Team id	PNT2022TMID16498
Project Name	AI-Based Discourse for Banking Industry

Project Report

1. **INTRODUCTION**

   a. Project Overview

   b. Purpose

2. **LITERATURE SURVEY**

   a. Existing problem

   b. References

   c. Problem Statement Definition

3. **IDEATION & PROPOSED SOLUTION**

   a. Empathy Map Canvas

   b. Ideation & Brainstorming

   c. Proposed Solution

   d. Problem Solution fit

4. **REQUIREMENT ANALYSIS**

   a. Functional requirement

   b. Non-Functional requirements

5. **PROJECT DESIGN**

   a. Data Flow Diagrams

   b. Solution & Technical Architecture

   c. User Stories

1. INTRODUCTION

a. Project Overview

To build a bank chatbot which can have the following capabilities:

- It should be able to guide a customer to create a bank account.

- It should be able to answer loan queries.

- It should be able to answer general banking queries.

- It should be able to answer queries regarding net banking.

- It should be able to answer all queries regarding banking industry.

b. Purpose

- The chatbot should work 24X7.

- The chatbot can be attached to the websites of the bank, or can be created as an app.

- The chatbot may have regional or local languages.

- The software should give the latest statictics if there is any change in banking rules.

- It should be user friendly.

- Should be easy to use.

- Should get as much queries from the customers as possible.

2. LITERATURE SURVEY

a. Existing problem

Customers of banks frequently experience problems such as poor customer service, funds and checks bounce, lack of internet and system availability in the bank, lack of service during lunch and break times, loan disputes, sluggish work progress, excessive and hidden fees within the banking organisations, to name a few.Customers have also emphasised that they frequently experience delays in receiving the services they need and that, in some cases, they must stand in a lengthy line before their turn comes. Similar issues have been raised by customers.

b. References

S. No	Title	Author & Year of Publication	Proposed Work	Limitation
1	**Drivers Of ArtificialIntelligence In Banking Service Sectors**	Mohamed Hussain Thowfeek,Et Al,[2020]	Consequently, Expenditures Are Reduced And Customer SatisfactionIs Increased. AccordingTo The Data, New Technologies Were Warmly AcceptedBy Clients. Banking Institutions And OtherService-Oriented Organizations With AHigh LevelOf Customer Interaction Might Use The Thesis'Implications To BetterMeet TheirCustomers' Needs.	. The outcome of thestudy focuses on the bankingsector and the implications arelimited to certain markets. This paper does nottalkabout Natural Language Processing (Nlp).

2	**What artificial intelligence can doandcan'tdo rightnow**	Andrew Ng (2016)	Andrew Ng (2016) inhis research paper —What artificial intelligence can do and can't do right now discusses the implications of AI on business. He discusses the automation age, how business is evolving because of robotics and machine learning. AI work requires cautiously picking A and B and providing the essential information to help the AI figure out the A→Brelationship. Selecting A and B creatively has already revolutionized numerous industries. Itis ready to revolutionize many more.	Largerdataset/Information is required to train the model to give thebestperformance.

| 3 | **The Impact of Chat-Botson the Banking Experience** | Geeta Narula, Rakhi Narula(2021) | The report held in April2021 The Impact of Chat-Bots on the Banking Experience says that the Indian banking sector plays a crucial role in the economy of our countryand is constantly evolving and innovating its services to enable and to serve its customers better andround the clock to the fullest of their capacity.One of the most revolutionizing step in this regard is the introduction and implantation of chatbots that is redefining the banking experience in many ways. | Lacking inMultilingual. |

4	**Utilization of artificialintelligence in finance**	Ryoji Kashiwagi (2005)	"Utilization of artificialintelligence in finance"studies that man-made artificial intelligence is presently entering another boom stage, thethird in its history, in the wake of a technicaladvancement known asprofound learning. Man-made AI is beingused in different structures even in the monetary segment. Money related foundations ought to use man-made consciousness all the more effectively through such methods as open innovation.	This paper does not elaborate about the Implementation of Chatbot system
5	**Drivers Of Artificial Intelligence In Banking Service Sectors**	Mohamed HussainThowfeek, EtAl,[2020]	ArtificialIntelligence Is Of Interest To Researchers.Due To Recent Technology Developments And Faster Data Accessibility, It Is Now Closer To Commercial Adoption.	Algorithm Cost Implementation. Lack of Supporting Data.

|			Using Panel Data From 28Semi-Structured Interviews With Banking Ai Professionals, This Study Investigates The Drivers And Constraints To Effective Ai Deployment In The BankingSector.	
6	**Conversation to Automation in Banking ThroughChatbot Using Artificial Machine Intelligence Language Methodology**	Vinod Kumar Shukla, Sasha Fathima Suhel,Sonali Vyas, Ved Prakash Mishra (2020)	This paper examines some of the latest AI patterns andactivities system Chatbots are made. In the banking industry, the introduction ofArtificial Intelligence has driven chatbots and changed the face of the interaction between bank and customers.	The dialogue capability can be limited to a very specific set or formatof questions thatare established by thechatbot development team.

c. Problem Statement Definition

1. The Banking Industry work efficiently only when they clarifies all the customers query.

2. It is very difficult to establish large number of employers to clarify the queries of the customer in the banking industry.

3. Clarifying query 24/7 a day is important to increase the productivity and also to make customer feel ease to access.

4. Analyzing the queries of customer help the banking industry to improve their Schemes as well as to improve customer relationship.

5. Arranging similar queries is important to answer them easily .

6. There should be communication between only two person Banker and Customer as the people interfere confusion increases.

7. In order to avoid such problems AI is important in Banking Industry.

3. IDEATION & PROPOSED SOLUTION

a. Empathy Map Canvas

b. Ideation & Brainstorming
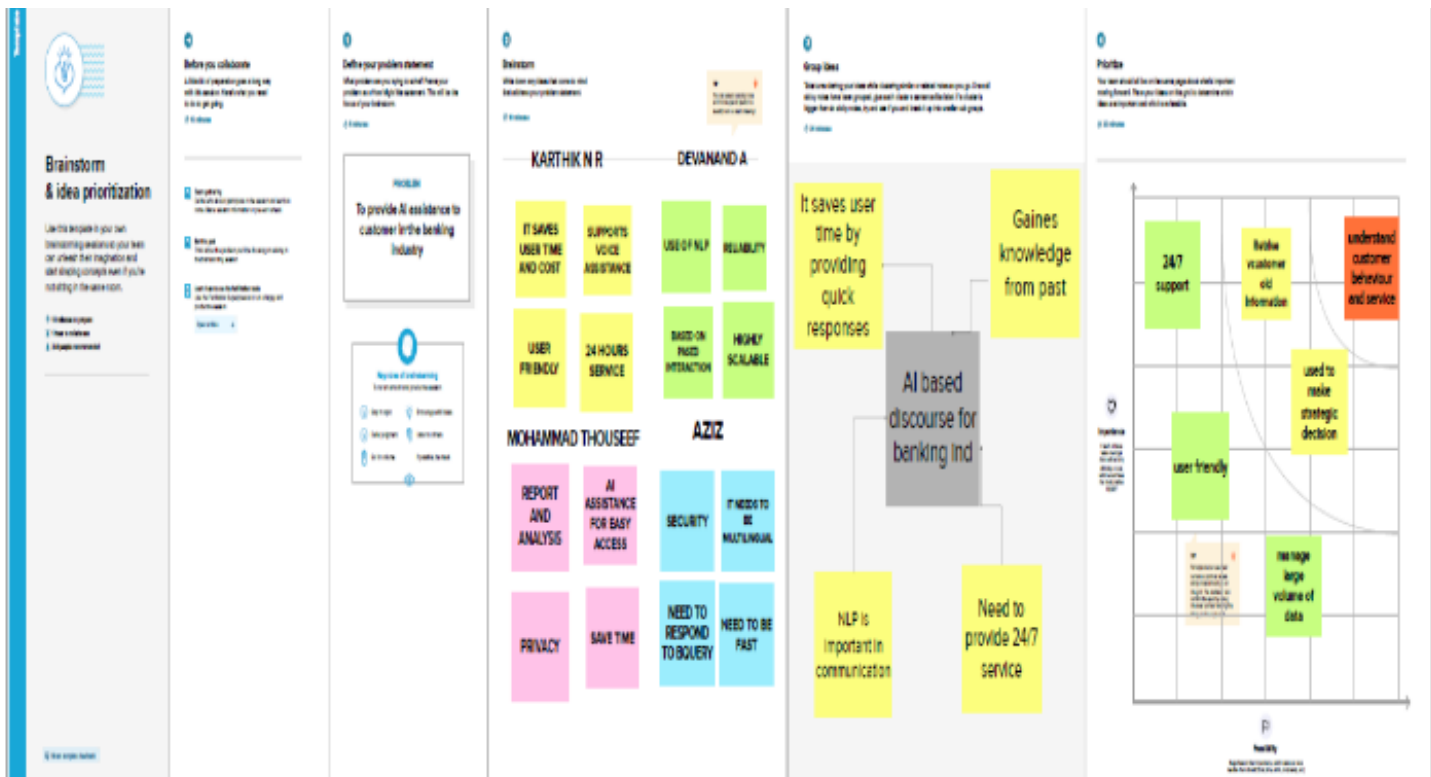
c. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problemto be solved)	To overcome language limitations, chatbotsallow users and customers to ask inquiries about banking, such as how to open a bank account or get a loan. They can also answer questions about net banking and general banking.

2.	Idea / Solution description	To design a smart assistant that can help clients with their problems, suchas a web or mobile application. IBM Watson as a personal assistant.
3.	Novelty / Uniqueness	This is a novelapproach given thatthere are many financial assistantsavailable today, but they lack specialised knowledge, which discourages customers from using them. This must be prevented.
4.	Social Impact/ CustomerSatisfaction	-Provide 24/7support. - Evaluate clientinformation to enhanceservices. -Can easilycommunicate with thebankingindustry.

5.	Business Model (RevenueModel)	Customers will flock to our bank because of the exceptional customer care it offers around-the-clock, and the bank will grow to have a very large customer base with a lot of money flowing throughit.
6.	Scalability of the Solution	-Able to communicate better. -Consume less time. -It can be used by customers all over the world.

d. Problem Solution fit

1.Customer Segments

Early detection is crucial because it will help us use Watson's assistant to build a chatbot that will help banks automate business processes like customer service. This serves a greater purpose than a manual examination.

6. Customer Constraints

The financial sector is dealing with two different problems. While on the one hand aiming for speed and agility in their operations, they must continue monitoring the security requirements and legal compliances.

2. Jobs To Be Done/Problems

Banks will need to create integrated proposals that go beyond highly standardised items and concentrate on "jobs to be done." This requires designing value propositions that go beyond the core banking product, include personalization decisions and incorporating intelligence that automates decisions and actions on the customer's behalf.

7.Behaviour

First, the leadership of the bank, which is displayed through leading by example and encouraging desired behaviours like lifelong learning, knowledge sharing, and inter-disciplinary cooperation, is significantly responsible for understanding and conviction.

3.Triggers

The triggers make use of AI-powered tools that can quickly spot trends across a wide range of channels and analyse massive amounts of data. This aids in predicting and preventing credit risks by identifying individuals or businesses that may not be able to pay their loans back.

4.Emotions: Before:After

Before: Adverse emotional responses include fear, anxiety, vulnerability, guilt, loss of confdence, anger.
After: Early detection and diagnosis gives sense of hope among patients

8.Channels of behaviour

To automatically assess loan risk and integrate new clients, banks are utilising AI bots. They are using deep learning, pattern matching, and computer vision to discover inefficiencies in the process. They are helping them prevent fraud, among many other use cases, with the aid of AI-based anti-money laundering technologies.

