

**NALAIYA THIRAN - IBM PROJECT REPORT**

**(19IT410T Professional Readiness for Innovation, Employability and Entrepreneurship)**

**ON**

**AI BASED DISCOURSE FOR BANKING INDUSTRY**

*Submitted by*

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*in partial fulfillment for the award of the degree of*

**BACHELOR OF TECHNOLOGY**

**IN**

**INFORMATION TECHNOLOGY**



## **VELAMMAL ENGINEERING COLLEGE, CHENNAI-66.**

(An Autonomous Institution, Affiliated to Anna University, Chennai)

**2022-2023**

## **VELAMMAL ENGINEERING COLLEGE CHENNAI -66**

(An Autonomous Institution, Affiliated to Anna University, Chennai)

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## **1. INTRODUCTION**

### **1.1 Project Overview**

Technology is one of the greatest tools for mankind and in recent times it has evolved a lot. Especially in banking sector. Emerging technologies have changed the banking industry from paper and branch based banks to digitized and networked banking services. Technology is now changing the way how banks are delivering services to their customers. In the era of social media and real-time communication, customers expect great service, and – crucially – fast responses. To fulfil this expectation, we are going to build a chatbot for banking Industry. It also frees up the bank staff from the ‘busy’ work – repetitive, easy tasks that can be automated, giving bank’s team more time to offer personal treatment to those who need it. They can spend more time on higher-value transactions, without diminishing the bank’s service.

### **1.2 Purpose**

The main purpose of our chatbot is to serve the users in an instant manner and to make them feel ease. Bank customers need not to go bank directly for simple queries as the users can get solutions for their queries from our chatbot and indirectly it saves cost, time and energy. Our chatbots can be used from anywhere and anytime. Chatbots can be integrated with banking websites as they can reduce operational costs, manpower as well as improve customer satisfaction by streamlining interactions. 24/7 available chatbots integrated to mobile applications can offer users immediate solutions to their urgent problems which cannot be solved via app. In recent years, Customers prefer messaging than face to face communication. Almost all mobile users are familiar with messaging apps such as Whatsapp, Telegram, Slack. Written and conversational communication over those applications is preferred especially by millennials. Chatbots can be integrated with those apps and make the users feel comfortable.

## 2. LITERATURE SURVEY

### 2.1 Existing problem

| Project Title  | Work done/Algorithms used   | Advantages   | Disadvantages   |
|--|---|--|---|
| An Overview of Chatbot Technology  | Explained the motivations that drive the use of chatbots, the impact of racial stereotypes on chatbots design, chatbot classification, general architecture of modern chatbots  | Encourages us to study them in greater extent and depth.   | Lacks the systematic analysis or experimentation                  |
| Design and Development of CHATBOT: A Review                                    | Explained about learning-cum-assisted tool-newly emerging tool for learning from CHATBOT  | .Platforms such as IBM Watson assistant is explained.  | No working model or a framework has been provided                 |
| A Review of Chatbots in the Banking Sector                                     | Discusses the anatomy of chatbots and its applications in the banking sector  | Improvements to current chatbot technologies are suggested.  | Has no involvement of Artificial Intelligence                     |
| Artificial intelligence applications in banking sector                         | Overview of a series of fundamental and interrelated technologies around machine learning and natural language underpin of AI. It also elaborates the kinds of AI used in different banking operations followed by the ways in which AI is being implemented in these operations. | Discusses about how, where, and why AI applications are critical in banking and also lists its pros and cons.  | No proof or demonstration for the result                          |
| Artificial intelligence in indian banking sector: challenges and opportunities | Discuss how Artificial Intelligence is used in the Indian banking sector, what are the benefits and what are the Challenges facing India's Artificial Intelligence.   | Development that Artificial Intelligence offers to FinTech and the different ways in which it can improve the operations of an Indian banking sector.                                  | The study is descriptive in nature and is based on secondary data |
| Chatbots and Virtual Assistant in Indian Banks                                 | The research paper included basic features, way to connect, services offered, accuracy, technology providers of chatbots and virtual assistants implemented by Indian banks.  | It necessitates enhancement of existing capabilities of chatbots, virtual assistant deployment by Indian banks and awareness with respect to usefulness among employees and customers. | No specific framework   |
| Algorithm Inspection for Chatbot Performance Evaluation                        | Aims to explore the prominent types of chatbot testing methods with detailed emphasis on algorithm testing techniques.  | Involves the use of techniques such as cross validation, grammar and parsing, verification and validation and statistical parsing.   | No implementation   |

## 2.2 References

1. Adamopoulou, Eleni & Moussiades, Lefteris. (2020), "An Overview of Chatbot Technology", 373-383. 10.1007/978-3-030-49186-4\_31.
2. Tamrakar, Rohit & Wani, Niraj. (2021), "Design and Development of CHATBOT: A Review".
3. Shashank Bairy R, Rashmi R, 2021, A Review of Chatbots in the Banking Sector, "INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT)" Volume 10, Issue 06 (June 2021),
4. Lakhangaonkar, Supriya & Kamath, Kavita. (2021), "ARTIFICIAL INTELLIGENCE APPLICATIONS IN BANKING SECTOR". 14. 185-190.
5. Vijai, C.. (2019), "ARTIFICIAL INTELLIGENCE IN INDIAN BANKING SECTOR: CHALLENGES AND OPPORTUNITIES", International Journal of Advanced Research. 7, 1581-1587. 10.21474/IJAR01/8987.
6. Singh, Netra & Singh, Devender. (2019). Chatbots and Virtual Assistant in Indian Banks. Industrija. 47. 75-101. 10.5937/industrija47-24578.
7. V., Vijayaraghavan & Cooper, Jack & J., Rian. (2020). Algorithm Inspection for Chatbot Performance Evaluation. Procedia Computer Science. 171. 2267-2274. 10.1016/j.procs.2020.04.245.

