PROJECT REPORT

# AI BASED DISCOURSE FOR BANKING INDUSTRY

**TEAM ID:** PNT2022TMID42870

TEAM MEMBERS:

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## INTRODUCTION:

### Overview:

> Industries are forced to evolve and update their practices due to technologicaladvances and the contemporary market. The banking sector is one of the mostdeveloped sectors and is always looking for the latest technological solutions
that improve its efficiency.

> Net banking websites are complex and involve navigating through a lot of pagesto find the information you need. Bank staff undergoes a lot of stressful situations when communicating with clients directly. Such situations can be avoided gracefully by using chatbots.

> Only 32% of 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 theindustry.

> A smart chatbot takes a query from the user in natural language and gives the appropriate response for the same. This paper aims to discuss the relevance ofchatbots in the banking sector and explore how chatbots can be implemented

using natural language processing techniques that can be used in the bankingindustry.

## LITERATURE SURVEY:

### Existing Problem:

> This paper [1] presents the use of the RASA framework for building smart context-remembering chatbots, it also describes how Rasa NLU works and howits performance is elevated by using intent recognition and entity extraction. Italso compares the accuracies of entity extraction using Rasa NLU and a NN,
results show Rasa NLU performs better to extract entities when whole sentencesare provided as compared to neural networks which require segmented inputs.
This paper discusses Rasa by implementing a chatbot related to the financedomain, using which the users can inquire about stock-related information.

> RASA NLU can introduce a vital component in intelligent chatbot systems. We can compose the system to extract the entity after intent recognition. This can befurther improved for complicated sentences and more entities.

> This paper [2] briefly discusses advancements in the field of AI and how this hasled to major shifts in some organizations about how they operate. It further mentions how the banking industry has moved to use chatbots for providing aninterface to customers so that they can have an assistant throughout the day forservice. This paper also gauges the ability of current chatbots to provide all theservices that a user needs.

> It includes several strategies for managing dialogue in the banking and finance industry based on ontology. Although further use of AI can make the chatbot notonly respond to questions but also self-learning to improve itself in more stages,improving user service quality and also reducing human load.

### Proposed solution:

> The solution to the problem is Artificial intelligence in the banking sector makesbanks efficient, trustworthy, helpful, and more understanding. It is strengthening the competitive edge of modern banks in this digital era. The growing impact of
AI in banking sector minimizes operational costs improves customer support andprocess automation.

> Nearly 40% to 50% of financial and banking service providers are using AI in their processes to harness the power of next-generation AI capabilities. The

companies believe that AI is the future of banking sector which can perform arange of banking operations in faster, easier, and more secure ways.

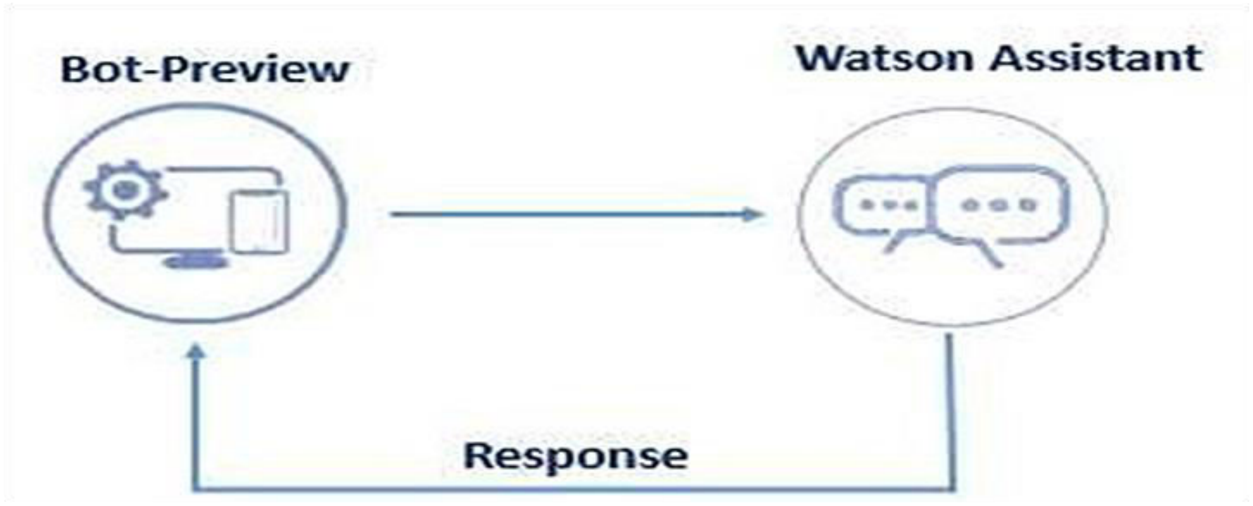
- AI banking Chatbots help customers in many ways. AI-based chatbot service for financial industry is one of the significant use cases of AI in banking sector. AI chatbots in banking are modernizing the way how businesses provide services totheir customers.
- AI chatbots in the banking industry can assist customers 24*7 and give accurateresponses to their queries. These chatbots provide a personalized experience tousers.
- AI chatbots in banking is providing a better customer experience.
- Hence, AI chatbots for banking and finance operations let banks attract customerattention, optimize service quality, and expand the brand mark in the market.

