help of a chatbot that is trained with some of the most frequently asked questions that banking customers usually tend to come up with. The chatbot is created using IBM Watson Assistant and is trained by manually adding the queries to it along with the relevant responses. The chatbot will then be available for use on a website which usually is the bank’s website for anyone to access. Customers or anyone in fact can access the chatbot to interact with it and find solutions to their queries.

Purpose

With banking being an essential service that people require and with it being a slightly complicated and confusing topic for many, a lot of queries naturally tend to arise. For them to be answered as they are predominantly now in a manual aspect either by face to face interactions with a banking employee or through a customer care service, will require a lot of workforce and still end up with long waiting times. Hence, comes the need for an automated solution to the problem which can be easily handled by our chatbot. A chatbot is free, easy to use and is readily accessible at all times and from anywhere. It also provides instant reliable answers to queries and hence eliminating the need for the customers to wait to get their queries cleared. It also ensures that there is no spread of misinformation by providing official and authentic responses to queries straight from the bank sources.

2. LITERATURE SURVEY

Existing problem

Banks are not able to resolve the queries of customers at all times related to the products or services in a satisfactory way which in turn hinders the customer satisfaction. Customers need to visit banks frequently for simple queries.

References

Paper 1

Authors: Vinod Kumar Shukla, Sasha Fathima Suhel, Sonali Vyas, Ved Prakash Mishra

Year: 2020

Title: Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language

Methodology: This paper examines some of the latest AI patterns and activities. System-Chatbots are made. In the banking industry, the introduction of Artificial Intelligence has driven chatbots and changed the face of the interaction between banks and customers.

Advantage: Artificial Intelligence involves creating machines that are capable of simulating knowledge. It also explores the existing usability of chatbot to assess whether it can fulfill the customers ever-changing needs.

Disadvantage: The dialogue capability can be limited to a very specific set or format of questions that are established by the chatbot development team.

Paper 2

Authors: Yomna Abdulla, Rabab Ebrahim, Sumathi Kumaraswamy

Year: 2020

Title: Artificial Intelligence in Banking sector: Evidence from Bahrain

Methodology: Artificial intelligence applications and robotic process automation for chatbots are discussed. Findings highlight that a high priority is given to the digital transformation journey in banks, which suggests that further development and implantation of technology in banks will be seen in the near future.

Advantage: AI can be best described as the computerized processes that employ knowledge, reasoning, and communication that aids smart decision making by chatbots in banks.

Disadvantage: Banking sector faces significant challenges relating to security, risk management and inefficiency that decrease the overall performance of banks.

Paper 3

Authors: Tebaga Lucky Mamela, Nita Sukdeo, Sambil Charles Mukwakungu

Year: 2020

Title: Adapting to Artificial Intelligence through Workforce Re-skilling within the Banking Sector in South Africa

Methodology: This research paper intends to inspire the banking sector to re-skill the banking Institution's workforces in South Africa to adapt to the Artificial Intelligence technologies.

Advantage: Re-skilling the banking workforce to cooperate and collaborate effectively with Artificial Intelligence will enable not only efficiency but futuristic innovation and continuous growth.

Disadvantage: Although AI is creating millions of new jobs, the banking institutions does the substitution of workforces with intelligent robots that could increase the inequality among the highly skilled workforce.

Paper 4

Authors: Shashank Bairy, Rashmi R

Year: 2021

Title: Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language

Methodology: Chatbot is a software application that listens to a user's query in natural language and responds accordingly. There is rapid adoption of the latest technologies in banking and chatbots are one of them. Answering customer queries and assisting customers with banking transactions are some of the ways in which it's making an impact on the industry.

Advantage: Netbanking websites are complex and involve navigating through a lot of pages to find the information that users need. Bank staff undergo a lot of stressful situations when communicating with clients directly. Such situations can be avoided gracefully by using chatbots with AI.

Disadvantage: Chatbots cannot hold the conversation which means it cannot answer multiple questions at the same time.

Paper 5

Authors: Navleen Kaur, Dr Monika Sharma, Supriya Lamba Sahdev, Laraibe Siddiqui

Year: 2020

Title: A Review of Chatbots in the Banking Sector

Methodology: Artificial intelligence (AI), is simulation of human intelligence in machines. Artificial intelligence consists of generally two fundamental ideas. First it involves studying human brains like how their thought process works and secondly it helps representing those processes through machine learning.

Advantage: AI is used in banking industry to minimize the chances of fraud and scam. It is also used to carry out effective decision-making

Disadvantage: 24.1% i.e. 27 people out of 112 are not sure that using artificial intelligence in banking is beneficial. 4.5% i.e. 5 people out of 112 don't think that it is beneficial at all. 22.3% i.e. 25 people don't agree that it has any impact on fast services.

Paper 6

Authors: Dr. Anil B Malali, Dr. S. Gopalakrishnan

Year: 2020

Title: Application of Artificial Intelligence and Its Powered Technologies in the Indian Banking and Financial Industry

Methodology: Examine the dynamics of AI ecosystems in the banking and financial industry and how it is fast becoming a most important disrupter by looking at some of the critical unsolved problems in this area of business

Advantage: AI will empower banking organizations to completely redefine how they operate, establish innovative products and services, and most importantly impact customer experience interventions.

Disadvantage: AI and ML are replacing the human analysts in business activities since human selection involves high cost.

Paper 7

Authors: Dr. Shalini Sayiwal

Year : 2020

Title: CHATBOTS IN BANKING INDUSTRY: A CASE STUDY

Methodology: Chatbots designed with AI are one of the most promising strategies of a banking business that can lead the bank to win the satisfaction vote of their loyal customers.

Advantage: Chatbots are relatively inexpensive to develop and maintain compared to the human equivalent. Chatbots are more intuitive and easier to use. There is no download required and the experience can be personalized over time through machine learning.

Disadvantage: Chatbots have significant limitations based on accents and languages.

Problem Statement Definition

Banking is one the crucial sectors, 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 a satisfactory way in turn hinders the customer satisfaction. In order to guide the customers throughout all the financial services provided by the bank, an intelligent system has to be introduced to provide people with the best solution possible. The users are bank customers who need 24/7 service to clear all their queries and guide them through all the banking processes. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient delivery of service. 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 centers as well as providing them with relevant suggestions.

3. IDEATION AND PROPOSED SOLUTION

Empathy Map Canvas



Ideation & Brainstorming

Template

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

⌚ 10 minutes to prepare
 ⌚ 1 hour to collaborate
 👤 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

⌚ 10 minutes

- A Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- B Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.
- C Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →

1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

⌚ 5 minutes

PROBLEM STATEMENT

The aim of our project is to build a chatbot using IBM Watson's assistant. This chatbot should be able to answer any general banking queries on account creation, loan, net banking, other services etc. The chatbot should provide 24/7 customer support with all the necessary data for solving their queries which reduces their time on moving to banks directly.

Key rules of brainstorming

Stay in topic. Encourage wild ideas.
 Defer judgment. Listen to others.
 Go for volume. If possible, be visual.

2

Brainstorm

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

🕒 10 minutes

TIP

You can select a sticky note and hit the pencil icon to start drawing!

