

1. INTRODUCTION

1.1 Project Overview

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

1.2 Purpose

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

2. LITERATURE SURVEY

2.1 Existing problem

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

2.2 References

Paper 1

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

Mishra Year: 2020

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

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

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

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

Paper 2

Authors: Yomna Abdulla, Rabab Ebrahim, Sumathi Kumaraswamy

Year: 2020

Title: Artificial Intelligence in Banking sector: Evidence from Bahrain

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

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

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

Paper 3

Authors: Tebaga Lucky Mamela, Nita Sukdeo, Sambil Charles

Mukwakungu Year: 2020

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

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

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

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

Paper 4

Authors: Shashank Bairy, Rashmi R

Year: 2021

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

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

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

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

Paper 5

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

Siddiqui Year: 2020

Title: A Review of Chatbots in the Banking Sector

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

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

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

Paper 6

Authors: Dr. Anil B Malali,

Dr. S. Gopalakrishnan Year: 2020

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

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

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

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

Paper 7

Authors: Dr. Shalini Sayiwal

Year : 2020

Title: CHATBOTS IN BANKING INDUSTRY: A CASE STUDY

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

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

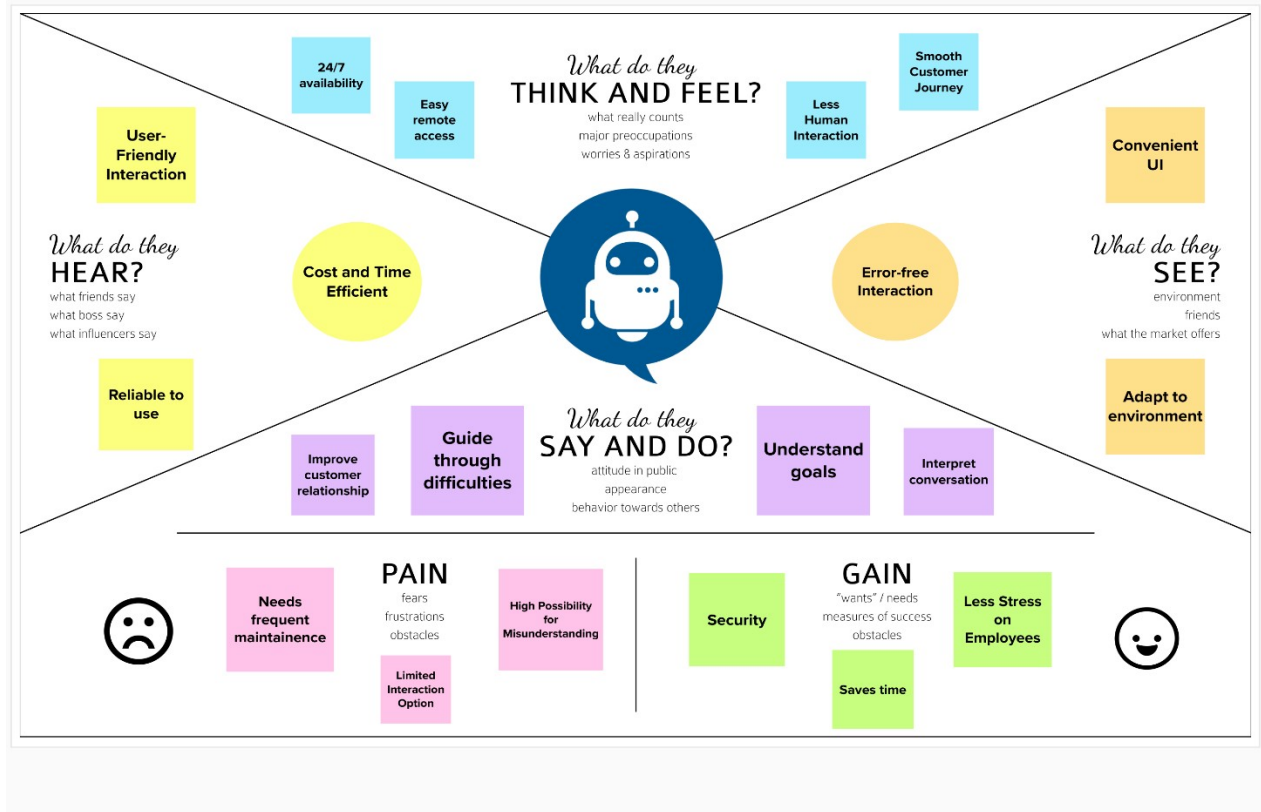
Disadvantage: Chatbots have significant limitations based on accents and languages.

2.3 Problem Statement Definition

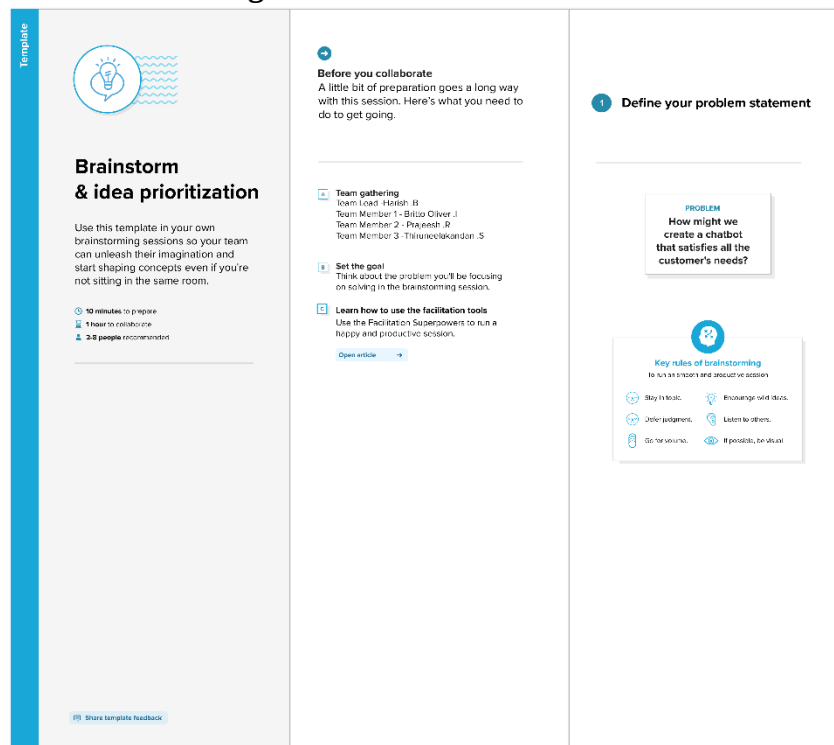
Banking is one the crucial sectors, it deals with financial transactions which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in a satisfactory way in turn hinders the customer satisfaction. In order to guide the customers throughout all the financial services provided by the bank, an intelligent system has to be introduced to provide people with the best solution possible. The users are bank customers who need 24/7 service to clear all their queries and guide them through all the banking processes. So, an enhanced and smarter way of interaction with the customers has to be built to ensure efficient delivery of service. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. It is built to be the overall virtual assistant that can facilitate customers to ask banking- related questions without visiting the bank or calling up customer service centers as well as providing them with relevant suggestions.