## THEORETICAL ANALYSIS:

### Services Used:

- IBM Watson Assistant

Block diagram:



## Hardware / Software designing:

To complete this project,you should have the following software and packages.

**Softwares:**

- Anaconda Spyder
- 
- IBM Watson studio

**Packages:**

- Flask

## FLOWCHART:

**To accomplish the above task, you must complete the below activities and tasks:**

- Create IBM Services.
- Creating skills & Assistant for Chatbot.
- Creating Savings account action.
- Creating Current account action.Creating
- Loan account action.
- Creating a general query action.

- Creating a Net banking action.
- Create HTML web page.
- Integrate the Watson Chatbot with web page.

## ADVANTAGES & DISADVANTAGES:

### Advantages:

- Round-the-clock service.
- Brand Consistency.
- Increased Productivity.
- Reduced Staffing Needs.
- Consistent Response Rate and Availability.
- Helps with Fraud Prevention.
- Chats can be saved.
- Lower costs.

### Disadvantages:

- Questions must be programmed beforehand.
- Impersonal
- Must keep information up-to-date.
- Technology issues.
- Needs additional measuresto protect identities.

## APPLICATIONS:

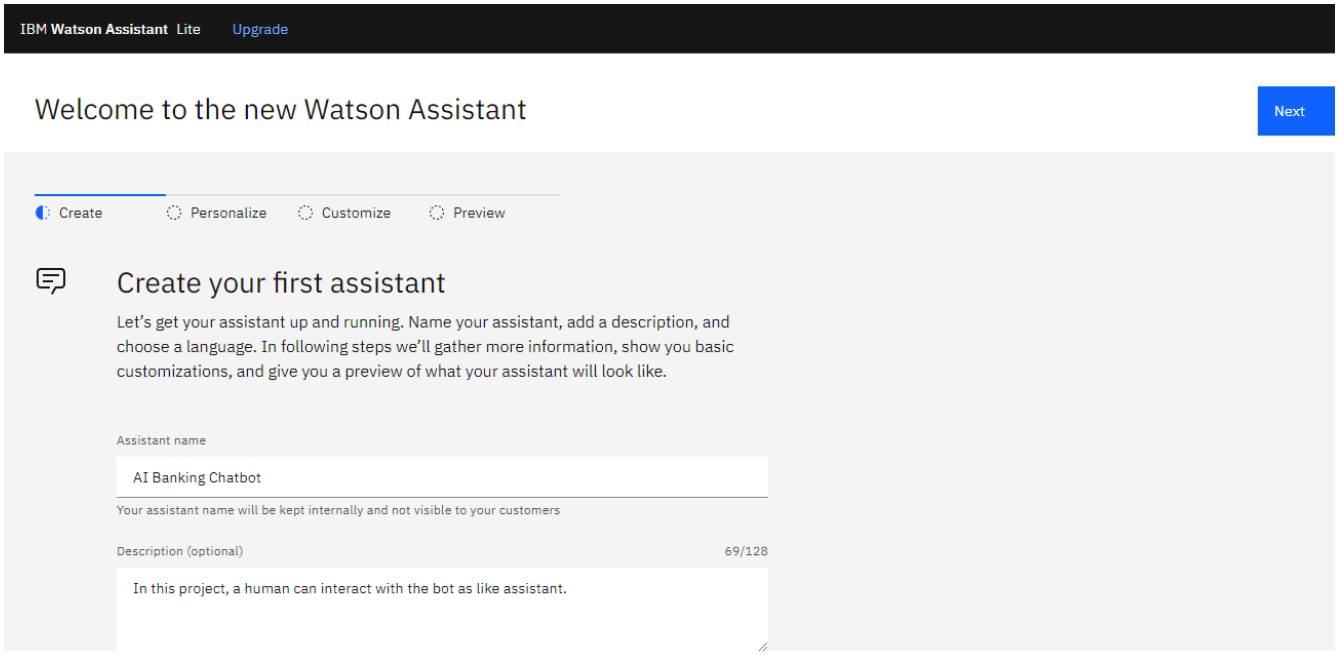
- Banking chatbots have all the data to predict the spending habits of customersand help them keep their finances on track.

## APPENDIX:

### Create IBM Service

In this activity, you will be creating the Necessary IBM service. Thefollowing arethe servicethat you have to create.

- Watson Assistant (fig.1)



Welcome to the new Watson Assistant

Create your first assistant

Let's get your assistant up and running. Name your assistant, add a description, and choose a language. In following steps we'll gather more information, show you basic customizations, and give you a preview of what your assistant will look like.