## 2.3 Problem Statement Definition

### PROBLEM STATEMENT 1:



### PROBLEM STATEMENT 2:



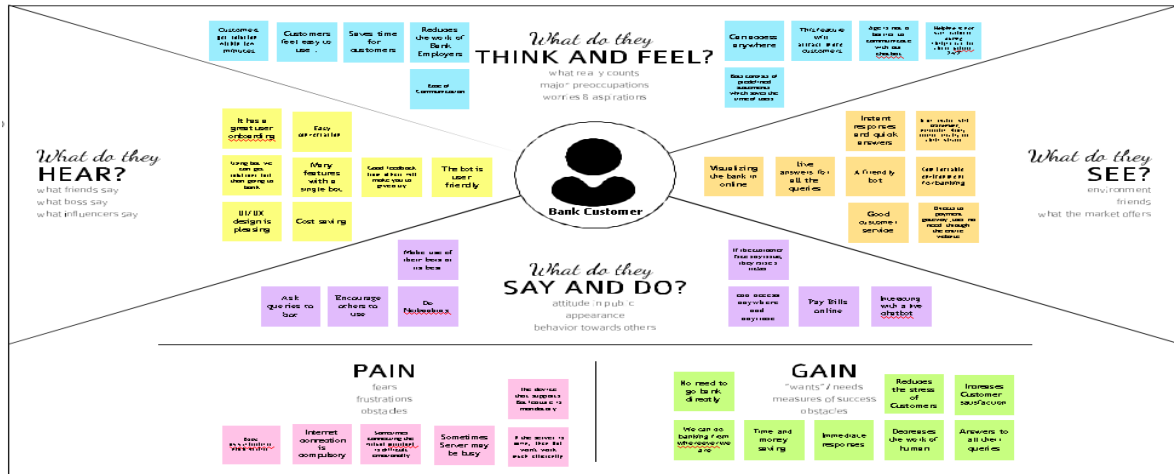
### PROBLEM STATEMENT 3:



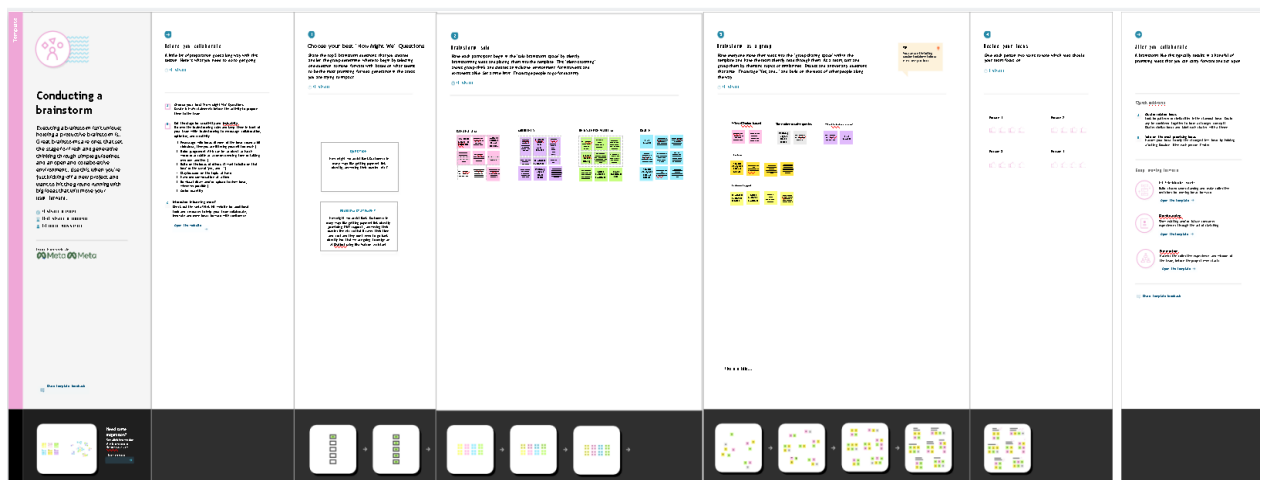
### PROBLEM STATEMENT 4:



### 3.1 Empathy Map Canvas



### 3.2 Ideation & Brainstorming



### 3.3 Proposed Solution

| S.No. | Parameter                                | Description   |
|-------|--|---|
| 1.    | Problem Statement (Problem to be solved) | Customers of the bank needs an assistant to assist them in online in many ways like getting payment link directly, answering their queries 24/7, loan queries, Net Banking , Details related to banking, Creating bank account ,connecting customer with the Bank Employee directly whenever needed, Live queries etc   |
| 2.    | Idea / Solution description              | To solve this Problem, we are going to design an AI Chatbot using IBM Watson Assistant which saves the Customer's time and cost as they don't need to go bank directly. We are going to Deploy using Python Flask. We are also going to make use of many trending features such as NLP, NLU and IBM Cloud. We are going to train our model using Deep Learning. Our Chatbot will be built in such a way that it can Chat for hours without the need for human supervision.  |
| 3.    | Novelty / Uniqueness                     | <ul style="list-style-type: none"><li>• Integrated with IBM Watson Assistant and deployed using Python Flask</li><li>• 24/7 support</li><li>• adapts to customer needs and doesn't break when deviations occur in conversations.</li><li>• Watson Assistant lets you protect and safeguard your customer conversations and data with IBM Security.</li></ul>  |
| 4.    | Social Impact / Customer Satisfaction    | People feel comfortable to use our Bot because they can interact using their native language. It can eliminate long wait times . Our AI chatbot allows Customers to complete their entire process without waiting so It saves the time of the Customers Customers are satisfied as it provides faster responses. Our Chatbot can make the Customers feel engaged and Customers wouldn't feel that they are chatting with a machine. As the users doesn't need any special hardware except their mobile for accessing the Bot, Customers can use with ease.. |
| 5.    | Business Model (Revenue Model)           | As Chatbots are recent advancements in AI domain, Not only banking sector, Many organizations are integrating Chatbots with their website or mobile app. This Integration is considered as the Business model. In Banking sector, if we integrate Chatbot with their website, Customers need not come to Bank Directly which will attract more Customers in this fast pace world as many don't have time to reach bank directly.  |
| 6.    | Scalability of the Solution              | Our Chatbot is scalable as it is dynamic and trained using AI and deep learning Models by IBM Watson Assistant.   |