5. Available Solution

AI, banks can manage enormous amounts of data at breakneck speeds in order to extract valuable information from it. A wider customer base may get access to better services thanks to technologies like AI bots, digital payment advisors, and biometric fraud detection systems.

9.Problem Root Cause

Due to a lack of topic expertise and unclear accountability, particularly between business units and technology teams, new solutions regularly fall short of consumer expectations. Additionally, multiple systems perform the same functions, which reduces system resilience and stability and increases the risk of changes as IT architecture grows more intricate as a result of the proliferation of applications.

4. REQUIREMENT ANALYSIS

a. Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)
FR-1	**Savings Account RelatedActions**	● Type of Savings Account Creation Details ● Interest Rate ● Minimum Balance ● Debit Card ● Credit Card
FR-2	**Current Account RelatedActions**	● Type of Company ● Current Account ClosureSteps ● Update GSTIN ● Zero Balance Current Account
FR-3	**Loan Account Related Actions**	● Type of Loan ● How long for approval ● Available Loan Amounts ● Loan Status ● Joint Loan
FR-4	**General Queries RelatedActions**	● Bank WorkingDays ● List of Braches ● Storage Locker Facility ● Currency Conversion Facility ● CIBIL ● Find a nearest branch
FR-5	**Net Banking RelatedActions**	● Login Steps ● Change Net BankingPassword ● Daily Limit ● Types of FundTransfer ● Add Beneficiary

b. Non-Functional requirements

| NFR No.	Non-Functional Requirement	Description

| NFR-1	**Usability**	Chatbots developed using AI shouldbe able to answer any general bankingqueries on accountcreation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a costefficient manner.
NFR-2	**Security**	The AI Chatbot maintains a confidentialconversation with customers. Chatbot will provide personal and efficient communication between theuser and the bank.
NFR-3	**Reliability**	Chatbots are trained very well using AI to provide solutions for the popularand frequently askedquestions, thereby providing the best suitedservice quickly. Thus AI Chatbots has a reliable end-user experience.
NFR-4	**Performance**	AI Chatbots are a greatway to overcome the limitation of workload of humans. Therecan be multiple instances of a single chatbotinquiring different peopleat the same time. Such chatbots workin real time with no need for the customers to wait. This ensures faster, easier and more efficient face-time withcustomers.
NFR-5	**Availability**	AI Chatbots provide 24/7 service to clear all customer queriesand guide themthrough all the banking processes. It is available to anyone withaccess to the internet withbasic hardware.
NFR-6	**Scalability**	AI Chatbots are helping bankingindustry to scaletheir customer serviceand to improvecustomer service satisfaction at the same time. It can be scaled as per the requirements of the bank to includeanswers to queries related to any new feature or service introduced by the bank.

5. PROJECT DESIGN

a. Data Flow Diagrams

The classic visual representation of how information moves through a system is a data flow diagram(DFD). A tidy and understandable DFD can graphically represent the appropriate quantity of the system demand. It demonstrates how information enters and exits the system, what modifies the data, and where information is kept.

**Simplified:**
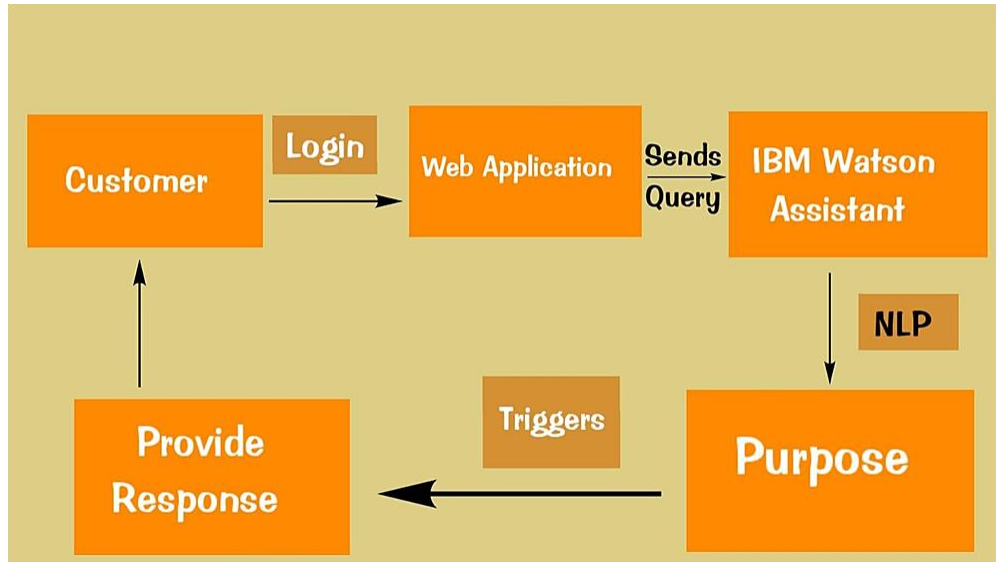
 # DFD – Industry standard
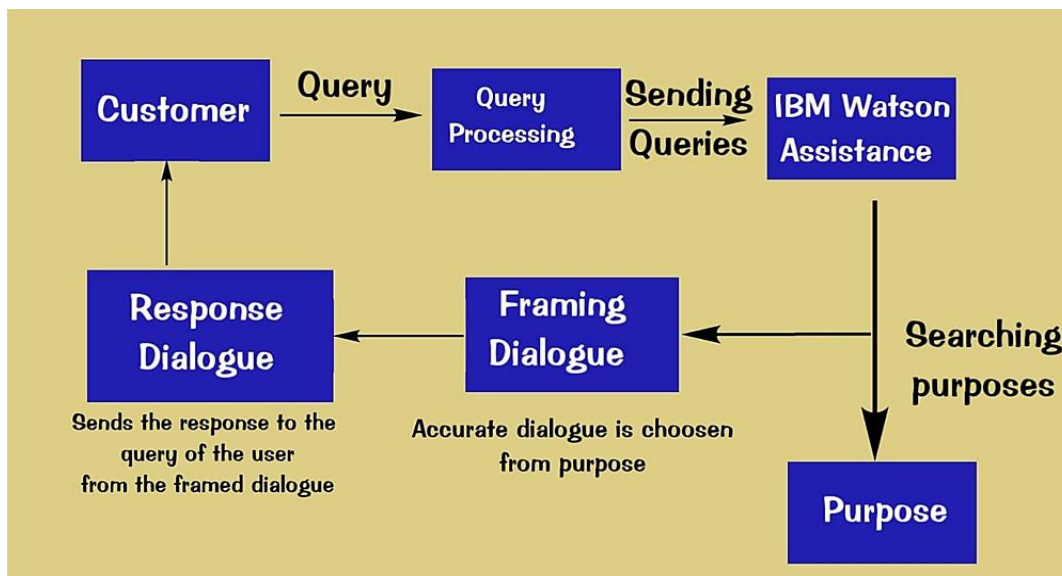
b. Solution & Technical Architecture

Technical Architecture Steps:

1. User queriesto the Chat Bot
2. Bot previewsthe query
3. Query is transferred to Watson Assistant
4. Natural Processing Language is used to understand the query
5. Watson Assistantsends the query
6. Watson finds the relevantresponse from cloud database
7. Queries and responses (sent and received) is stored in cloud database
8. All queriesand related information is sent to the bank for improvement

Technical Architecture :
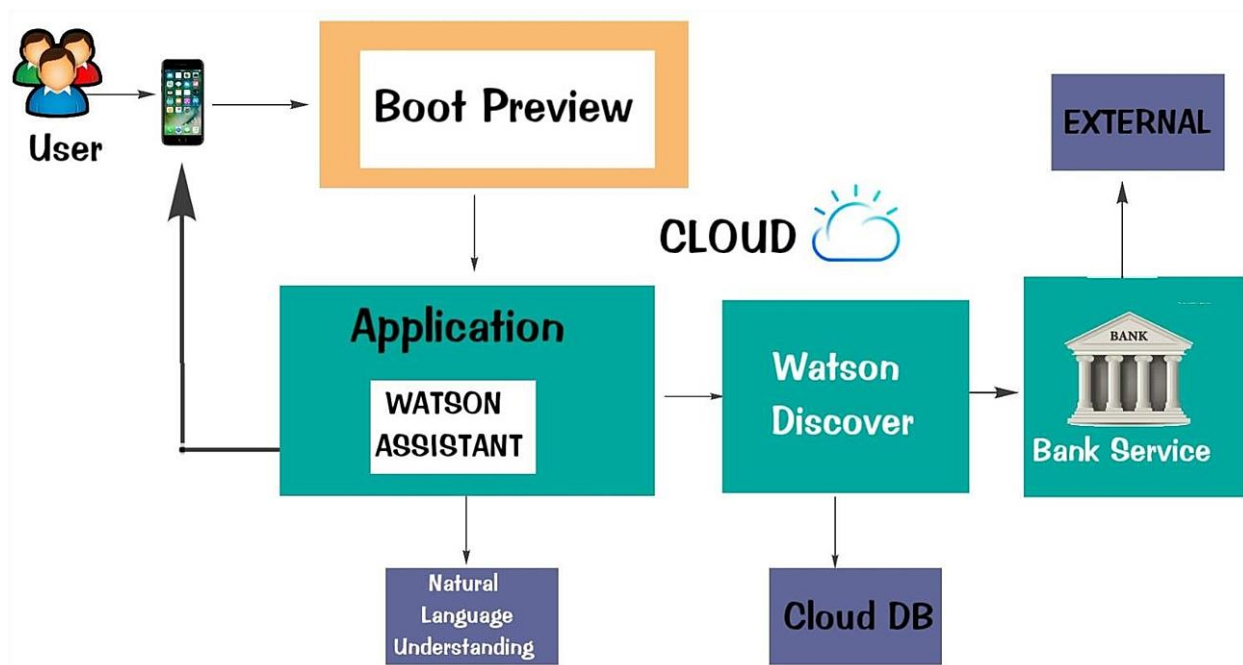
c. User Stories

User type	Functional Requirement (Epic)	User story Number	User Story / Task	Acceptance Criteria	Priority	Release
Customer (Web User)	Introduction Greeting	USN-1	I will begin by presenting myself to the bot as a user, and the bot will then introduce itself.	Introduction phase	High	Sprint 1
	Displaying Querylist	USN-2	I can see the Bot's list of displayed queries as a user. I can ask my query manually if it's not included in the list.	Now that the bot is aware of what users want, they can input an answer that is not on the list if necessary.	High	Sprint 1

	Choosing the query	USN-3	I have the choice of selecting a question from the bot's list of optionsor entering my own.	Query selection	High	Sprint 1

		Loan query	USN-4	All of my loan-relatedquestions, such as the list of available loan programmes, loans for business, loans for education, and loan amountsfor each programme, can be asked and answered here.	I will get solution for my queries related to loan	Medium	Sprint 2
		Net Banking query	USN-5	You can ask and getanswers to all of yourloan-related questions here, including ones on thelist of available loanprogrammes, loansforbusinesses, loansfor education, andloanlevels for eachprogramme.	I will getsolution for myqueries related to NetBanking instantly instead ofgoing throughthe FAQsection	Medium	Sprint 2
		Bank Account Creation	USN-6	I can open a bank account as a user by following theinstructions the bot provides. The bot willoutline how to open a bank account step-by-step.	I can create aBank account	Medium	Sprint 3

