

AI BASED DISCOURSE FOR BANKING INDUSTRY

Date	17 November 2022
Team ID	PNT2022TMID24700
Team Leader	Saran Gowshick(210419104146)
Team Members	Vasanth Kumar(210419104178) Thirumalaivasan (210419104174) Rupesh KUMar(210419104136)
Project Name	AI Based Discourse for Banking Industry

1. INTRODUCTION:

1.1 - Overview:

- Banking is a crucial sector, it deals with financial transaction which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way which in turn hinders the customer satisfaction.
- In order to overcome the user satisfaction issues associated with banking services, a chatbot will provide personal and efficient communication between the user and the bank.
- A smart chatbot takes query from the user in natural language and gives the appropriate response for the same. This paper aims to discuss the relevance of chatbots in the banking sector and explore how chatbots can be implemented using natural language processing techniques that can be used in the banking industry.
- Only 32% of the companies in the finance industry currently use AI chatbots, and 37% are planning to start using them within 18 months said a report from salesforce. This results in a potential growth rate of 118% which indicates the demand in the industry.

1.2 - Purpose:

- Banks need chatbots to close the gap between a potential customer

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and the digital account opening systems. With the speed of conflict resolution of a chatbot, abandonment rates will automatically decrease, and customer experience will level up.

- Users may utilize chatbots to apply for services such as loans, new cards, and reward programs. It can provide consumers with information such as a list of documents that must be provided to complete the procedure smoothly.
- Chatbots can answer several fundamental questions regarding accounts of customers or banking products. For instance, chatbots can answer questions like “How can I apply for a credit card.”

2. LITERATURE SURVEY:

2.1 - Existing Problem:

The Flaws Of AI bots

One problem is that artificial intelligence is in its infancy. AI bots use natural language processing (“NLP”) to try and understand comments from users. This is what allows them to attempt human like conversations. NLP is a concept that’s rapidly evolving but is not quite there yet. For a small business, developing an AI is difficult. Instead of improving customer experience, you may end up frustrating them.

There are bot platforms that support machine learning, but they can involve a lot of setup time. So it’s common for small businesses to use bots as simple conversational flows with limited user input.

Message Interpretation

Chatbots that offer customer support encounter one of the most significant challenges; interpreting the messages from customers. It also involves being able to understand user intent. Flexible algorithms for message intent’s interpretation should be in there.

Chatbot Security Natural Language Processing Limitations

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2.2 - References:

1. Dialogue AI for Financial Services by Takeshi Shirai, Masaaki Yamamoto, Ph.D., Yu Asano, Ph.D., Yusuke Fujita and Katsuyuki Tsunami published in the year 2018.
2. An Ontology-Based Dialogue Management System for Banking and Finance Dialogue Systems by Duygu Altinok.
3. A Review of Chatbots in the Banking Sector by Shashank Bairy R, Rashmi R in the year 2021.
4. Survey of Conversation to Automation in Banking Through Chatbot using Artificial Machine Intelligence Language by Asst. Prof. Veena M Naik and Sandhya Shree in the year 2022.
5. Chatbot for Healthcare System Using Artificial Intelligence by Lekha Athota, Vinod Kumar Shukla, Nitin Pandey and Ajay Rana in the year 2020.
6. Chatbots in Banking Industry, A Case Study by Dr. Shalini Sayiwal in the year 2020.

2.3 - Problem Statement Definition:

Banking is a crucial sector, it deals with financial transactions which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way which in turn hinders the customer satisfaction.

In order to guide the customers throughout all the financial services provided by the bank, an intelligent system has to be introduced to provide people with the best solution possible. The users are bank customers who need a service, available 24/7, to clear all their queries and guide them through the various banking processes. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient delivery of service.

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In order to overcome the user satisfaction issues associated with banking services, a chatbot will provide personal and efficient communication between the user and the bank.

3. IDEATION AND PROPOSED SOLUTION:

3.1 - Empathy Map Canvas:

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to help teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.


Empathy map for CHATBOT:

3.2 - Ideation & Brainstorming:

Step-1: Team Gathering, Collaboration and Select the Problem Statement




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Template




Brainstorm & idea prioritization

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


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

[Share template feedback](#)



Before you collaborate

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

 10 minutes

A

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C


Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →

1


Define your problem statement

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

 5 minutes


PROBLEM


Unavailability of chat bots that are interactive enough to navigate the user to do whatever they want. Need for a more User-friendly Interface. The main aim of the project is to develop a smart AI chat-bot for Banking Industry





Key rules of brainstorming


To run an smooth and productive session


 Stay in topic.