### 3.4 Problem Solution fit

#### Problem-Solution fit canvas 2.0

Purpose / Vision

|                         |   |  |  |                                   |
|-------------------------|---|--|--|-----------------------------------|
| Define CS, fit into CC  | <b>1. CUSTOMER SEGMENT(S)</b> <span>CS</span><br>Who is your customer?<br><u>the</u> working parents of 0-5 <u>age</u> kids<br><br>People who want to do the following tasks in online :<br>General bank queries<br>Net Banking<br>Bank Account Creation<br>Online Transaction<br>Loan Queries  | <b>6. CUSTOMER CONSTRAINTS</b> <span>CC</span><br>What constraints prevent your customers from taking action or limit their choices of solutions? <u>the</u> spending power, budget, no cash, network connection, available devices.<br><br><ul style="list-style-type: none"> <li>• Spending power</li> <li>• Cost</li> <li>• Comfortness</li> <li>• Time</li> <li>• Human Efforts</li> </ul> | <b>5. AVAILABLE SOLUTIONS</b> <span>AS</span><br>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? <u>the</u> pen and paper is an alternative to digital notetaking<br><br>Chatbot using IBM Watson assistant<br>Human staff for assisting the customer   | Explore AS, differentiate         |
|                         | <b>2. JOBS-TO-BE-DONE/ PROBLEMS</b> <span>J&amp;P</span><br><ul style="list-style-type: none"> <li>• It takes more time to go to bank and do transactions, sometimes we have to wait in a long queue.</li> <li>• If the bank is at distant, we have to spend huge amount for transportation itself</li> <li>• For each small doubt we need to go to bank directly</li> <li>• In certain occasion times such as month starting, salary day, pension day, bank will be rush</li> <li>• During government holidays bank will be leave<br/>We <u>cannot take</u> money and do transactions</li> </ul> | <b>9. PROBLEM ROOT CAUSE</b> <span>RC</span><br><ul style="list-style-type: none"> <li>• In this digital world everyone wants to do everything in online that is paying bills, shopping, transactions, getting answer to their bank queries, ticket booking from anywhere and anytime</li> <li>• As time and cost is precious, we cannot save it by going to bank directly</li> </ul>          | <b>7. BEHAVIOUR</b> <span>BE</span><br><ul style="list-style-type: none"> <li>• Customer searches a good assistant to answer all their queries</li> <li>• Customers do some research and chooses an efficient Chatbot which saves time and cost</li> <li>• If the experience is good with the Chatbot, they will recommend it to others who have same trouble.</li> </ul>  |                                   |
| Identify strong TR & EM | <b>3. TRIGGERS</b> <span>TR</span><br><ul style="list-style-type: none"> <li>• When a regular Chatbot user recommends it to others, New Customers tends to use it.</li> <li>• Feedback/Review provided in the Internet</li> <li>• Advertisement of the Chatbot</li> </ul>   | <b>10. YOUR SOLUTION</b> <span>SL</span><br>Chatbot built using IBM Watson Assistant   | <b>8. CHANNELS of BEHAVIOUR</b> <span>CH</span><br>1.1 ONLINE<br>When need of services for customer is arise, customer interact online through browser or app<br><br>Customers will type their queries to chatbot and Chatbot will reply the Customers.<br>Customers can access the Bot from anywhere<br><br>1.2 OFFLINE<br>When need of services for customer is arise, customer interact offline through phone or app<br>via customer for customer convenience | Refract online & offline CH of BE |
|                         | <b>4. EMOTIONS: BEFORE / AFTER</b> <span>EM</span><br><br><b>BEFORE:</b><br>It was difficult to get answer <u>for all</u> the queries from bank.<br>For each small doubt we need to go to bank directly<br><b>AFTER:</b><br>All our Difficulties are solved using our proposed Solution Chatbot   |  |  |                                   |

## 4. REQUIREMENT ANALYSIS

### 4.1 Functional requirement

Following are the functional requirements of the proposed solution

| FR No. | Functional Requirement (Epic)   | Sub Requirement (Story / Sub-Task)   |
|--------|---------------------------------|--|
| FR-1   | Solving General Banking Queries | Our Bot will solve the Banking queries, Loan queries, Bank account creation queries, NetBanking queries.   |
| FR-2   | Easy handling of queries        | Our Chatbot consists of Well-designed user interfaces and experiences (UI / UX) which will make our Customers feel comfortable to use the ChatBot. |
| FR-3   | Directing to payment gateway    | When the user asks the payment link for paying any bills, it directs to the secured payment gateway directly. There user can make their payments   |
| FR-4   | Handle complex dialogues        | As the Chatbot uses NLP, it can identify the intent of a question to provide an accurate answer and suggest options to resolve the issue           |
| FR-5   | Query processing                | The chatbot can capture, read and process large amounts of data to gain insights from relevant data and to quickly solve customer problems.        |
| FR-6   | Fast onboarding                 | As our Bot is deployed using Flask and we no need to do any prior registration to use the Bot, our chatbot will be launched quickly                |

### 4.2 Non-Functional requirements

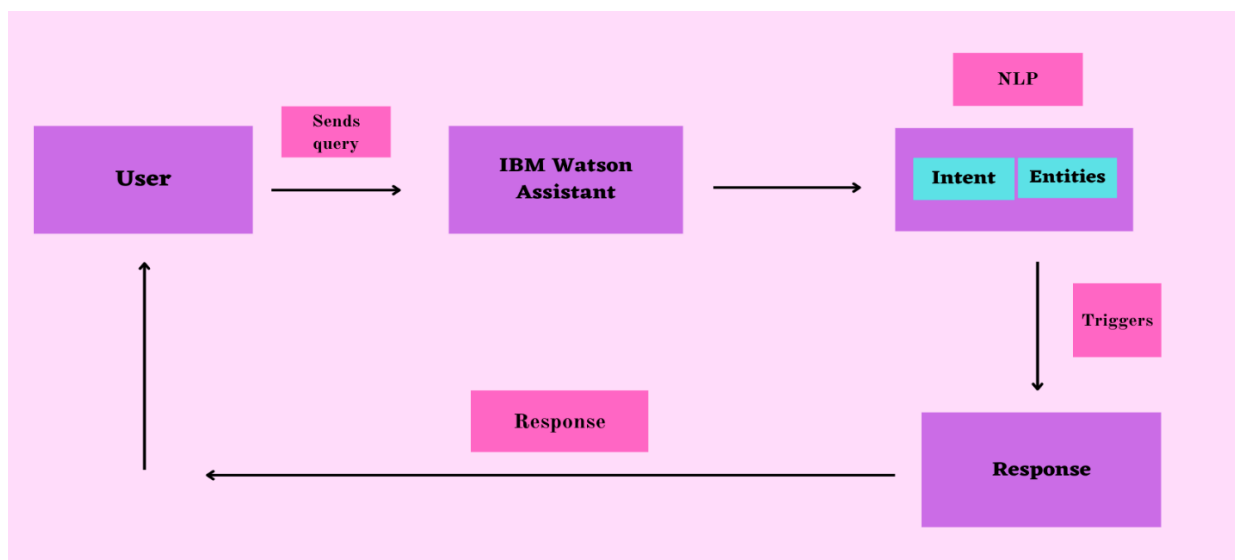
Following are the non-functional requirements of the proposed solution.