3. IDEATION AND PROPOSED SOLUTION

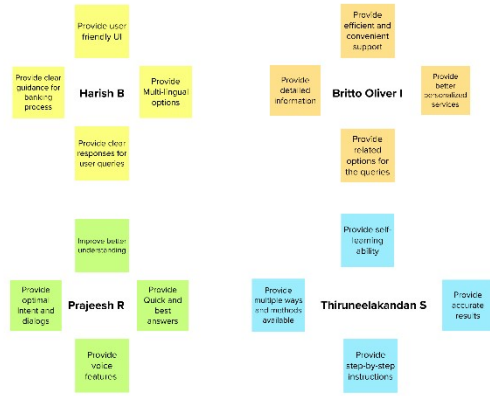
3.1 Empathy Map Canvas



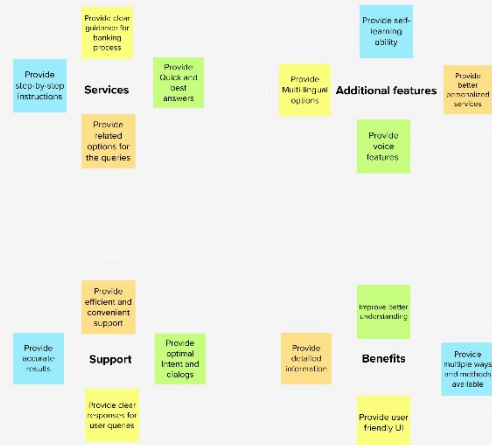
3.2 Ideation & Brainstorming



2 Brainstorm



3 Group ideas



4 Prioritize



3.3 Proposed Solution

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 build an efficient chatbot for banking industry:</p> <ul style="list-style-type: none">• IBM Watson Assistant – To build chatbot interface using Intents and Dialogs.• Flask- Web Framework for Chatbot Interface.• NLP – Processing and answering customer queries.
3.	Novelty / Uniqueness	<ul style="list-style-type: none">• We have developed a chatbot that works for all scenarios and thus enormous customized test cases are being provided to the chatbot so that it can handle any type of situation.
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none">• Customer Queries, Services are solved successfully.• Available 24/7.• Ease of users to provide a hassle-free internet banking experience.• Providing customizable valuable experience to the users.• Multi lingual chatbot for different customers.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none">• Banks will enable much and reliable services which will gain customer loyalty.• As we are dealing with customers need, implementing this will increase the trust among the people.• With the amount of customers increase, during the growth of the application. We can provide premium features to the user with advanced options.
6.	Scalability of the Solution	<ul style="list-style-type: none">• 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.• It reflects the Deep and broad perspectives on the bank's global features. Chatbots understands the customer concerns and assists them, round the clock.

3.4 Problem Solution fit

Define CS, fit into CC	<div>1. CUSTOMER SEGMENT(S)<div>CS</div></div> <div>Who is your customer? i.e. working parents of 0-5 y.o. kids</div> <div><ul style="list-style-type: none">Customers of the bank who have queries and issues.Customers who want to create new account.</div>	<div>6. CUSTOMER CONSTRAINTS<div>CC</div></div> <div>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.</div> <div><ul style="list-style-type: none">High Complexity.Lack of Knowledge in Form filling.Accessibility of the bank.Lacking clear explanation.</div>	<div>5. AVAILABLE SOLUTIONS<div>AS</div></div> <div>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking</div> <div><ul style="list-style-type: none">Chatbot can be used for clear guidance in issues such as creating new account, loan issues etc.Chatbot for time saving and <u>remote access</u> from anywhere anytime.</div>	Explore AS, differentiate
	<div>2. JOBS-TO-BE-DONE / PROBLEMS<div>J&P</div></div> <div>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.</div> <div><p>P: Giving confidential details to an unknown person, Providing wrong information to the bank.</p><p>J: Providing useful data about various confusions in account creation, online banking etc.</p></div>	<div>9. PROBLEM ROOT CAUSE<div>RC</div></div> <div>What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.</div> <div><ul style="list-style-type: none">Improper guidance to Customer queries, lack of digital knowledge.Lack of quick responses.Delayed transactions leading to confusion.Money loss concerns.</div>	<div>7. BEHAVIOUR<div>BE</div></div> <div>What does your customer do to address the problem and get the job done? i.e. Directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)</div> <div><ul style="list-style-type: none">Learning different usage of chatbot.Face to face interactions with the bank.Analysing and delivering proper plan for get the process done.</div>	Focus on J&P, tap into BE, understand RC
Identify strong TR & EM	<div>3. TRIGGERS<div>TR</div></div> <div><ul style="list-style-type: none">Chatbot access anytime, anywhere for queries.Illegal transactions, fear of money loss, fear of not getting loan at the right time.Guidance for any queries and issues.</div>	<div>10. YOUR SOLUTION<div>SL</div></div> <div>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 behaviors.</div> <div><ul style="list-style-type: none">AI based Chatbot providing all solutions to problems by identifying the correct solution for that problem.Providing wide range of new digital user interface chatbot for seamless experience.Multilanguage functionality in chatbots and quick response support.</div>	<div>8. CHANNELS OF BEHAVIOUR<div>CH</div></div> <div>8.1 ONLINE What kind of actions do customers take online? Extract online channels from 7</div> <div>8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from 7 and use them for customer development.</div> <div><p>Online: General Queries and complaints regarding accounts, Collect details regarding loans etc.</p><p>Offline: Intense Queries related to money loss, Block in transactions, Queries related to chatbot and usage, freeze customer accounts, money withdraw by cheque etc.</p></div>	Identify strong TR & EM
	<div>4. EMOTIONS: BEFORE / AFTER<div>EM</div></div> <div>How do customers feel when they face a problem of a job and afterwards? i.e., lost, insecure -> confident, in control - use it in your communication strategy & design.</div> <div><p>Before – Anxious, Irritated, Exhausted.</p><p>After – Happy, Secure, Satisfied.</p></div>			