 Encourage wild ideas.

 Defer judgment.

 Listen to others.

 Go for volume.

 If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

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2

Brainstorm

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

10 minutes

TIP

You can select a sticky note and drag it to the board (either by itself, or to start drawing!)

Nizamul Haq S

Provides omnichannel support

Make the chatbot to understand natural and vernacular language

Storing customer conversation

Available 24*7

Improves facilities for future

Reduced workload

Parnandhi Rohan

OTP Enable

Full screen window

Providing details of the current account

Creating a new account based on customer preference

Helping to lock or unlock cards during theft related situations

Automated notifications to keep customers updated with their account

Mohammed Saad K

Transfer Money

Providing assistance in account closure

Tackling suspicious activity

Track Transactional history

Simple interface

Easy connect with bank staff

MD Zaid N

Better Scalability

Providing Interest related advice

Less processing time

Ensured Privacy

Safe Handling of Sensitive Documents

Predefined questions

3

Group ideas

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

20 minutes

TIP

Ask: customer/what helps to sticky notes to make it easier to find, remove, organize, and categorize as important ideas as they come with your ideas.

Transfer Money

Automated notifications to keep customers updated with their account

OTP Enable

Available 24*7

Full screen window

Less processing time

Reduced workload

Ensured Privacy

TOP IDEAS

Step-3: Idea Prioritization

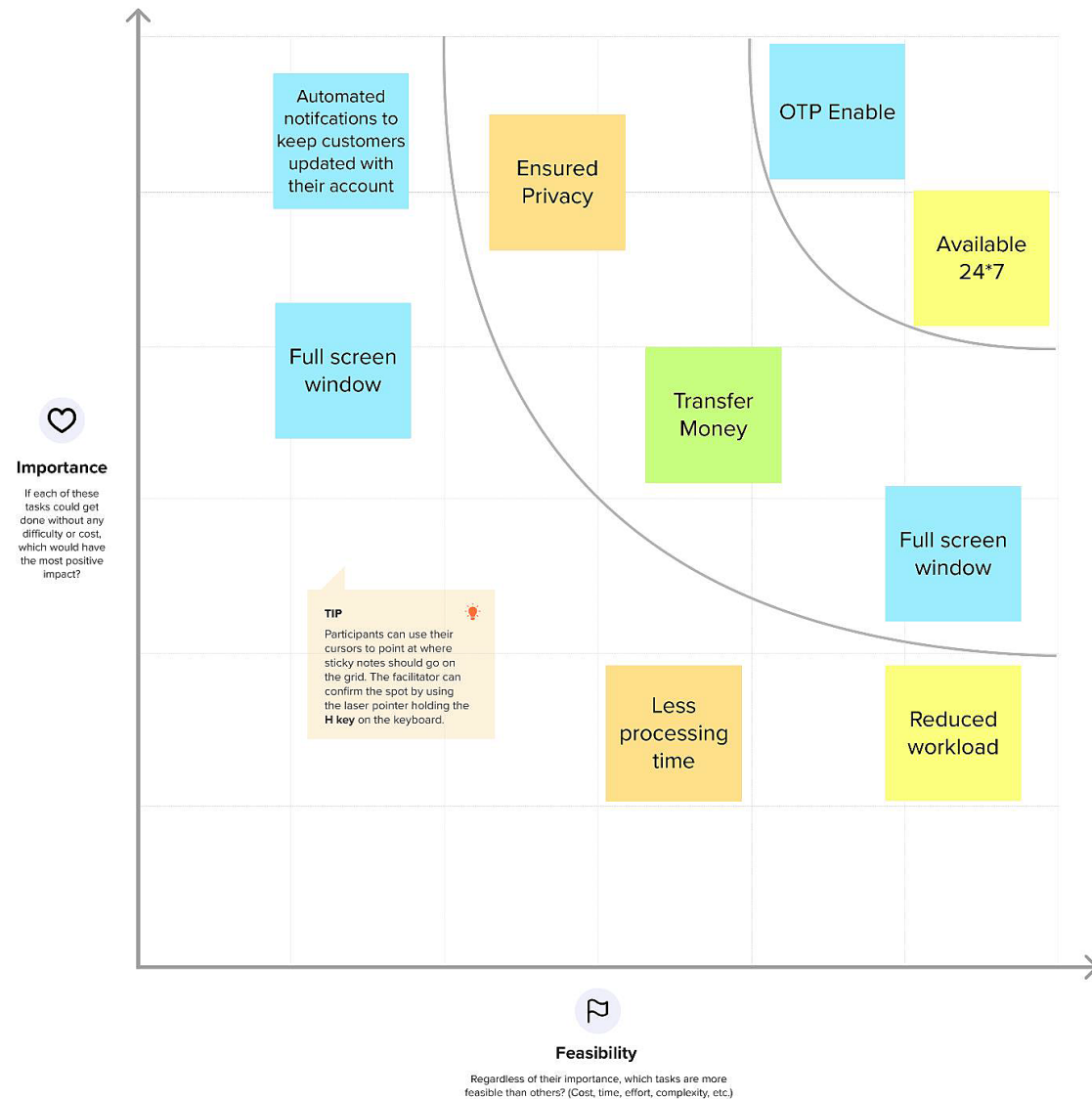
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4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕒 20 minutes