Assistant name

AI Banking Chatbot

Your assistant name will be kept internally and not visible to your customers

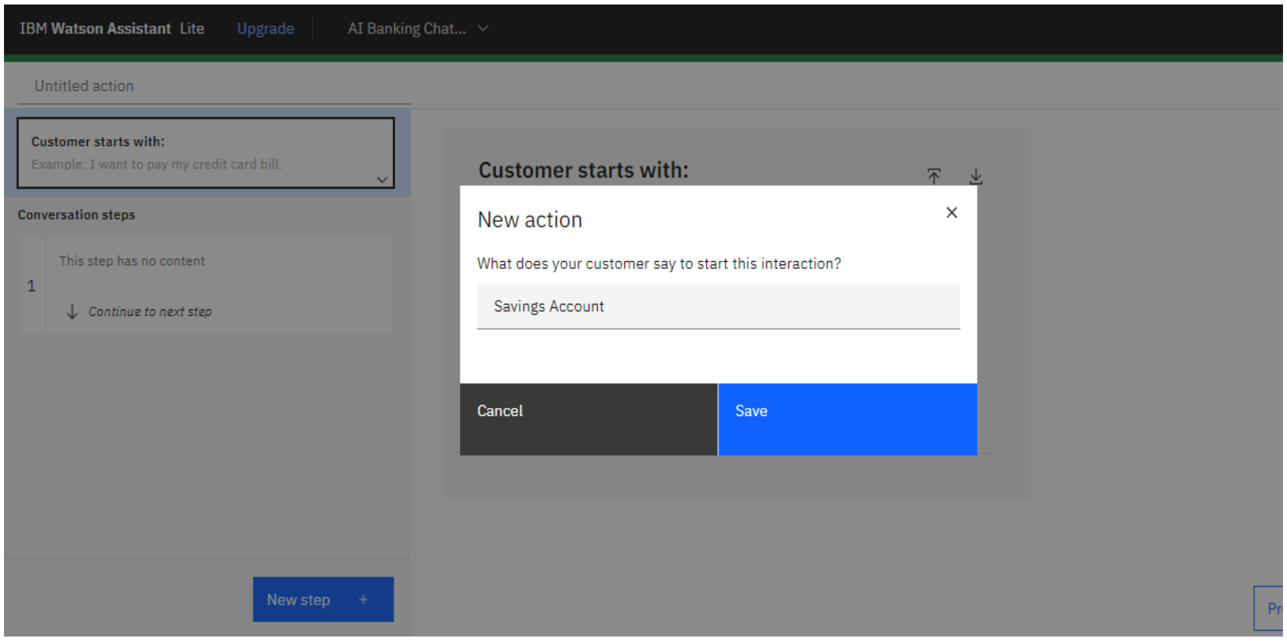
Description (optional) 69/128

In this project, a human can interact with the bot as like assistant.

(Fig.1)

### Creating Skills & Assistant For Chatbot

Skills are nothing but actions and steps. Steps are the subset of actionswhere conversations are built and Assistant is used to integrate skills.



New action

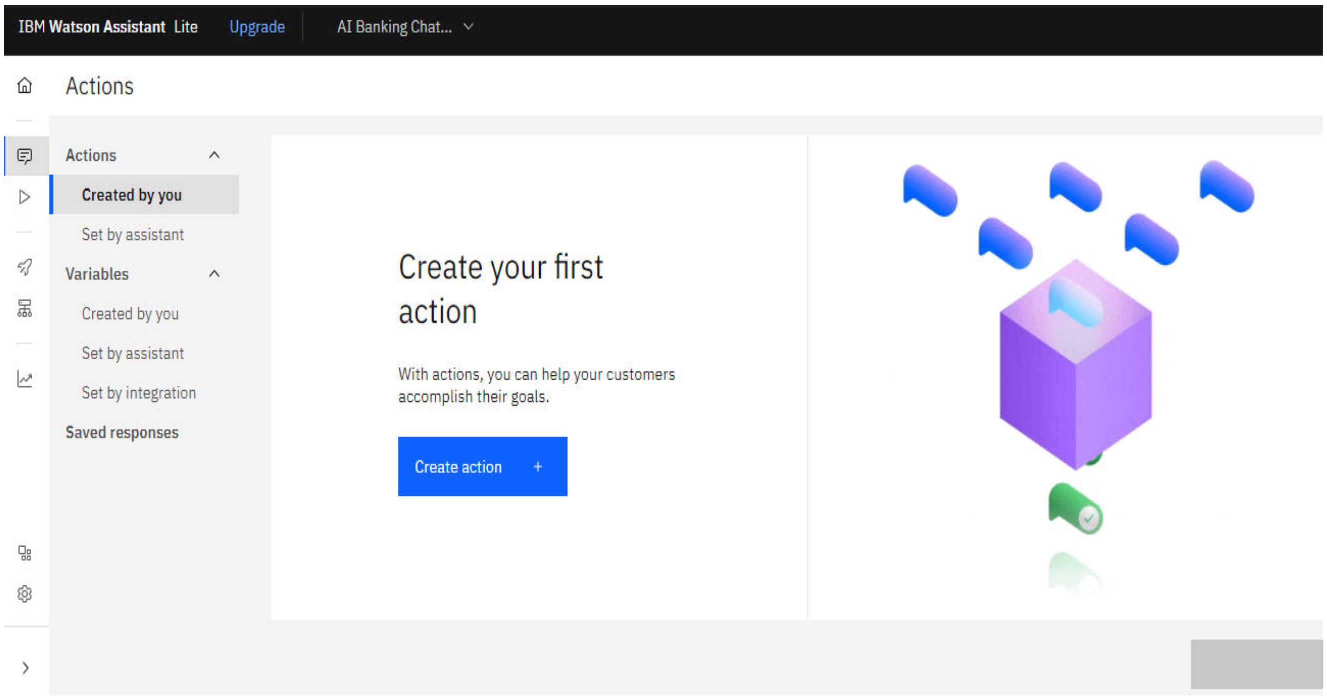
What does your customer say to start this interaction?