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

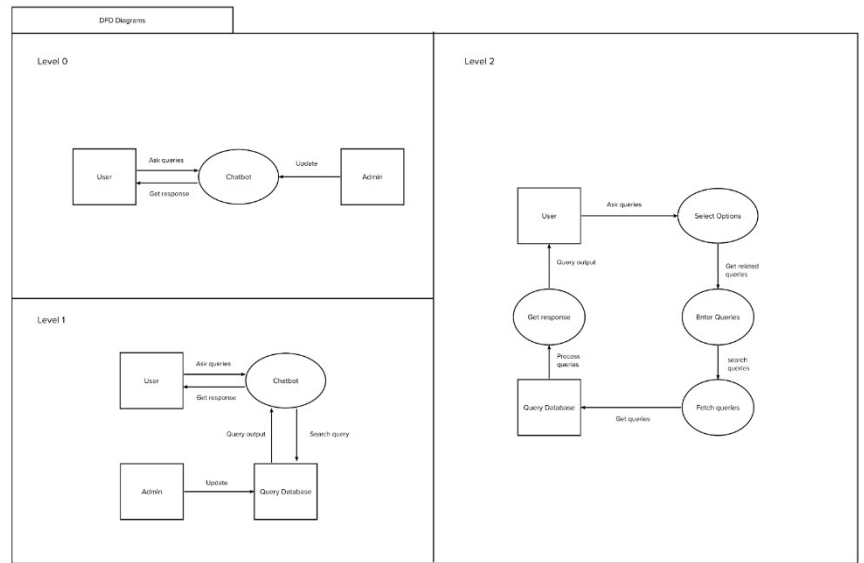
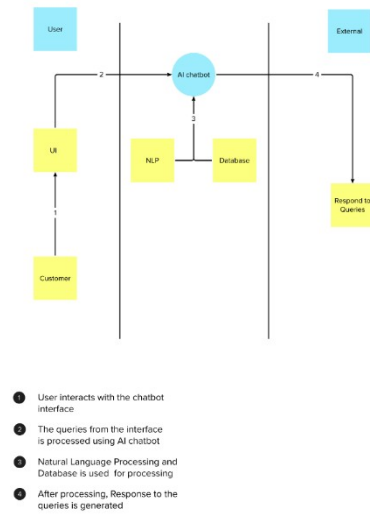
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Savings Account Related Actions	<ul style="list-style-type: none">• Type of Savings Account Creation Details• Interest Rate• Minimum Balance• Debit Card• Credit Card
FR-2	Current Account Related Actions	<ul style="list-style-type: 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 Branches• Storage Locker Facility• Currency Conversion Facility• CIBIL• Find a nearest branch
FR-5	Net Banking Related Actions	<ul style="list-style-type: none">• Login Steps• Change Net Banking Password• Daily Limit• Types of Fund Transfer• Add Beneficiary
FR-6	Customer care Related Actions	<ul style="list-style-type: none">• Customer care number details• Face-to-Face appointment• Bank Employee Availability details

4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Customer can access chatbot more efficiently and in a simpler way. Multilanguage functionality is supported. Top chat topics are displayed for easy access.
NFR-2	Security	Customer can have utmost security of their information. The details are stored in cloud where the bank employee have total control in accessing valuable information. Customers also get a mail if requested for a confidential information.
NFR-3	Reliability	If the criteria or the topic which customer expectations are not met via chatbot, bank employee will be able to provide details for that issue within a short span of time.
NFR-4	Performance	Chatbot can provide consistency and frequent updating of queries are made without any loss in information.
NFR-5	Availability	It is available 24x7 and the progress is not lost, even if the servers go down. Cloud storage ensures that data is protected and can be retrieved whenever needed.
NFR-6	Scalability	New user interfaces are made in the chatbot for good customer experience. It can support wide range of users queries and provide instant responses. The queries of more than 1000 people can be answered using the chatbot.