	End Greeting	USN-7	As a user, I will be happy with the solution, and the Bot will thank me at the conclusion, giving me the impression that I am speaking with a real person.	I can end the conversation with a sweetgreeting, feeling that I have conversed withthe real Human.	Medium	Sprint 3
	Response	USN-8	I want the response as soon as possible as a user so that I don't have to slog through FAQs or browse the full website on my own.	I will be able toget quickresponse without wandering through FAQ	Medium	Sprint 2
	User Friendly user experience	USN-9	As a user, I want to have the impression that I'm speaking to a real person, so I need to have a positive userexperience.	I will feel as chatting with a real human	Medium	Sprint 3
Bank Staff	Solving queries which can'tbe solved by Chatbot	USN-10	If a bot cannot answermy question, I will speak with a bank employee directly. I (user) will be directed by the bot to Bank employees	I don't need to depend only on Bot,It will direct the user to the Bank staff whenever needed	Medium	Sprint 3

6. PROJECT PLANNING & SCHEDULING

a. Sprint Planning & Estimation

Milestone	Task	Starting Date	Ending Date	Project Completi onStatus	Team Members
Create IBM Servie	Creation of Banking Chatbot or Assistant using IBM Watson Assistant	24Oct2022	25Oct2022	10%	Devanand A, KarthikN R
	Understanding Customer's Banking Related Queries and skills	25Oct2022	29Oct2022	13%	Aziz T,Mohammad Thouseef S
Create Skills AndAssista nt for Chat bot	Training the Chatbot with Banking relateddataset	31Oct2022	01Nov2022	28%	Karthik N R, Mohammad Thouseef S
	Building action and Adding responses to Account Creation	01Nov2022	02Nov2022	25%	Aziz T, Devana nd A
	Building action and Adding responses to Banking related queries	02Nov2022	03Nov2022	36%	Devanand A, Karthik N R
	Building action and Adding responses to Net Banking	03Nov2022	04Nov2022	38%	Aziz T, MohammadThouseef S
	Building action and Adding responses to Loan Queries	04Nov2022	05Nov2022	43%	Devanand A, Karthik N R
Testing Assistant & Integrate With Flask webpage	Testing the chatbot performancewith the trained bankingfunctionaliti es or conversations	07Nov2022	09Nov2022	60%	Aziz T, Mohammad Thouseef S
	Integration of Flask webpage with the chat bot assistant to provide a framework	09Nov2022	12Nov2022	82%	Devanand A, Karthik N R
Deployment Of Chat bot	Final Deployment ofAI basedchat bot for	15Nov2022	19Nov2022	100%	Aziz T, Devanand A

Sprint	Functional Requirement(Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
	Banking Industry or Running the Chat bot service infullyefficient and effective condition					

b. Sprint Delivery Schedule

Sprint	Functional Requirement(Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-1	Savings AccountRelated 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.	4	High	Devanand A,Karthik N R
Sprint-1		USN-2	As a user, I can check the Interest Ratesof Savings Account	4	High	Aziz T, Mohammad Thouseef S
Sprint-1		USN-3	As a user ,I can check the Minimum Balanceof SavingsAccount	3	Medium	Karthik N R, Mohammad Thouseef S
Sprint-1	Current AccountRelated Actions	USN-4	As a user ,I can choose the Type of CompanyTo know the information on documents to be submitted for creating current	5	High	Aziz T, Devanand A

Sprint		User Story Number	User Story/Task	Story Points	Priority	Team Members
			account			
Sprint-1		USN-5	As a user ,I want to get details on procedureto close my Current Account	4	High	Devanand A,Karthik N R
Sprint-2	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans toknow the information on choosing an essential Loan scheme	3	High	Aziz T, Mohammad Thouseef S
Sprint-2		USN-7	As a user, I can check the Loan Amounts that Can be offered for corresponding Loan Accounts chosen	3	High	Devanand A, KarthikN R
Sprint-2		USN-8	As a user, I can check the Status of Loan formy Loan Accounts	1	Low	Aziz T, Mohammad Thouseef S

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-2	General Queries Related Actions	USN-9	As a user, I want to get the procedure detailsfor Currency Conversion facility of my bank account	2	Medium	Devanand A, Karthik N R
Sprint-2		USN-10	As a user, I want to check my CIBIL score for my loan	1	Low	Aziz T, Devanand A

Sprint		USN	User Story	Story Points	Priority	Assignee
			application and to ensure whether my loan application is approved by the bank.			
Sprint-2		USN-11	As a user, I want to get the procedure detailsfor maintaining Storage Locker facility of my bank account	3	High	Devanand A, Karthik N R
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	Aziz T Mohammad Thouseef S
Sprint-2		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in netbanking	2	Medium	Karthik N R. Mohammad Thouseef S
Sprint-2		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	2	Medium	Aziz T , Devanand A
Sprint-3	Web Application	USN-15	As a user, I want to access the chat bot in a web browserthat can be accessed from almost alldevices.	20	High	Devanand A, Karthik N R
Sprint-4	User Interface and WebPages	USN-16	As a user, I want to view pages of the bankingwebsite and have access to the chat bot easily.	20	High	Devanand A, Karthik N R

c. Reports from JIRA

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	4 Days	19 Oct 2022	22 Oct 2022	20	22 Oct 2022
Sprint-2	20	4 Days	23 Oct 2022	26 Oct 2022	20	26 Oct 2022
Sprint-3	20	4 Days	27 Oct 2022	30 Oct 2022	20	30 Oct 2022
Sprint-4	20	4 Days	31 Oct 2022	03 Nov 2022	20	03 Nov 2022

Velocity:

Velocity of the team is 20 (points per sprint).Let's calculate the team's averagevelocity (AV) per iteration unit (story points per day)

$$AV = 20/4 = 5$$

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be appliedto any project containing measurable progress over time.

Month	OCT				OCT				OCT				Oct	Nov	
Date	19	20	21	22	23	24	25	26	27	28	29	30	31 3	1	2
Sprints	Sprint - 1				Sprint – 2				Sprint – 3				Sprint - 4		
Create a bank website	■														
Create IBM cloudaccount		■													
Create a chatbotinstance			■	■											
Create Savings Account action					■										
Create Current Accountaction						■									
Create Loan Accountaction							■	■							
Create General Queryaction									■						
Create Net Bankingaction										■					
Run the application											■				
Test the application												■			
Integrate chatbot in the bank website													■	■	
Deploy the application for public use														■	■

MILESTONES:

Milestones are used in project managements to mark specific points along a a projecttimeline. These points may signal anchors such as a project start and end date, or a need for external reviewor input and budget checks.

Deadline date	Milestone
19-Oct	Create a bankwebsite
20-Oct	Create an IBM cloud account
21-Oct	Create a chatbotinstance
26-Oct	Create Savings, Current, Loan Account actions
28-Oct	Create General Query,Net banking and other actions
30-Oct	Run and test the chatbot
01-Nov	Integrate chatbot in the bank website
03-Nov	Deploy the application for public use
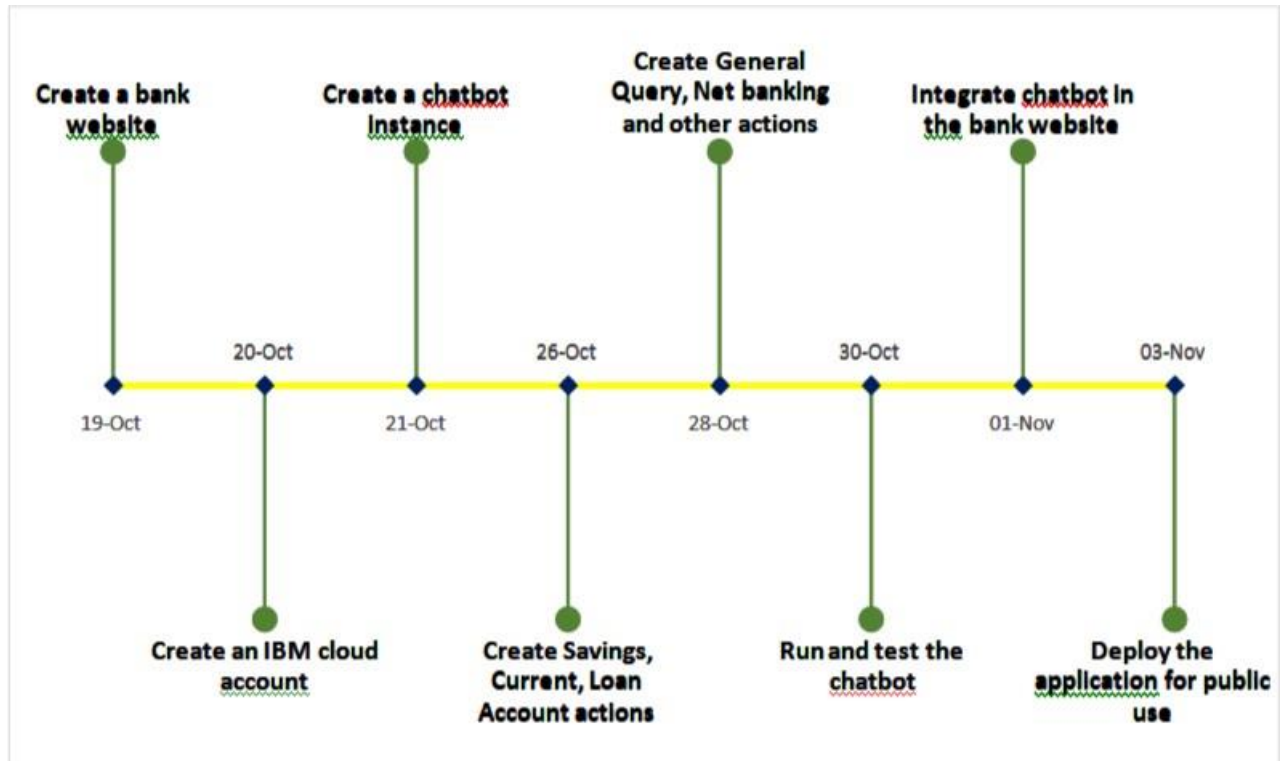
The various activities in the project are:

1. Create a bank website
2. Create an IBM cloud account
3. Create a chatbot instance
4. Create Savings,Current, Loan Accountactions
5. Create GeneralQuery, Net bankingand other actions
6. Run and test the chatbot
7. Integrate chatbotin the bank website
8. Deploy the application for public use

a. Create a bank website:

A new website will be created for the bank, in case the bank doesn't has it own website. This website will not only hold a chatbot,but also the necessary detailsof the bank. To bedone by Karthik N R and Devanand A.

b. Create an IBM cloud account:

Using an institutional or organizational mail id, a new IBM cloud accountis generated. Tobe done by Mohammad Thouseef and Aziz.

c. Create a chatbotinstance:

After making an IBM Cloud Account,an IBM Watson Assistant cloud service free subscription is acquired. This will be used to create the chatbot for helping the bank customers. To be done by Karthik N R and Mohammad Thouseef.

d. Create Savings, Current,Loan Account actions:

On providing a suitable name to the chatbot, the actions, descriptions and replies for savings account, loan account, current account, and responses for its sub actions arecreated and saved. To be done by Devanand A and Aziz T.

e. Create General Query, Net banking and other actions:

The rest of the actions for General Query, Net Banking,Credit Cards, PersonalDetails are generated along with the replies which they will give when prompted by a customer. Tobe done by Karthik N R and Aziz T.

f.Run and test the chatbot:

After creating the chatbot, it is tested under the "Preview Section" of the Watson Assistant. The working of the chatbotis verified here.Any bugs, if found, will be rectified.To be done by Devanand A and Mohammad Thouseef.

g.Integrate chatbot in the bank website:

Under the integrations section of IBM watson, copy the chatbot's javascript code for embeding the chatbot with the website. The javascript code is to be embedded in the HTML code of the website. To be done by Karthik N R and Devanand A.

h.Deploy the application for public use:

The files of the HTML code and the background image is uploadedin the GitHub for thepublic to use it anytime and anywhere. To be done by Karthik N R and Mohammad Thouseef.

