IBM NALAIYA THIRAN

AI BASED DISCOURSE FOR BANKING INDUSTRY

PROJECT REPORT

TEAM ID : PNT2022TMID14929

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CHAPTER – 1

INTRODUCTION

1.1 PROJECT OVERVIEW

Banking is one of the most important key areas, which deals with financial transactions that everyone may use, yet banks are unable to adequately handle consumer concerns about goods or services, which affects customer satisfaction. Most banks now provide a wide range of goods and services, such as credit and debit cards, savings accounts, financial planning, personal loans and so on.

Many consumers are not always familiar of all of the services and updates provided by the financial company. Customers must visit banks and wait for significant periods of time to resolve minor issues. It was difficult for the customer to contact a customer support representative for guidance or help. Customers are exhausted since they must visit the bank numerous times to apply for a loan, insurance, and other services. Addressing and fixing this problem will be extremely advantageous to banks and for the customer.

As we all know, the world is relishing the advent of chatbots, and many sectors have opted to automate the process and broaden their services. To address these issues, we adopted a phenomenal tool called Watson Assistant, supplied by IBM Watson, to build chatbots and virtual assistants in our project. IBM Watson Assistant uses artificial intelligence to give quick, consistent, and accurate responses across any application or device. Using Watson Assistant, we developed Steve, a personalized financial bot that is programmed to respond to customer inquiries whenever they ask for them. We created it a user-friendly bot that provides accurate replies, and we put some posters on updates so that customers are much aware of fresh bank updates. Steve provides Frequently Asked Questions (FAQs) and feedback options for customers to provide valuable feedback.

1.2 PURPOSE

The main goal of this project is to build a personalized bot that provides financial advice and assistance. It is available around the clock so that customers may get timely and accurate responses to their inquiries. It is available around the clock so that customers may get timely and accurate responses to their inquiries. Two key areas are meeting customers ' expectations and maintaining loyalty.

CHAPTER – 2
LITERATURE SURVEY

2.1 EXISTING PROBLEM

One of the most significant industries is banking, which deals with universally accessible financial transactions. However, consumer satisfaction is lower since banks struggle to effectively respond to customer queries regarding goods and services. Currently, most banks provide a wide range of goods and services, such as credit cards, savings accounts, debit cards, financial planning, personal loans, mortgages, and so on. Many customers are sometimes unaware of all the goods and updates that the financial company they are doing business with offers. Even to clear up minor questions, customers must visit banks and wait a lengthy period. The consumer had trouble getting in touch with a customer support representative for guidance or help.

2.2 SURVEY WORK

2.2.1 CONVERSATION TO AUTOMATION IN BANKING THROUGH CHATBOT USING ARTIFICIAL MACHINE INTELLIGENCE LANGUAGE [Sasha Fathima Suhel, Vinod Kumar Shukla, Sonali Vyas, Ved Prakash Mishra, 2020]

Artificial Machine Intelligence may be a terribly sophisticated topic. It involves making machines that are capable of simulating data. This paper examines a number of the most recent AI patterns and activities so provides various theory of amendment in a number of the popular and wide accepted postulates of these days. supported basic A.I. (Artificial Intelligence) structuring and dealing for this, System-Chatbots are created (or chatter bots). The paper shows that A.I is ever rising. As of currently there isn't enough data on A.I. but this paper provides a brand-new thought that addresses machine intelligence and sheds light-weight on the potential of intelligent systems. the increase of chatbots within the finance sector is that the latest unquiet force that has

modified the means customers act. within the industry, the introduction of computer science has driven chatbots and altered the face of the interaction between bank and customers. The banking sector plays a crucial role in development into any country. It additionally explores the present usability of chatbot to assess whether or not it will fulfill customers dynamical desires.

2.2.2 AN INTELLIGENT CHATBOT USING DEEP LEARNING WITH BIDIRECTIONAL RNN AND ATTENTION MODEL - [Manyu Dhyani, Rajiv Kumar, 2020]

This paper shows the modeling and performance in deep learning computation for an Assistant informal Agent (Chatbot). the use of TensorFlow package library, notably Neural MT (NMT) model. deed information for modeling is one amongst the foremost vital tasks and quite troublesome to preprocess it. The two-way perennial Neural Networks (BRNN) containing attention layers is employed, in order that input sentence with sizable number of tokens (or sentences with over 20–40 words) may be replied with additional applicable oral communication. The dataset employed in the paper for coaching of model is employed from Reddit. The model is developed to perform English to English translation. the most purpose of this work is to extend the disarray and learning rate of the model and notice cheese Score for translation in same language. The experiments square measure conducted victimization TensorFlow victimization python3.6. The disarray, leaning rate, cheese score and Average time per one thousand steps square measure 56.10, 0.0001, 30.16 and 4.5 severally. One epoch is completed at 23,000 steps. The paper conjointly studies MacBook Air as a system for neural network and deep learning.

2.2.3 AI-BASED CHATBOTS IN CUSTOMER SERVICE AND THEIR EFFECTS ON USER COMPLIANCE [Martin Adam, Michael Wessel, Alexander Benlian, 2020]

Communicating with clients through live chat interfaces has become associate progressively common suggests that to supply time period customer

service in several e-commerce settings. Today, human chat service agents are oftentimes replaced by informal code agents or chatbots, that are systems designed to speak with human users by suggests that of language usually supported AI (AI). The cost and time saving opportunities triggered a widespread implementation of AI-based chatbots, they still oftentimes fail to fulfill client expectations, probably leading to users being less inclined to fits requests created by the chatbot. Drawing on social response and commitment-consistency theory, we have a tendency to through empirical observation examine through a randomized on-line experiment however verbal humanlike style cues and also the foot-in-the-door technique have an effect on user request compliance. Our results demonstrate that each representational process furthermore because they got to keep consistent considerably increase the probability that users fit a chatbot's request for service feedback. Moreover, the results show that social presence mediates the impact of humanlike style cues on user compliance.

2.2.4 A BANKING CHATBOT SECURITY CONTROL PROCEDURE FOR PROTECTING USER DATA SECURITY AND PRIVACY [Sen-Tarng Lai, Fang-Yie Leu, Jeng-Wei Lin, 2019]

The rise of AI has prompted the money business to enter the intelligent money technology (FinTech). Chatbot with AI technologies is a vital member of FinTech. The money trade is actively introducing chatbot to boost the market competitive advantage. several banks and card issuers within the us have introduced or developed chatbots from 2017 to extend user convenience and assist business promotion of monetary establishments. However, chatbot with AI options could infringe client security and private privacy. Security has become a vital issue that Chatbot should listen to. so as to enhance the safety of chatbot, this paper analyzes the safety ways of e-commerce (EC), and combines the AI security principles to set up the Chatbot Security management Procedure (CSCP). CSCP uses security specifications confirmation, specifications implementation, scrutiny activity and improvement manners four stages to observe chatbot. Banking chatbot with CSPS will hold blessings of chatbots, cut

back the safety risk, and concretely defend client knowledge security and private privacy.

2.2.5 CHATBOT ASSISTED MARKETING IN FINANCIAL SERVICE INDUSTRY[Jon T. S. Quah, Y. W. Chua, 2019]

The rise of chatbots within the finance sector is that the latest riotous force that has modification the method customers act. The adoption of computer science battery-powered chatbots notably within the banking system has modified the face of communication interface between bank and customers. This paper explores the effectiveness of this use of chatbot in banking system. The banking sector plays a major role in economy. It conjointly investigates this chatbot practicality to work out if it will meet the dynamical expectation of shoppers.

2.2.6 TOWARD A CHATBOT FOR FINANCIAL SUSTAINABILITY [Sewoong Hwang, Jonghyuk Kim, 2021]

This study examines technology effectiveness for business demand during which computer science (AI) is applied within the money sector. It summarizes previous studies on chatbot and client service and investigates theories on acceptance attitudes for innovative technologies. By setting variables, the study examines bank revenue methodologically and assesses the impact of client service and chatbot on bank revenues through client age classification. The results indicate that new product-oriented funds or housing subscription savings are additional appropriate for purchase through client service than through chatbot. However, services for existing product through chatbot absolutely have an effect on bank's profits. once classified by age, purchases by the bulk cohort within the channel absolutely have an effect on bank profits. Finally, there's an inclination to method tiny banking transactions through the chatbot system, that saves dealings and management prices, absolutely poignant profits. Through empirical analysis, we have a tendency to initial examine the result of associate

degree AI-based chatbot system enforced to strengthen money soundness and counsel policy alternatives. Second, we have a tendency to use banking knowledge to extend the study's real-life relevance and prove that issues in client service will be resolved through a chatbot system.