| FR No. | Non-Functional Requirement | Description   |
|--------|----------------------------|---|
| NFR-1  | Usability                  | <ul style="list-style-type: none"><li>• People under all age group can use the Bot</li><li>• Using the Bot is like a normal messaging to a person which means it is easy to use as we use messaging system in our day to day life.</li><li>• A very basic Communication skill is enough to use our Bot.</li></ul> |
| NFR-2  | Security                   | <ul style="list-style-type: none"><li>• Interactions with the Bot are not shared anywhere.</li><li>• Chats with the Bot are not stored anywhere.</li><li>• The Bot doesn't collect any confidential information like password, pin etc.,</li></ul>  |

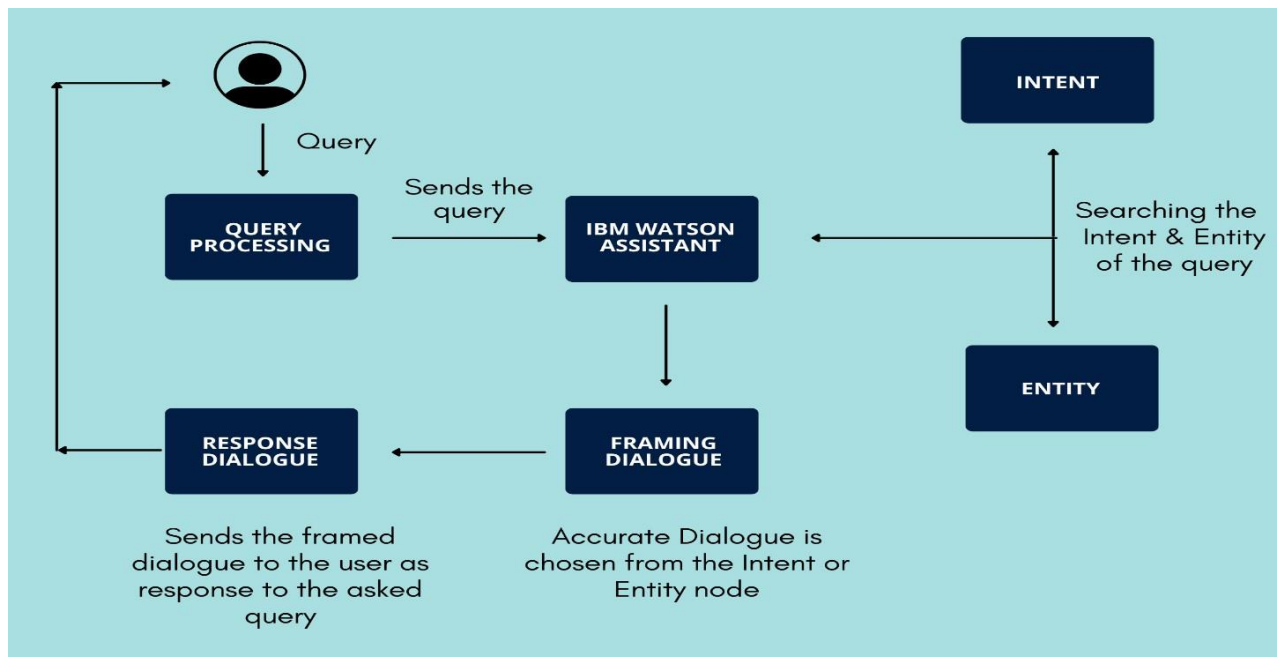
|       |                     |   |
|-------|---------------------|---|
| NFR-3 | <b>Reliability</b>  | <ul style="list-style-type: none"> <li>When the bot can't answer certain queries, It will connect the Customer to the Bank staffs.</li> <li>When the webpage is not loaded or loaded with delay, the Bot will load the web page automatically.</li> <li>When the Bot doesn't know the solution to the queries, it will provide alternate approaches.</li> </ul> |
| NFR-4 | <b>Performance</b>  | <ul style="list-style-type: none"> <li>Bot will provide faster response</li> <li>The loading time of the Bot will be less than 5 seconds.</li> <li>We will get accurate answers within shorter time.</li> <li>The Bot is customized for each user.</li> </ul>   |
| NFR-5 | <b>Availability</b> | <ul style="list-style-type: none"> <li>Bot will be available 24/7</li> <li>Bot will have the answers readily available</li> <li>Bot will have the answers which meet the Customer requirements</li> </ul>   |
| NFR-6 | <b>Scalability</b>  | <ul style="list-style-type: none"> <li>When more number of people access the Bot still the server won't crash</li> <li>Each user will be having their customized Bot so many users can access at the same time.</li> </ul>  |

## 5. PROJECT DESIGN

### 5.1 Data Flow Diagrams



## 5.2 Solution & Technical Architecture



## 5.3 User Stories

| User type           | Functional Requirement (Epic) | User story Number | User Story / Task   | Acceptance Criteria  | Priority | Release  |
|---------------------|-------------------------------|-------------------|---|--|----------|----------|
| Customer (Web User) | Introduction Greeting         | USN-1             | As a user, I will start introducing me to the bot and the Bot will introduce itself. (conversation Initialization)                    | Introduction phase   | High     | Sprint 1 |
|                     | Displaying Query list         | USN-2             | As a user, I can see the list of queries displayed by the Bot. If my query is not available in the list, I can ask my query manually. | Now bot will know what users want to know ,The user may type the option which isnot in the list if needed. | High     | Sprint 1 |
|                     | Choosing the query            | USN-3             | As a user, I can choose an option from the query list provided by Bot or the query can be user defined                                | Selecting the query  | High     | Sprint 1 |

|  |                               |       |  |  |        |          |
|--|-------------------------------|-------|--|--|--------|----------|
|  | Loan query                    | USN-4 | I can ask and get solutions for all my queries related to loan such as list of loan schemes available, Loans for education, Loan for business, Loan amount for each schemes. | I will get solution for my queries related to loan   | Medium | Sprint 2 |
|  | Net Banking query             | USN-5 | I can ask and get solutions for all my queries related to NetBanking   | I will get solution for my queries related to NetBanking instantly instead of going through theFAQ section | Medium | Sprint 2 |
|  | Bank Account Creation         | USN-6 | As a user, I can create bank account with the provided guidelines by the bot .The Bot will be providing the step by step ways to create a Bank account.                      | I can create a Bank account  | Medium | Sprint 3 |
|  | End Greeting                  | USN-7 | As a user, I will be satisfied with the solution and the Bot will greet me in the end which make me feel that I am chatting with the real human.                             | I can end the conversation with a sweet greeting, feeling that I have conversed with the real Human.       | Medium | Sprint 3 |
|  | Response                      | USN-8 | As a user, I want to get the answer as quickly as possible so that I don't have to wade through FAQ's on my own or go through the entire website                             | I will be able to get quick response without wandering through FAQ   | Medium | Sprint 2 |
|  | User Friendly user experience | USN-9 | As a user, I want to feel enough as if I were talking to a live human being so for that I should be able to get a good User experience and Interface                         | I will feel as chatting with a real human  | Medium | Sprint 3 |