Arun



Vishnu



Syed Abdul



Saran



Madhumitha S



3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Basic



Tasking



Implementation



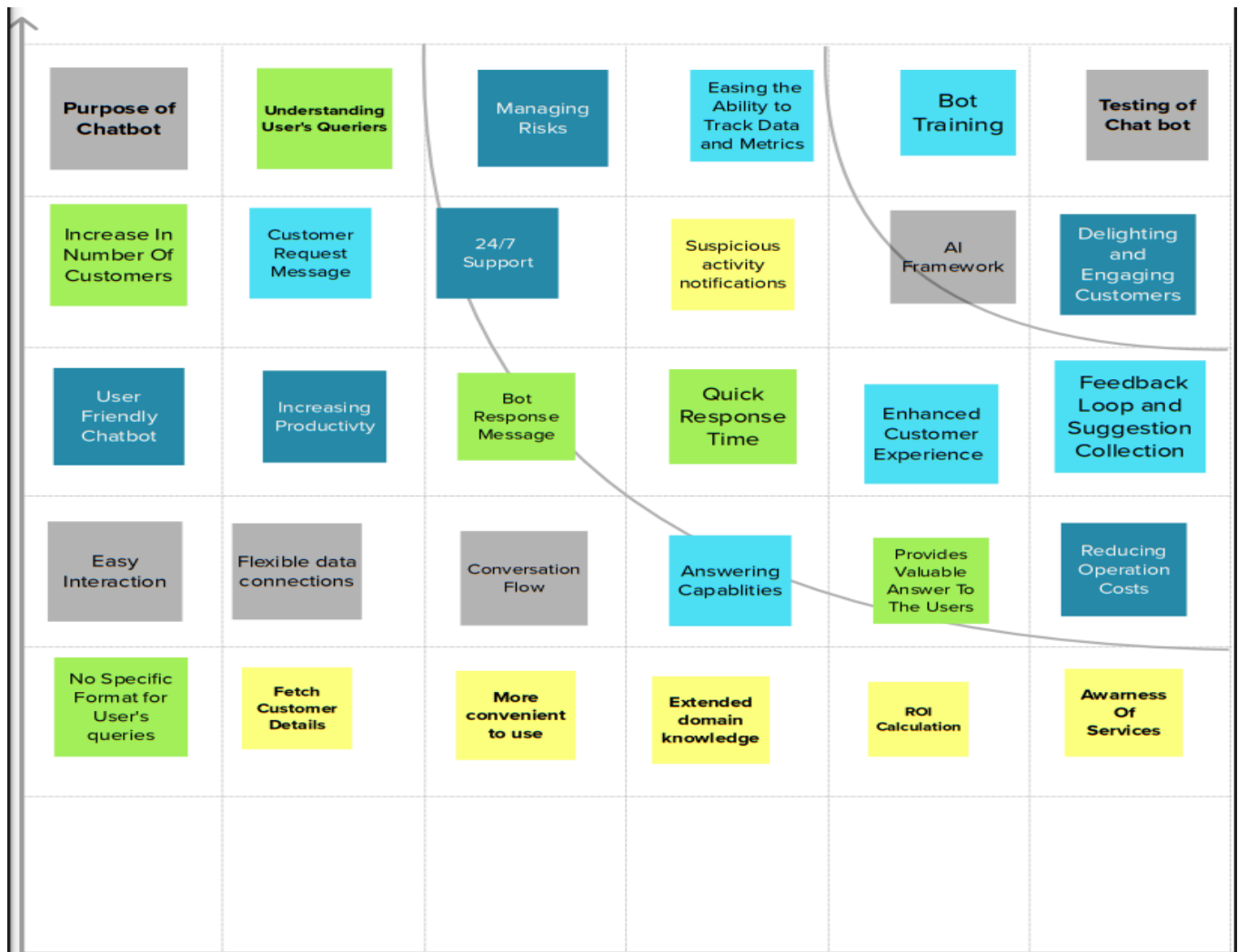
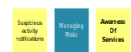
Communication



Feedback



Security



Proposed Solution

S.NO	PARAMETER	DESCRIPTION
1.	Problem Statement (Problem to be solved)	Banks are not able to resolve the queries of customers at all times related to the products or services in a satisfactory way which in turn hinders the customer satisfaction. Customers need to visit banks frequently for simple queries.
2.	Idea / Solution description	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.
3.	Novelty / Uniqueness	Chatbots developed using AI should be able to answer any general 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.
4.	Social Impact / Customer Satisfaction	In order to attain 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 centers as well as providing them with relevant suggestions.
5.	Business Model (Revenue Model)	Employing a chatbot will be a cost-effective solution to clear customer queries for banks. 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.
6.	Scalability of the Solution	AI Chatbots provides 24/7 service to clear all customer queries and guide them through all the banking processes. It supports voice assistance feature and maintains a confidential conversation with customers. 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.

Problem Solution fit

Problem-Solution fit canvas 2.0

Purpose / Vision AI Based Discourse for Banking Industry

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) Who is your customer? I.e. working parents of 0-3 y.o. kids <div>CS</div> <ul style="list-style-type: none"> New customers who would like to learn more about the bank and how to create an account Regular customers who would like to access the various features and services of the bank 	6. CUSTOMER CONSTRAINTS What constraints prevent your customers from taking action or limit their choices of solutions? I.e. spending power, budget, no cash, network connection, available devices. <div>CC</div> <ul style="list-style-type: none"> Network connection is required Unfamiliarity with/unaccustomed to chatting, especially among elders Unable to convey themselves properly through chat Safety and privacy concerns 	5. AVAILABLE SOLUTIONS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? I.e. pen and paper is an alternative to digital notetaking <div>AS</div> <p>Customer care telephone lines and staff at banks are available to clear customer's queries. Both of these current methods are time consuming and can involve in the customer waiting for a long time to get their answers. A chatbot can squash these issues as they can provide answers instantly at any time from the convenience of the customer's phone.</p>	Explore AS, differentiate
	2. JOBS-TO-BE-DONE / PROBLEMS Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides. <div>J&P</div> <ul style="list-style-type: none"> Answering customer queries correctly and quickly Convenience of banking guidance anywhere and anytime Cost and time efficiency and be improved 	9. PROBLEM ROOT CAUSE What is the real reason that this problem exists? What is the back story behind the need to do this job? I.e. customers have to do it because of the change in regulations. <div>RC</div> <ul style="list-style-type: none"> Banking can initially be a slightly complicated task that people sometimes might want guidance or support while performing certain operations As banking is essential, a lot of people need their queries cleared which requires a huge workforce to match the demand which can be very costly and still time taking Banks can introduce new features regularly or might update existing features to keep up with changing regulations that can lead to confusions 	7. BEHAVIOUR What does your customer do to address the problem and get the job done? I.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) <div>BE</div> <p>Banking customers usually have queries related to creating a bank account, loans or general banking queries. Currently, customers will have to rely either on customer care lines or will have to physically visit a bank, wait in line for their turn and then speak to a bank staff to clear their queries. Even the telephone lines are known to have a high wait time which can get frustrating.</p>	
Identify strong TR & EM	3. TRIGGERS What triggers customers to act? I.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. <div>TR</div> <ul style="list-style-type: none"> Word of mouth about how convenient and easy it is to use Watching others use it from home or on the go instant instead of waiting in lines at the bank 	10. YOUR SOLUTION If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. Customers can access an AI based chatbot that can be placed in the bank's website. This can then be used to clear the customer's queries instantly and can be used at any time of the day or from any place as long as the customer has an internet connection. This in turn also reduces the need for banks to employ a large workforce to clear customer queries. As the queries of the customers are answered correctly and in a convenient manner, it is a very efficient and satisfactory solution to the problem. <div>SL</div>	8. CHANNELS of BEHAVIOUR 8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7. They search the web for answers to their queries which are usually scattered and are not reliable. <div>CH</div>	Extract online & offline CH of BE
	4. EMOTIONS: BEFORE / AFTER How do customers feel when they face a problem or a job and afterwards? I.e. lost, insecure > confident, in control - use it in your communication strategy & design. <div>EM</div> <ul style="list-style-type: none"> Before: Frustrated, helpless, confused, nervous After: Confident, relieved, at-ease, interested 	8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development. <div>CH</div> <ul style="list-style-type: none"> They visit banks and meet the bank staff to clear their queries They call the customer care/toll free number of the bank and speak to a customer care employee 		



Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 license
 Created by Daria Nepriakhina / Amaltama.com