2.3 PROBLEM STATEMENT DEFINITION

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Student who created a new bank account	Know more about the available features of the bank	I have to spend more time at the bank	I have to ask bank employees about my doubts	Exhausted
PS-2	A New Customer	Be familiar about loans available in the bank	It takes long time	There is always a long queue as bank employees are busy	Irritated
PS-3	An Old Customer at the bank	Find out my current balance in my bank account	I have to travel to bank now	I have to speak to a bank employee to get the work done	Frustrated

CHAPTER – 3
IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS
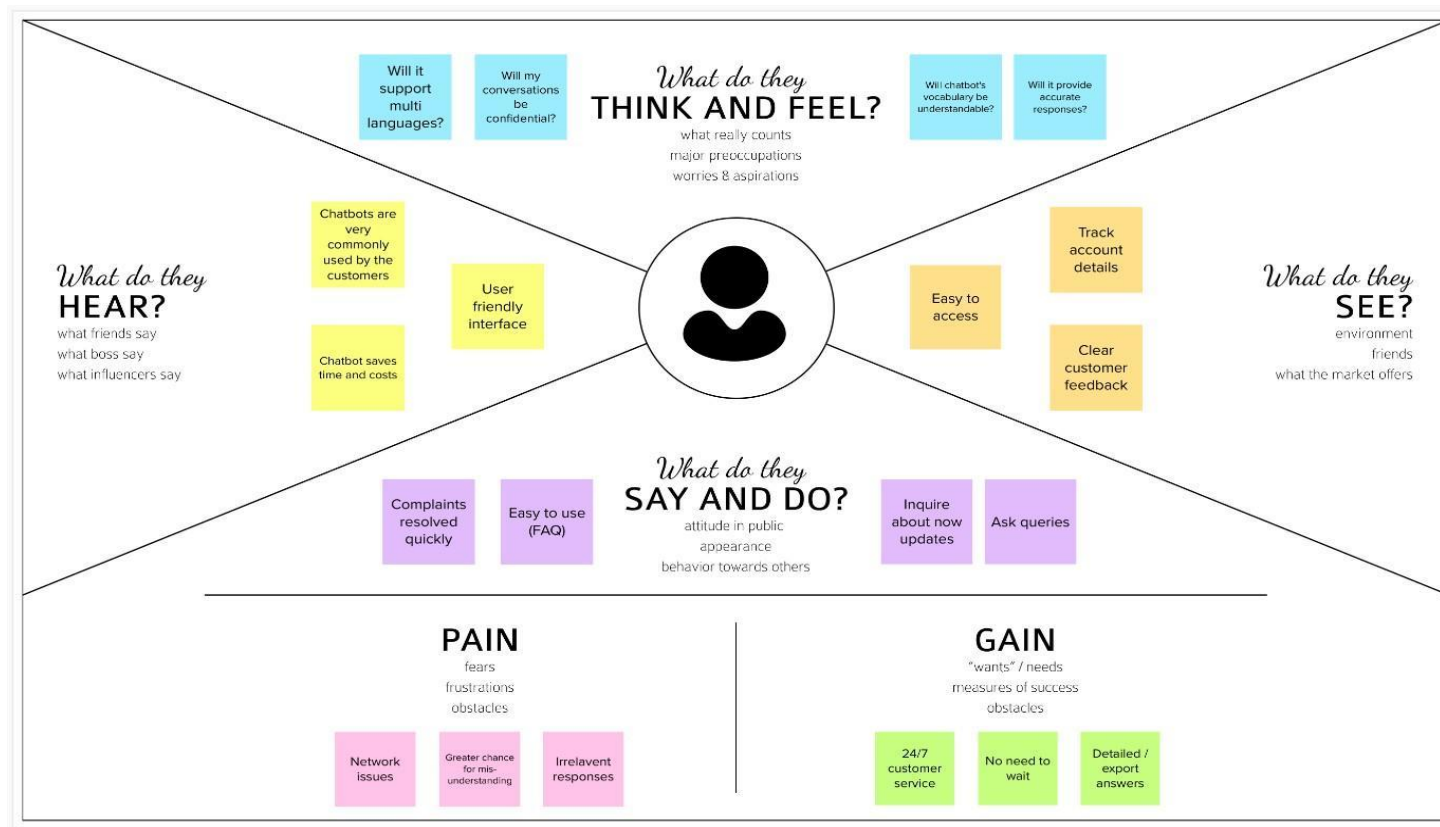
Figure 3.1.1 Empathy Map Canvas

3.2 IDEATION & BRAINSTORMING
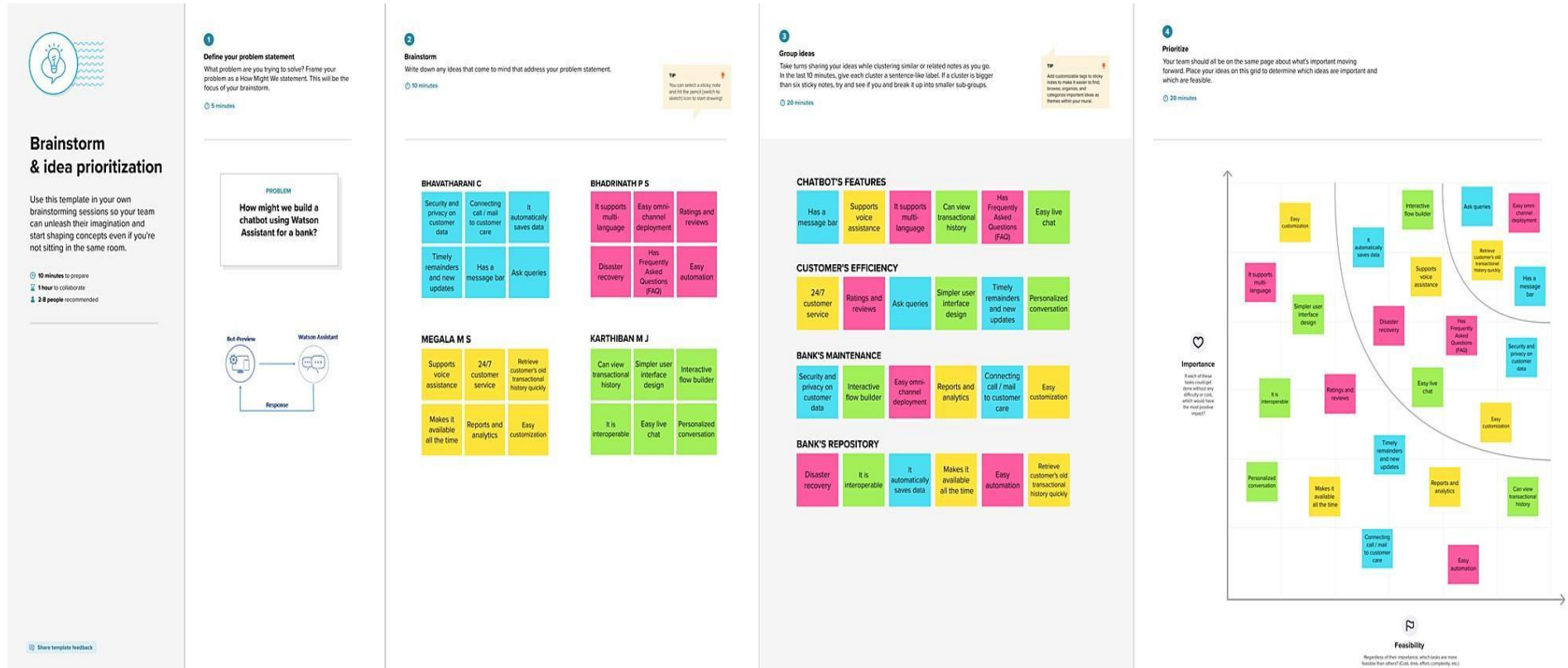
Figure 3.2.1 Brainstorming and Idea Priorization

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	The Chatbot should solve the customer queries related to banks.
2.	Idea / Solution description	We develop chatbots using the IBM Watson Assistant tools service, which leverages NLP techniques like intent classification and entity recognition to understand user intent and context.
3.	Novelty / Uniqueness	IBM Watson Assistant uses artificial intelligence to contextually understand your customers to deliver fast, consistent, and accurate answers across applications, devices, and channels. Take the frustration out of long waits, tedious searches, and useless chatbots with your trusted AI leader.
4.	Social Impact / Customer Satisfaction	Getting instant and accurate responses makes customers feel satisfied in such a way that it solves queries by saving cost and time.
5.	Business Model (Revenue Model)	IBM Watson is IBM's AI technology for business, helping organizations to better predict and shape future outcomes, automate complex processes, and optimize employees' time.
6.	Scalability of the Solution	Deep and broad perspectives on the bank's global features.