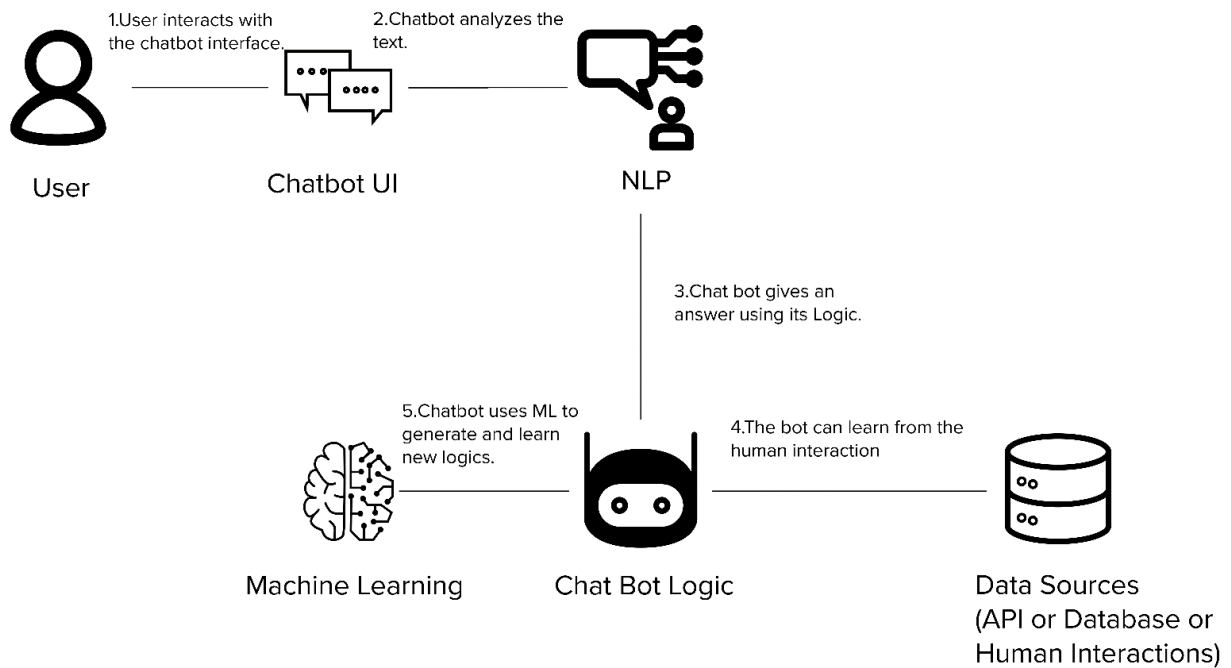
5. PROJECT DESIGN

5.1 Data Flow Diagrams

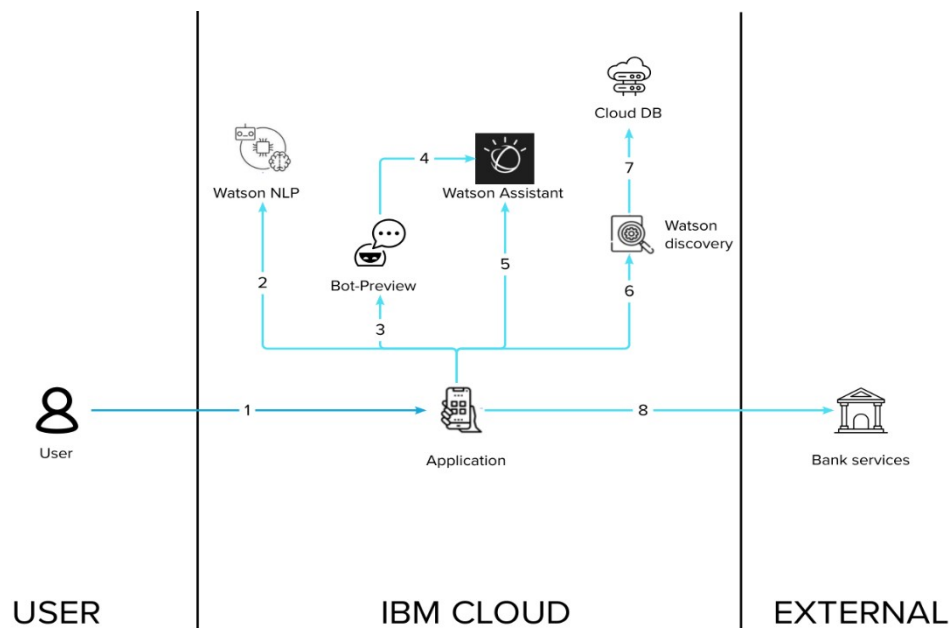


5.2 Solution & Technical Architecture

Solution Architecture



Technical Architecture



5.3 User Stories

User Type	Functiona l Require ment (Epic)	User Story Numbe r	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile or Web user)	Savings Account Related Actions	USN-1	As a user, in the Savings Account option, I can select Types of Savings Account to get details regarding documents required for creating that savings account.	I can clear my queries regarding types of savings account	High	Sprint-1
		USN-2	As a user, I can check the Interest Rates of Savings Account	I can clear my queries regarding interest rates of savings account	High	Sprint-1
		USN-3	As a user, I can check the Minimum Balance of Savings Account	I can clear my queries regarding minimum balance of savings account	Medium	Sprint-2
	Current Account Related Actions	USN-4	As a user, I can choose the Type of Company to know the information on documents to be submitted for creating current account	I can clear my queries regarding types of companies	High	Sprint-1
		USN-5	As a user, I want to get details on procedure to close my Current Account	I can clear my queries regarding current account closure	High	Sprint-2
	Loan Account Related Actions	USN-6	As a user, I can choose the Type of Loans to know the information on choosing an essential loan scheme	I can clear my queries regarding types of loan account	High	Sprint-1
		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	I can clear my queries regarding loan amounts of loan account	High	Sprint-2
		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	I can clear my queries regarding loan status of loan account	Low	Sprint-2

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	I can clear my queries regarding CIBIL score of loan application	Medium	Sprint 3
		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	I can clear my queries regarding storage locker facilities of bank account	High	Sprint-3
	Net Banking Related Actions	USN-12	As a user, I want to get the procedure details for changing the Net Banking password of my bank account	I can clear my queries regarding change of net banking password	Medium	Sprint-2
		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	I can clear my queries regarding types of fund transfers in net banking	High	Sprint-3
		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	I can clear my queries regarding adding beneficiaries in net banking	Low	Sprint-3
Administrator		USN-15	As an admin, I can change responses to queries and modify them as and when needed.	I can modify responses of the chatbot	Medium	Sprint-1
		USN-16	As an admin, I can add more options to queries and add new options as new features get added.	I can add more options and queries into the chatbot	Medium	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

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.	5	High	Harish.B
Sprint-1		USN-2	As a user, I can check the Interest Rates of Savings Account	5	High	Harish.B
Sprint-1		USN-3	As a user, I can check the Minimum Balance of Savings Account	4	Medium	Harish.B
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	Britto Oliver.I
Sprint-1		USN-5	As a user, I want to get details on procedure to close my Current Account	5	High	Britto Oliver.I
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	5	High	Prajeesh.R
Sprint-2		USN-7	As a user, I can check the Loan Amounts that can be offered for corresponding Loan Accounts chosen	5	High	Prajeesh.R
Sprint-2		USN-8	As a user, I can check the Status of Loan for my Loan Accounts	3	Low	Prajeesh.R
Sprint-3	General Queries Related Actions	USN-9	As a user, I want to get the procedure details for Currency Conversion facility of my bank account	3	Low	Thiruneelakan dan.S
Sprint-3		USN-10	As a user, I want to check my CIBIL score for my loan application and to ensure whether my loan application is approved by the bank.	4	Medium	Thiruneelakan dan.S
Sprint-3		USN-11	As a user, I want to get the procedure details for maintaining Storage Locker facility of my bank account	5	High	Thiruneelakan dan.S
Sprint-4	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	4	Medium	Harish.B

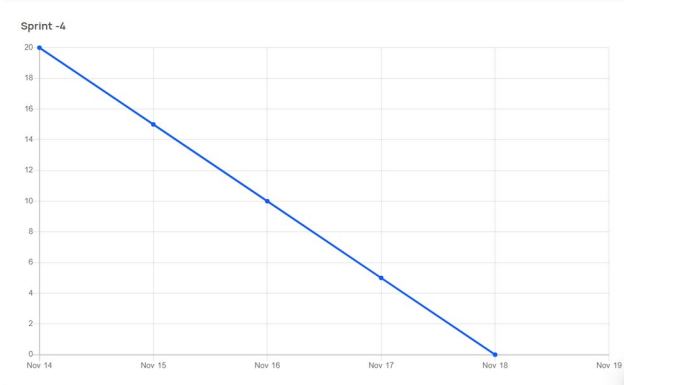
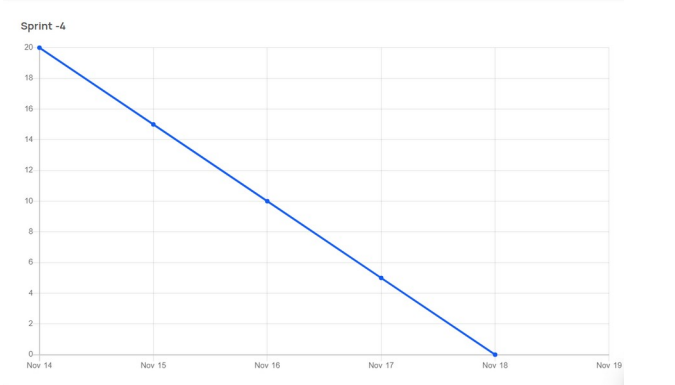
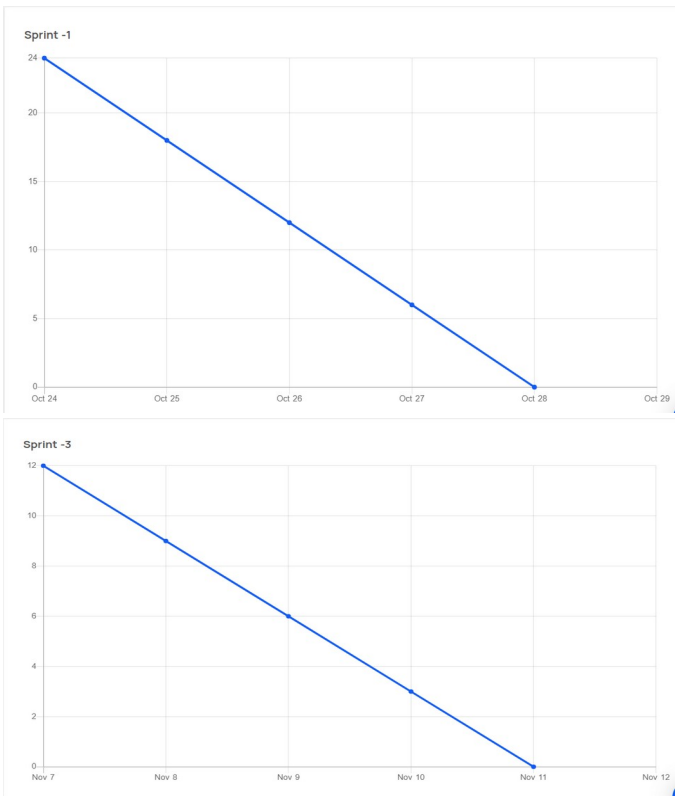
Sprint-4		USN-13	As a user, I can select types of fund transfers to get details regarding different services available in net banking	5	High	Harish.B
Sprint-4		USN-14	As a user, I want to get the procedure details for adding beneficiaries to my net banking account.	3	Low	Harish.B
Sprint-4	Web Application	USN-15	As a user, I want to access the chatbot in a web browser that can be accessed from almost all devices.	4	Medium	Harish.B, Britto Oliver.I, Prajeesh.R, Thiruneelakan dan.S
Sprint-4		USN-16	As a user, I want to view pages of the banking website and have access to the chatbot easily.	4	Medium	Harish.B, Britto Oliver.I, Prajeesh.R, Thiruneelakan dan.S