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

a. Feature 1

Create IBM Watson Service:
STEPS:

1.Create your IBM cloud account

2. Select the location (DALLAS) and click create
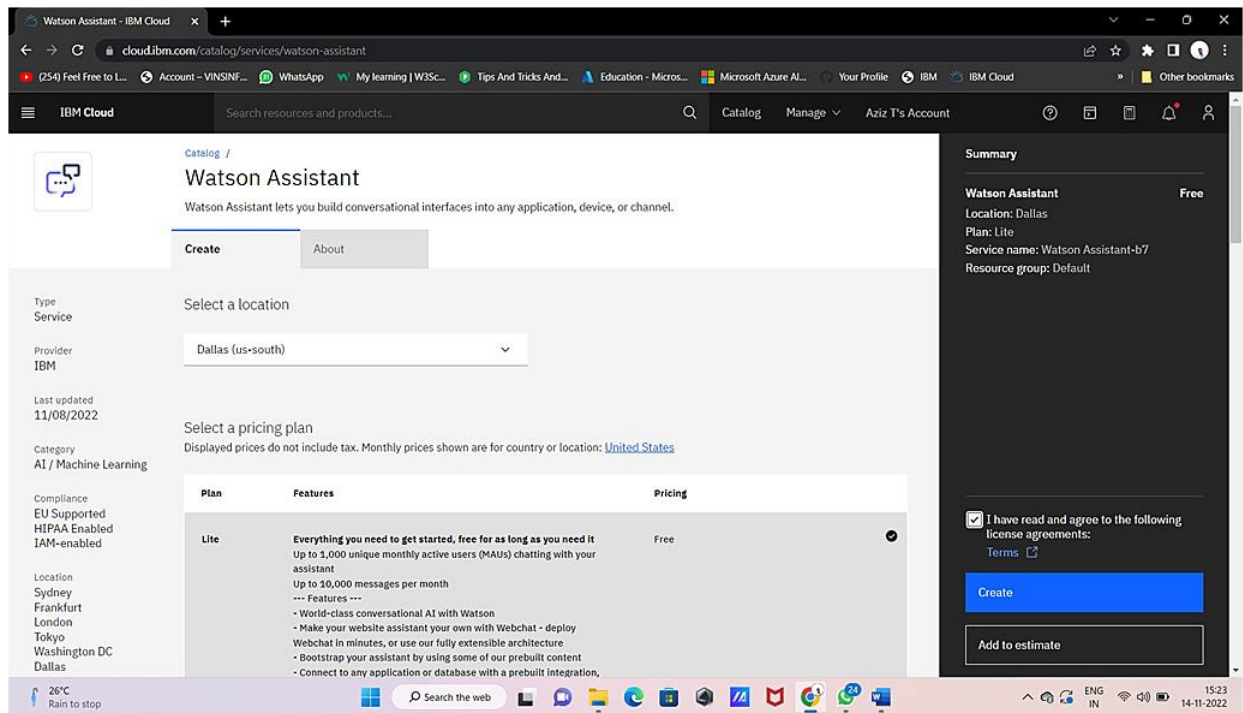
3. Then personalize yourassistant
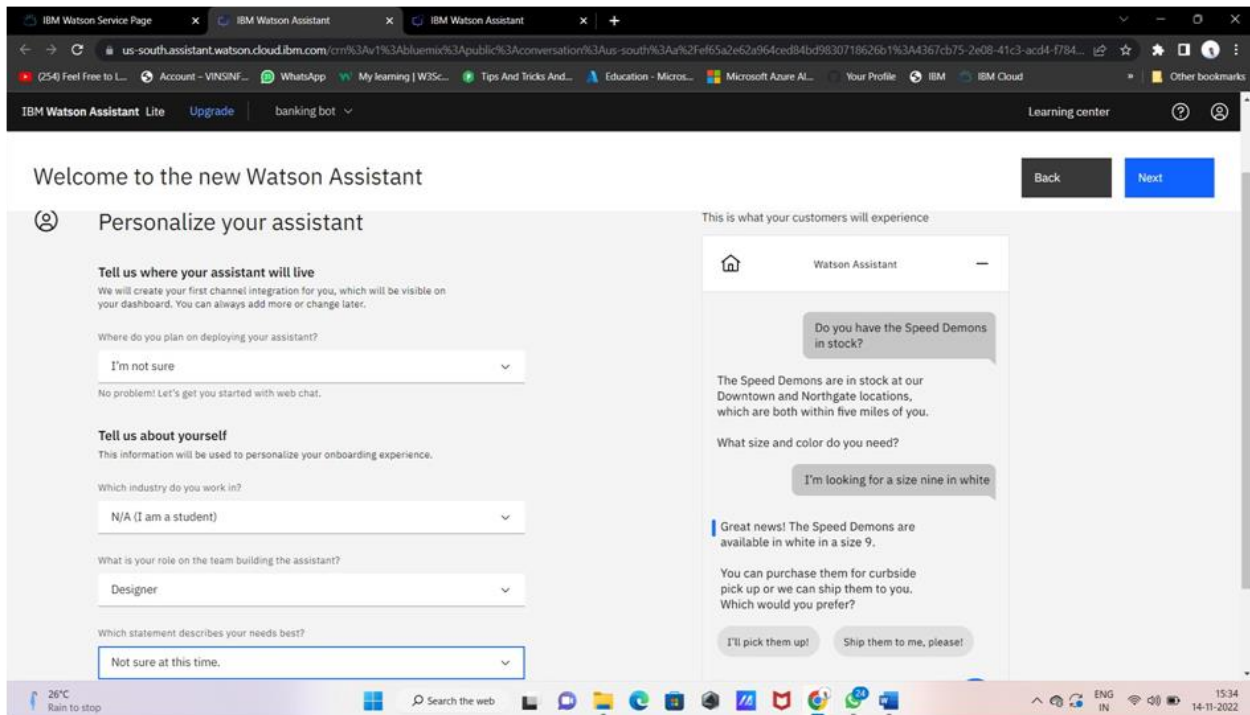
4. Customize your Watson Assistant
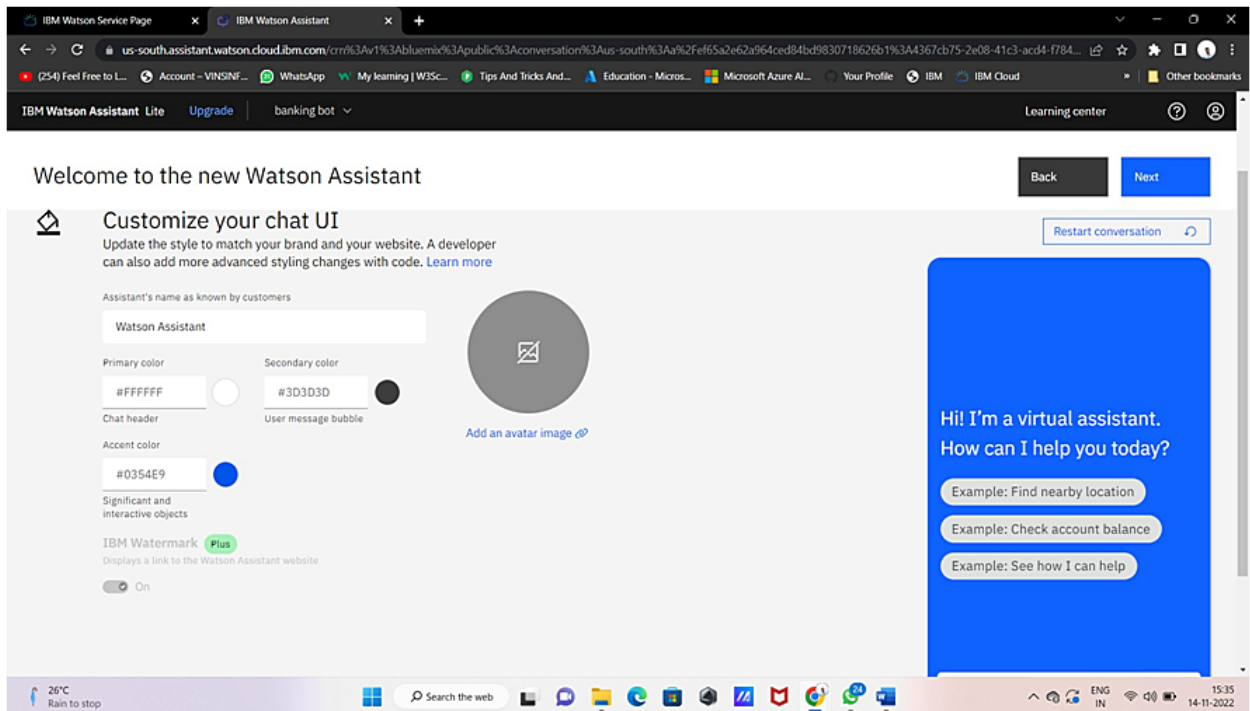
5. Create Skill Creation