3.4 PROBLEM SOLUTION FIT

Problem-Solution fit

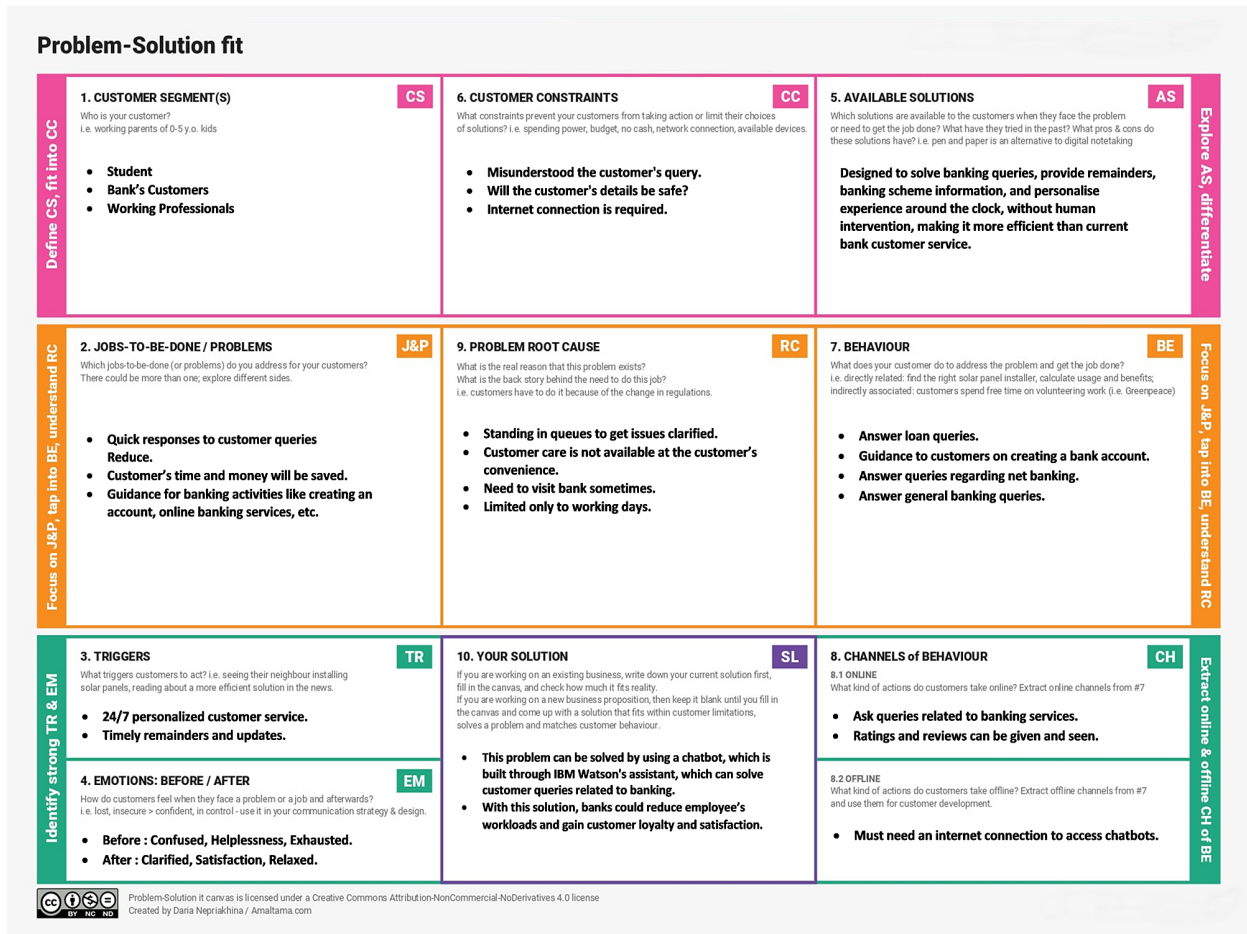| **1. CUSTOMER SEGMENT(S)** `CS`	**6. CUSTOMER CONSTRAINTS** `CC`	**5. AVAILABLE SOLUTIONS** `AS`
Who is your customer? i.e. working parents of 0-5 y.o. kids	What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.	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
• Student • Bank's Customers • Working Professionals	• Misunderstood the customer's query. • Will the customer's details be safe? • Internet connection is required.	Designed to solve banking queries, provide remainders, banking scheme information, and personalise experience around the clock, without human intervention, making it more efficient than current bank customer service.

Define CS, fit into CC — **Explore AS, differentiate**

2. JOBS-TO-BE-DONE / PROBLEMS `J&P`	**9. PROBLEM ROOT CAUSE** `RC`	**7. BEHAVIOUR** `BE`
Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.	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.	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)
• Quick responses to customer queries Reduce. • Customer's time and money will be saved. • Guidance for banking activities like creating an account, online banking services, etc.	• Standing in queues to get issues clarified. • Customer care is not available at the customer's convenience. • Need to visit bank sometimes. • Limited only to working days.	• Answer loan queries. • Guidance to customers on creating a bank account. • Answer queries regarding net banking. • Answer general banking queries.

Focus on J&P, tap into BE, understand RC — **Focus on J&P, tap into BE, understand RC**

3. TRIGGERS `TR`	**10. YOUR SOLUTION** `SL`	**8. CHANNELS of BEHAVIOUR** `CH`
What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.	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.	**8.1 ONLINE** What kind of actions do customers take online? Extract online channels from #7
• 24/7 personalized customer service. • Timely remainders and updates.	• This problem can be solved by using a chatbot, which is built through IBM Watson's assistant, which can solve customer queries related to banking. • With this solution, banks could reduce employee's workloads and gain customer loyalty and satisfaction.	• Ask queries related to banking services. • Ratings and reviews can be given and seen.
4. EMOTIONS: BEFORE / AFTER `EM`		**8.2 OFFLINE** What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.
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.		
• Before : Confused, Helplessness, Exhausted. • After : Clarified, Satisfaction, Relaxed.		• Must need an internet connection to access chatbots.

Identify strong TR & EM — **Extract online & offline CH of BE**

Figure 3.4.1 Problem Solution Fit

CHAPTER – 4
REQUIREMENTS ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Preview	Customers may examine the chatbot preview and use it to ask questions.
FR-2	Greetings	The IBM Watson Assistant Chatbot needs instructions for a greeting message to greet the customer when they visit the chatbot.
FR-3	Customer support	● The Chatbot has a message bar in which the user can type their queries and get solutions instantly to their queries. ● It has predefined questions and keywords to deliver it to the customer. ● Frequently Asked Questions (FAQs) are available so that the customer can easily resolve basic questions.
FR-4	Updates	The Virtual Assistant will display new updates so the client can easily familiarize themselves with the new services and policies.

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4.2 NON - FUNCTIONAL REQUIREMENT

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	• You may connect conversational user interfaces into any application, gadgets, or channel using Watson Assistant. • The Bot can be used by anybody to answer questions. • Basic communication skills are sufficient.
NFR-2	**Security**	• IBM employs robust security includes employing encryption and access control techniques, which enable us to code or relocate data to restrict access to unauthorized users, de-identify data and use it in accordance with applicable permissions. • The Chatbot does not gather any sensitive information such as account numbers or passwords.
NFR-3	**Reliability**	• The confidentiality and privacy of data are guaranteed. • Watson Assistant can handle numerous client's requests at a time. Compared to Google Dialog flow, it is 5.6% more accurate. • If the bot does not recognize the answer to a query, it suggests alternatives.

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NFR-4	**Performance**	● It is super accurate, easy and simple to use. ● Many customers feel happy that their queries are solved instantly and satisfied that they got accurate responses using Watson Assistant Chatbots. ● The Bot is personalized to each individual user.
NFR-5	**Availability**	● Here, chatbots for banks are created with IBM Watson Assistant and made accessible to customers anytime they need them. ● Customer support is available around-the-clock.
NFR-6	**Scalability**	● The best part about customer service chatbots is their ability to help business growth and scale with ease and best in terms of profit. ● IBM Watson Assistant also produces quick and accurate responses and meets customer's expectations. ● It introduces deep and broad perspectives in the bank's globaL Features.