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	24	6 Days	24 Oct 2022	29 Oct 2022	24	30 Oct 2022
Sprint-2	13	6 Days	31 Oct 2022	05 Nov 2022	13	06 Nov 2022
Sprint-3	12	6 Days	07 Nov 2022	12 Nov 2022	12	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Sprint	Total Story Points	Duration	Average Velocity
Sprint -1	24	6 Days	$24/6 = 4$
Sprint -2	13	6 Days	$13/6 = 2.16$
Sprint -3	12	6 Days	$12/6 = 2$
Sprint -4	20	6 Days	$20/6 = 3.33$
Overall	69	24 Days	$69/24 = 2.87$

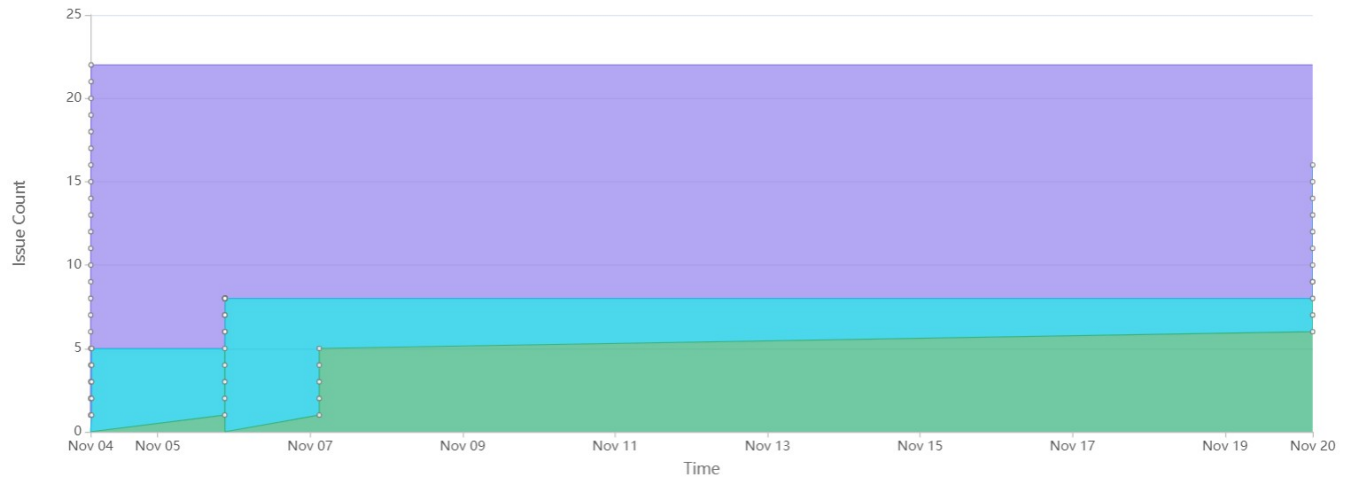
Burn down chart:



6.3 Reports from JIRA

	T	NOV	DEC	AN '23
Sprints		ABDF... ABDF... ABDF... ABDF...		
> ABDFBI-1 Savings Account Related Actions				
> ABDFBI-2 Current Account Related Actions				
> ABDFBI-3 Loan Account Related Actions				
> ABDFBI-4 General Queries Related Actions				
> ABDFBI-5 Net Banking Related Actions				
> ABDFBI-6 Web Application				

☒ To Do
 ☒ In Progress
 ☒ Done



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

7.1 Feature 1

Python Flask

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

HTML

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

Build PYTHON FLASK Code:

APP.PY

```
from flask import Flask,render_template
app=Flask(__name__, template_folder='templates')
@app.route('/')
def bank():
    return render_template('bankai.html')

if __name__ == '__main__':
    app.run(debug = True)
```