Creating Savings Account Action
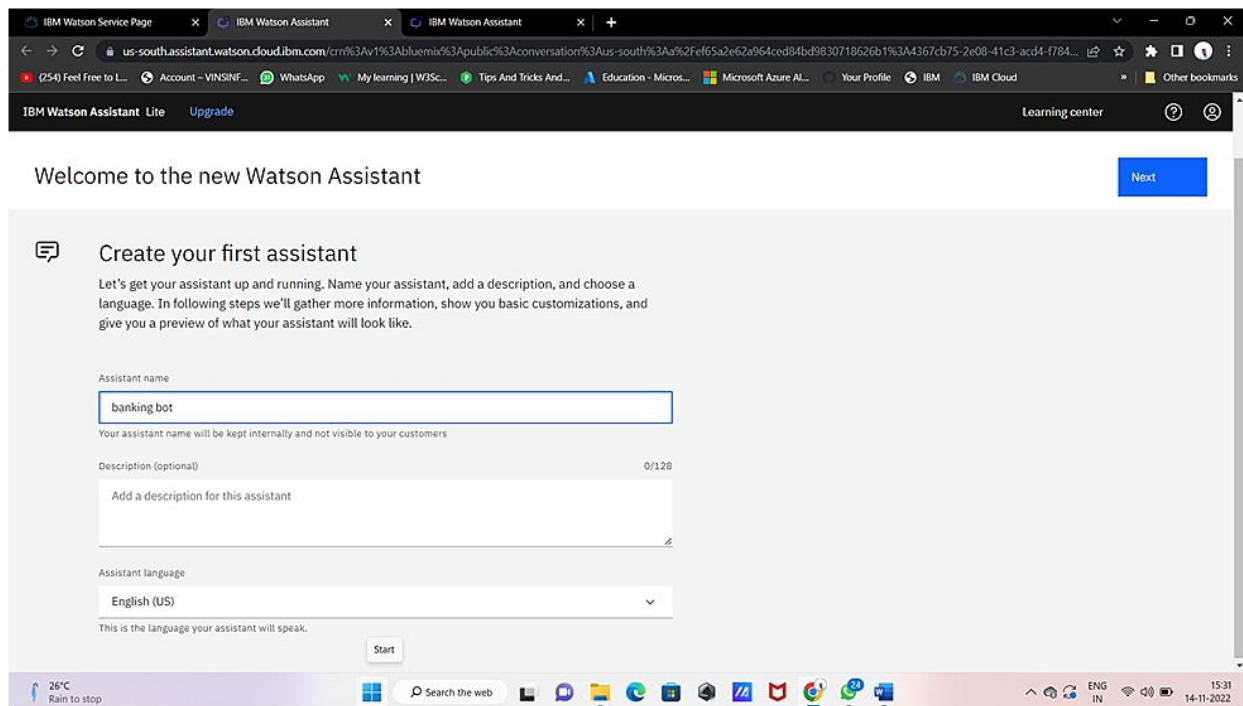
6. Savings Account Is Created
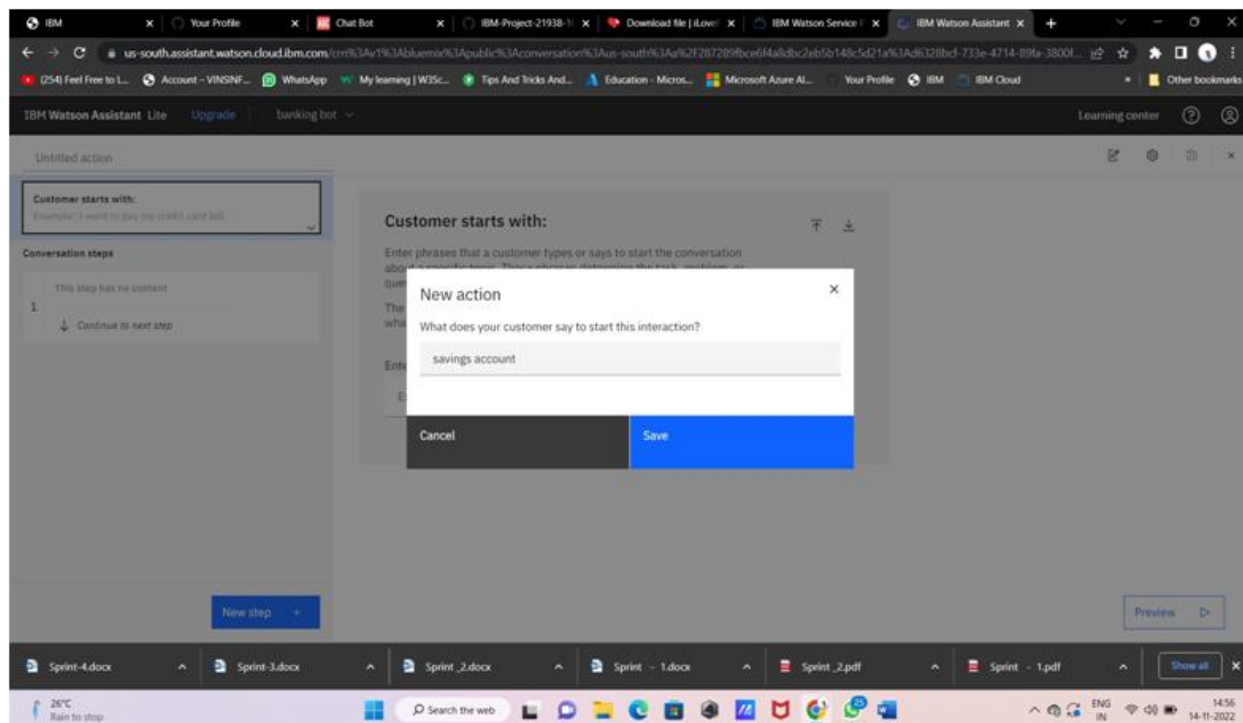
7. Skill has been added successfully.
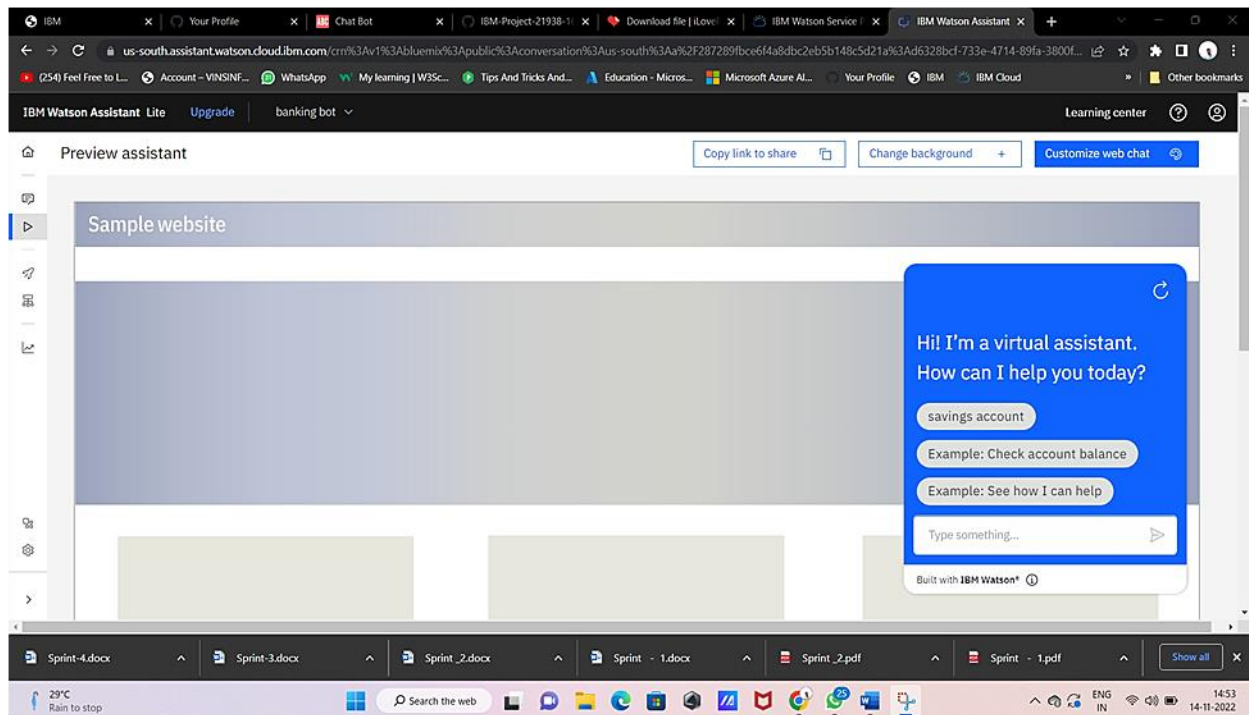
8. To create a new actionclick on Createa new action button.
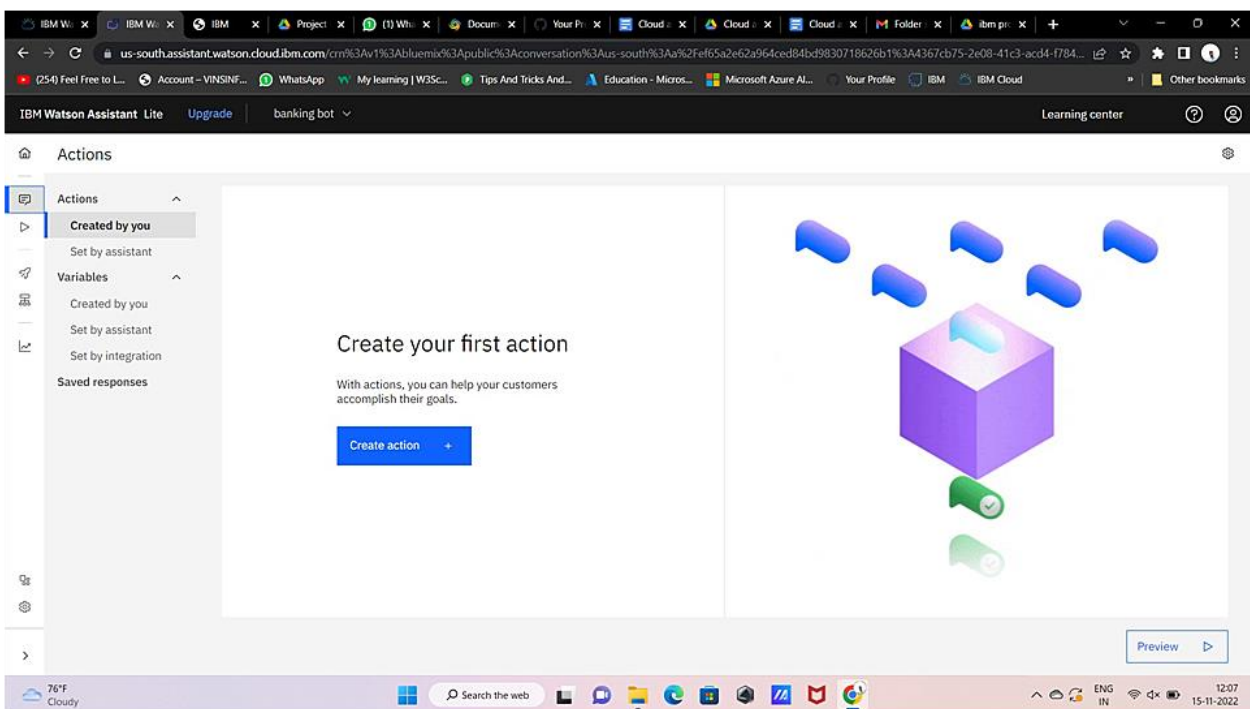
9.Click the start from scratch to build your action.
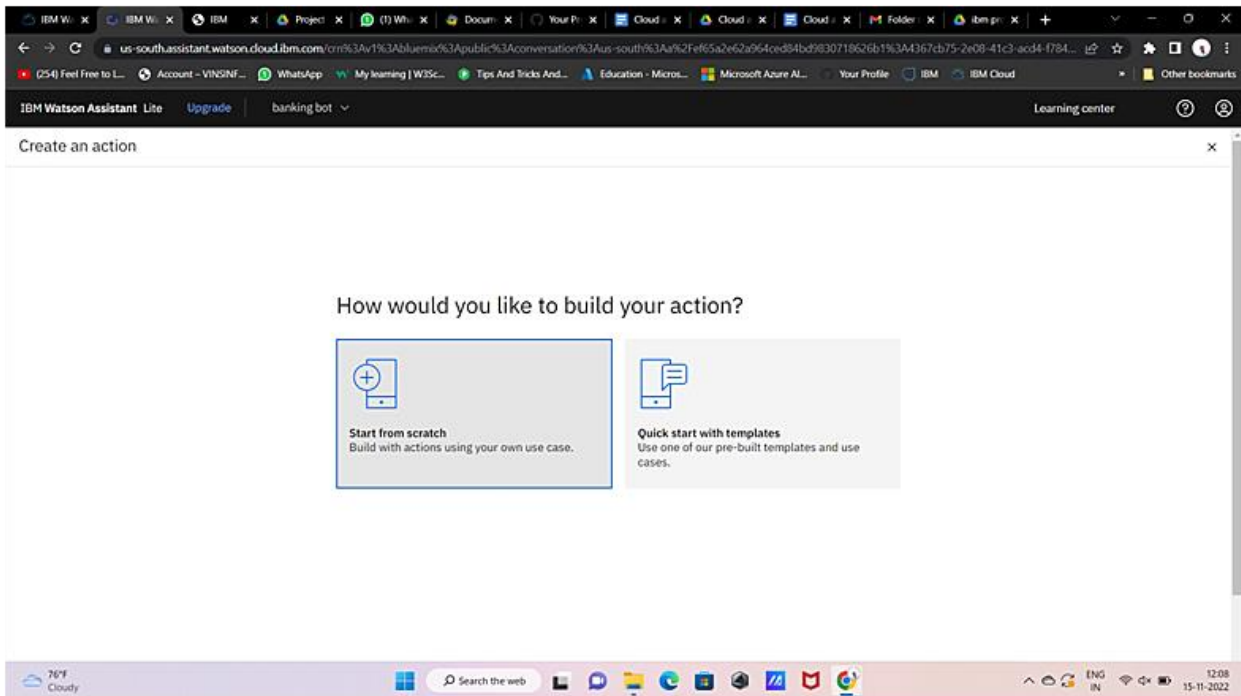
10. Enter the name of your action and click save.
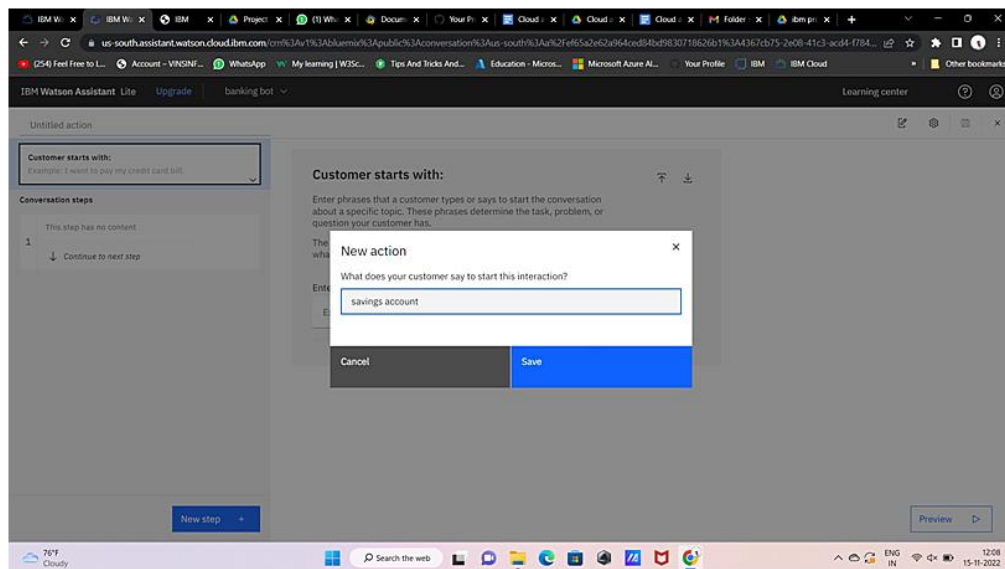
Now the action has been created,we can add further query.
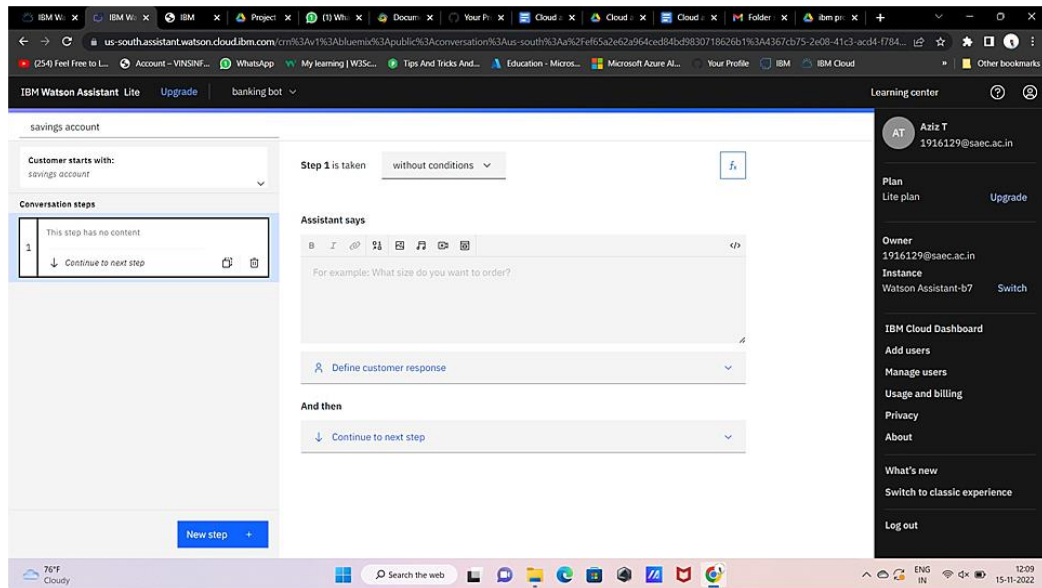
savings account skill has been added successfully.
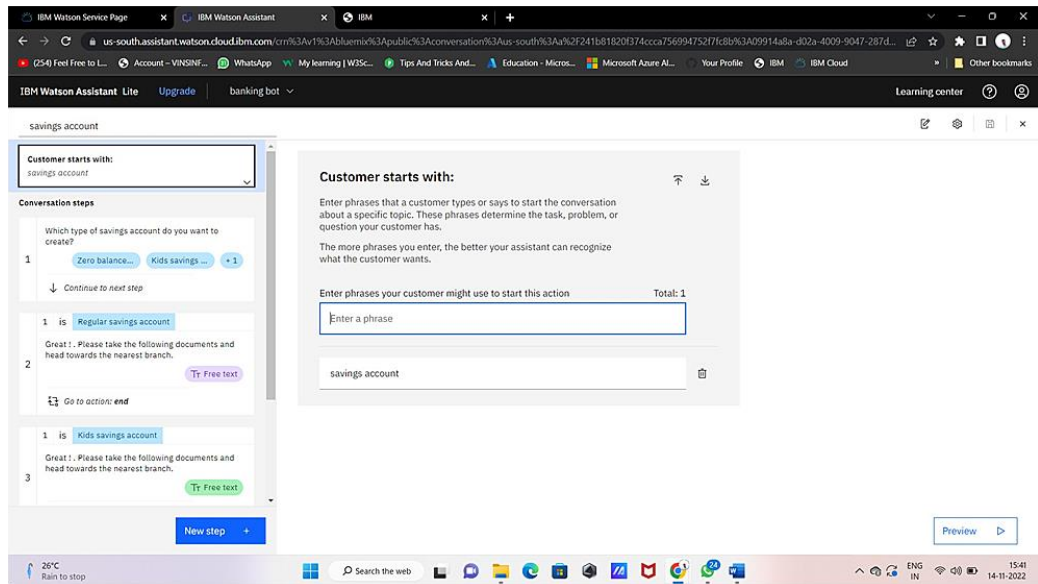
Conversation step has been created
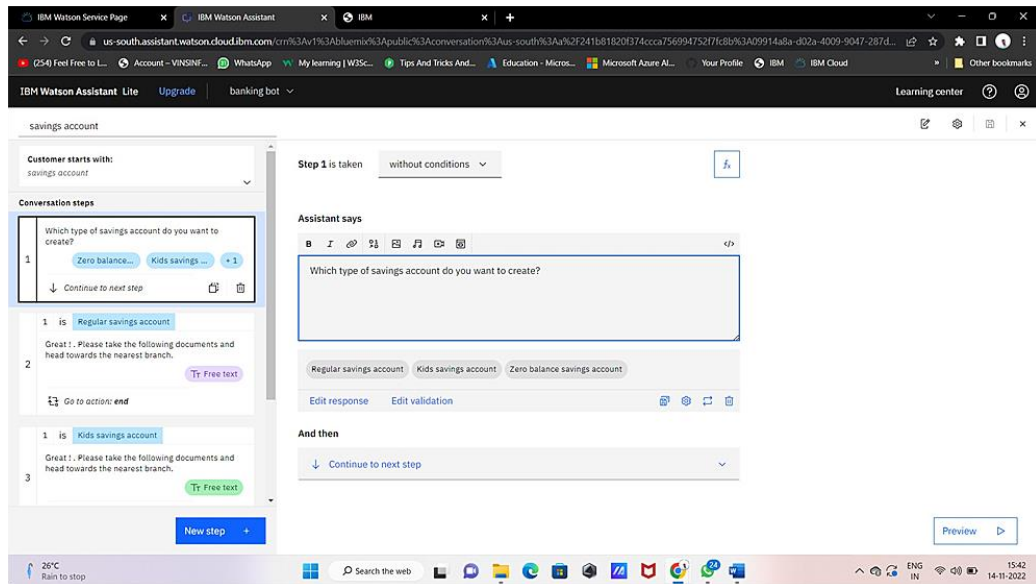
Query has been added
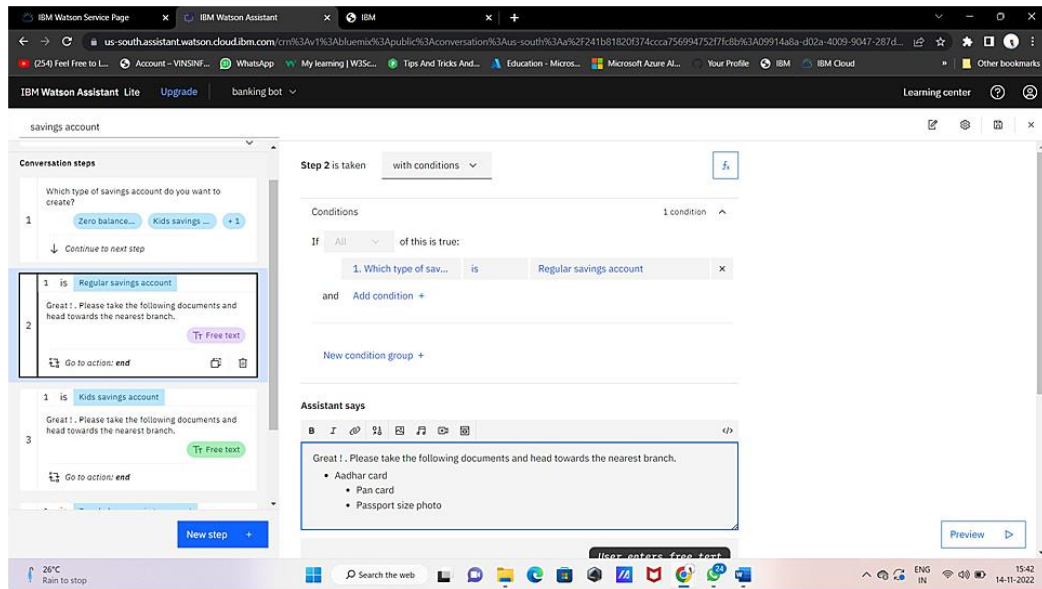
Another query has been added
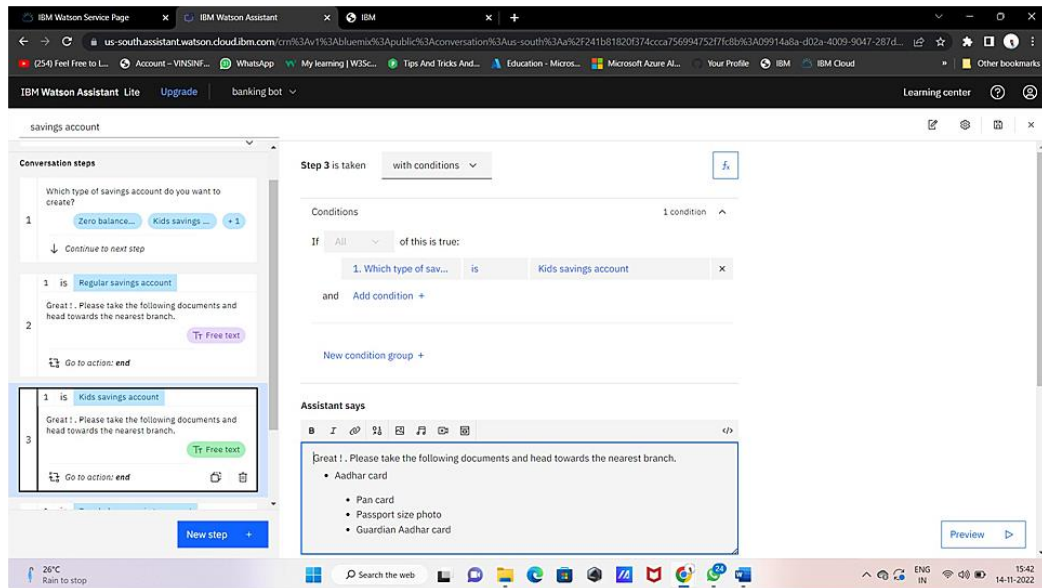
Final query for saving account has been created
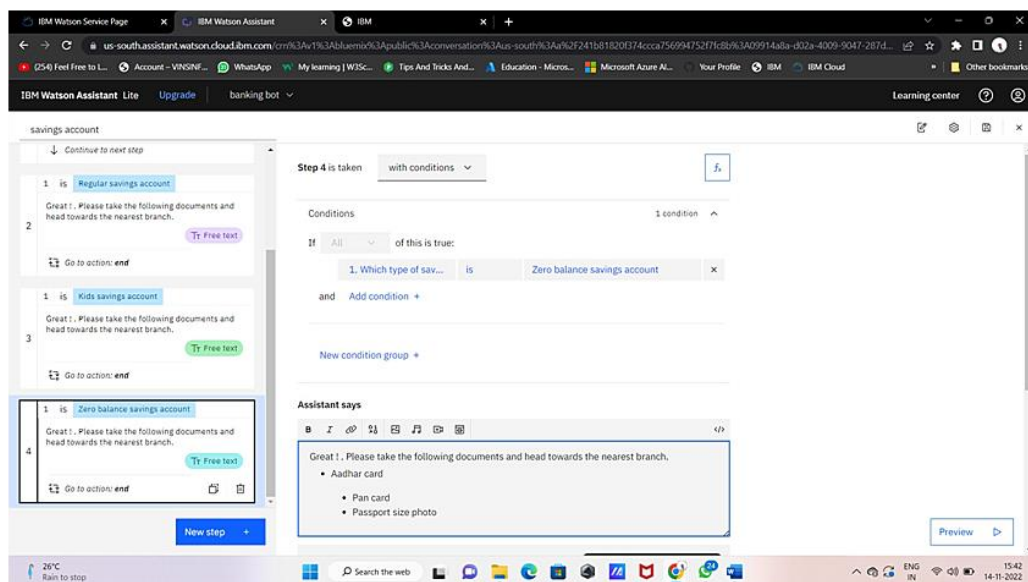
Creating Current Account Action