4. REQUIREMENT ANALYSIS

Functional requirements

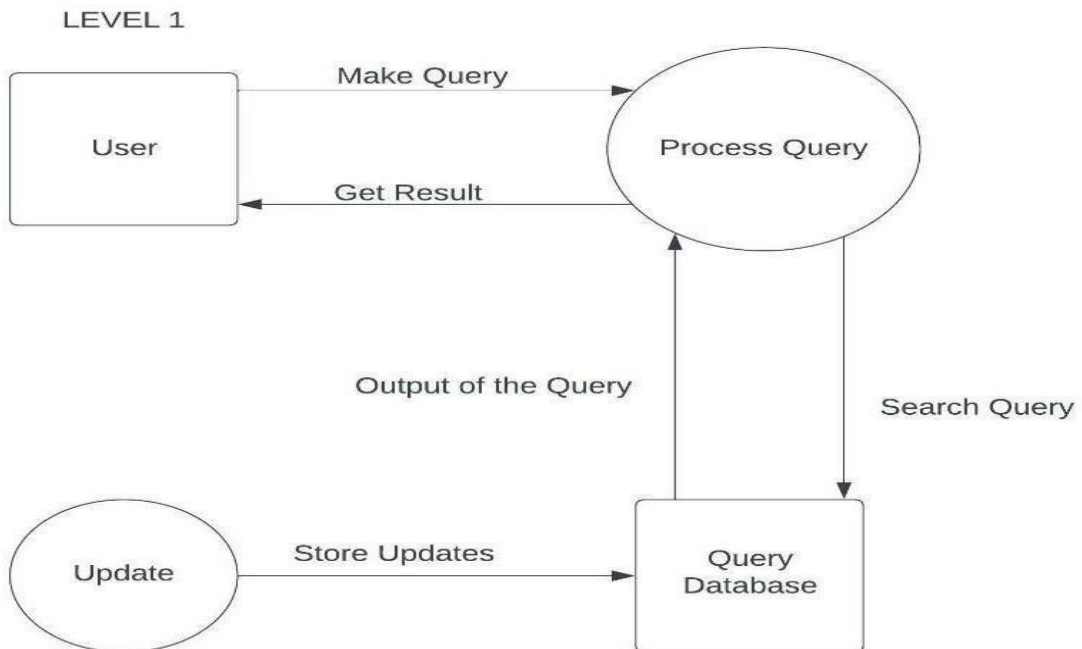
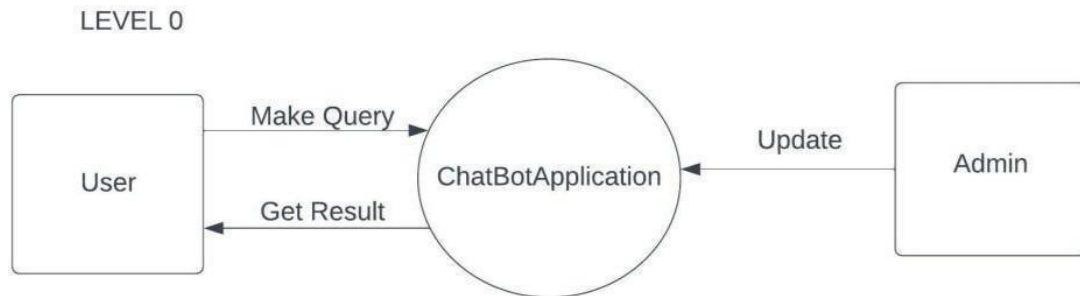
FR NO.	FUNCTIONAL REQUIREMENT (EPIC)	SUB REQUIREMENT (STORY / SUB-TASK)
FR-1	Savings Account Related Actions	<ul style="list-style-type: none">• Type of Savings Account Creation Details• Interest Rate• Minimum Balance• Debit Card• Credit Card
FR-2	Current Account Related Actions	<ul style="list-style-type: none">• Type of Company• Current Account Closure Steps• Update GSTIN• Zero Balance Current Account
FR-3	Loan Account Related Actions	<ul style="list-style-type: none">• Type of Loan• How long for approval• Available Loan Amounts• Loan Status• Joint Loan
FR-4	General Queries Related Actions	<ul style="list-style-type: none">• Bank Working Days• List of Branches• Storage Locker Facility• Currency Conversion Facility• CIBIL• Find a nearest branch
FR-5	Net Banking Related Actions	<ul style="list-style-type: none">• Login Steps• Change Net Banking Password• Daily Limit• Types of Fund Transfer• Add Beneficiary

Non-Functional requirements

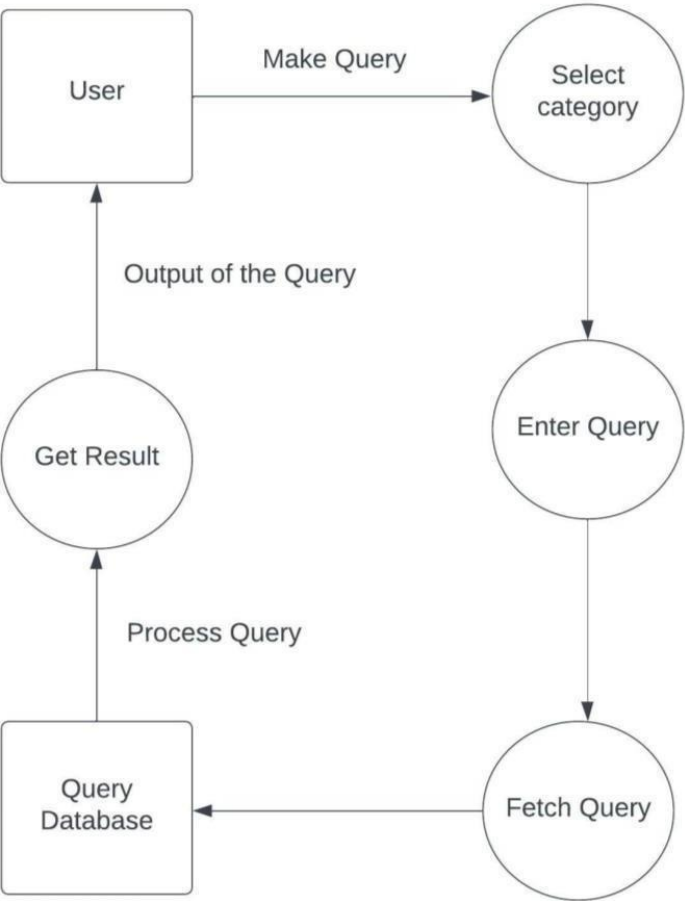
NFR NO.	NON-FUNCTIONAL REQUIREMENT	DESCRIPTION
NFR-1	Usability	Chatbots developed using AI should be able to answer any general banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a cost efficient manner.
NFR-2	Security	The AI Chatbot maintains a confidential conversation with customers. Chatbot will provide personal and efficient communication between the user and the bank.
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 are a great way to overcome the limitation of workload of humans. There can be multiple instances of a single chatbot inquiring about different people at the same time. Such chatbots work in real time with no need for the customers to wait. This ensures faster, easier and more efficient face-time with customers.
NFR-5	Availability	AI Chatbots provide 24/7 service to clear all customer queries and guide them through all the banking processes. It is available to anyone with access to the internet with basic hardware.
NFR-6	Scalability	AI Chatbots are helping the banking industry to scale their customer service and to improve customer service satisfaction at the same time. 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.