Bankai.HTML

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>Bankai</title>
<link rel="icon" type="image/x-icon" href="https://i.postimg.cc/7h3vGjrt/log.png">
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
<style>
body{
background-image: url("https://i.postimg.cc/tR67SRj0/Portal-Tech-Co.png");
background-size: cover;
}
</style>
</head>
<body>
<script>
window.watsonAssistantChatOptions = {
    integrationID: "1d23840d-6a73-49ee-b439-2a36c562c24b", // The ID of this integration.
    region: "au-syd", // The region your integration is hosted in.
    serviceInstanceID: "7c7a4b50-0ccf-4046-b58c-c6f3d2f99450", // 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>

```

7.2 Feature 2

IBM CHATBOT:

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

Chatbot actions:

IBM Watson Assistant Lite

Upgrade

Bankai

Learning center

Actions

Actions

Created by you

Set by assistant

Variables

Created by you

Set by assistant

Set by integration

Saved responses

Search

Filter

New action +

Name	Last edited	Examples Count	Status
Current Account	a day ago	1	✓
Loan Account	a day ago	2	✓
Index	8 days ago	2	✓
General Queries	a day ago	1	✓
End	a day ago	3	✓
Net Banking	2 days ago	1	✓
Greetings	a day ago	6	✓
Savings account	a day ago	1	✓

Items per page: 50

Showing 1–8 of 8 actions

1 1 of 1 pages

Preview

Savings account related actions:

IBM Watson Assistant Lite Upgrade Bankai

Learning center

Savings account

Customer starts with:
Savings account

Conversation steps

1

What do you want to know about Savings account?

Interest rates

Minimum Bal...

+ 1

Continue to next step

1 is

Creation

2

What type of savings account do you want to create?

Zero Savings ...

Kids Savings ...

+ 2

Continue to next step

2 is

Regular Savings account

3

To create Regular Savings account, the documents required are:

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action Total: 1

Enter a phrase

Savings account

Preview ▶

Current account related actions:

Current Account

Customer starts with:
Current Account

Conversation steps

1

What do you want to know about Current account?

Types of com...

Closing the a...

Continue to next step

1 is

Closing the account

2

To close the current account, You need to do the following:

Go to action: End

1 is

Types of company account

3

what type of company account do you want to create?

Individuals

Partnership F...

+ 2

Continue to next step

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action Total: 1

Enter a phrase

Current Account

Preview ▶

Loan account related actions:

IBM Watson Assistant LiteUpgradeBankai

Learning center

Loan Account

Customer starts with:
Loan Account

Conversation steps

What do you want to know about Loan Account?

1

Loan StatusLoan Amounts+ 1

Continue to next step

1 is Types of loans

Which type of loan do you want to know about?

2

Personal LoanHome Loan+ 3

Continue to next step

2 is Personal Loan

To take a personal loan, the required documents are: - Identity proof (copy of passport/voter ID...

3

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this actionTotal: 2

Enter a phrase

Loan

Loan Account

Preview

General queries related actions:

IBM Watson Assistant LiteUpgradeBankai

Learning center

General Queries

Customer starts with:
General Queries

Conversation steps

What do you want to know about?

1

Bank TimingsCIBIL Score+ 2

Continue to next step

1 is Currency Conversion

If you are buying or selling currencies in India, you will need to carry along any of the following...

2

Go to action: End

1 is CIBIL Score

To check the CIBIL score, perform the following steps: 1. Go to the official CIBIL website. 2. Select...

3

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

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

Enter a phrase

General Queries

Preview

Netbanking related actions:

Net Banking

Customer starts with:
Net Banking

Conversation steps

What do you want to know about net banking?

1



Change Pass...

Beneficiaries

+ 1



Continue to next step

1

is

Beneficiaries

2

To add a new beneficiary, do the following steps: 1. Login into the Net banking account 2. Once you log...

2



Go to action: End

1

is

Change Password

3

To change the net banking password, do the following steps: 1. Login into Online Portal. 2. Go t...

3



Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this action


Total: 1

Enter a phrase

Net Banking

Preview

Greet customer [default]



Greetings Customer,
Welcome to BANKAI Assistant

Type something...

8. TESTING

8.1 Test Cases

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

8.2 User Acceptance Testing

Test case ID	Test Scenarios	Results	Executed By
UI_1	Verify user is able to open and view chatbot UI	Executed as expected	Harish.B
UI_2	Verify user is able to interact with chatbot or not	Executed as expected	Harish.B
UI_3	Verify chatbot is able to respond to user queries immediately	Executed as expected	Harish.B
UI_4	Verify chatbot is able to provide options for user to choose various choices	Executed as expected	Britto Oliver.I
SA_1	Verify user is able to select type of savings account	Executed as expected	Britto Oliver.I
SA_2	Verify user is able to know the procedure to create savings account for selected type	Executed as expected	Prajeesh.R
SA_3	Verify user is check the minimum balance	Executed as expected	Prajeesh.R
SA_4	Verify user is able to find interest rate	Executed as expected	Prajeesh.R
CA_1	Verify user is able to select type of company account	Executed as expected	Thiruneelakandan.S
CA_2	Verify user is able to know the procedure to create current account for selected type	Executed as expected	Thiruneelakandan.S
CA_3	Verify user is able to know the procedure to close current account	Executed as expected	Thiruneelakandan.S
LA_1	Verify user is able to choose options for selecting type of available loan policies	Executed as expected	Harish.B
LA_2	Verify user is able to know about available loan amounts	Executed as expected	Harish.B
LA_3	Verify user is able to check the loan status	Executed as expected	Harish.B
GQ_1	Verify user is able to know about bank working days	Executed as expected	Harish.B
GQ_2	Verify user is able to know about the CIBIL score	Executed as expected	Harish.B