3.3 - Proposed Solution:

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S.NO.	Parameter	Description
1	Problem statement (Problem to be solved)	<p>To build an efficient AI based banking chatbot or banking assistant to effectively to curb out the following constraints:</p> <ul style="list-style-type: none"> Guiding customer on account creation, net banking, etc., Answering queries regarding financial and loan instantly.
2	Idea / Solution description	<p>The following approaches are used to built an efficient chatbot for banking industry:</p> <ul style="list-style-type: none"> IBM Watson Assistant – To build chatbot interface Flask – Web framework for the chatbot NLP – Answering customer queries AI, DL – To Automate the banking process
3	Novelty / Uniqueness	This AI powered chatbot gives a 24*7 efficient automated banking process to both customers and staffs by giving solutions their queries which saves time and effort.
4	Social Impact / Customer Satisfaction	This Chatbot provides a huge and effective banking process to the Banking staff, customer, borrowers, lenders, depositor etc.,
5	Business Model (Revenue Model)	By implementing this Chatbot banks can enable more reliable services to customers which gains customer loyalty and saves the cost needed for manual support.
6	Scalability of the solution	Implementing this Chatbot banks can manage and measure demands in the sectors and improve the profit for the management with the help of measured volumes of the needed services.

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3.4 - Problem Solution:

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer's problem. It helps entrepreneurs, marketers and corporate innovators identify behavioural patterns and recognize what would work and why.

4. REQUIREMENT ANALYSIS:

4.1 - Functional Requirement:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Savings Account Related Actions	<ul style="list-style-type: none">• Type of Savings Account Creation Details• Interest Rate• Minimum Balance• Debit Card• Credit Card
FR-2	Current Account Related Actions	<ul style="list-style-type: none">• Type of Company• Current Account Closure Steps• Update GSTIN• Zero Balance Current Account
FR-3	Loan Account Related Actions	<ul style="list-style-type: none">• Type of Loan• How long for approval• Available Loan Amounts• Loan Status• Joint Loan
FR-4	General Queries Related Actions	<ul style="list-style-type: none">• Bank Working Days• List of Braches• Storage Locker Facility

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		<ul style="list-style-type: none"> • Currency Conversion Facility • CIBIL • Find a nearest branch
FR-5	Net Banking Related Actions	<ul style="list-style-type: none"> • Login Steps • Change Net Banking Password • Daily Limit • Types of Fund Transfer • Add Beneficiary

4.2 - Non-Functional Requirement:

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	Chatbots developed using AI should be able to answer any general banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a cost efficient manner.
NFR-2	Security	The AI Chatbot maintains a confidential conversation with customers. Chatbot will provide personal and efficient communication between the user and the bank.
NFR-3	Reliability	Chatbots are trained very well using AI to provide solutions for the popular and frequently asked questions, thereby providing the best suited service quickly. Thus AI Chatbots has a reliable end-user experience.
NFR-4	Performance	AI Chatbots are a great way to overcome the limitation of workload of humans. There can be multiple