5. PROJECT DESIGN

Data Flow Diagrams

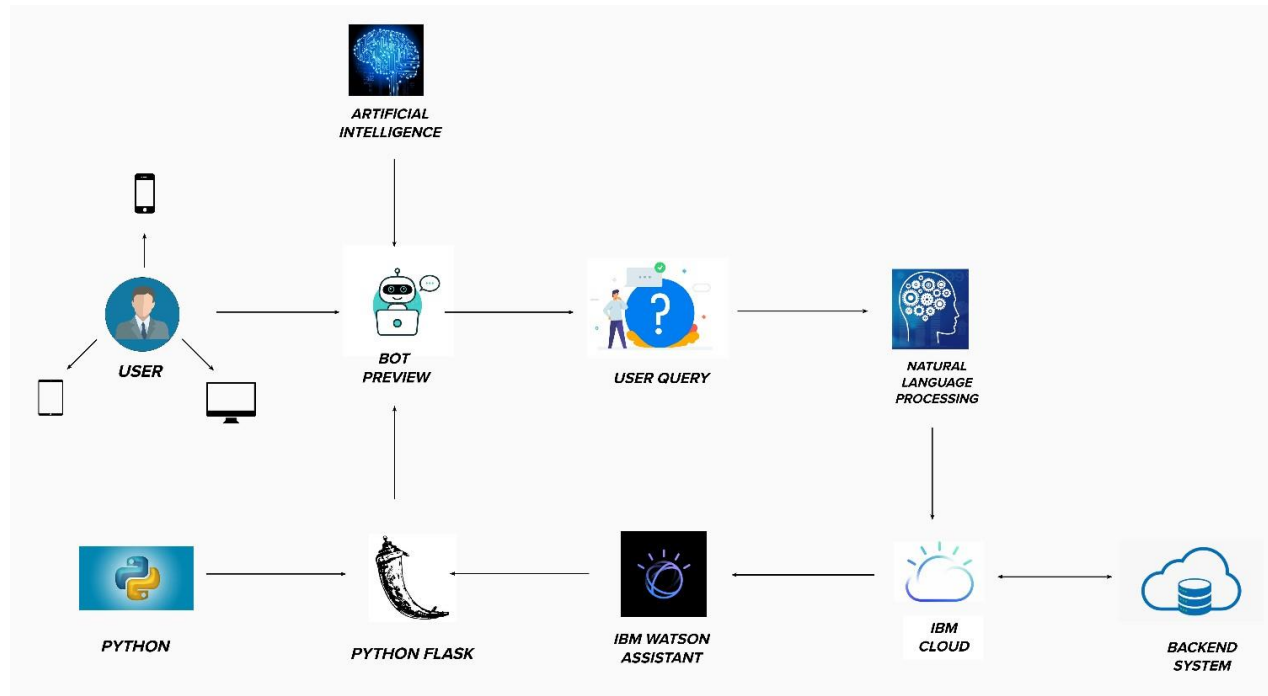


LEVEL 2

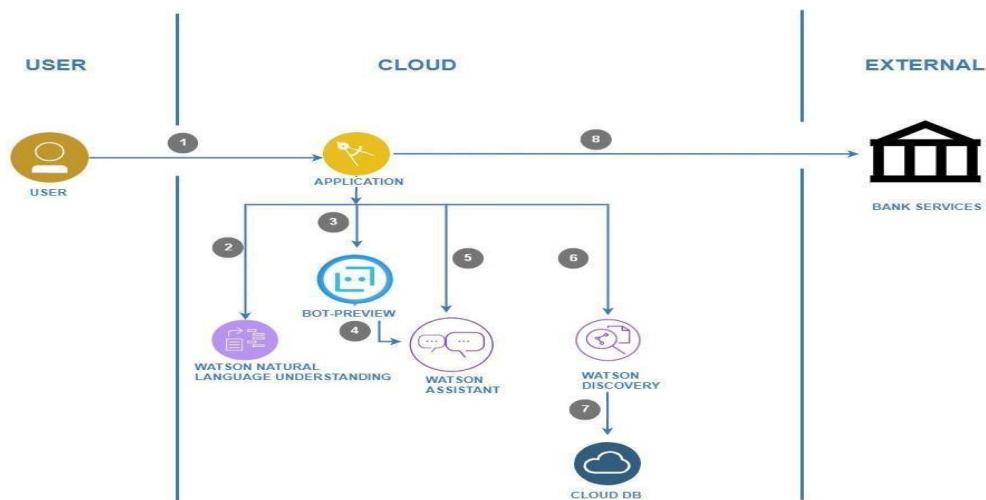


Solution & Technical Architecture

Solution Architecture



Technical Architecture



User Stories

USER TYPE	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	ACCEPTANCE CRITERIA	PRIORITY	RELEASE
Customer (Mobile or Web user)	Savings Account Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	I can clear my queries regarding types of savings account	High	Sprint-1
		USN-2	As a user, I can check the Interest Rates of Savings Account	I can clear my queries regarding interest rates of savings account	High	Sprint-1
		USN-3	As a user, I can check the Minimum Balance of Savings Account	I can clear my queries regarding minimum balance of savings account	Medium	Sprint-2
	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	I can clear my queries regarding types of companies	High	Sprint-1
		USN-5	As a user, I want to get details on procedure to close my Current Account	I can clear my queries regarding current account closure	High	Sprint-2
	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	I can clear my queries regarding types of loan account	High	Sprint-1
		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	I can clear my queries regarding loan amounts of loan account	High	Sprint-2
		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	I can clear my queries regarding loan status of loan account	Low	Sprint-2

USER TYPE	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	ACCEPTANCE CRITERIA	PRIORITY	RELEASE
		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	I can clear my queries regarding CIBIL score of loan application	Medium	Sprint 3
		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	I can clear my queries regarding storage locker facilities of bank account	High	Sprint-3
	Net Banking Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	I can clear my queries regarding change of net banking password	Medium	Sprint-2
		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	I can clear my queries regarding types of fund transfers in net banking	High	Sprint-3
		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	I can clear my queries regarding adding beneficiaries in net banking	Low	Sprint-3
Administrator		USN-15	As an admin, I can change responses to queries and modify them as and when needed.	I can modify responses of the chatbot	Medium	Sprint-1
		USN-16	As an admin, I can add more options to queries and add new options as new features get added.	I can add more options and queries into the chatbot	Medium	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

Sprint Planning & Estimation

SPRINT	FUNCTIONAL REQUIREMENT (EPIC)	USER STORY NUMBER	USER STORY / TASK	STORY POINTS	PRIORITY	TEAM MEMBERS
Sprint-1	Savings Account Related Actions	USN-1	As a user in Savings Account option, I can select the Type of Savings Account to get details regarding documents required for creating Savings Account	4	High	VISHNU
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	4	High	VISHNU
Sprint-1		USN-3	As a user, I can check the Minimum Balance of Savings Account	3	Medium	VISHNU
Sprint-1	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	5	High	SYED ABDUL SATTAR
Sprint-1		USN-5	As a user, I want to get details on procedure to close my Current Account	4	High	SYED ABDUL SATTAR
Sprint-2	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	3	High	SYED ABDUL SATTAR
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	3	High	ARJUN
Sprint-2		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	1	Low	ARJUN
Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	2	Medium	ARJUN
Sprint-2		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	1	Low	MADHU
Sprint-2		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	3	High	MADHU