Savings Account

Cancel Save

(Fig.2)

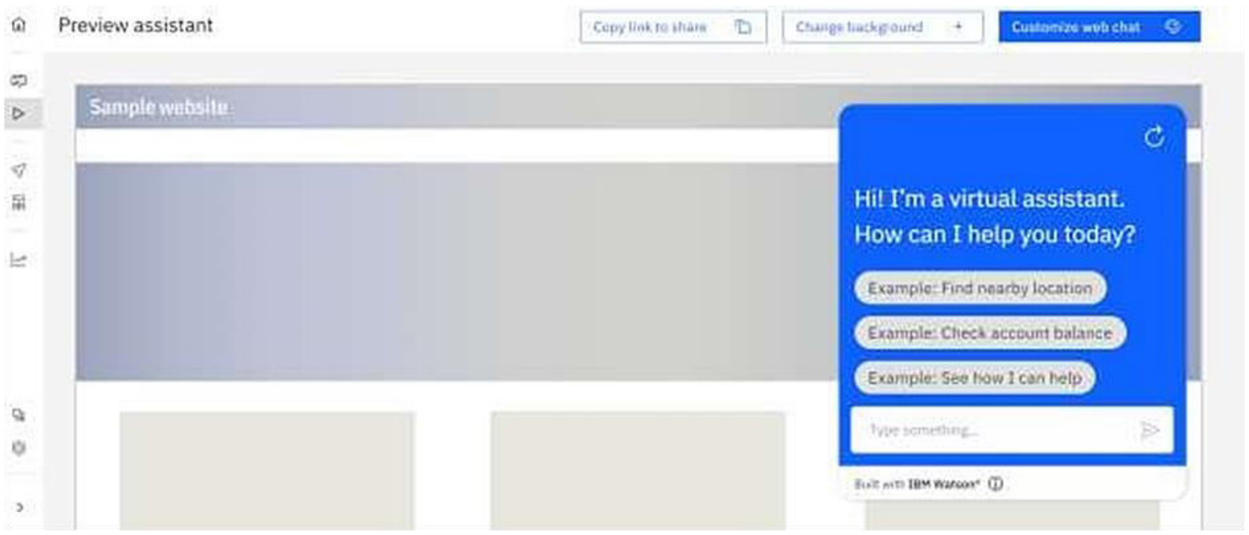
A default template chatbot is created. Need to add actions.



Create your first action

With actions, you can help your customers accomplish their goals.

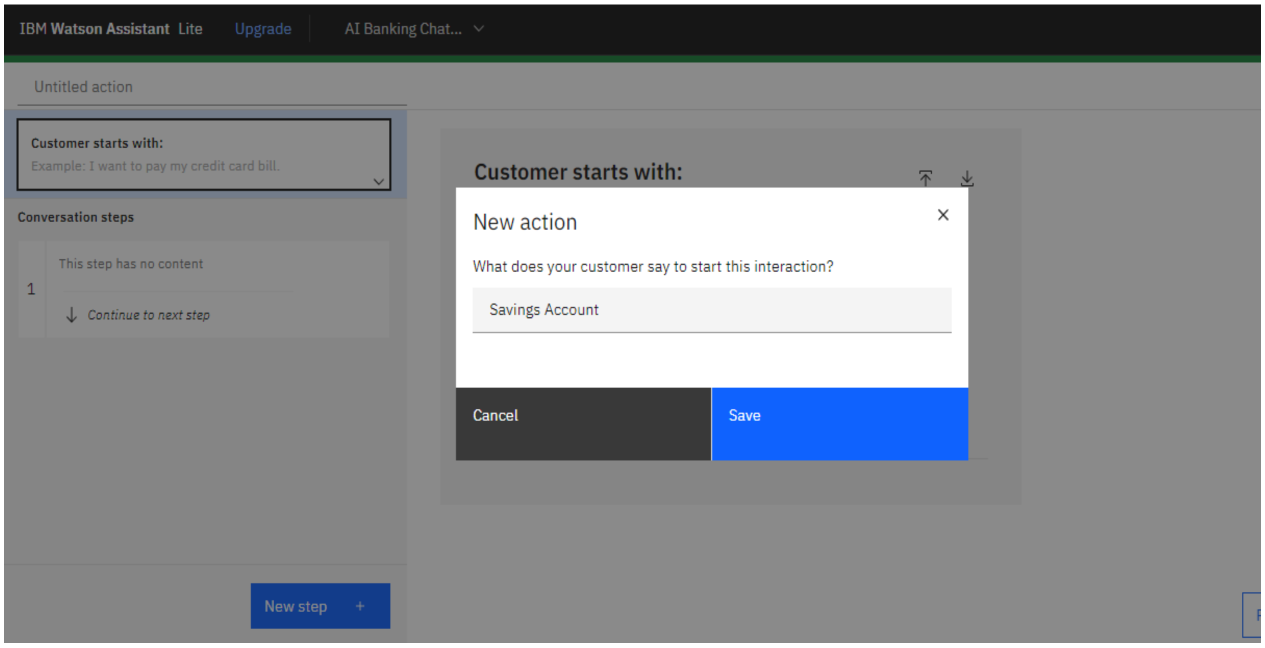
(Fig.3)