Create a new **Action** Current for the currentaccount action and add the steps in it .
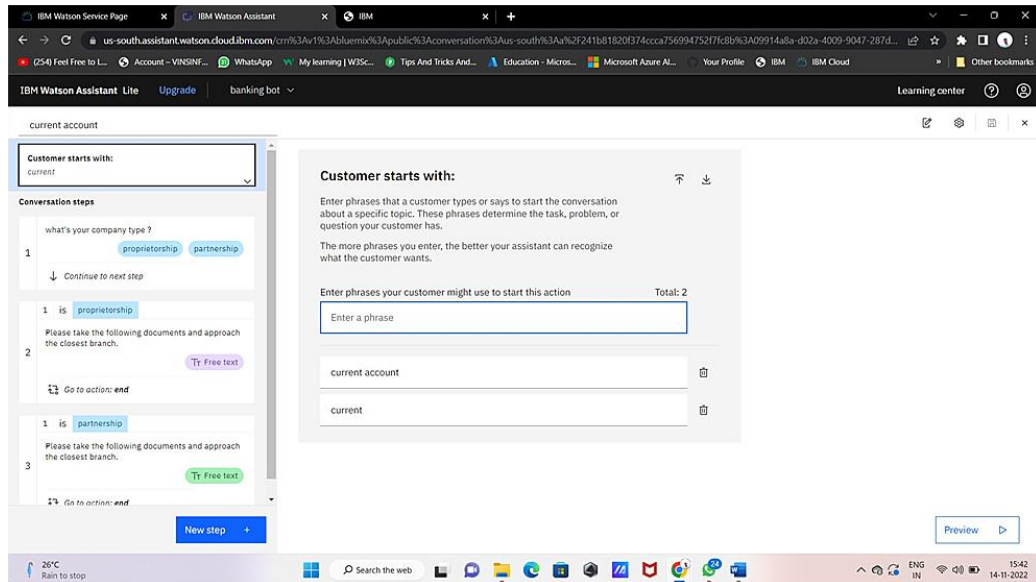
b. Feature 2