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CHAPTER – 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS
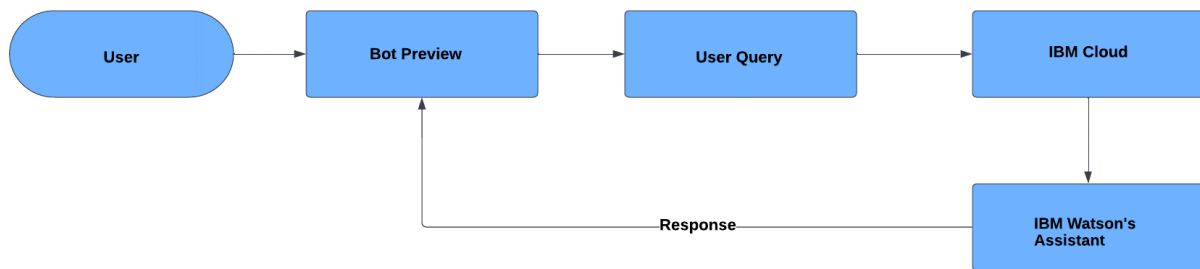
Figure 5.1.1 Data Flow Diagrams

5.2 SOLUTION AND TECHNICAL ARCHITECTURE
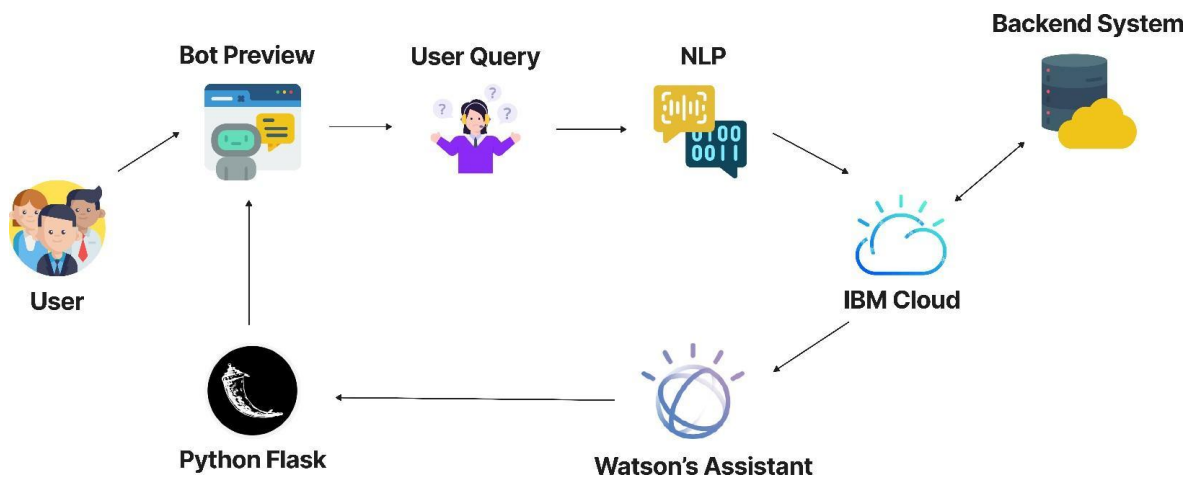
Solution Architecture

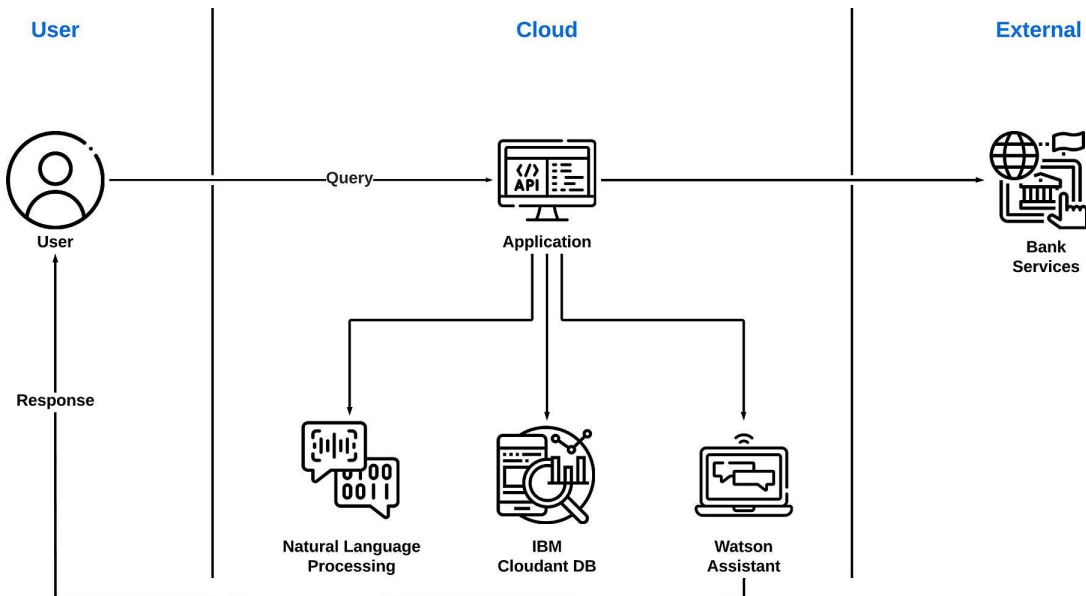**Figure 5.2.1 Solution Architecture**

Technical Architecture

Figure 5.2.2 Technical Architecture

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Bot Preview	As they have an easily accessible environment, a user interacts with the Bot to ask queries.	HTML, CSS, JavaScript
2.	Application Logic-1	On the Bot's message bar, the user can type questions.	Python / IBM Watson Assistant
3.	Application Logic-2	Frequently Asked Questions (FAQ) could be used by users.	IBM Watson STT service
4.	Application Logic-3	Users can examine fresh updates and be alerted of recent additions from the bank.	IBM Watson Assistant
5.	Cloud Database	Queries are predicted with solutions and stored in the cloud to be retrieved whenever they are needed.	IBM Cloudant DB
6.	External API-1	It gives your client application runtime methods for sending user input to an assistant and receiving a response.	Watson Assistant v2 API

	External API-2	An on-premises and cloud-based enterprise-grade platform for developing, securing, controlling, sharing, monetizing, and analyzing customized APIs.	IBM Cloud API
7.	Deep Learning Model	It learns to execute classification tasks directly from text and achieves cutting-edge accuracy, sometimes outperforming human performance.	Deep Learning
8.	Infrastructure (Server / Cloud)	On cloud server we will be deploying the chatbot using flask in the web page.	Python Flask

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open - Source Frameworks used	Python Flask, CSS styling framework
2.	Security Implementations	Employing encryption, access control techniques, IBM Cloud.	IBM Watson assistant, IBM Cloudant DB
3.	Scalable Architecture	Bot is built using intents, entities, dialog The Scalability consists of 3 tiers (Web server, Application server, Cloud server)	Web Server - IBM Watson Assistant Application Server - Python Flask Cloud Server - Cloudant DB
4.	Availability	Bot is made available for 24/7 using load balancers, distributed servers.	IBM Cloud
5.	Performance	Responds to about 10,000 consumer questions at the same time.	IBM load balancer, CDN

5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile/ Web user)	Bot Preview	USN-1	As a user, I can view the bot preview and it has a user-friendly UI.	I can view the bot preview and it has a user-friendly UI.	Medium	Sprint-4
	Greeting Message	USN-2	As a user, I can receive welcoming messages from the bot.	I can receive welcoming messages from the bot.	Medium	Sprint-4
	Ask Queries	USN-3	As a user, I can see the bot preview asking for guidance to create a saving bank account.	I can able to ask guidance for creating a saving bank account.	Medium	Sprint-4
		USN-4	As a user, I can see the bot preview asking for guidance to create a current bank account.	I can able to ask guidance for creating a current bank account.	Medium	Sprint-4
		USN-5	As a user, I can type loan-related queries.	I can type loan-related inquiries.	Medium	Sprint-4
		USN-6	As a user, I can type general banking queries.	I can type general banking inquiries.	Medium	Sprint-4
		USN-7	As a user, I can type net-banking queries.	I can type net-banking inquiries.	Medium	Sprint-4
		USN-8	As a user, I can type credit card queries and access FAQ's.	I can type credit card inquiries and access FAQ's.	Medium	Sprint-4