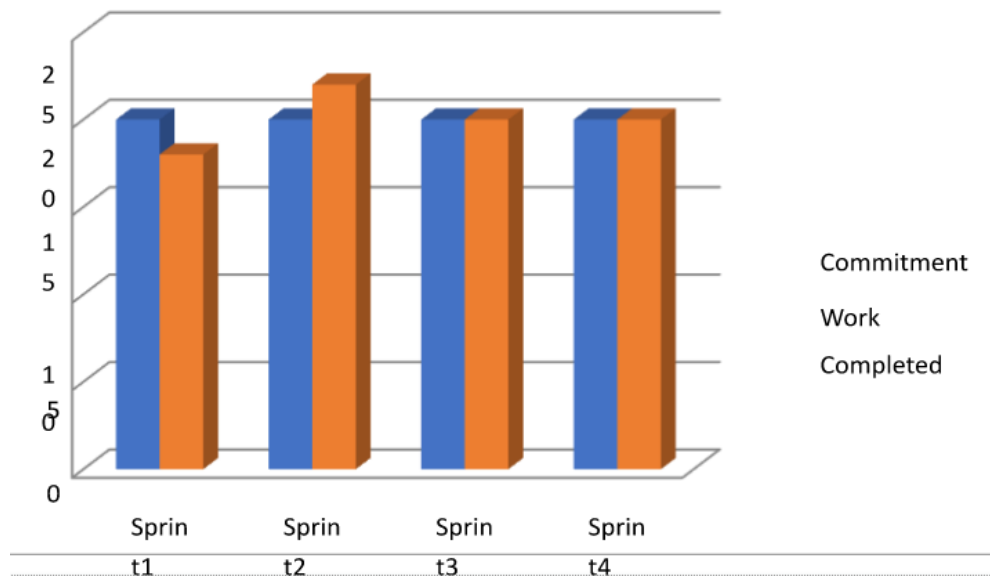
Sprint-2	Net Banking Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	3	High	MADHU
Sprint-2		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	2	Medium	SARAN
Sprint-2		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	2	Medium	SARAN
Sprint-3	Web Application	USN-15	As a user, I want to access the chatbot in a web browser that can be accessed from almost all devices.	20	High	SARAN
Sprint-4	User Interface and Web Pages	USN-16	As a user, I want to view pages of the banking website and have access to the chatbot easily.	20	High	VISHNU

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	18	02 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	22	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

SPRINT	TOTAL STORY POINTS	DURATION	AVERAGE VELOCITY
Sprint-1	20	6 Days	$20/6 = 3.33$
Sprint-2	20	6 Days	$20/6 = 3.33$
Sprint-3	20	6 Days	$20/6 = 3.33$
Sprint-4	20	6 Days	$20/6 = 3.33$
Overall	80	24 Days	$80/24 = 3.33$

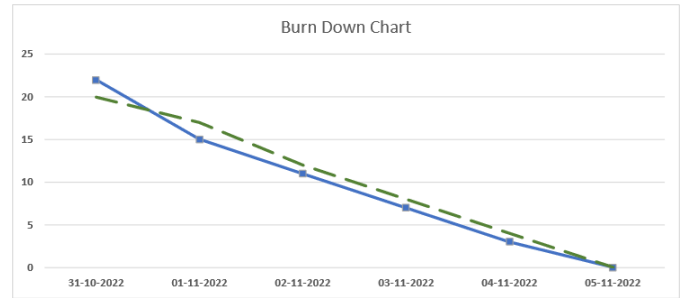
Velocity chart:



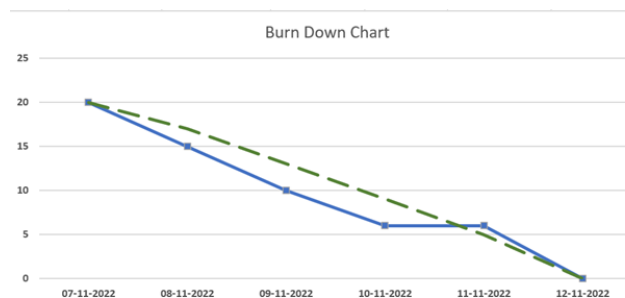
Burn down chart:



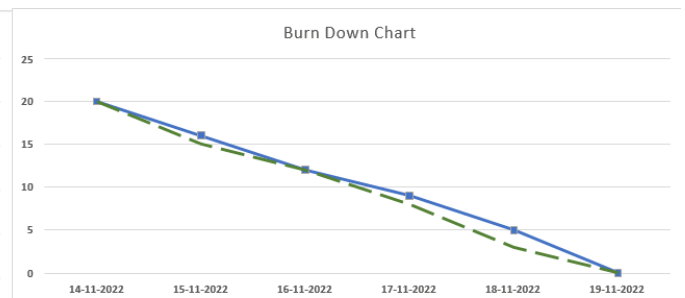
Sprint 1



Sprint 2



Sprint 3



Sprint 4

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

Feature 1

Python Flask

Python Flask is used to develop chatbot applications using python. Flask is mainly used to render and integrate the chatbot application in the browser by providing API. By running the python application, the suitable server domain link is obtained and run in the browser.

HTML

The HTML and CSS is used to design the overall chatbot UI. HTML is used to add UI components and CSS is used to add style to those components. IBM watson assistant deploys HTML code to train the Chatbot.

Build PYTHON FLASK Code:

APP.PY

```
from flask import Flask,render_template

app=Flask(__name__)

@app.route('/')

def bank():

    return render_template('Home.html')

@app.route('/about')

def about():

    return render_template('About.html')

@app.route('/contact')

def contact():

    return render_template('Contact.html')

if __name__=='__main__':

    app.run(debug = True)
```