GQ_3	Verify user is able to know about storage locker facility	Executed as expected	Harish.B
GQ_4	Verify user is able to know about currency conversion facility	Executed as expected	Britto Oliver.I
NB_1	Verify user is able to know the procedure to login net banking account	Executed as expected	Britto Oliver.I
NB_2	Verify user is able to know the procedure to change net banking password	Executed as expected	Prajeesh.R
NB_3	Verify user is able to choose options for selecting type of fund transfers	Executed as expected	Prajeesh.R
NB_4	Verify user is able to know about adding beneficiaries	Executed as expected	Prajeesh.R

Test Report

1. Purpose of Document

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

2. Defect Analysis

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

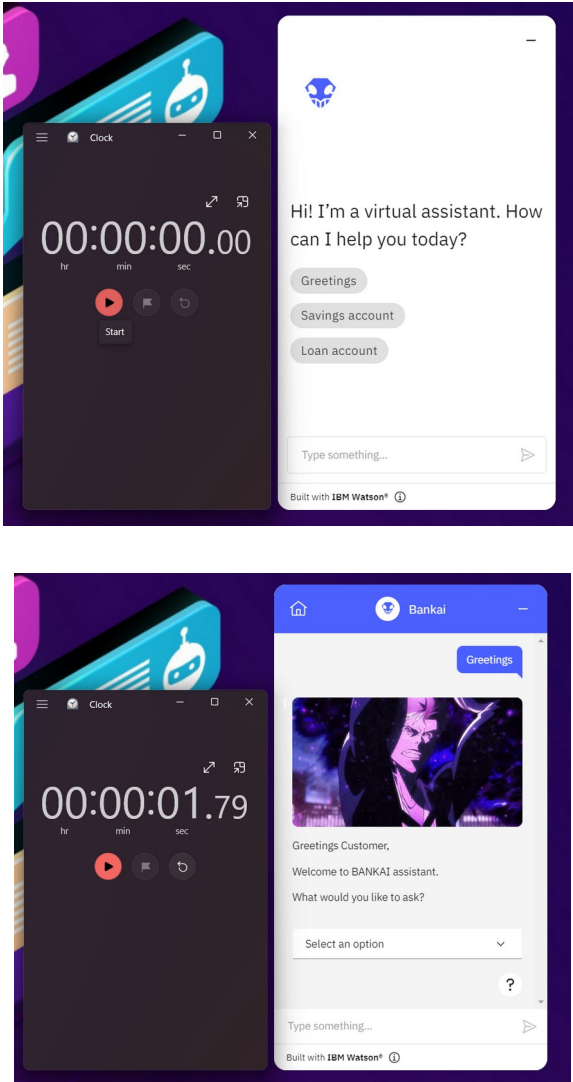
3. Test Case Analysis

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

9. RESULTS

9.1 Performance Metrics

Model Performance Testing:

S.No.	Parameter	Values	Screenshot
1.	Model Summary	<p>The chatbot is used by the user to interact and select queries that are populated based on frequently asked questions of banking customers. There can be multiple instances of a single chatbot serving different users at the same time. It quickly responds with expected answers to frequently asked customer queries. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank.</p>	

2.	Accuracy	<div>Training Accuracy – 100%</div> <div>Validation Accuracy – 100%</div>	<div><div><div>Unique users</div><div>10</div></div><div><div>Conversations</div><div>52</div></div><div><div>Requests ⓘ</div><div>60</div></div></div> <div><div>How often are requests recognized by your assistant? ⓘ</div><div>Daily ▾ % #</div><div><div>Average recognition</div><div>100%</div></div></div>
----	----------	---	---

10. ADVANTAGES AND DISADVANTAGES

Advantages

1. **Round-the-clock support:** Chatbots provide 24/7 client support, so existing and potential customers can try and solve their banking problems after work hours and on weekends. This ultimately also leads to better customer experience.
2. **Enhanced productivity of bank personnel:** Not all clients' problems require the help of a staff member. Artificial intelligence may successfully deal with minor issues leaving only the most urgent and complicated cases for the human approach.
3. **More convenient mode of communication:** Chatbots may combine various functionalities that would make them convenient for customers of different age groups.

Disadvantages

1. **Internet Issues:** Chatbots will not work without the internet. If there is a network problem, Chatbots may stop working and will not respond to client queries.
2. **Requirement of technical knowledge:** Users who make use of chatbots must know how to use chatbots. Otherwise, it is difficult to do interaction with chatbot.
3. **Providing unexpected answers:** Chatbots in some cases may get confused due to prolonged user inputs and may provide irrelevant answers.
4. **Inability to interpret multiple queries:** Chatbots can't understand multiple questions at a time if a user continuously posts queries to it. So it is necessary for a user to post queries one-by-one.

11. CONCLUSION

Chatbots developed using AI are able to answer any frequently asked banking queries on account creation, loan, net banking, other services etc. It addresses the queries of customers immediately and effectively in a cost efficient manner. It eliminates the need for a massive customer care workforce and even reduces the workload of the bank employees whose efforts can be used elsewhere. AI Chatbots provides 24/7 service to clear all customer queries and guide them through all the banking processes. It can be scaled as per the requirements of the bank to include answers to queries related to any new feature or service introduced by the bank. In order to overcome the user satisfaction issues associated with banking services, chatbot will provide personal and efficient communication between the user and the bank. It is built to be the overall virtual assistant that can facilitate customers to ask banking-related questions without visiting the bank or calling up customer service centers as well as providing them with relevant suggestions.

12. FUTURE SCOPE

Chatbots help people obtain the information they need and solve their problems. The technology sector has seen a massive increase in AI development, which has led to the creation of chatbots that can help users easily find the information they need online. AI Chatbots effectively create a strong brand image. They will continue to evolve and play an important role in customer service for businesses.

1. Bots for Internal Business Communications

Chatbots can be used for various purposes, including addressing common problems, communicating with employees, and finishing HR-related tasks and transactional functions. Chatbots for websites are acting as a guide to new employees through company protocols, recording answers for screen questions, and assisting with the onboarding process for new employees. Chatbots can save time for IT desk agents and help with more complicated issues.

2. Content Marketing

Chatbots can communicate with the target market by speaking with them in complete sentences with a natural and easy-going conversational flow. Some markets use these bots to serve customer service and retail, amongst others. Chatbots can segment consumers for future marketing campaigns. This can be incredibly useful for creating more accurate target marketing. Based on the information from dialogue with chatbots, marketers can use this information to help with personalizing brand content.

3. Social Media

Chatbots have better customer interaction rates on social media. Chatbot interactions increase consumer confidence in a brand or business. Customers are informed with daily or weekly announcements about deals, events, and promotions via social media. With time, it is used for voicing opinions, ordering products and services, offering reviews, and even getting in touch with businesses.

4. Use of AI in contact centers

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

13. APPENDIX

Source Code

Build PYTHON FLASK Code:

APP.PY