	Updates on Loan and Ratings	USN-9	As a user, I can view fresh Updates on Loan and give my Ratings.	I can view fresh updates on Loan and give my Ratings.	Medium	Sprint-4
	Customer Support	USN-10	As a user, I can receive contact information from customer care executive through the bot.	I can receive contact information from customer care executive through the bot.	Medium	Sprint-4
	Run The Application	USN-11	A user can access the bot at any time.	I can use the banking bot to ask my questions at any time.	Medium	Sprint-4
Admin	Create IBM Service	USN-12	As an admin, I must create the required IBM service, Watson Assistant.	I can create the required IBM service, Watson Assistant.	Medium	Sprint-1
	Chatbot Skill Creation	USN-13	As an admin, I can add welcoming messages, customer care executive contact information to the bot.	I can add welcoming messages, customer care executive contact information to the bot.	Medium	Sprint-1
	Creating Saving Account Action	USN-14	As an admin, I can add a response to create a new saving account.	I can add a response to create a new saving account.	High	Sprint-1
	Creating Current Account Action	USN-15	As an admin, I can add a response to create a new current account.	I can add responses to create a new current account.	High	Sprint-1
	Creating Loan Account Action	USN-16	As an admin, I can add a response to create a new loan account.	I can add responses to create a new loan account.	High	Sprint-2

	Creating General Query Action	USN-17	As an admin, I can insert responses to general banking queries.	I can add responses to general banking queries.	High	Sprint-2
	Creating Net-Banking Action	USN-18	As an admin, I can insert responses to net-banking queries.	I can add responses to net-banking queries.	High	Sprint-3
	Credit Card Action and FAQ Module	USN-19	As an admin, I can add responses to credit card queries and add responses to FAQ modules.	I can add responses to credit card queries and add responses to FAQ modules.	Medium	Sprint-4
	Updates on Loan and Ratings	USN-20	As an admin, I can add posters on Loan Update and add Rating options.	I can add posters on Loan Update and add Rating options.	Medium	Sprint-4
	Integrate With Flask Webpage	USN-21	As an admin, I can integrate with the Flask webpage using Python code following the establishment of Assistant.	I can integrate with the Flask webpage using Python code following the establishment of Assistant.	High	Sprint-3
	Bot Preview	USN-22	As an admin, I employ HTML code to design the front-end of the website.	I can able to employ HTML code to design the front-end of the website.	High	Sprint-3
	Run The Application	USN-23	As an admin, I can copy the local host URL and paste it into a browser.	I can access the application using a web browser.	Medium	Sprint-4

CHAPTER – 6
PROJECT PLANNING & SCHEDULING

6.1 SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-4	Bot Preview	USN-1	As a user, I can view the bot preview, and it has a user-friendly UI.	2	Medium	Sandhiya T
Sprint-4	Greeting Message	USN-2	As a user, I can receive welcoming messages from the bot.	1	Medium	K Poornima Sekhar
Sprint-4	Ask Queries	USN-3	As a user, I can see the bot preview asking for guidance to create a saving bank account.	1	Medium	Sandhiya T
Sprint-4		USN-4	As a user, I can see the bot preview asking for guidance to create a current bank account.	1	Medium	Valarmangai
Sprint-4		USN-5	As a user, I can type loan-related queries.	1	Medium	Haripriya K
Sprint-4		USN-6	As a user, I can type general banking queries.	1	Medium	K Poornima Sekhar
Sprint-4		USN-7	As a user, I can type net-banking queries.	1	Medium	Haripriya K
Sprint-4		USN-8	As a user, I can type credit card queries and access FAQ's.	1	Medium	K Poornima Sekhar
Sprint-4	Updates on Loan and Ratings	USN-9	As a user, I can view fresh Updates on Loan and give my Ratings	2	Medium	Haripriya K

Sprint-4	Customer Support	USN-10	As a user, I can receive contact information from customer care executive through the bot.	1	Medium	K Poornima Sekhar
Sprint-4	Run The Application	USN-11	A user can access the bot at any time.	3	Medium	Valarmangai
Sprint-1	Create IBM Service	USN-12	As an admin, I must create the required IBM service, Watson Assistant.	2	Medium	Valarmangai
Sprint-1	Chatbot Skill Creation	USN-13	As an admin, I can add welcoming messages, customer care executive contact information to the bot.	3	Medium	K Poornima Sekhar
Sprint-1	Creating Saving Account Action	USN-14	As an admin, I can add a response to create a new saving account.	5	High	Sandhiya T
Sprint-1	Creating Current Account Action	USN-15	As an admin, I can add a response to create a new current account.	5	High	Valarmangai
Sprint-2	Creating Loan Account Action	USN-16	As an admin, I can add a response to create a new loan account.	5	High	Haripriya K
Sprint-2	Creating General Query Action	USN-17	As an admin, I can insert responses to general banking queries.	5	High	K Poornima Sekhar
Sprint-3	Creating Net-Banking Action	USN-18	As an admin, I can insert responses to net-banking queries.	5	High	Haripriya K
Sprint-4	Credit Card Action and FAQ Module	USN-19	As an admin, I can add responses to credit card queries and add responses to FAQ modules.	1	Medium	K Poornima Sekhar

Sprint-4	Updates on Loan and Ratings	USN-20	As an admin, I can add posters on Loan Update and add Rating options.	1	Medium	Haripriya K
Sprint-3	Integrate With Flask Webpage	USN-21	As an admin, I will integrate with the Flask webpage using Python code following the establishment of Assistant.	5	High	K Poornima Sekhar
Sprint-3	Bot Preview	USN-22	As an admin, I employ HTML code to design the front-end of the website.	5	High	Sandhiya T
Sprint-4	Run The Application	USN-23	As an admin, I can copy the local host URL and paste it into a browser.	3	Medium	Valarmangai

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	15	6 Days	24 Oct 2022	29 Oct 2022	15	29 Oct 2022
Sprint-2	10	6 Days	31 Oct 2022	05 Nov 2022	10	06 Nov 2022
Sprint-3	15	6 Days	07 Nov 2022	12 Nov 2022	15	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

$$AV = Velocity / Sprint\ duration$$

Sprint-1:

Velocity / Sprint duration = 15 / 6 = 2.5

Sprint-2:

Velocity / Sprint duration = 10 / 6 = 1.6

Sprint-3:

Velocity / Sprint duration = 15 / 6 = 2.5

Sprint-4:

Velocity / Sprint duration = 20 / 6 = 3.3

Total Average Velocity = 4.27

6.3   REPORTS FROM
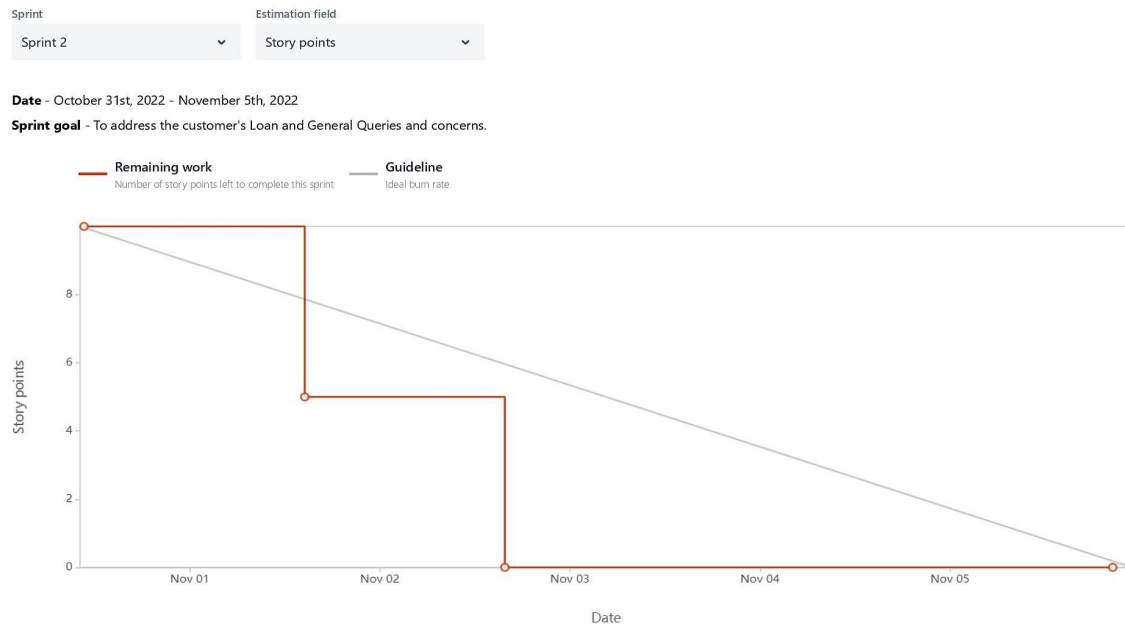
JIRA SPRINT-1

Figure 6.3.1 Sprint-1

SPRINT-2

Sprint
Sprint 2 ∨

Estimation field
Story points ∨

Date - October 31st, 2022 - November 5th, 2022

Sprint goal - To address the customer's Loan and General Queries and concerns.