HOME.HTML

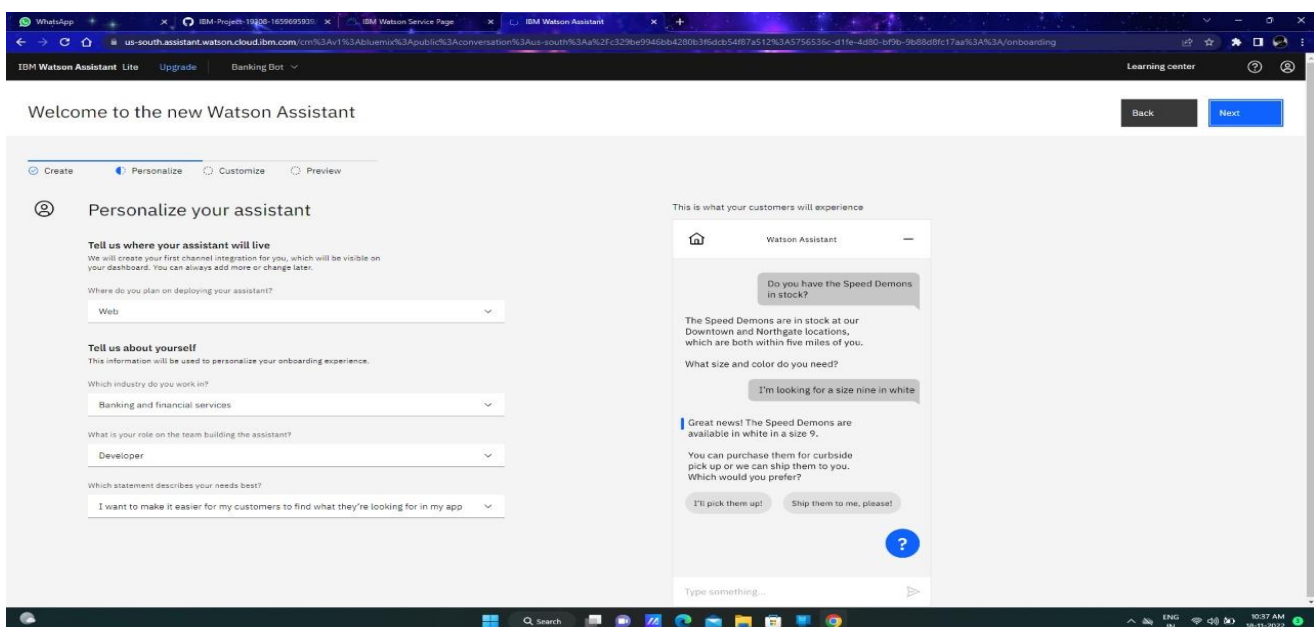
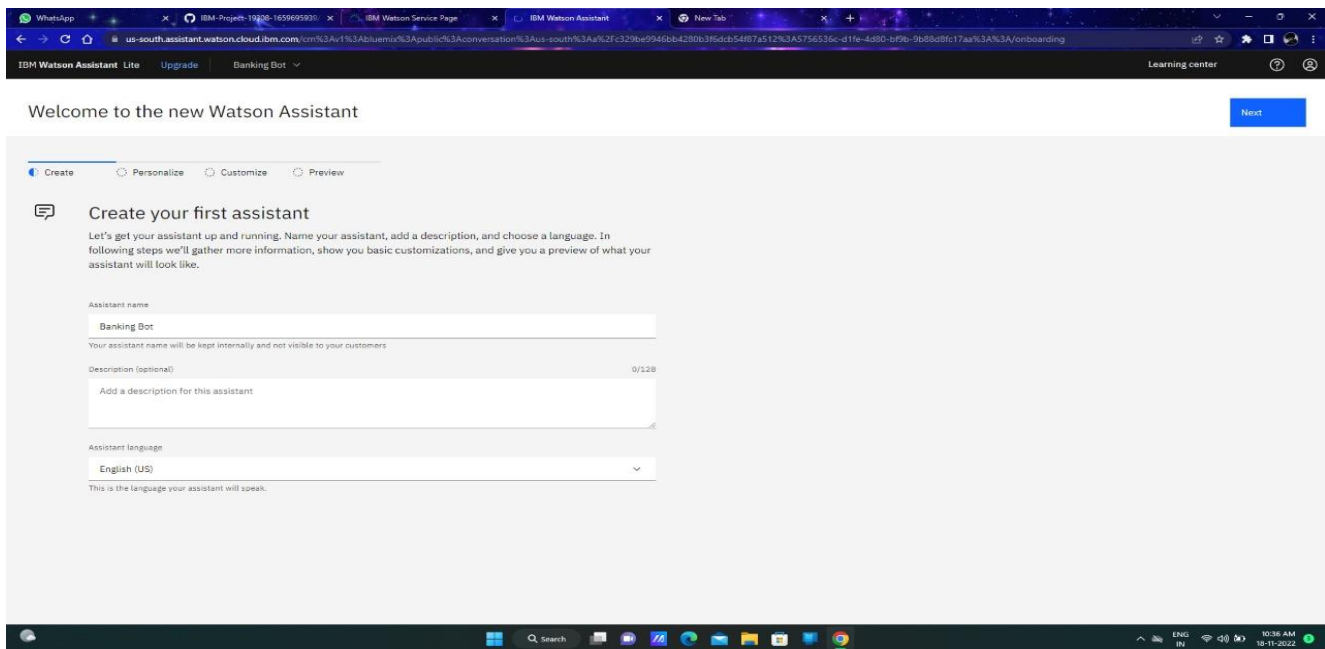
```
<!DOCTYPE html>
<html style="font-size: 16px;" lang="en"><head>
  <body>

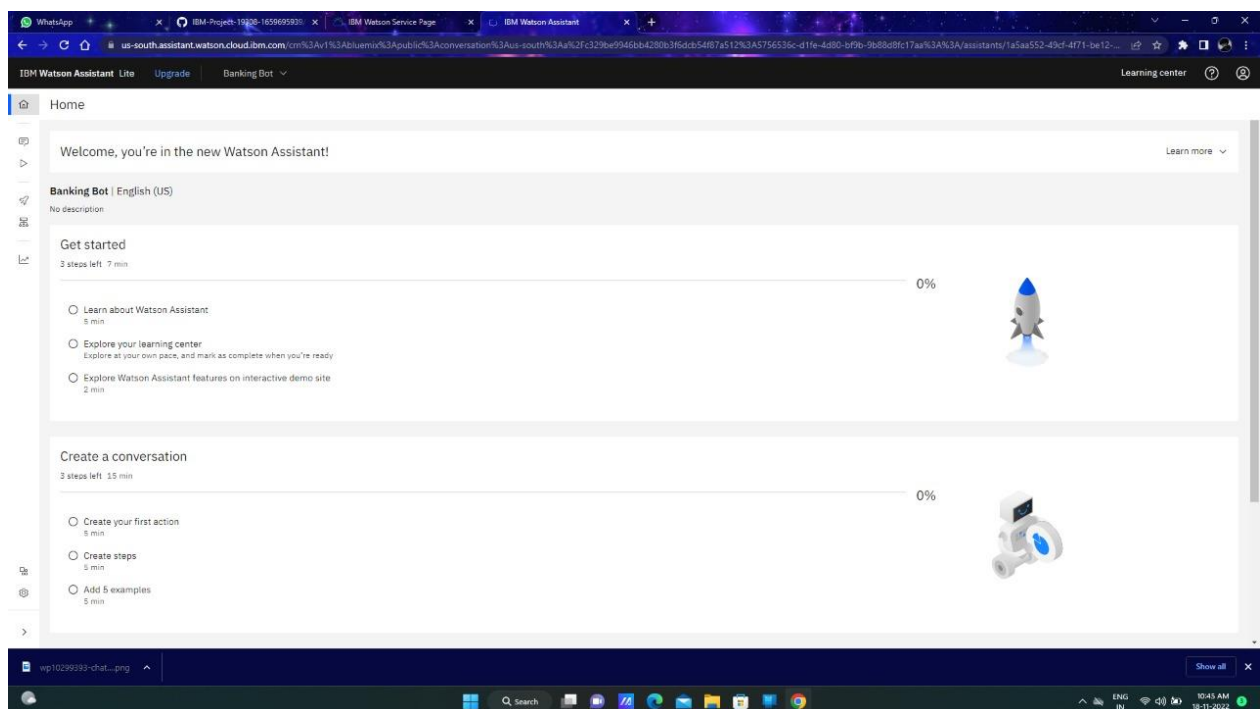
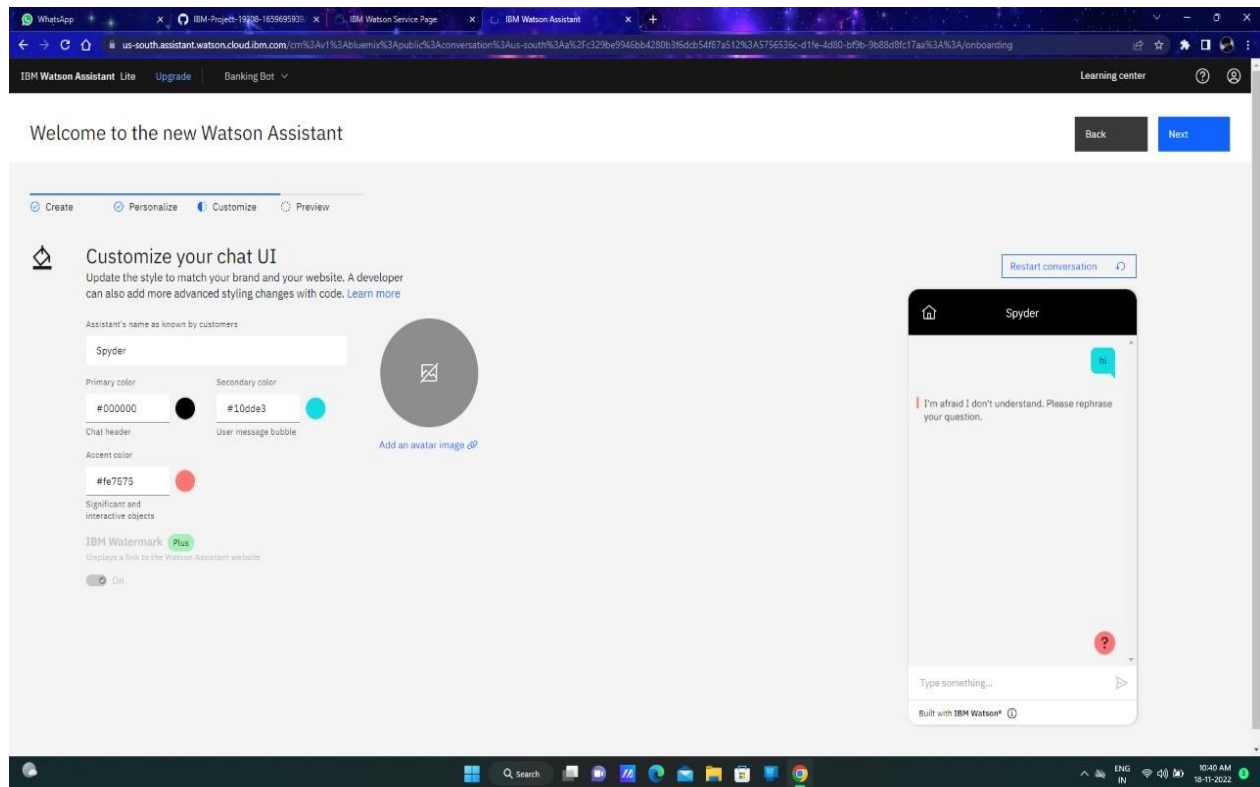
<!--Chat Integration==!>
  <script>
    window.watsonAssistantChatOptions = {
      integrationID: "ffa94b22-82fd-424d-baf0-05322655ecf4", // The ID of this integration.
      region: "us-south", // The region your integration is hosted in.
      serviceInstanceID: "e5ada103-ff26-4155-9a22-6cd24e8a71e0", // 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>
  <footer class="u-align-center u-clearfix u-footer u-grey-80 u-footer" id="sec-bfdd"><div
class="u-clearfix u-sheet u-sheet-1">
    <p class="u-small-text u-text u-text-variant u-text-1">Banking ChatBot-2022</p>
  </div></footer>
</body></html>
```