Loan action is created with the respective procedures
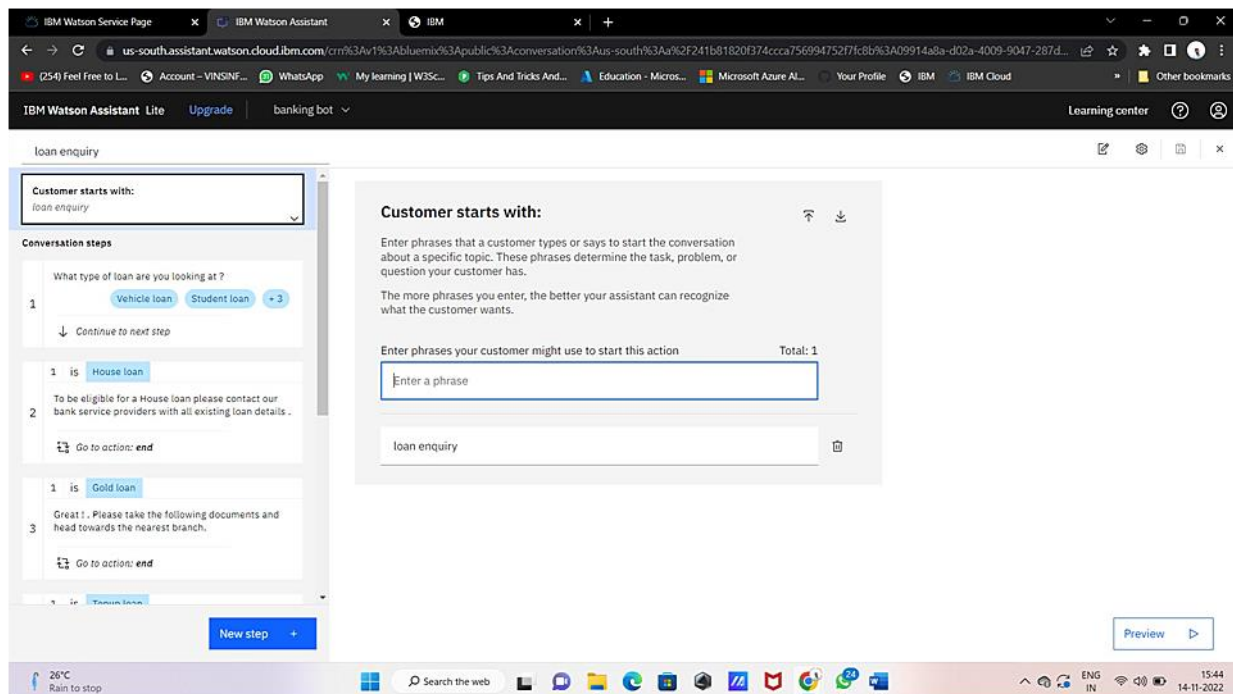
General query action is created with the respective procedure.

Net banking action is created with the necessary steps. In addition to it. greeting, end greeting, index and end actions are also created

Creating Assistant & Integrate with Flask Web Page

You will be creatinga banking bot in this activity that has thefollowing capabilities

1. The Bot should be able to guide a customer to create a bankaccount.
2. The Bot should be able to answer loan queries.

3. The Bot should be able to answer general banking queries.
4. The Bot should be able to answer queries regarding net banking.
5. With the help of this bot ,you can get all the requireddetailsrelated to banking.

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

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

This process includes the following steps:
   a. Building python code
   b. Building html code
   c. Running the application

Build Python Code

1. Importing Libraries

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

```
from flask importFlask,render_template
```

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

2. **Creating our flaskapplication and loading**

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

3. **Routing to the Html Page**

Here, the declaredconstructor is used to route to the HTML page created earlier.
The '' route is bound with the bot function. Hence, when the home page of a web serveris opened in the browser,the HTML page willbe rendered.

```
@app.route('/')def
front():
    returnrender_template('front.html')
```

Main Function

This is used to run the application in localhost. The debug=True property will displaywhat kind of error we are facingwhile running

the application. If there are no errors ,flask will run the html filesuccessfully.

The Full Python code looks like:

```
C:\Users\Devanand\Desktop\app.py

app.py  ×

1    from flask import Flask,render_template
2    app=Flask(__name__,template_folder='template')
3    @app.route('/')
4    def front():
5        return render_template('front.html')
6    if __name__ =='__main__':
7        app.run(debug=True)
8
```
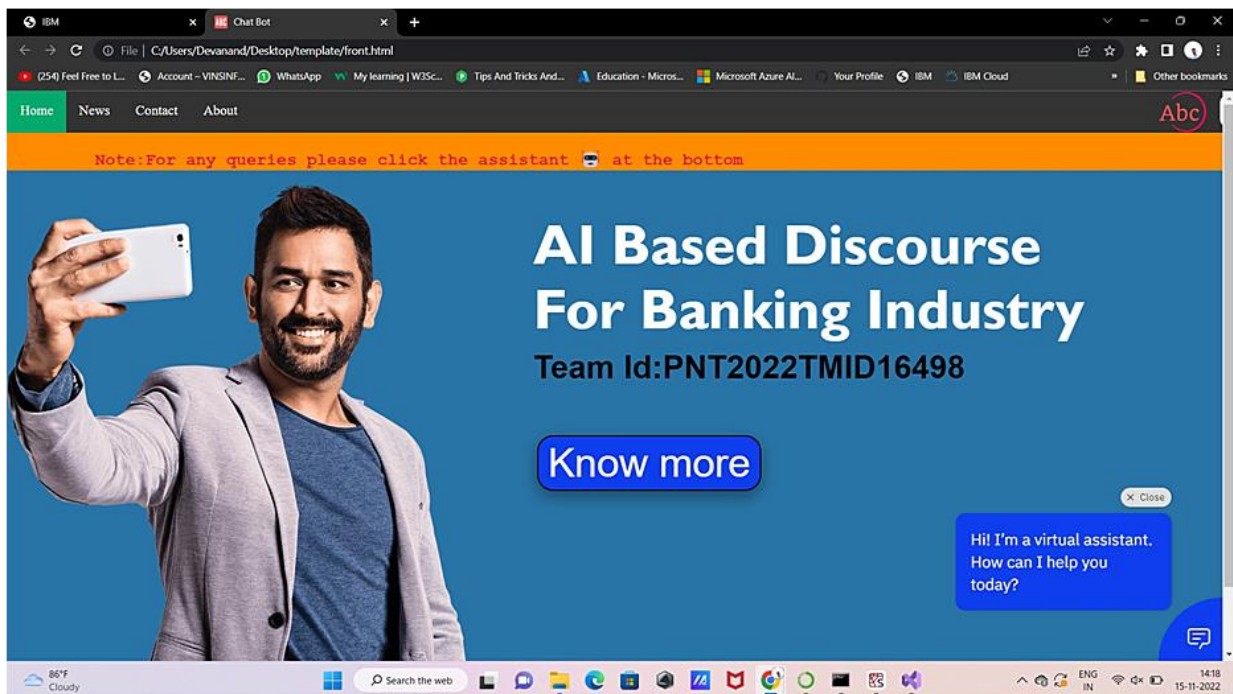
Build HTML Code

1. We use HTML to create the front-end part of the webpage.
2. Here, we have created 1 HTMLpage-front.html
3. front.html displays the home page which integrates withWatson Assistant.
4. A simple HTML page is created. Auto-generated source codefrom IBM Watson Assistants is copied and pastedinside the body tag.
5. The links, paths and the folder names are correctly assigned asper the default names which python flask willbe able to recognize.