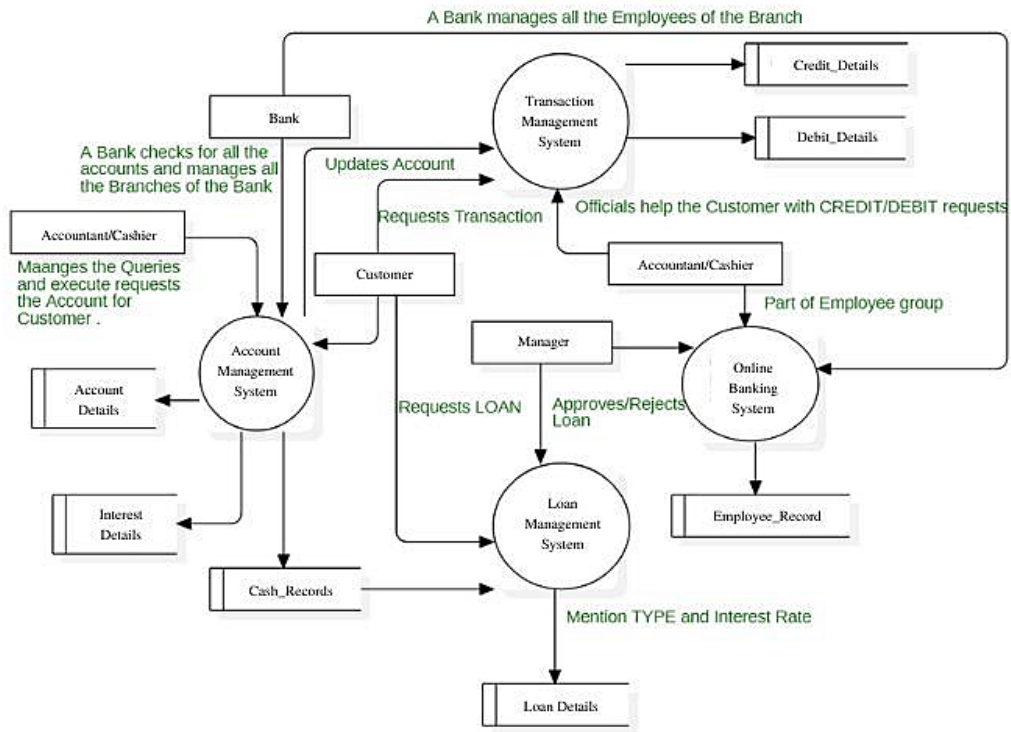
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		instances of a single chatbot inquiring different people at the same time. Such chatbots work in real time with no need for the customers to wait. This ensures faster, easier and more efficient face-time with customers.
NFR-5	Availability	AI Chatbots provide 24/7 service to clear all customer queries and guide them through all the banking processes. It is available to anyone with access to the internet with basic hardware.
NFR-6	Scalability	AI Chatbots are helping banking industry to scale their customer service and to improve customer service satisfaction at the same time. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.

5. PROJECT DESIGN:**5.1 - Data Flow Diagrams:**

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A data flow diagram maps out the flow of information for any process or system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

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5.2 - Solution & Technical Architecture:

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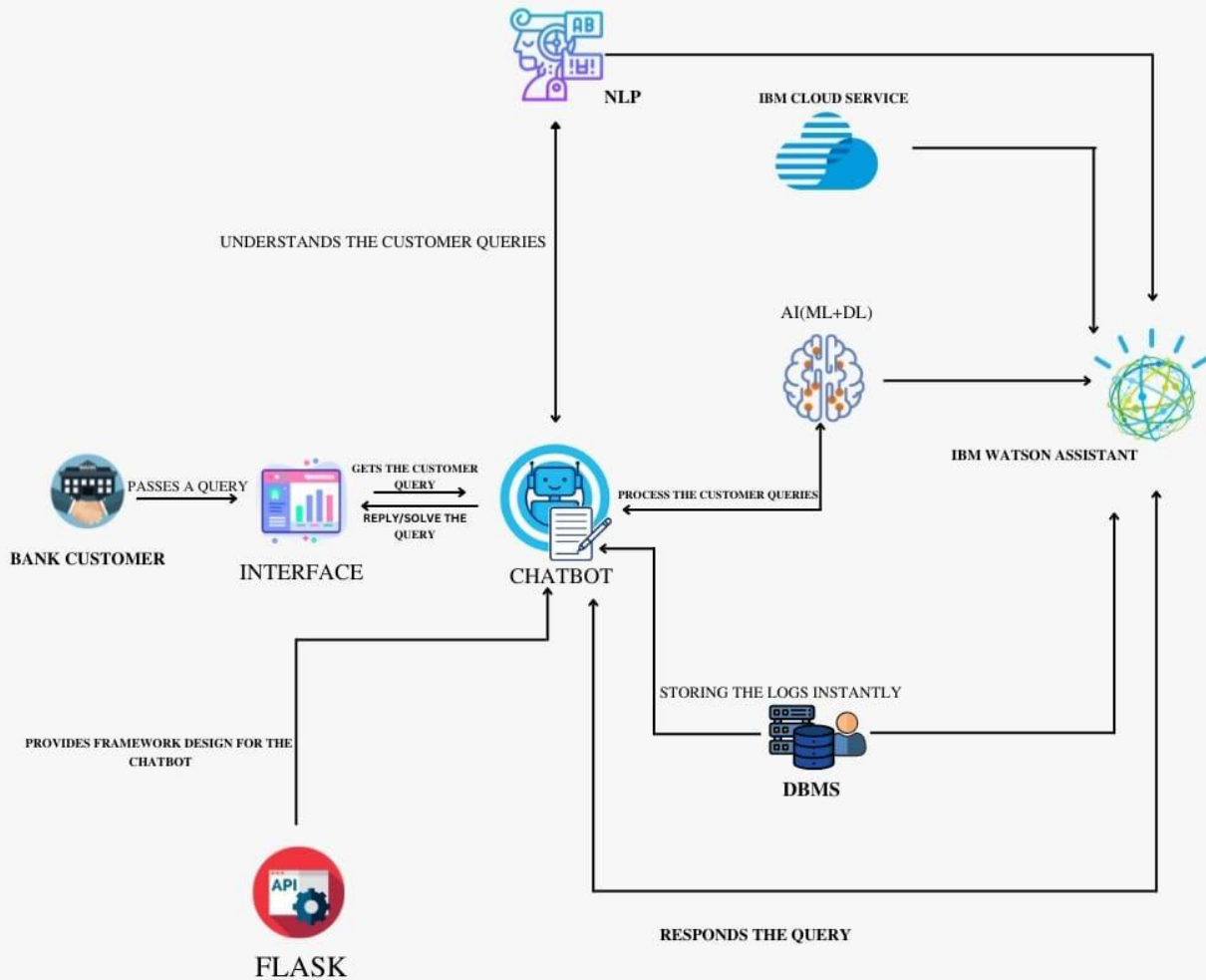