## 6. PROJECT PLANNING & SCHEDULING

### 6.1 Sprint Planning & Estimation

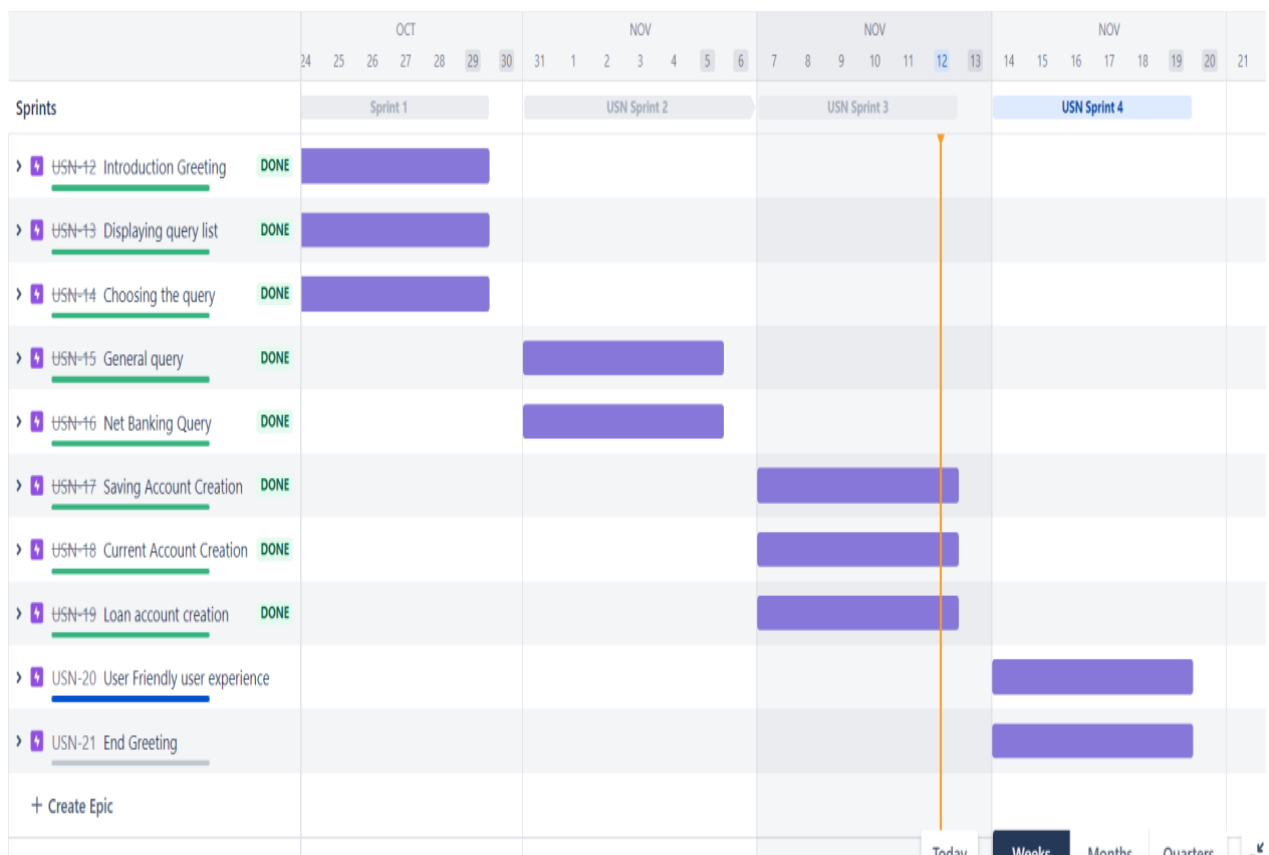
| Sprint   | Functional Requirement (Epic) | User Story Number | User Story / Task   | Story Points | Priority | Team Members                                      |
|----------|-------------------------------|-------------------|---|--------------|----------|---|
| Sprint-1 | Introduction Greeting         | USN-1             | As I am a new user, the Bot will start introducing itself to me. (Conversation Initialization)  | 1            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |
| Sprint-1 |                               | USN-2             | As a user, I will start introducing me to the bot   | 1            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |
| Sprint-1 | Displaying Query list         | USN-3             | As a user, I can see the list of queries displayed by the Bot. If my query is not available in the list, I can ask my query manually. | 2            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |
| Sprint-1 | Choosing the query            | USN-4             | As a user, I can choose an option from the query list provided by Bot or the query can be user defined                                | 1            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |
| Sprint 2 | General query                 | USN-5             | I can ask and get solutions for all my queries related to bank.   | 2            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |

| Sprint   | Functional Requirement (Epic) | User Story Number | User Story / Task  | Story Points | Priority | Team Members                                      |
|----------|-------------------------------|-------------------|--|--------------|----------|---|
| Sprint 2 | Net Banking query             | USN-6             | I can ask and get solutions for all my queries related to Net Banking.   | 2            | High     | Bhuvaneshwari G M, Miridini V                     |
| Sprint-2 | Saving Account Creation       | USN-7             | As a user, I can create a saving account with the provided guidelines by the bot. The Bot will be providing the step-by-step ways to create a saving account.  | 2            | High     | Bhuvaneshwari G M, Miridini V                     |
| Sprint-3 | Current Account Creation      | USN-8             | As a user, I can create a current account with the provided guidelines by the bot. The Bot will be providing the step-by-step ways to create a current account.  | 2            | High     | Sahana J M, Suji N                                |
| Sprint3  | Loan account creation         | USN-9             | As a user, I can create a loan account with the provided guidelines by the bot. The Bot will be providing the step-by-step ways to create a loan account. We can also get details about as loan such as list of loan schemes available, Loans for education, Loan for business, Loan amount for each scheme. | 2            | High     | Sahana J M, Suji N                                |
| Sprint-4 | User Friendly user experience | USN-10            | As a user, I want to feel enough as if I were talking to a live human being so for that I should be able to get a good User experience and Interface.  | 2            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |
| Sprint-4 | End Greeting                  | USN-11            | As a user, I will be satisfied with the solution and the Bot will greet me in the end which make me feel that I am chatting with the real human.   | 2            | High     | Sahana J M, Bhuvaneshwari G M, Miridini V, Suji N |