Feature 2

IBM CHATBOT:

- Our chatbot is able to guide a customer to create a bank account.(Both current and savings account)
- Our chatbot is able to answer loan queries.
- Our chatbot is able to answer general banking queries.
- Our chatbot is able to answer queries regarding net banking.





IBM Watson Assistant LiteUpgradeBanking Bot

Manage

Savings

Customer starts with:
Savings

Conversation steps

This step has no content

1Regular savin...Kids saving a...+2

Continue to next step

1 is What is savings account?
A savings account is a deposit account designed to hold money you don't plan to spend immediately...

2Go to action: end

1 is Regular savings account
Please take the following documents to the nearest branch 1. Aadhar card 2. Pan card 3. Passport size...

3Go to action: end

1 is Kids saving account
Please take the following documents to the nearest branch 1. Aadhar card 2. Pan card 3. Passport size...

4Go to action: end

1 is Zero balance account
Please take the following documents to the nearest branch 1. Aadhar card 2. Pan card 3. Passport size...

5

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.
The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this actionTotal: 1

Enter a phrase

Savings

Preview >

IBM Watson Assistant LiteUpgradeBanking Bot

Manage

Greeting

Customer starts with:
Good evening

Conversation steps

Nice to meet you!

1Go to action: Index

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.
The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this actionTotal: 6

Enter a phrase

Hello

Hi

Greeting

Good morning

Good afternoon

Good evening

New step +

Preview >

8. TESTING

Test Cases

	Test Scenarios
1	Verify user is able to open and view chatbot UI
2	Verify user is able to interact with chatbot or not
3	Verify chatbot is able to respond to user queries immediately
4	Verify chatbot is able to provide options for user to choose various choices
	Savings Account Related Actions
1	Verify user is able to select type of savings account
2	Verify user is able to know the procedure to create savings account for selected type
3	Verify user is check the minimum balance
4	Verify user is able to find interest rate
	Current Account Related Actions
1	Verify user is able to select type of company
2	Verify user is able to know the procedure to create current account for selected type
3	Verify user is able to know about zero balance current account
4	Verify user is able to know the procedure to close current account
	Loan Account Related Actions
1	Verify user is able to choose options for selecting type of available loan policies
2	Verify user is able to know about available loan amounts
3	Verify user is able to check the loan status
4	Verify user is able to know about joint loan
	General Query Related Actions
1	Verify user is able to know about bank working days
2	Verify user is able to know about list of branches
3	Verify user is able to find the nearest branch
4	Verify user is able to know about storage locker facility
5	Verify user is able to know about currency conversion facility
	Net banking Related Actions
1	Verify user is able to know the procedure to login netbanking account
2	Verify user is able to know the procedure to change netbanking password
3	Verify user is able to choose options for selecting type of fund transfers
4	Verify user is able to know about daily transaction limit

Test Report

1. 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).

2. Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	0	0	2	1	3
Duplicate	0	0	0	0	0
External	0	0	0	0	0
Fixed	0	0	2	1	3
Not Reproduced	0	0	0	0	0
Skipped	0	0	0	0	0
Won't Fix	0	0	0	0	0
Totals		0	2	2	6

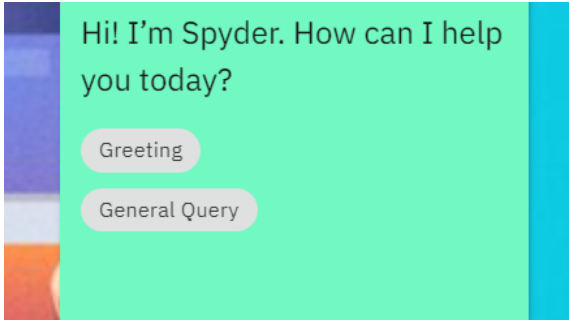
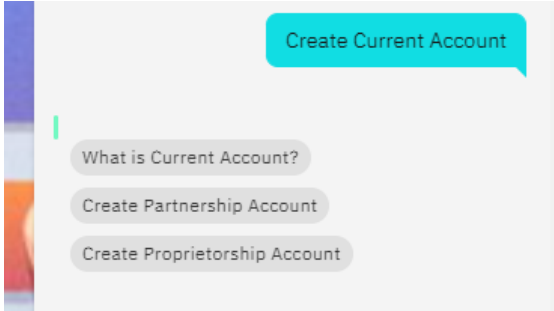
3. Test Case Analysis

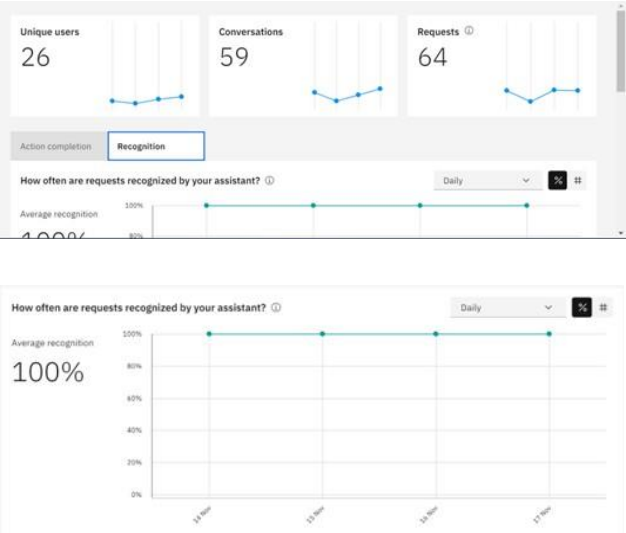
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	0	0	0	0
Client Application	25	0	0	25
Security	0	0	0	0
Outsource Shipping	0	0	0	0
Exception Reporting	0	0	0	0
Final Report Output	25	0	0	25
Version Control	0	0	0	0

9. RESULTS

9.1 Performance Metrics

Model Performance Testing:

S.NO .	PARAMETER	VALUES	SCREENSHOT
1.	Model Summary	<p>The chatbot is used by the user to interact and select queries that are populated based on frequently asked questions of banking customers. There can be multiple instances of a single chatbot serving different users at the same time. It quickly responds with expected answers to frequently asked customer queries. 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.</p>	 