Table-1 : COMPONENTS & TECHNOLOGIES:-

S.NO	COMPONENT	DESCRIPTION	TECHNOLOGY
1	User Interface	Chatbot	HTML, CSS, JavaScript / Angular Js / React Js etc.
2	Application Logic-1	Query Processing	NLP and NLU

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3	Application Logic-2	Dealing with Dataset	IBM Watson STT service
4	Application Logic-3	Training and Building Deep Learning Model	IBM Watson Assistant
5	Database	Data Type –Dialog, Intent etc. Configurations done using small integration Code snippets such as Javascript , SQL and can also be done using Watson APIs.	MySQL or NoSQL or IBM DB2
6	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
7	File Storage	We store dataset	IBM Block Storage or Other Storage Service or Local Filesystem, IBM cloud, IBM Watson studio
8	External API-1	To incorporate conversation, language and advanced text analytics into chatbot	IBM Watson Assistant API,v2 runtime API, etc.
9	External API-2	Banking API –Data transfer between two systems and data accessibility	Banking API, etc.
10	Machine Learning Model	Intent detection model and other deep learning models	Object Recognition Model, Intent detection model, IBM Watson studio etc.

Table-2: APPLICATION CHARACTERISTICS:-

S.NO	CHARACTERISTICS	DESCRIPTION	TECHNOLOGY
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1	Open-Source Frameworks	Open-source frameworks used is IBM Watson	Technology of Opensource framework- IBM Watson
2	Security Implementations	IBM Cloud	Watson assistant has certifications such as ISO,SOC2,US HIPAA, European Union GDPR,PCI DSS. We use security systems such as TCS/SSL,IPSEC ,Third party CAs, HTTPS, Encrypted file systems, Encrypted storage systems, Key management systems, AES - 256 bit.
3	Scalable Architecture	Chatbot architecture consist of four pillars. They are intents, entities ,data flow, scripts (3 – tier architecture –presentation tier, application tier, data tier and Micro-services architecture)	Technology used –IBM Watson Assistant
4	Availability	The Bot is made available using load balancers, distributed servers etc.	Technology used –IBM Watson
5	Performance	IBM Watson –automate processes, The deep learning model is trained using IBM Watson studio for better performance, Cache, CDN's, etc.	Watson Assistant is used to build the chatbot.

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5.3 - User Stories:

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
CUSTOMER (MOBILE USER)	REGISTRATION	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	SPRINT-1
CUSTOMER (MOBILE USER)	REGISTRATION	USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	SPRINT-1
CUSTOMER (MOBILE USER)	REGISTRATION	USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	SPRINT-2
CUSTOMER (MOBILE USER)	REGISTRATION	USN-4	As a user, I can register for the application through Gmail	I can register & access the dashboard with Gmail Login	Medium	SPRINT-1
CUSTOMER (MOBILE USER)	LOGIN	USN-5	As a user, I can log into the application by entering email & password	I can log in & access the dashboard with email and password	High	SPRINT-1
CUSTOMER (MOBILE USER)	DASHBOARD	USN-6	As a user, I can access the dashboard	I can access the dashboard	High	SPRINT-1
CUSTOMER (WEB USER)	REGISTRATION	USN-7	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account/dashboard in web	High	SPRINT-1
CUSTOMER (WEB USER)	BALANCE	USN-8	As a user, I want to check balance of my bank account	I can see the balances displayed	High	SPRINT-1
CUSTOMER (WEB USER)	TRANSFER MONEY	USN-9	As a user, I want to transfer money from my account to another bank account	I can transfer money from my account to another bank account	High	SPRINT-1
CUSTOMER CARE EXECUTIVE	SOLVING QUERY		As a user, To continuously improve product knowledge and awareness of market trends and competitor products.	I can deal with customer issues and churning out an easy-to-follow solution.	High	SPRINT-1
ADMINISTRATOR	BACKUP DATA	USN-9	As a Net Banking Administrator, I want to have the customer's data backed up so that I can restore it any time in case of issues	I can deal with customer's backup data	High	SPRINT-1

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-1	Savings Account Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	4	High	NIZAMULHAQ S
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	4	High	NIZAMULHAQ S
Sprint-1		USN-3	As a user, I can check the Minimum Balance of Savings Account	3	Medium	NIZAMULHAQ S
Sprint-1	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	5	High	PARNANDHI ROHAN NIZAMULHAQ
Sprint-1		USN-5	As a user, I want to get details on procedure to close my Current Account	4	High	MOHAMMED SAAD K
Sprint-2	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	3	High	PARNANDHI ROHAN
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	3	High	PARNANDHI ROHAN
Sprint-2		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	1	Low	PARNANDHI ROHAN

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6.2 - Sprint Delivery Schedule:

Milestone	Task	Starting Date	Ending Date	Project Completion Status	Team Members
Create IBM Service	Creation of Banking Chatbot or Assistant using IBM Watson Assistant	24 Oct 2022	25 Oct 2022	9%	Nizamul Haq S, Pamandhi Rohan, Mohammed Saad K, MD ZAID N
	Understanding Customer's Banking Related Queries and skills	25 Oct 2022	29 Oct 2022	15%	Nizamul Haq S, Pamandhi Rohan, Mohammed Saad K, MD ZAID N
Create Skills and Assistant for Chatbot	Training the Chatbot with Banking related dataset	31 Oct 2022	01 Nov 2022	24%	Nizamul Haq S, Pamandhi Rohan, Mohammed Saad K, MD ZAID N
	Building action and Adding responses to Account Creation	01 Nov 2022	02 Nov 2022	29%	Nizamul Haq S
	Building action and Adding responses to Banking related queries	02 Nov 2022	03 Nov 2022	34%	Pamandhi Rohan,
	Building action and Adding responses to Net Banking	03 Nov 2022	04 Nov 2022	39%	Mohammed Saad K
	Building action and Adding responses to Loan Queries	04 Nov 2022	05 Nov 2022	44%	MD ZAID N
Testing Assistant & Integrate with Flask webpage	Testing the chatbot performance with the trained banking functionalities or conversations	07 Nov 2022	09 Nov 2022	60%	Nizamul Haq S, Pamandhi Rohan
	Integration of Flask webpage with the chatbot assistant to provide a framework	09 Nov 2022	12 Nov 2022	83%	Mohammed Saad K, MD ZAID N
Deployment Of Chatbot	Final Deployment of AI based chatbot for	14 Nov 2022	19 Nov 2022	100%	

	banking Industry or Running the Chatbot service in fully efficient and effective condition				Nizamul Haq S, Pamandhi Rohan, Mohammed Saad K, MD ZAID N
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- The chatbot created with IBM Watson Assistant allows users to interact seamlessly, and provide resolutions to issues and queries raised by the customer. The main feature of the project is the Virtual Assistant button on the website, which allows the users to access the interface and chat with the bot.
- The chatbot provides a way for users to clear their doubts, by selecting the relevant options provided by the chatbot. It also provides 24x7 service, so users can point their queries to the bot at any time of the day.