Preview assistant
Copy link to share
Change background
Customize web chat
Sample website
Hi! I'm a virtual assistant. How can I help you today?
Example: Find nearby location
Example: Check account balance
Example: See how I can help
Type something...
Built with IBM Watson

(Fig.4)

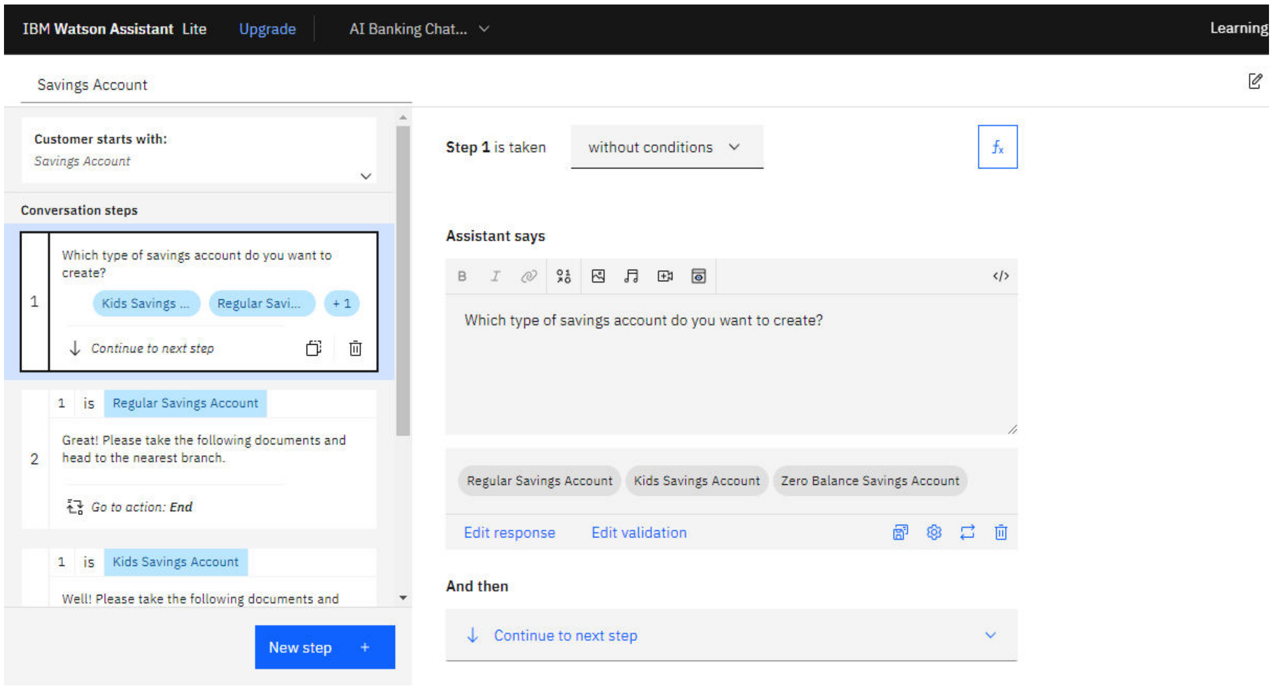
## Creating Saving Account Action

Create a saving account in IBM Watson. Create new **Action** Saving.



(Fig.5)

Add steps in savings action :


IBM Watson Assistant Lite Upgrade AI Banking Chat... Learning

Savings Account

Customer starts with:
*Savings Account*

Conversation steps

1 Which type of savings account do you want to create?
Kids Savings ... Regular Savi... + 1
*Continue to next step*

2 1 is Regular Savings Account
Great! Please take the following documents and head to the nearest branch.
*Go to action: End*

1 is Kids Savings Account
Well! Please take the following documents and

New step +

Step 1 is taken without conditions

Assistant says

Which type of savings account do you want to create?