Figure 6.3.2 Sprint-2

SPRINT-3

Sprint
Sprint 3 ∨

Estimation field
Story points ∨

Date - November 7th, 2022 - November 12th, 2022

Sprint goal - To address the customer's Net Banking queries, use HTML code to construct the front-end of the project's website, and use Python code to interface with the Flask webpage.
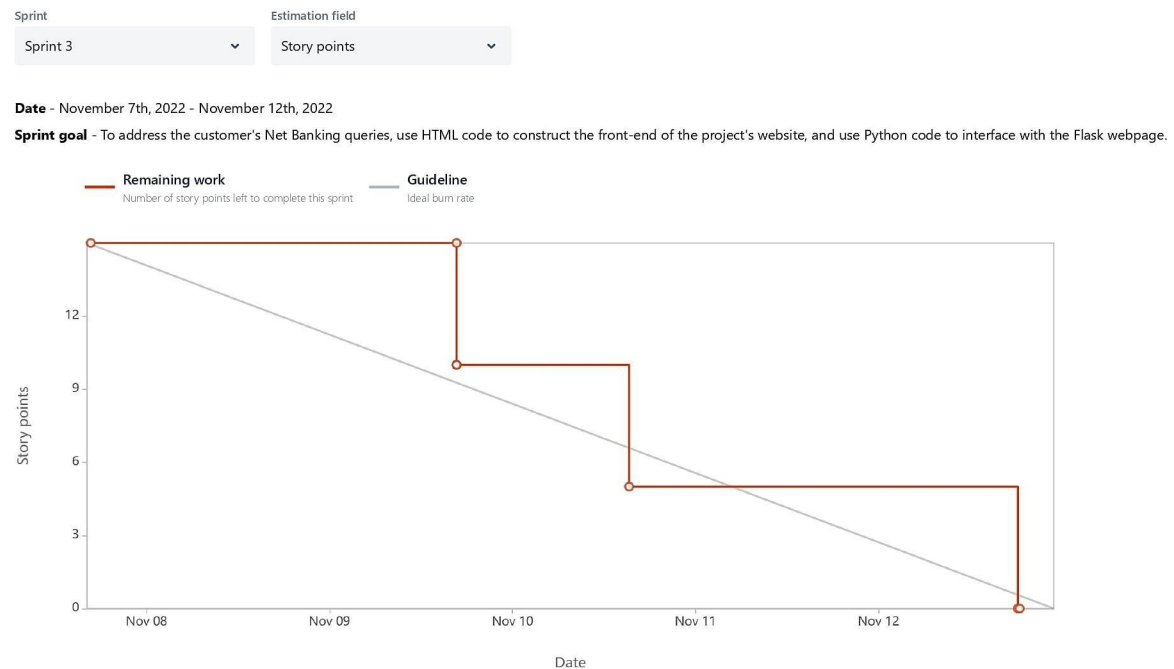
Figure 6.3.3 Sprint-3

SPRINT-4

Figure 6.3.4 Sprint-4

CHAPTER – 7
CODING & SOLUTIONING

7.1 FEATURE 1

CREDIT CARD AND DEBIT CARD QUERY ACTION

Credit cards offer you make large purchases, offer emergency finances, and protect you from fraud. A debit card makes payments far more convenient and safe by allowing you to make electronic payments straight from your bank account. These are the primary services offered by the bank. We've updated certain FAQs about both card services, like benefits, deactivating cards and so on.
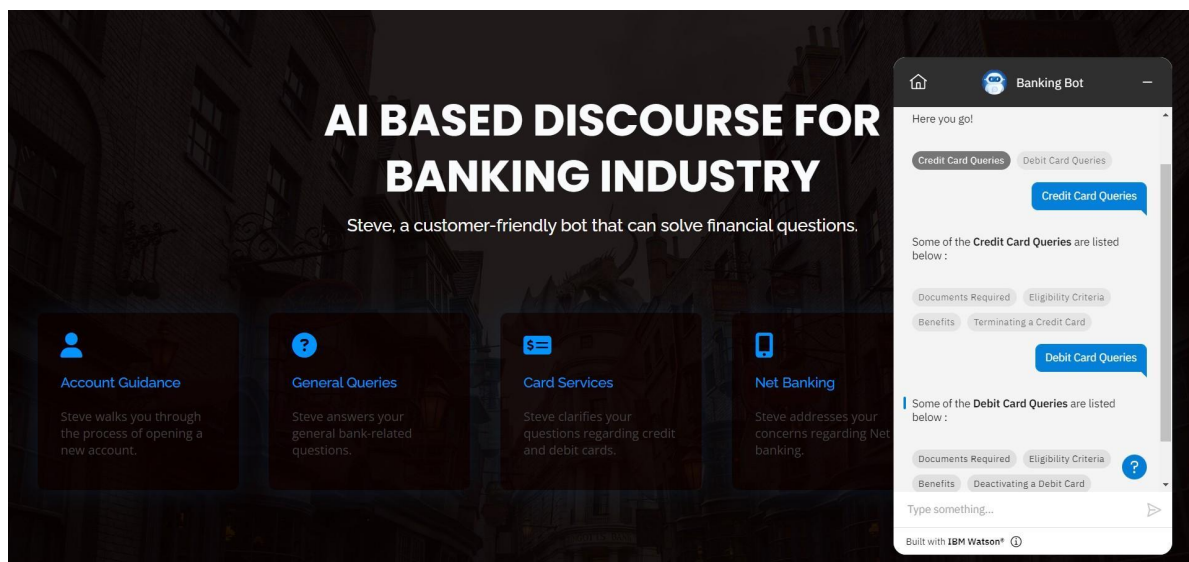

Figure 7.1.1 Credit Card And Debit Card Query Action

7.2   FEATURE 2

POSTERS ON LOAN

Posters are meant to be both visually appealing and informational. We have added posts on new bank updates so that customers are aware of new bank services.
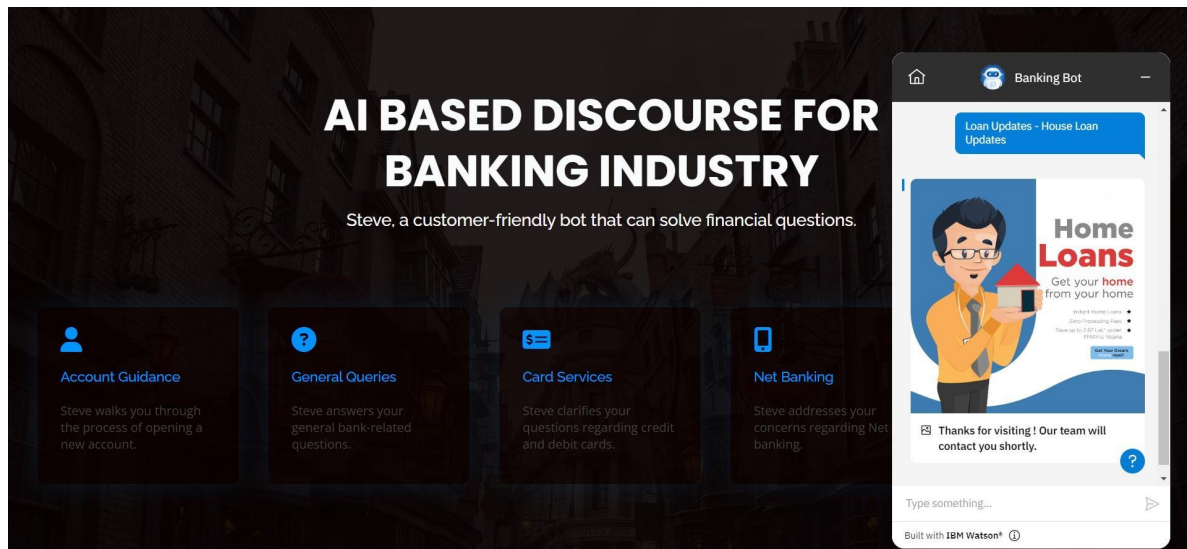
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Figure 7.2.1 POSTERS ON LOAN