Run the application

6. Open the anaconda prompt from the start menu.

7. Navigate to the folder where your app.py resides.

8. Now type the "python app.py" command.

9. It will show the localhost where your app is running
   onhttp://127.0.0.1.5000/

10. Copy that localhost URL and open that URL in the
    browser. Itdoes navigate me to where you can view your
    webpage.

Then it will run on localhost:5000

Final Output:

8. TESTING

a. Test Cases

Below are the importanttest cases to be executedby a tester:

i. Verifythe designof the website,availability of the chatbot at the bottomof the website.

ii. Verify if the chatbot starts or not.

iii. Application should show below elements in dropdown box:

1. SavingsAccount
2. Current Account
3. Loan Enquiry
4. General Query
5. Net Banking
6. Credit / Debit Card Queries
7. Change personal details

iv. Verify the workingof Savings accountaction, and its sub-actions too.

v. Verify the working of Current account action,and its sub-actions too.

vi. Verify the working of Loan Enquiry action,and its sub-actions too.

vii. Verify the workingof GENERAL QUERY action, and its sub-actions too.

viii. Verify the workingof NET BANKING action, and its subactions too.

ix. Verify the workingof Credit/Debit Card Queries action, and its subactions too.

x. Verify the workingof Credit/Debit Card Queries action, and its subactions too.

b. User Acceptance Testing

Section	Total Cases	Not tested	Fail	Pass
Print Engine	2	0	0	2
Client Application	42	0	0	42
Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Rporting	0	0	0	0
Final report Output	1	0	0	1
Version Control2	2	0	0	2

Ressolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By design	1	0	2	0	3
Duplicate	0	0	0	0	0
External	0	0	0	0	0
Fixed	1	0	2	0	0
Not Reproduced	0	0	0	0	0
Skipped	0	0	0	0	0
Won't fix	0	0	0	0	0
Totals	2	0	4	0	6

9. RESULTS

a. Performance Metrics

Test Scenarios	StepsTo Execte	Actual Result	Statu
Verify the design of the website, availability of the chatbot at the bottomof the website.	1. Enter the URL. 2. Click on Chatbotbutton which will appearat bottom right.	Working as expected	Pass
Verify if the chatbot starts or not.	1. Click on the STARTbutton	Working as expected	Pass

Verify the working of Savingsaccount action, andits sub-actions too.	1. Choose Savings Account option.
	2. Verify eachof the sub-actions present in thedropdown box:
	  a. Regular SavingsAccount
	  b. Kids Savings Account
	  c. Zero Balance
	  d. Senior Citizens savings
	  e. Family Savings
	  f. Salary Account
		Working as expected	Pass

Verify the working of Currentaccount action, andits sub-actions too.	1. Choose Current Account option.
	2. Verify eachof the sub-actions present in thedropdown box:
	  a. Premium account
	  b. Standard
	  c. Foreign Currency
	  d. Joint Currency
		Working as expected	Pass

Verify the working of Loan Enquiry action, anditssub-actions too.	1. Choose LoanEnquiry option.
	2. Verify eachof the sub-actions present in thedropdown box:
	    a. Home loan
	    b. Gold loan
	    c. TopUp Loan
	    d. Car Loan
	    e. Student Loan
	    f. Business Loan
	F. Personal Loan
		Working as expected	Pass

Verify the working of GENERAL QUERYaction,and its sub-actions too.	1. Choose GENERALQUERYoption.
	2. Verify eachof the sub-actions present in thedropdown box:
	    a. Bank working days
	    b. List of branches
	    c. Locker StorageFacility
	    d. Currency conversion facility
	    e. CIBIL
	    f. Find the nearest branch
		Working as expected	Pass

Verify the working of NETBANKING action, and its subactions too.	1. Choose NET BANKINGoption.
	2. Verify each of thesub-actions present in the dropdown box:
	    a. What is net banking?
	    b. How do I register for net banking?
	    c. What are the features for net
		Working as expected	Pass

	banking? d. I am facing errorsin net banking e. Forgot my password f. What is thelimit of trnsaction in net banking?		

Verify the working of Credit/Debit Card Queries action, and its subactions too.	1. Choose CREDIT/DEBIT CARD option.
	 2. Verify eachof the sub-actions present in thedropdown box:
	     a. Card is going to expire
	     b. Card is not working
	     c. Forgot cardPIN number
		Working as expected	Pass

Verify the working of Credit/Debit Card Queries action, and its subactions too.	1. Choose CHANGEPERSONAL DETAILS option.
	 2. Verify each of thesub-actions present in the dropdown box:
	     a. Add personal details
	     b. Change personal details
		Working as expected	Pass

Verify if the chatbot stopsor not	Click on the End button, or select "NO" whenprompted for more queries.	Working as expected	Pass

10. ADVANTAGES & DISADVANTAGES

Advantages:

a. High engagement of the customers and clients with the chatbotsmade through IBMWason.

b. Customizable chatbotwith low cost deployment.

c. High query response time.

d. High accuract rate when replying to complex customerqueries.

e. Compatible o attach with social media websites.

f. Easy to train the bot in WatsonAssistant.

g. User friendly and simpleinterface.

Disadvantages:

a. Can be toughto troubleshoot en error.

b. No feature to uploador capture responses from users.

c. For admin, large data visualization is not easy.

11. CONCLUSION

Thus this project banking bot will be more efficient while it is been put into practice and it helps the customers to easily performthe user's actionof performing variousbanking tasks. It allows the user having various bank accounts to integrate into a single interface and he/she can add their account detailsinto this bot account and easily performtheir banking operations within seconds.Natural language processing is a vital component of intelligentChatbot systems is used. In this paper The user will definitely have accounts in various banks.It will be tedious for the user to login to the various internet banking site every time so this bot will be handy at this situationand it is interactive too. Customer expectations are growingwith increasing technological development.

Customer satisfaction is very importantto businesses and enterprises becauseif the customers are not satisfied with the servicecustomers never return.If we consider the bot's safety,it is been secured throughthe one time password. So user will have no issues in using this bot. This banking bot will be really helpful when it is been integrated with the payment gateway. Still no such development like this is not been implemented in real time environment. When this is been implemented in the real time the customers will be able to access all the banking information from a single integrated site that can be any like social media or web application.

12. FUTURE SCOPE

The extent of this exploration is to decide whether AI-empowered Chatbots can change the client experience and assist the Banks with developing their business by accomplishing supportable upperhand and satisfying the client's requests. This exploration likewise assists with figuring out theimpression of clients when a bank carries out innovation like a Chatbot. This exploration will likewisefocus on the issues and limitations of the chatbotapplication The share of banksthat use AI solutions and chatbots in particular is constantly rising.As another factor,the use of smartphones and other smart devices is also a rapidly growingtrend. These two driving forces determine the near futureof artificial intelligence assistants in the bankingindustry.

More and more banks tend to integrate chatbots into their mobile apps. This is a convenient way to stay in touch with their clients and, at the same time, reduce the involvement of human personnel. Accordingto estimations calculated by Juniper Research, in 2023, chatbotinteractions will save many million hours for banks, which will lead to save billions of cost worldwide.

13. APPENDIX

a. Source Code

HTML:

```
<html>
  <head>
    <title>Chat Bot</title>
    <link rel ="Stylesheet" href="style.css">
```

```html
      <link rel="icon"href="aa.ico"type="image/favicon.ico">
    </head>
    <body>
      <div class="topnav">
        <a class="active" href="#home">Home</a>
        <a href="#news">News</a>
        <a href="#contact">Contact</a>
        <a href="#about">About</a>
        <div id="logo">
         <img src="logo-no-background.png"id="img-1">
        </div>
        <button type="submit" id="log">LOGIN</button>
      </div>
              <marquee><h2 id="head">Note:For any queries press the button at the
bottom</h2></marquee>

        <div class="img-2">
          <img src="dhoni.png"id="img-2">
        </div>
        <div class="box">
            <h1 id="AI">AI Based Discourse <br>For Banking Industry <h4 id="team">Team
Id:PNT2022TMID16498</h4></h1>

        <button id="button">Know more</button>
        </div>
        </div>
    </body>
  </html>


  CSS:
  body {
   background-color: #2874A6  ;
    margin:0;
```

```css
  }
  .topnav {
    display:flex;
    justify-content: left;
  background-color: #333;
  overflow: hidden;
}

/* Style the links inside the navigation bar */
.topnav a {
  float: left;
  color: #fffefe;
  text-align: center;
  padding: 14px 16px;
  text-decoration: none;
  font-size: 17px;
}
/* Change the color of links on hover */
.topnav a:hover {
  background-color: #ddd;
  color: black;
}

/* Add a color to the active/current link */
.topnav a.active {
  background-color: #04AA6D;
  color: white;
}
marquee{
  margin-bottom: 5px;
  background-color: darkorange;


}
```

```css
#head{
  font-family: 'Courier New', Courier, monospace;
  color:white;
  font-size:21px;
  animation-name:colorChange;
  animation-duration: 15s;
  animation-iteration-count: infinite;
  margin-bottom: 1px;
}
@keyframes colorChange {
  25%{
    color: rgb(35, 206, 86);
  }
  25%{
    color:red
  }
  50%{
    color:rgb(202, 29, 124);
  }
  100%{
    color:rgb(17, 167, 226);
  }
}
#logo{
  padding:1px;
}
#img-1{
  height: 50px;
  width:80px;
  margin-left:70pc;
  color:white
}
#img-1:hover{
```

```css
       border:3px solid white;

  }


.box{
   float:Right;
   width: 60%;
   height:700px;




}
.h1{


   margin-left:500px;
   background-color: #aa4f04;
}
.img-2{
   float:left;




}
#img-2{
   height:700px;


   padding-left: 0px;

  }
#button{
   margin-top: 60px;;
   background: #0E3EEE ;
```

```css
    color:white;
    width:50px;
    margin-left:6%;
    width:280px;
    height:70px;
    font-size:50px;
   font-family: sans-serif;
   border-radius:20px;
   box-shadow:0 8px 16px 0 rgba(0, 0, 0, 0.2), 0 6px 20px 0 rgba(0,0,0,0.19);
}
#button:hover{
    box-shadow: 0 12px 16px 0 rgba(0, 0, 0, 0.24),0 17px 50px 0 rgba(0,0,0,0.19);
}
#log{
  margin-left:10px;
  height:40px;
  padding:10px;
  padding-right:10px;
  padding-left:10px;
  border:none;
  background:white;
  margin-top:5px;
  border-radius: 10px;
}
#log:hover{
    background:#04AA6D;
    color:white
}
#AI{
  color:white;
  font-size: 70px;
  margin-left: 50px;
  font-family:'Gill Sans', 'Gill Sans MT', Calibri, 'Trebuchet MS', sans-serif;
```

```css
  margin-bottom: 1px;
}
#team{
  color:black;
  font-size: 40px;
  margin-left: 50px;
  font-family:sans-serif;
  margin-top: 10px;;
  margin-bottom: 1px;
}
```

PYTHON:

```python
from flask import Flask,render_template
app=Flask(_name_,template_folder='template')
@app.route('/')
def front():
    return render_template('front.html')
if__name___=='_main_':
    app.run(debug=True)
```

b. GitHub & Project Demo Link

Link to view deployed chatbot:https://karthik280.github.io/Bank/

Github link to view our project documents:

https://github.com/IBM-EPBL/IBM-Project-7084-1658846777