Regular Savings Account | Kids Savings Account | Zero Balance Savings Account

Edit response Edit validation

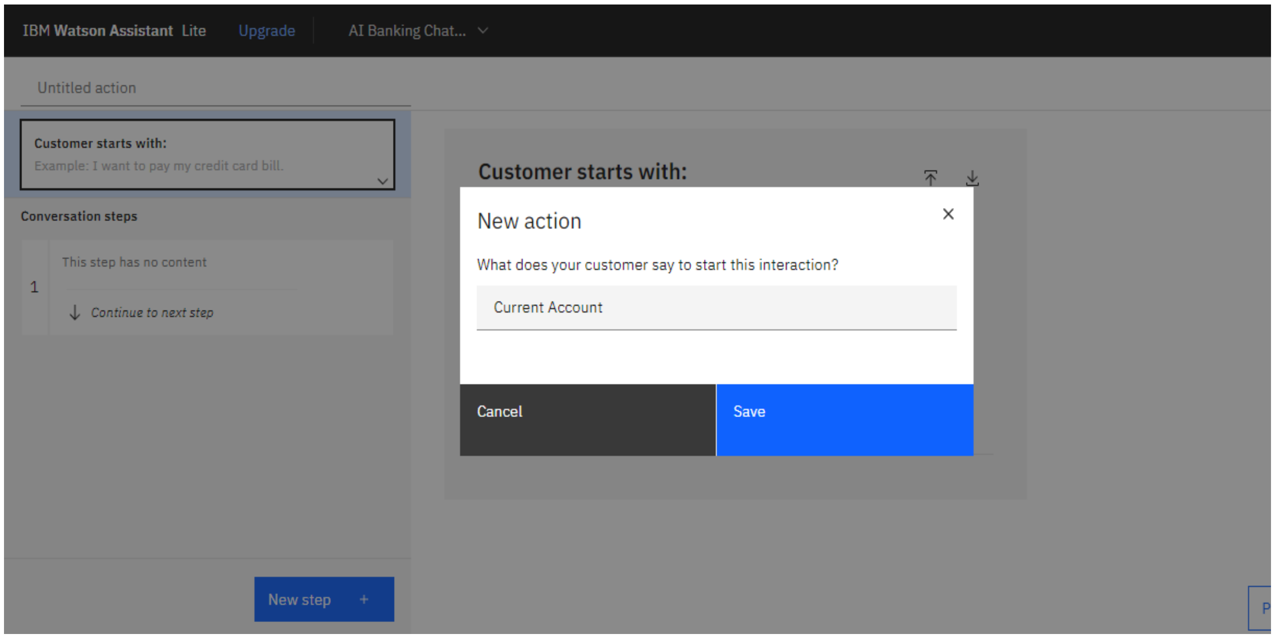
And then

Continue to next step

Fig.6

## Creating Current AccountAction

Create a new **Action** Current for the currentaccount action.


IBM Watson Assistant Lite Upgrade AI Banking Chat...

Untitled action

Customer starts with:
Example: I want to pay my credit card bill.

Conversation steps

1 This step has no content
*Continue to next step*

New step +

Customer starts with:

New action

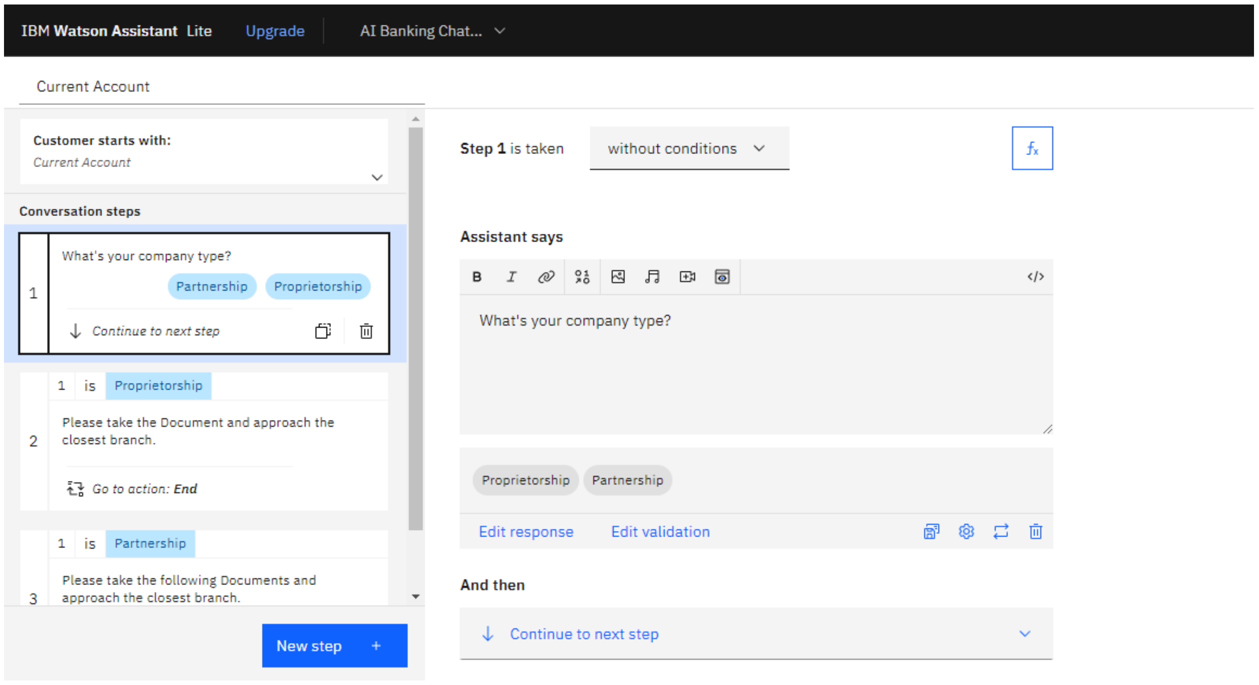
What does your customer say to start this interaction?

Current Account

Cancel Save

Fig.7

Add steps in Current Account action :


IBM Watson Assistant Lite Upgrade AI Banking Chat...

Current Account

Customer starts with:
*Current Account*

Conversation steps

1 What's your company type?
Partnership Proprietorship
*Continue to next step*

2 1 is Proprietorship
Please take the Document and approach the closest branch.
*Go to action: End*

3 1 is Partnership
Please take the following Documents and approach the closest branch.

New step +

Step 1 is taken without conditions

Assistant says

What's your company type?