1						Date	17-Nov-22							
2						Team ID	PNT2022TMD37484							
3						Project Name	AI-based discourse for Banking Industry							
4						Maximum Marks	4 marks							
5	Test case ID	Feature Type	Component	Test Scenario	Pre-Requsite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
6	ChatbotHome_TC_O01	Functional	Home Page	Verify if user is able to see the chatbot icon when website is launched	Internet connection is required	1.Enter URL and click go 2.Verify chatbot icon popup displayed or not	https://ibm-chatbot.nizamintruder08.repl.co/	ChatBot icon should display.	Working as expected	Pass	Nil	N	-	Nizamulhaq, S
7	ChatbotHome_TC_O02	UI	Home Page	Verify the UI elements in chatbot icon popup	Internet connection is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify if chatbot icon popup is displayed 3.After 30 seconds information about chatbot popup displayed or not.	https://ibm-chatbot.nizamintruder08.repl.co/	After 30 seconds information about chatbot popup displayed	Working as expected	Pass	Nil	N	-	Parnandi Rohan
8	ChatbotHome_TC_O03	Functional	Home Page	Verify if user is able to see the greeting from chatbot "Hi I'm a virtual assistant. How can I help you today?"	Internet connection is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows this greeting or not.	https://ibm-chatbot.nizamintruder08.repl.co/	User should see the greeting message from chatbot	Working as expected	Pass	Nil	N	-	Mohammed Saad. K
9	ChatbotHome_TC_O04	Functional	Home Page	Verify if user can click the options provided by the bot in home page "Services", "General Banking Queries", "Netbanking"	Internet connection is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows greeting. 4.Verify whether user able to click the	https://ibm-chatbot.nizamintruder08.repl.co/	User is able to select the options from the Home Page	Working as expected	Pass	Nil	N	-	Parnandi Rohan
10	ChatbotHome_TC_O05	Functional	Chatbot	Verify user is able to type query in text field.	-	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows greeting. 4.Verify whether user able to type query in text field or not.	https://ibm-chatbot.nizamintruder08.repl.co/	User able to type the query in text field.	Working as expected	Pass	Nil	N	-	Mohammed Saad. K

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11	ChatbotHome_TC_006	Functional	Chatbot	Verify if user is able to get the response from chatbot	Question is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows greeting. 4. Verify whether user is able to type query in text field or not.	W to open a new savings acco	Users get the response from chatbot.	Working as expected	Pass	Nil	N	-	MD Zaid N
12	ChatbotHome_TC_007	Functional	Chatbot	Verify if user whether get the response if the user enters wrong query	Question is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows greeting. 4. Verify whether user is able to type query in text field or not. 5. Verify whether the user gets the response even if the user types the wrong or unrelated query	https://ibm-chatbot.nizamintruder08.repl.co/	Kindly contact our customer care executive. Contact Us @93xx275839	Working as expected	Pass	Nil	N	-	Nizamulhaq, S
13	ChatbotHome_TC_008	Functional	Chatbot	Verify if all given options are working properly	Question is required	1.Enter URL(https://ibm-chatbot.nizamintruder08.repl.co/) 2. Verify chatbot icon popup displayed 3. Verify when clicking that icon, it shows greeting. 4. Verify whether user is able to type query in text field or not. 5. Verify whether the user gets the response 6. Verify whether the options are clickable and response is given by the bot	https://ibm-chatbot.nizamintruder08.repl.co/	User is able to click the options and get proper response from bot	Working as expected	Pass	Nil	N	-	MD Zaid N

8.2 - User Acceptance Testing:

Defect Analysis

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

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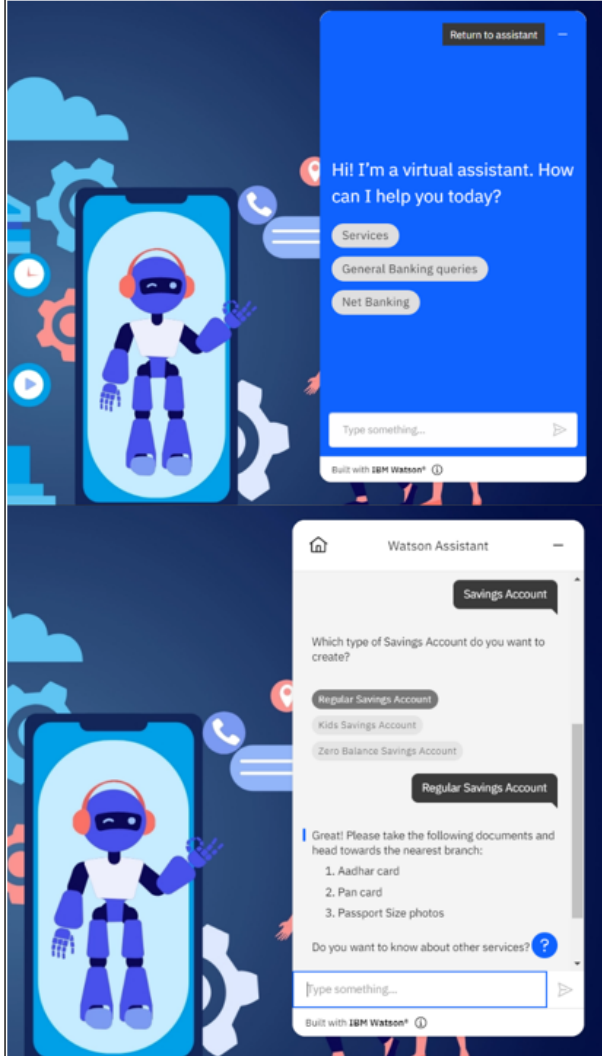
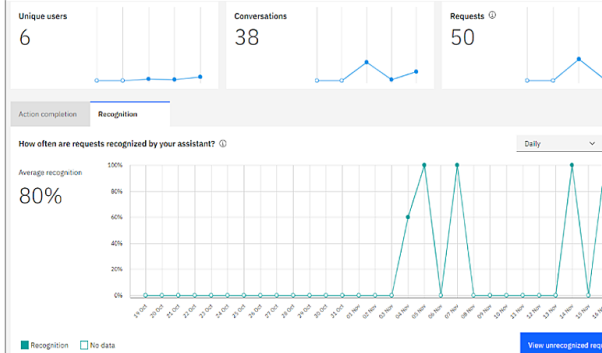
Test Case Analysis