## 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 | 5                  | 6 Days   | 24 Oct 2022       | 29 Oct 2022               | 5   | 29 Oct 2022                  |
| Sprint-2 | 6                  | 6 Days   | 31 Oct 2022       | 05 Nov 2022               | 6   | 05 Nov 2022                  |
| Sprint-3 | 4                  | 6 Days   | 07 Nov 2022       | 12 Nov 2022               | 4   | 12 Nov 2022                  |
| Sprint-4 | 4                  | 6 Days   | 14 Nov 2022       | 19 Nov 2022               | 4   | 19 Nov 2022                  |

## 6.3 Reports from JIRA



## 7. CODING & SOLUTIONING:

### PYTHON CODE:

```
from flask import Flask, render_template
app = Flask(__name__, static_url_path='/static')

@app.route('/')

def bot():

    return render_template('Chatbot.html')

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

### HTML CODE:

```
<!DOCTYPE html>

<html lang="en">

<head>
    <meta charset="UTF-8">
    <title>JASPER</title>

    <link rel="icon" type="image/x-icon"
href="https://tse4.mm.bing.net/thid=OIP.IAPgOWOraT0pwPI0NG_OiQHaHy&pid=Api&P=0">
    <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

    <style>
        .h1,h1 {
            font-size: 36px;
            font-family: Georgia, serif;
            color: #dadada;
            text-shadow: 1px 1px 5px rgb(237, 237, 237);
        }

        body {
            font-family: "Helvetica Neue", Helvetica, Arial, serif;
            font-size: 14px;
            line-height: 1.42857143;
            color: rgb(255, 255, 255);
            padding-left: 20px;

            background: url("https://www.wealthandfinance-news.com/wp content/uploads/2021/01/online-
banking.jpg");

            background-size: cover;
        }

        .containerteam
padding: 2px 9px;
        font-size: 20px;
        font-family: 'Times New Roman', Times, serif
align-items: center }
```



```

.card1 {
  box-shadow: 0 4px 8px 0 rgba(255, 255, 255, 0.2);
  transition: 0.3s;
  width: 20%;
  background-color: #060707;
  border-radius: 5px;
  padding-left: 10px;
}

.card1:hover {
  box-shadow: 0 12px 20px 0 rgba(197, 191, 191, 0.4);
}
</style>
</head>