```
from flask import Flask,render_template
app=Flask(__name__, template_folder='templates')
@app.route('/')
def bank():
    return render_template('bankai.html')

if __name__ == '__main__':
    app.run(debug = True)
```

Build HTML code:

Bankai.HTML

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>Bankai</title>
<link rel="icon" type="image/x-icon" href="https://i.postimg.cc/7h3vGjrt/log.png">
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
<style>
body{
background-image: url("https://i.postimg.cc/tR67SRj0/Portal-Tech-Co.png");
background-size: cover;
}
</style>
</head>
<body>
<script>
    window.watsonAssistantChatOptions = {
        integrationID: "1d23840d-6a73-49ee-b439-2a36c562c24b", // The ID of this integration.
        region: "au-syd", // The region your integration is hosted in.
        serviceInstanceID: "7c7a4b50-0ccf-4046-b58c-c6f3d2f99450", // 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>

IBM CHATBOT:

IBM Watson Assistant LiteUpgradeBankai

Learning center

Actions

Actions

Created by you

Set by assistant

Variables

Created by you

Set by assistant

Set by integration

Saved responses

Name	Last edited	Examples Count	Status
Current Account	a day ago	1	✓
Loan Account	a day ago	2	✓
Index	8 days ago	2	✓
General Queries	a day ago	1	✓
End	a day ago	3	✓
Net Banking	2 days ago	1	✓
Greetings	a day ago	6	✓
Savings account	a day ago	1	✓

Items per page: 50Showing 1–8 of 8 actions

11 of 1 pages

Preview

IBM Watson Assistant LiteUpgradeBankai

Learning center

Savings account

Customer starts with:
Savings account

Conversation steps

1What do you want to know about Savings account?
Interest ratesMinimum Bal...+1
Continue to next step

1 is Creation
2What type of savings account do you want to create?
Zero Savings ...Kids Savings ...+2
Continue to next step

2 is Regular Savings account
3To create Regular Savings account, the documents required are:
Go to action: End

New step

Customer starts with:

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

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

Savings account

Preview

Current Account

Customer starts with:
Current Account

Conversation steps

What do you want to know about Current account?

1

Types of com...Closing the a...

Continue to next step

1 is Closing the account

To close the current account, You need to do the following:

2

Go to action: End

1 is Types of company account

what type of company account do you want to create?

3

IndividualsPartnership F...+ 2

Continue to next step

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

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

Enter a phrase

Current Account

Preview▶

IBM Watson Assistant LiteUpgradeBankai

Learning center

Loan Account

Customer starts with:
Loan Account

Conversation steps

What do you want to know about Loan Account?

1

Loan StatusLoan Amounts+ 1

Continue to next step

1 is Types of loans

Which type of loan do you want to know about?

2

Personal LoanHome Loan+ 3

Continue to next step

2 is Personal Loan

To take a personal loan, the required documents are: - Identity proof (copy of passport/voter ID...

3

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

Enter phrases your customer might use to start this actionTotal: 2

Enter a phrase

Loan

Loan Account

Preview▶

IBM Watson Assistant LiteUpgradeBankai

Learning center

General Queries

Customer starts with:
General Queries

Conversation steps

What do you want to know about?

1

Bank TimingsCIBIL Score+ 2

Continue to next step

1 is Currency Conversion

2If you are buying or selling currencies in India, you will need to carry along any of the following...

Go to action: End

1 is CIBIL Score

3To check the CIBIL score, perform the following steps: 1. Go to the official CIBIL website. 2. Select...

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

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

Enter a phrase

General Queries

Preview

IBM Watson Assistant LiteUpgradeBankai

Learning center

Net Banking

Customer starts with:
Net Banking

Conversation steps

What do you want to know about net banking?

1

Change Pass...Beneficiaries+ 1

Continue to next step

1 is Beneficiaries

2To add a new beneficiary, do the following steps: 1. Login into the Net banking account 2. Once you log...

Go to action: End

1 is Change Password

3To change the net banking password, do the following steps: 1. Login into Online Portal. 2. Go t...

Go to action: End

New step +

Customer starts with:

Enter phrases that a customer types or says to start the conversation about a specific topic. These phrases determine the task, problem, or question your customer has.

The more phrases you enter, the better your assistant can recognize what the customer wants.

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

Enter a phrase

Net Banking

Preview

AI based discourse for Banking Industry

Team ID :
PNT2022TMID38577

Team Members :
Harish. B
Britto Oliver. I
Prajeesh. R
Thiruneelakandan. S

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Hi! I'm a virtual assistant. How
can I help you today?

Greetings

Savings account

Loan account

Type something...

Built with IBM Watson®

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PNT2022TMID38577

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Britto Oliver. I
Prajeesh. R
Thiruneelakandan. S

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Bankai

Greetings



Greetings Customer,
Welcome to BANKAI assistant.
What would you like to ask?

Select an option

?

Type something...

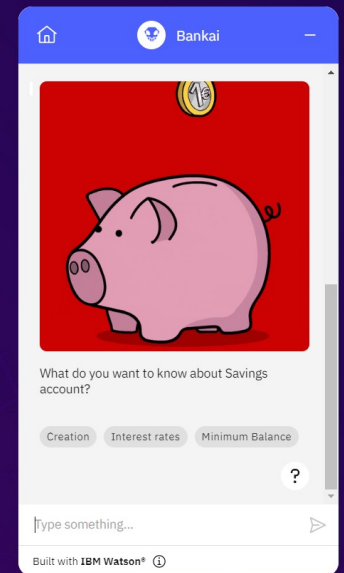
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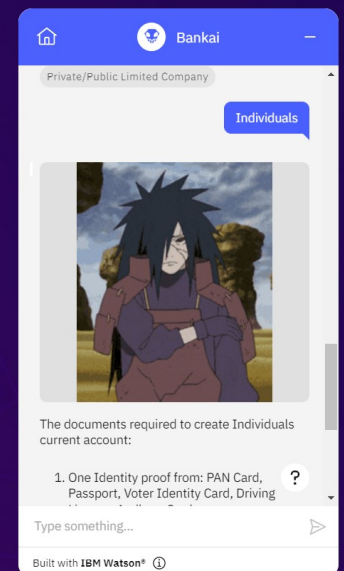


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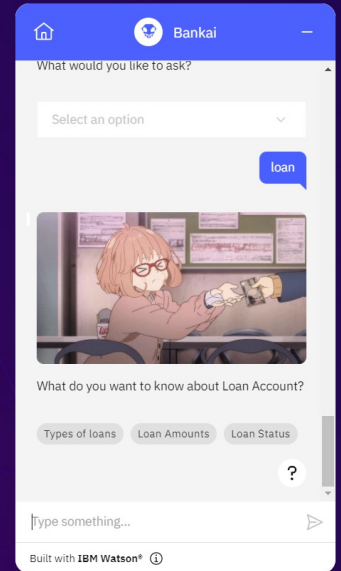


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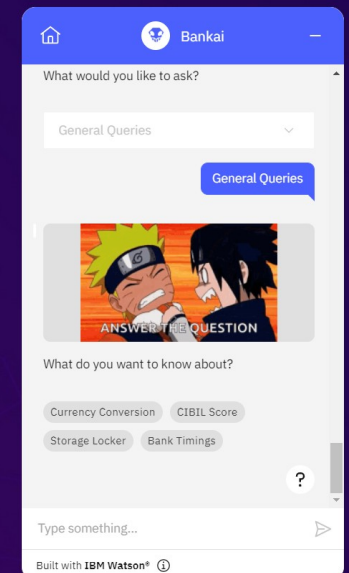


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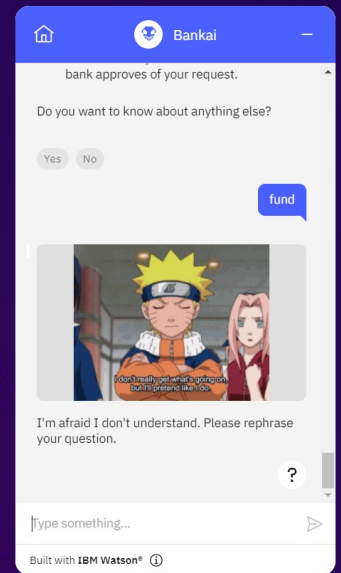


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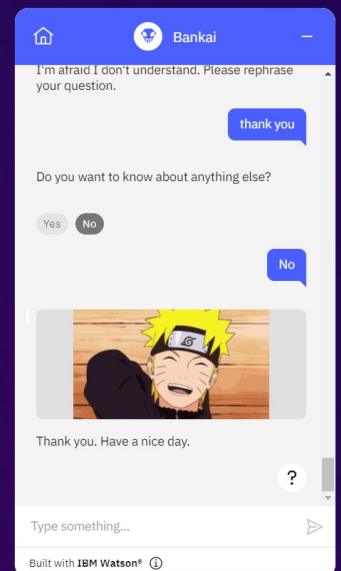


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GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-17687-1659675217>

PROJECT DEMO LINK:

<https://youtu.be/ptIjBsgWyxo>