RATINGS OPTIONS

Ratings measure our customers' perceptions of our services, which will help us improve them further. We've included rating options so that customers may share their thoughts on their interactions with our chatbot.
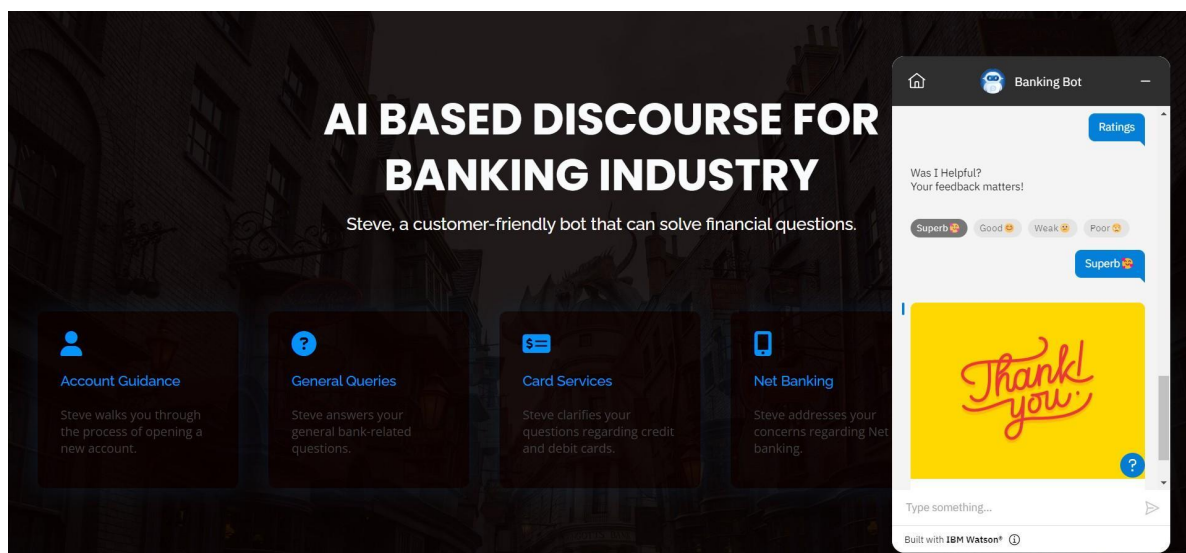

Figure 7.2.2 Ratings Options

CHAPTER – 8
TESTING

8.1 TEST CASES

	Test Scenerios
1	Verify that the user can access the bot.
2	Verify the user and the bot can communicate.
3	Verify how soon and accurately the bot responds.
4	Verify whether the bot can offer options for the user to choose varies choices.
	Savings Account Related Actions
1	Verify the user can able to choose the type of savings account.
2	Verify the user is able to know the process to create the selected type.
	Current Account Related Actions
1	Verify user is able to select the type of company.
2	Verify user is able to know the process to create the selected type.
	Loan Account Related Actions
1	Verify user is able to choose options for selecting type of loan policies.
2	Verify user is able to know the process to create the selected type.
3	Verify user is able to access Loan FAQ's
4	Verify user is able to view fresh updates on 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 about Net Banking Registration.
2	Verify user is able to know about Net Banking Charges.
3	Verify user is able to know about Net Banking Features.
4	Verify user is able to know about Facing errors in Net Banking.
	Credit and Debit Card Related Actions
1	Verify user is able to know about Documents Required.
2	Verify user is able to know about Eligibility Criteria.
3	Verify user is able to know about Benefits.
4	Verify user is able to know about Deactivatings the cards.
	Ratings
1	Verify user is able to give Ratings on the bot.

8.2 USER ACCEPTANCE TESTING

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation (Y/N)	BUG ID	Executed By
BankingBot_TC_001	UI	Home Page	Verify that the user can access the bot.	-	1.Enter URL and click go 2. Click on Chatbot Icon 3.Verify chatbot preview is displayed or not.	URL Link	Bot preview should be displayed.	Working as expected	Pass	Steps are clear to follow	N	-	Megala M S
BankingBot_TC_002	Functional	Bot Preview	Verify the user and the bot can communicate.	-	1.Click on the Chatbot icon 2. Type Query in the message bar.	User Query	User should interact with the chatbot easily.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_003	Functional	Bot Preview	Verify how soon and accurately the bot responds.	-	1. Click on the Chatbot icon 2. Type Query in the message bar. 3.Press Enter	User Query	Chatbot should provide timely and accurate responses.	Working as expected	Pass	Steps are clear to follow	N	-	Karthiban M J
BankingBot_TC_004	Functional	Bot Preview	Verify whether the bot can offer options for the user to choose varies choices.	-	1. Click on the Chatbot icon 2. Type Query in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should able to provides options to select.	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_001	Functional	Bot Preview	Verify the user can able to choose the type of savings account.	-	1. Click on the Chatbot icon 2. Type savings account in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should provide the desired options in Savings account.	Working as expected	Pass	Steps are clear to follow	N	-	Megala M S
BankingBot_TC_002	Functional	Bot Preview	Verify the user is able to know the process to create the selected type.	-	1. Click on the Chatbot icon 2. Type savings account in the message bar. 3.Press Enter. 4. Select the desired actions. 5. Process will be displayed.	User Query	Chatbot should display the process on the selected option.	Working as expected	Pass	Steps are clear to follow	N	-	Megala M S

Test Case ID	Type	Component	Test Scenario		Steps	Test Input	Expected Result	Actual Result	Status	Comments			Executed By
BankingBot_TC_001	Functional	Bot Preview	Verify user is able to select the type of company.	-	1. Click on the Chatbot icon 2. Type current account in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should provide the desired options in Current account.	Working as expected	Pass	Steps are clear to follow	N	-	Karthiban M J
BankingBot_TC_002	Functional	Bot Preview	Verify user is able to know the process to create the selected type.	-	1. Click on the Chatbot icon 2. Type current account in the message bar. 3.Press Enter. 4. Select the desired actions. 5. Process will be displayed.	User Query	Chatbot should display the process on the selected option.	Working as expected	Pass	Steps are clear to follow	N	-	Karthiban M J
BankingBot_TC_001	Functional	Bot Preview	Verify user is able to choose options for selecting type of loan policies.	-	1. Click on the Chatbot icon 2. Type loan account in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should provide the desired options in loan account.	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_002	Functional	Bot Preview	Verify user is able to know the process to create the selected type.	-	1. Click on the Chatbot icon 2. Type loan account in the message bar. 3.Press Enter. 4. Select the desired actions. 5. Process will be displayed.	User Query	Chatbot should display the process on the selected option.	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_003	Functional	Bot Preview	Verify user is able to access Loan FAQ's	-	1. Click on the Chatbot icon 2. Type loan queries in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should display the loan FAQ's .	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_004	Functional	Bot Preview	Verify user is able to view fresh updates on Loan	-	1. Click on the Chatbot icon 2. Type loan updates in the message bar. 3.Press Enter. 4. Select the desired actions.	User Query	Chatbot should display the posters on loan updates.	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K

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BankingBot_TC_001	Functional	Bot Preview	Verify user is able to know about bank working days	-	1. Click on the Chatbot icon 2. Type bank working days in the message bar. 3.Press Enter.	User Query	Chatbot should display the information on the selected option.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_002	Functional	Bot Preview	Verify user is able to know about list of branches	-	1. Click on the Chatbot icon 2. Type list of branches in the message bar. 3.Press Enter.	User Query	The Chatbot should take the user to Google Maps to view a list of branches.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_003	Functional	Bot Preview	Verify user is able to find the nearest branch	-	1. Click on the Chatbot icon 2. Type the nearest branch in the message bar. 3.Press Enter.	User Query	The Chatbot should take the user to Google Maps to view the banks near me.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_004	functional	Bot Preview	Verify user is able to know about storage locker facility	-	1. Click on the Chatbot icon 2. Type storage locker facility in the message bar. 3.Press Enter.	User Query	The Chatbot should take the user to Google Maps to view the storage locker facility.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_005	functional	Bot Preview	Verify user is able to know about currency conversion facility	-	1. Click on the Chatbot icon 2. Type currency conversion facility in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information.	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_001	functional	Bot Preview	Verify user is able to know about Net Banking Registration	-	1. Click on the Chatbot icon 2. Type Net Banking Registration in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_002	functional	Bot Preview	Verify user is able to know about Net Banking Charges	-	1. Click on the Chatbot icon 2. Type Net Banking Charges in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_003	functional	Bot Preview	Verify user is able to know about Net Banking Features	-	1. Click on the Chatbot icon 2. Type Net Banking Features in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K