2.	Accuracy	<p>Training Accuracy – 100%</p> <p>Validation Accuracy – 100%</p>	 <p>The screenshot displays a dashboard for an assistant's performance. At the top, three summary cards show 'Unique users' (26), 'Conversations' (59), and 'Requests' (64), each with a small line graph. Below these is a 'Recognition' tab. The main section is titled 'How often are requests recognized by your assistant?' and features a line graph showing 'Average recognition' at 100% over a period from 14 Nov to 17 Nov. The graph shows a constant line at the 100% mark.</p>
----	----------	---------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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 centers 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 create 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 centers

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

13. APPENDIX

Source Code

Build PYTHON FLASK Code:

APP.PY

```
from flask import Flask,render_template

app=Flask(__name__)

@app.route('/')

def bank():

    return render_template('Home.html')

@app.route('/about')

def about():

    return render_template('About.html')

@app.route('/contact')

def contact():

    return render_template('Contact.html')

if __name__=='_main_':

    app.run(debug = True)
```

Build HTML and CSS Code

HOME.HTML

```
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <title>Output</title>

    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

    <style>

        body
        {

            background-image: url("https://acquire.io/wp-content/uploads/2020/06/chatbots-in-banking-and-
finance-1024x551.jpg");
            overflow:hidden;
            background-size: cover;

        }

        .moving_text{
            transform:translateX(30vw);
            transition:transform 3s;
            background:linear-gradient(to top left, #A100FFFF, #119CFDFF);
            font-family: Algerian;
            color: yellow;
            width:55vw;
        }

        .team_info{
            margin-top:10vw;
            margin-left:3vw;
        }

    </style>

</head>
<body>
<div>
<h1 class="moving_text">AI DISCOURSE BASED ON BANKING INDUSTRY</h1>
</div>
<div class="team_info">
<div style="display: inline-
flex;"><h3>TEAMID:</h3><h3><strong>PNT2022TMID37046</strong></h3></div><br>
```

```
<div style="display: inline-flex;"><h4>TEAM  
LEADER:</h4><h4><strong>VISHNUVAITHEESWAR</strong></h4></div>
```

```
<h4>TEAM MEMBERS:</h4>  
<div style="transform:translate(11.5vw, -2.1vw);">  
<h4><strong>ARJUN P</strong></h4>  
<h4><strong>SARAN P.S</strong></h4>  
<h4><strong>MADHU S</strong></h4>  
<h4><strong>SYED ABDUL</strong></h4>  
</div>
```

```
</div>  
</body>  
<script>  
  window.watsonAssistantChatOptions = {  
    integrationID: "6b05a2b5-f7b8-402c-a570-4f68124dc0b8", // The ID of this integration.  
    region: "us-south", // The region your integration is hosted in.  
    serviceInstanceID: "5756536c-d1fe-4d80-bf9b-9b88d8fc17aa", // 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);  
  });  
  text=document.querySelector(".moving_text");  
  text.style.transform=`translateX(20vw)`  
  current=0  
  setInterval(function(){text.style.transform=`translateX(${current}vw)`  
    if(current==0){  
      current=20;  
    }  
    else{  
      current=0;  
    }  
  },3000)  
</script>  
</html>
```

<--IBM Chatbot Integration:-->

```
<script>
window.watsonAssistantChatOptions = {
  integrationID: "ffa94b22-82fd-424d-baf0-05322655ecf4", // The ID of this integration.
  region: "us-south", // The region your integration is hosted in.
  serviceInstanceID: "e5ada103-ff26-4155-9a22-6cd24e8a71e0", // 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>
<footer class="u-align-center u-clearfix u-footer u-grey-80 u-footer" id="sec-bfdd"><div
class="u-clearfix u-sheet u-sheet-1">
  <p class="u-small-text u-text u-text-variant u-text-1">Banking ChatBot-2022</p>
</div></footer>
</body></html>
```

HOME.CSS

```
.u-section-1 {
  background-image: url("/static/img/bg.jpg");
  background-position: 50% 50%;
  min-height: 100vh;
}
.u-section-1 .u-layout-wrap-1 {
  width: calc(((100% - 1140px) / 2) + 1140px);
  margin: -18px 0 0 auto;
}
.u-section-1 .u-layout-cell-1 {
  min-height: 723px;
}
.u-section-1 .u-container-layout-1 {
  padding: 30px 29px;
}
.u-section-1 .u-line-1 {
  width: 111px;
  height: 6px;
  transform-origin: left center 0px;
  margin: 111px auto 0 11px;
```

```

}
.u-section-1 .u-text-1 {
  font-size: 3.75rem;
  font-weight: 700;
  line-height: 1;
  margin: 20px 17px 0 11px;
}
.u-section-1 .u-text-2 {
  font-style: italic;
  margin: 23px 17px 0 11px;
}
.u-section-1 .u-layout-cell-2 {
  background-position: 50% 50%;
  min-height: 723px;
}
.u-section-1 .u-container-layout-2 {
  padding: 30px;
}
.u-section-1 .u-shape-1 {
  width: 23px;
  height: 23px;
  margin: 279px 183px 0 auto;
}
.u-section-1 .u-image-1 {
  width: 443px;
  height: 444px;
  margin: -240px 0 0 auto;
}
@media (max-width: 1199px) {
  .u-section-1 .u-layout-wrap-1 {
    width: calc(((100% - 940px) / 2) + 940px);
  }
  .u-section-1 .u-layout-cell-1 {
    min-height: 596px;
  }
  .u-section-1 .u-text-1 {
    margin-right: 0;
  }
  .u-section-1 .u-text-2 {
    margin-right: 0;
  }
  .u-section-1 .u-layout-cell-2 {
    min-height: 596px;
  }
  .u-section-1 .u-container-layout-2 {
    padding-left: 27px;
  }
}

```

```
padding-right: 27px;
}
.u-section-1 .u-shape-1 {
margin-top: 296px;
}
.u-section-1 .u-image-1 {
margin-top: -249px;
}
}
@media (max-width: 991px) {
.u-section-1 .u-layout-wrap-1 {
width: calc(((100% - 720px) / 2) + 720px);
}
.u-section-1 .u-layout-cell-1 {
min-height: 100px;
}
.u-section-1 .u-text-1 {
font-size: 3rem;
}
.u-section-1 .u-layout-cell-2 {
min-height: 525px;
}
.u-section-1 .u-shape-1 {
margin-top: 285px;
}
.u-section-1 .u-image-1 {
width: 319px;
height: 319px;
margin-top: -238px;
}
}
@media (max-width: 767px) {
.u-section-1 .u-layout-wrap-1 {
width: calc(((100% - 540px) / 2) + 540px);
}
.u-section-1 .u-container-layout-1 {
padding-top: 50px;
padding-right: 60px;
padding-left: 10px;
}
.u-section-1 .u-text-1 {
font-size: 3.75rem;
}
.u-section-1 .u-layout-cell-2 {
min-height: 663px;
}
}
```

```
.u-section-1 .u-container-layout-2 {  
  padding-left: 10px;  
  padding-right: 10px;  
}  
}  
@media (max-width: 575px) {  
  .u-section-1 {  
    min-height: 907px;  
  }  
  .u-section-1 .u-layout-wrap-1 {  
    width: 390px;  
    margin-right: auto;  
  }  
  .u-section-1 .u-container-layout-1 {  
    padding-right: 50px;  
  }  
  .u-section-1 .u-text-1 {  
    font-size: 3rem;  
  }  
  .u-section-1 .u-layout-cell-2 {  
    min-height: 417px;  
  }  
}
```

GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-19308-1659695939>

PROJECT DEMO LINK:

https://drive.google.com/file/d/1HFMSICeQ8e5o5sI_PMZKIqOoCXEfzkRe/view?usp=sharing

GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-19308-1659695939>

PROJECT DEMO LINK:

https://drive.google.com/file/d/1HFMSICeO8e5o5sI_PMZKIqOoCXEfzkRe/view?usp=sharing