Proprietorship Partnership

Edit response Edit validation

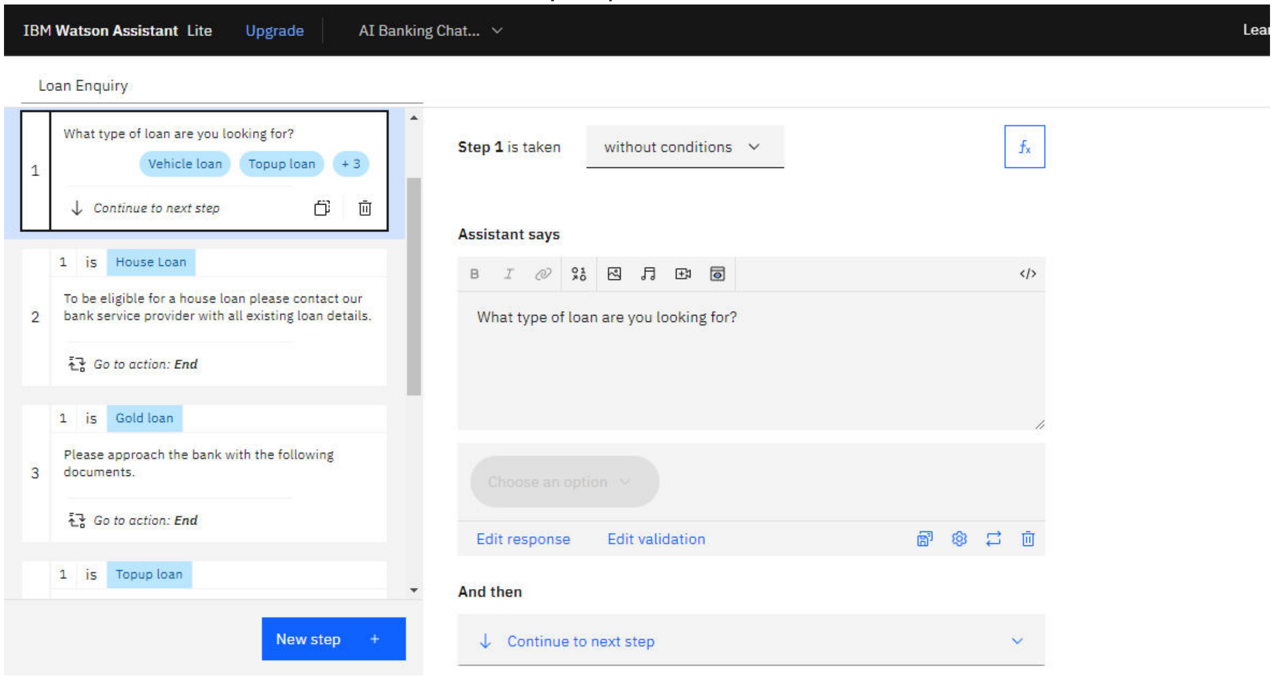
And then

Continue to next step

Fig.8

## Creating Loan Account Action

Loan action is created with the necessary steps.


IBM Watson Assistant Lite Upgrade AI Banking Chat... Lear

Loan Enquiry

1 What type of loan are you looking for?
Vehicle loan Topup loan + 3
*Continue to next step*

2 1 is House Loan
To be eligible for a house loan please contact our bank service provider with all existing loan details.
*Go to action: End*

3 1 is Gold loan
Please approach the bank with the following documents.
*Go to action: End*

1 is Topup loan

New step +

Step 1 is taken without conditions

Assistant says

What type of loan are you looking for?