<body>
  <h1>
    <center>Hello! I am Jasper, your banking bot</center>
  </h1>

  <div class="card1 ">

    <div class="containerteam ">

      <h3><b>PNT2022TMID23608</b></h3>
      <hr>

      <h4><b>Team Memembers: </b></h4>
      <p>Bhuavaneshwari G M</p>
      <p>Miridini V</p>
      <p>Sahana J M</p>
      <p>Suji N</p>
    </div>
  </div>
</script>
window.watsonAssistantChatOptions = {
  integrationID: "31fbefba-772f-4174-ae96-b5c12c18676b", // The ID of this integration.
  region: "us-south", // The region your integration is hosted in.
  serviceInstanceID: "3d6ce4f6-21bc-4f1a-b60c-1a22d7863292", // 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>

```

## OUTPUT:











## 8. TESTING

### 8.1 TEST CASES

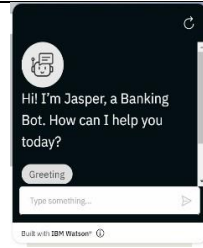
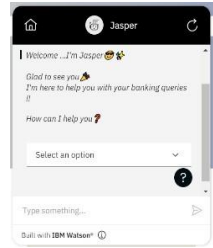

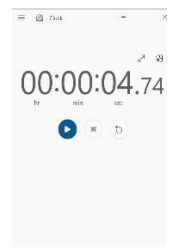
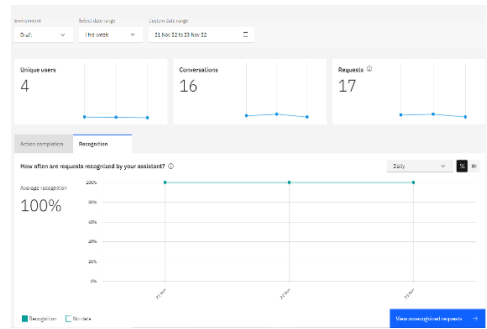
| S.No | Test Cases  | Passed/ Failed |
|------|---|----------------|
| 1.   | Providing List of Queries                               | Passed         |
| 2.   | Choosing Options  | Passed         |
| 3.   | Delivering responses to savings account related queries | Passed         |
| 4.   | Delivering responses to loan account related queries    | Passed         |
| 5.   | Delivering responses to current account related queries | Passed         |
| 6.   | Delivering responses to general queries                 | Passed         |
| 7.   | Delivering responses to net banking queries             | Passed         |

### 8.2 USER ACCEPTANCE TESTING

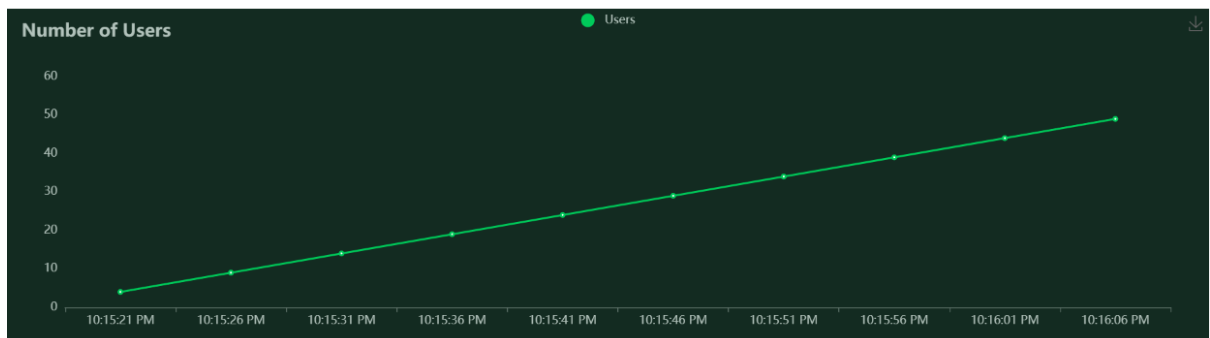
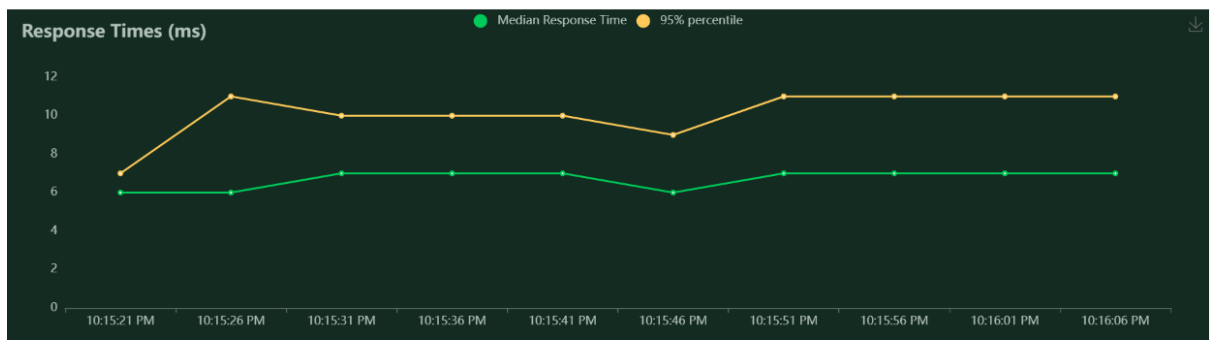
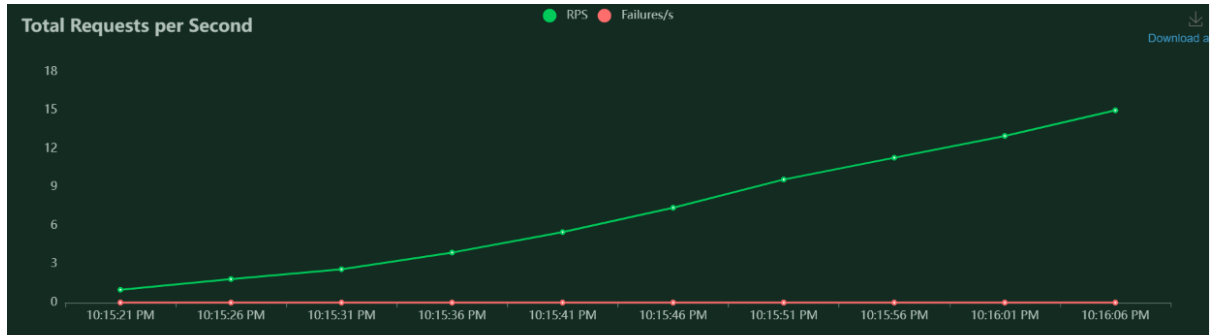
| S.No | Test Cases                           | Yes/ No |
|------|--------------------------------------|---------|
| 1.   | Managing multiple users              | Yes     |
| 2.   | Responding with accurate answers     | Yes     |
| 3.   | Has decision making skills           | Yes     |
| 4.   | Understands anytype of abbreviations | Yes     |
| 3.   | Learns from realtime interactions    | Yes     |

## 9. RESULTS

### 9.1 Performance Metrics

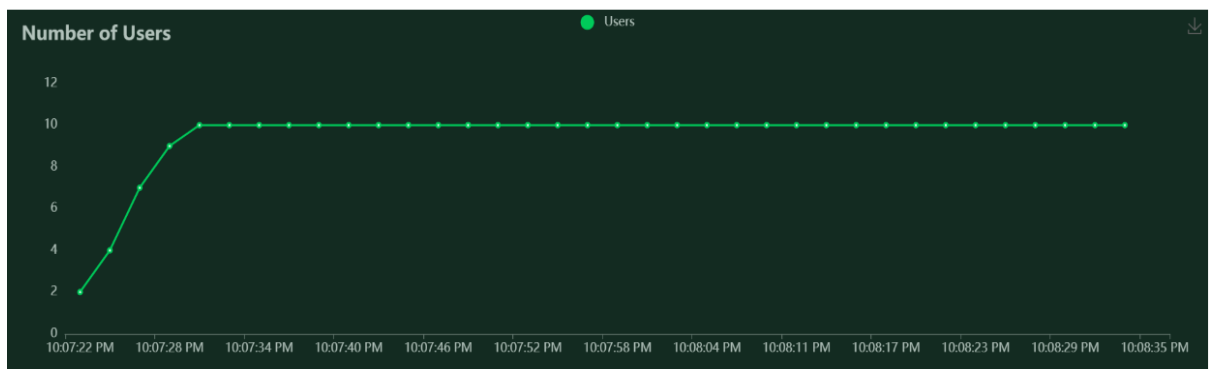
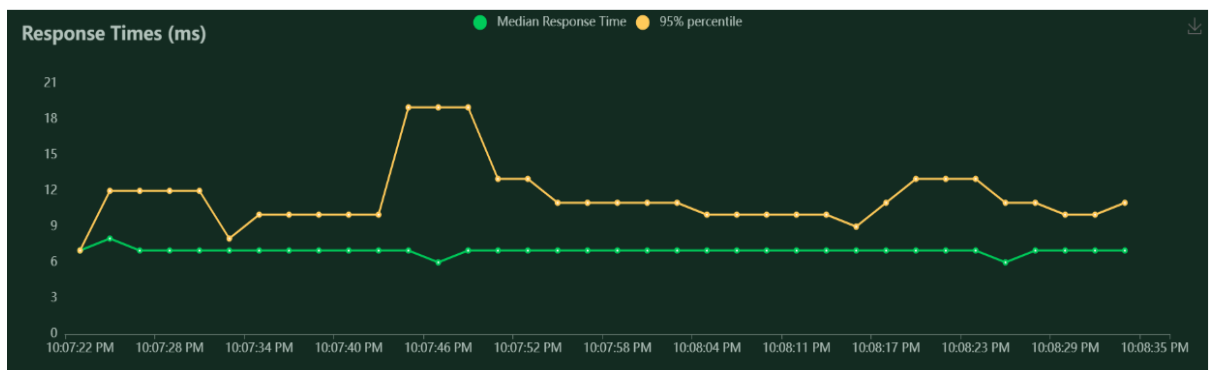
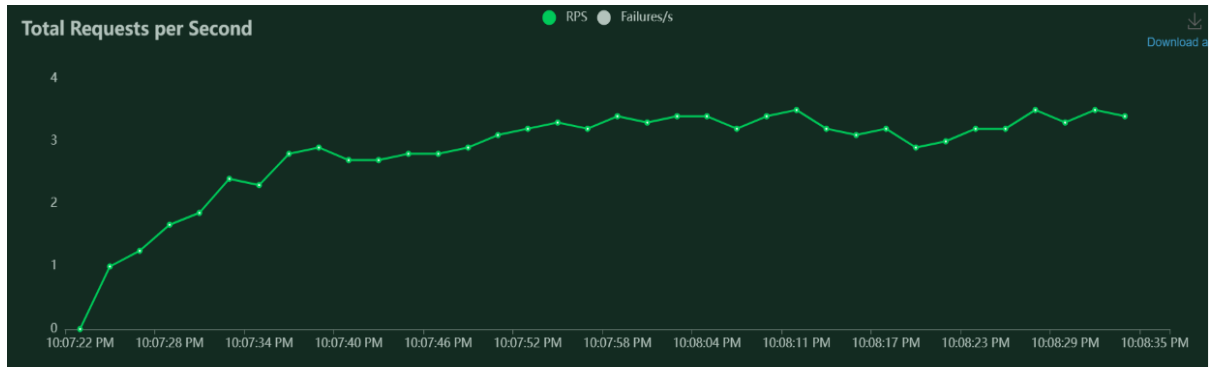
| S.N<br>o. | Parameter     | Values   | Screenshot  |
|-----------|---------------|--|---|
| 1.        | Model Summary | This Chabot can be used by customers to clear their doubts regarding Banking Industry. Chabot is designed to be comfortably interactive with the users and gives responses instantaneously. There can be multiple instances of this single Chabot attending different users 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. |     |
| 2.        | Accuracy      | Training Accuracy –<br><br>100% Validation<br><br>Accuracy -100%   |    |

## LOCUST FOR 10 USERS





## LOCUST FOR 100 USERS



## **10. ADVANTAGES**

- Cost Effectiveness.
- Respond to customer instantly.
- Increased Productivity.
- More convenient mode of communication.
- 24\*7 Availability
- Reduces Operational Costs
- Provide a customized experience
- Saves time
- Chatbots can be access from anywhere and anytime
- Reduces need of human staff

## **DISADVANTAGES**

- Potential Job Losses.
- Initial Investment Costs.
- Chatbot does not have human emotion

## **11. CONCLUSION**

In every sector where top-notch customer assistant is required, chatbot and other AI technologies are quite helpful. The banking sector is one such industry. Our Chatbot has been trained now to answer queries related to loan and the various types of loan, net banking, savings account, etc. Though the bot would not be able to solve or satisfy all the queries for customer, it can certainly resolve issues that the user might be facing often and help the banking sectors maintain great relationships with their customers. We aim to incorporate much more features to this bot in the near future.

## **12. FUTURE SCOPE**

We can enhance this project further by adding these features

- Bot can do audio message greeting
- Bot can greet the user in the language in which the users are comfortable (Multilanguage support)
- Do sentiment analysis in customer message. With sentiment analysis, bots can figure out your happy and annoyed users.
- We can add call services in Chatbot
- Bots can greatly reduce the number of human agents required and also improve the employee attrition ratio which is due to the repetitive nature of routine calls.
- Chatbot can do voice reply to the text messages.

### 13. APPENDIX

#### PYTHON CODE:

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

#### HTML CODE:

```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="UTF-8">
  <title>JASPER</title>

  <link rel="icon" type="image/x-icon"
href="https://tse4.mm.bing.net/thid=OIP.IAPgOWOraT0pwPI0NG_0iQHahy&pid=Api&P=0">
  <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">

  <style>
    .h1,h1 {
      font-size: 36px;
      font-family: Georgia, serif;
      color: #dadada;
      text-shadow: 1px 1px 5px rgb(237, 237, 237);
    }

    body {
      font-family: "Helvetica Neue", Helvetica, Arial, serif;
      font-size: 14px;
      line-height: 1.42857143;
      color: rgb(255, 255, 255);
      padding-left: 20px;

      background: url("https://www.wealthandfinance-news.com/wp-
content/uploads/2021/01/online-banking.jpg");

      background-size: cover;
    }

    .containerteam {
      padding: 2px 9px;
      font-size: 20px;
      font-family: 'Times New Roman', Times, serif;
      align-items: center;
    }
  </style>
```

```

.card1 {
  box-shadow: 0 4px 8px 0 rgba(255, 255, 255, 0.2);
  transition: 0.3s;
  width: 20%;
  background-color: #060707;
  border-radius: 5px;
  padding-left: 10px;
}

.card1:hover {
  box-shadow: 0 12px 20px 0 rgba(197, 191, 191, 0.4);
}
</style>
</head>

<body>
  <h1>
    <center>Hello! I am Jasper, your banking bot</center>
  </h1>

  <div class="card1 ">

    <div class="containerteam ">

      <h3><b>PNT2022TMID23608</b></h3>
      <hr>

      <h4><b>Team Memembers: </b></h4>
      <p>Bhuavaneshwari G M</p>
      <p>Miridini V</p>
      <p>Sahana J M</p>
      <p>Suji N</p>
    </div>
  </div>
  <script>
    window.watsonAssistantChatOptions = {
      integrationID: "31fbefba-772f-4174-ae96-b5c12c18676b", // The ID of this integration.
      region: "us-south", // The region your integration is hosted in.
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instance.
      onLoad: function(instance) {
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      }
    };
    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>

```

**GitHub :** <https://github.com/IBM-EPBL/IBM-Project-22981-1659863767>

**Project Demo Link :** [https://drive.google.com/file/d/1iFbF\\_qPKAkCn1Jpi3LEZFy1ww2OoC4\\_q/view](https://drive.google.com/file/d/1iFbF_qPKAkCn1Jpi3LEZFy1ww2OoC4_q/view)