BankingBot_TC_004	functional	Bot Preview	Verify user is able to know about Facing errors in Net Banking.	-	1. Click on the Chatbot icon 2. Type Facing errors in Net Banking in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K
BankingBot_TC_001	functional	Bot Preview	Verify user is able to know about Documents Required.	-	1. Click on the Chatbot icon 2. Type Documents Required in the message bar. 3. Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_002	functional	Bot Preview	Verify user is able to know about Eligibility Criteria.	-	1. Click on the Chatbot icon 2. Type Eligibility Criteria in the message bar. 3. Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_003	functional	Bot Preview	Verify user is able to know about Benefits.	-	1. Click on the Chatbot icon 2. Type Benefits in the message bar. 3. Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_004	functional	Bot Preview	Verify user is able to know about Deactivating the cards.	-	1. Click on the Chatbot icon 2. Type Deactivating the cards in the message bar. 3.Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	K Poornima Sekhar
BankingBot_TC_001	functional	Bot Preview	Verify user is able to give Ratings on the bot.	-	1. Click on the Chatbot icon 2. Type Ratings in the message bar. 3. Press Enter.	User Query	The Chatbot should display the desired information	Working as expected	Pass	Steps are clear to follow	N	-	Haripriya K

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UAT REPORT

1. Purpose of Document

The purpose of this document is to briefly discuss the test coverage and unresolved issues of the AI Based Discourse for Banking Industry project at the time of the release of User Acceptance Testing (UAT).

2. Defect Analysis

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	0	0	0	1	1
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	0	2	2	4
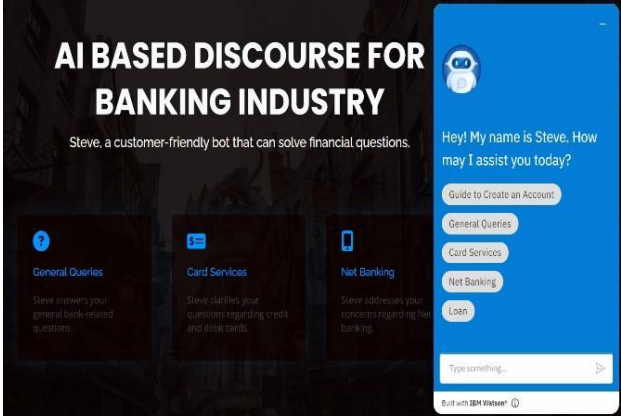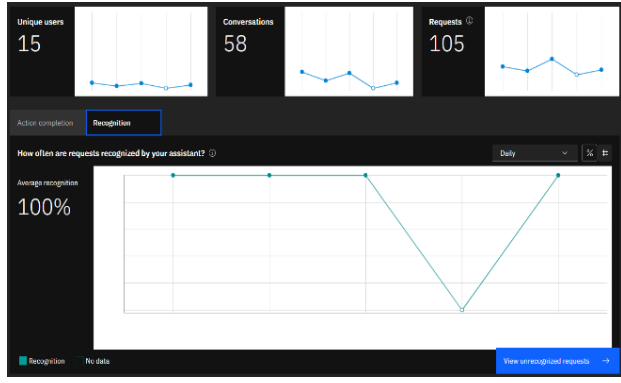
3. Test Case Analysis

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	0	0	0	0
Client Application	26	0	0	26
Security	0	0	0	0
Outsource Shipping	0	0	0	0
Exception Reporting	0	0	0	0
Final Report Output	26	0	0	26
Version Control	0	0	0	0

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CHAPTER – 9
RESULTS

9.1 PERFORMANCE METRICS

	Parameter	Values	Screenshot
1	Watson Assistant Summary	IBM Watson Assistant uses artificial intelligence to give quick, consistent, and accurate responses across any application, device, or platform. With the leader in trustworthy AI, you can remove the frustration of long wait times, time-consuming searches, and unhelpful chatbots.	
2	Accuracy	Training Accuracy – 100% Validation Accuracy – 100%	

CHAPTER – 10
ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- **Round-the-clock accessibility:** People might experience problems with their accounts at any time of the day and the biggest benefits that chatbot offer is 24/7 availability.

- **User friendly UI :** Chatbots are simple to use and offer personalized features like FAQs and updates for a pleasant customer experience.

- **Personalized touch :** Chatbot has been developed to interact with humans and offer a personal touch to the conversation.

- **Quick and Accurate Responses :** Chatbot provides timely responses with precise solutions and even suggests alternatives.

- **Saves time :** Customers don't have to wait in a long queue to meet an agent to solve a simple query.

DISADVANTAGES

- **Technology Issues :** People need to be more tech-savvy to use a chatbot than to make a simple phone call or interact with a customer service representative in person.

- **Questions must be programmed beforehand :** When customers use chatbots, they need to ask questions in specific ways to be able to get accurate answers.

CHAPTER – 11
CONCLUSION

Steve, a Customized Banking Bot, built with IBM Watson Assistant answers any banking queries related to Guidance on Account Creation, loan, Net Banking, Credit Card Services and General Banking Queries. It has posters on new updates in the banks. It addresses the queries of customers quickly and effectively in a cost-efficient manner. Its 24/7 availability is one the biggest benefits so that the customer can ask queries any time. 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. Chatbots will enable personal and efficient contact between the user and the bank in order to address the user satisfaction concerns related with banking services. It is designed to be an all-around virtual assistant that allows customers to ask banking-related inquiries without having to visit the bank or call customer service, as well as provide pertinent ideas. Banking bots, on the other hand, provide significant benefits to banks, such as increased revenue, gain customer loyalty, reduce operational costs and risks, reduce human error and so on.

CHAPTER – 12
FUTURE SCOPE

The financial bot's future features might include voice assistance, sentiment analysis, and multilingual choices. By adding voice assistants, users may naturally speak to the programmes and ask for everything they want while multitasking. By introducing sentiment analysis methodologies into chatbot services, we help users obtain better replies and have a better experience. The addition of multilingual choices gives users with multiple language support and allows them to engage with customers in multiple languages. Customers may have a true experience with the chatbot and boost customer satisfaction by implementing these characteristics into the banking bot. Banks may enhance customer loyalty by making it accessible.

CHAPTER – 13
APPENDIX

13.1   SOURCE CODE

INDEX.HTML

```html
<html>
<head>
   <title>

       chatbot for bank

   </title>

   <link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm
" crossorigin="anonymous">
   <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
   <link rel="stylesheet" href="style.css">


</head>
<body>

       <script>
 window.watsonAssistantChatOptions = {

   integrationID: "f36ae076-029e-4064-abb5-0ec54a6de440", // The ID of this
integration.
   region: "us-south", // The region your integration is hosted in.

   serviceInstanceID: "b5f024cc-3bc4-4203-ad5f-208701e29db1", // 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";
```

```html
        document.head.appendChild(t);

    });

</script>




    <div class="banner">

        <div class="navbar">

            <img src="logo.png" class="logo">

            <ul>

                <li><a href="about.html">Home</a></li>

                <li><a href="home.html">Form</a></li>

                <li><a href="services.html">About</a></li>

                <li><a href="faq.html">Samples</a></li>

            </ul>

        </div>


    <div>

        <h1 class="para">AI BASED DISCOURSE FOR BANKING INDUSTRY</h1>

        <P class="pages"> This is a web page with chatbot for bank to help the
customers by providing answers for the quesions which is arised by the
customer.</P>

    </div>

    </div>

</body>

</html>
```

13.2 GITHUB & PROJECT DEMO LINK

GitHub Link

https://github.com/IBM-EPBL/IBM-Project-33809-1660227255

Project Link

https://ai-based-discourse-for-banking.netlify.app/

Project Demo Link

https://drive.google.com/file/d/1hPomhYgRSjEUV6c_cZ0rXbvgzY47UDPt/view?usp=sharing

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