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	0	0	0	0
Client Application	8	0	0	8
Security	0	0	0	0
Outsource Shipping	0	0	0	0
Exception Reporting	0	0	0	0
Final Report Output	8	0	0	8
Version Control	0	0	0	0

9. RESULTS:

9.1 - Performance Metrics

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S.No.	Parameter	Values	Screenshot
1.	Model Summary	<ul style="list-style-type: none"> The chatbot is used by the user to interact and select queries that are populated based on frequently asked question of banking customers. It quickly responds with expected answers to frequently asked customer queries. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank. 	
2.	Accuracy	Training Accuracy—80% Validation Accuracy—80%	

10. ADVANTAGES & DISADVANTAGES:

10.1 - Advantages:

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- Increase in sales
- Cost Savings
- 24/7 service
- Increased customer interaction
- Scalability

10.2 - Disadvantages:

- Time consumption for development is high
- Constant maintenance is required
- Can only answer basic questions

11. CONCLUSION:

Tech-savvy consumers of today are always on the lookout for the best and most personalized customer experiences. It can seem an impossible task to fulfill the onslaught of ever-evolving demands.

However, there is one solution primed to satisfy the modern customer, and that is a chatbot. With a chatbot, organizations can easily offer high-quality support and conflict resolution any time of day, and for a large quantity of customers simultaneously.

According to Microsoft, 90% of consumers expect an online portal for customer service. As a significant aspect of business evolution, the need for AI-powered chatbots will only continue to rise. Chatbots are essential for the growth of business to automate processes and to help solve minor issues and queries of customers.

Banking industry needs a well trained chatbot to handle the various queries and issues and bring a proper resolution so that customer satisfaction is achieved and business is conducted smoothly.

12. FUTURE SCOPE:

This project of creating an powered Chatbot can further be developed by:

- Training the bot with more diverse dialogues and making the process smooth and seamless.

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- Adding more actions and different type of responses to the user's demands.
- Adding functionalities like the ability to verify customers with the use of OTPs.
- Giving access to the database to retrieve customer information like bank balance and payment dues.

13. APPENDIX:

13.1 - Source Code:

main.py file:

```
from flask import Flask, render_template
app = Flask(__name__)
@app.route('/')
def bot():
    return render_template('chatbot.html')
if __name__ == '__main__':
    app.run()
```

chatbot.html file:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Banking Bot</title>

  <style>
    body {
      background-image: url('static/bot.png');
      background-size: cover;
    }

  </style>
</head>
```

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```
<body>
  <script>
    window.watsonAssistantChatOptions = {
      integrationID: "131ae0f5-7d29-4e7c-989b-f0f6458c1b7e", // The ID of this integration.
      region: "us-south", // The region your integration is hosted in.
      serviceInstanceID: "ac979948-a9e0-4767-adb1-10ea1505de01", // The ID of your
service instance.
      onLoad: function(instance) { instance.render(); }
    };
    setTimeout(function(){
      const t=document.createElement('script');
      t.src="https://web-chat.global.assistant.watson.appdomain.cloud/versions/" +
(window.watsonAssistantChatOptions.clientVersion || 'latest') +
"/WatsonAssistantChatEntry.js";
      document.head.appendChild(t);
    });
  </script>
</body>
</html>
```