Choose an option

Edit response Edit validation

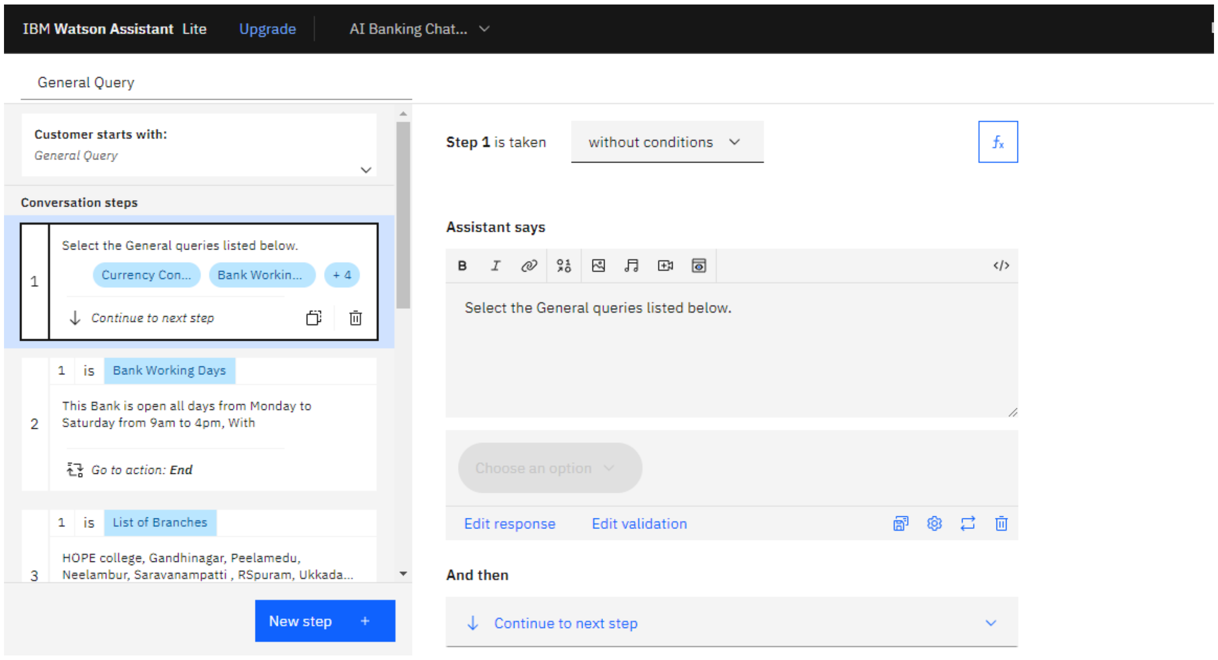
And then

Continue to next step

Fig.9

## Creating GeneralQuery Action

General query action is created with the necessary steps.


IBM Watson Assistant Lite Upgrade AI Banking Chat...

General Query

Customer starts with:
*General Query*

Conversation steps

1 Select the General queries listed below.
Currency Con... Bank Workin... + 4
Continue to next step

2 1 is Bank Working Days
This Bank is open all days from Monday to Saturday from 9am to 4pm, With
Go to action: End

3 1 is List of Branches
HOPE college, Gandhinagar, Peelamedu, Neelambur, Saravanampatti , RSpuram, Ukkada...

New step +

Step 1 is taken without conditions

Assistant says

Select the General queries listed below.

Choose an option

Edit response Edit validation

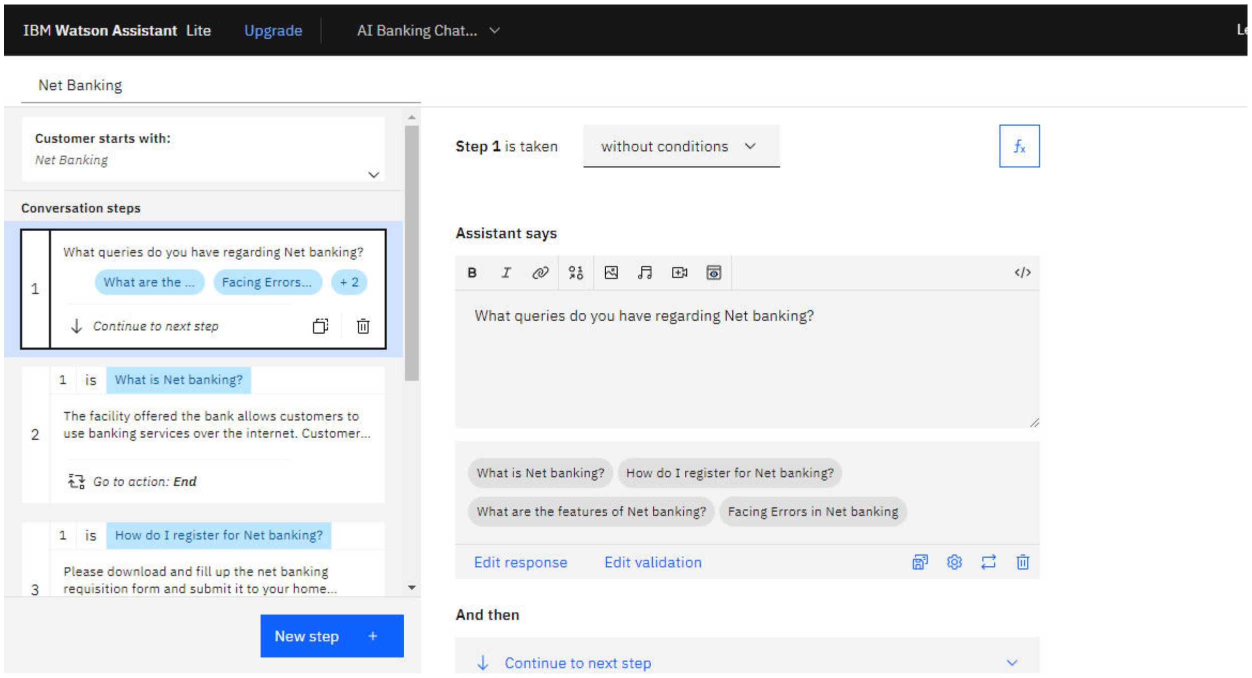
And then

Continue to next step

Fig.9

## Creating Net Banking Action

Net banking action is created with the necessary steps.


IBM Watson Assistant Lite Upgrade AI Banking Chat...

Net Banking

Customer starts with:
*Net Banking*

Conversation steps

1 What queries do you have regarding Net banking?
What are the ... Facing Errors... + 2
Continue to next step

2 1 is What is Net banking?
The facility offered the bank allows customers to use banking services over the internet. Customer...
Go to action: End

3 1 is How do I register for Net banking?
Please download and fill up the net banking requisition form and submit it to your home...

New step +

Step 1 is taken without conditions

Assistant says

What queries do you have regarding Net banking?

What is Net banking? How do I register for Net banking?
What are the features of Net banking? Facing Errors in Net banking

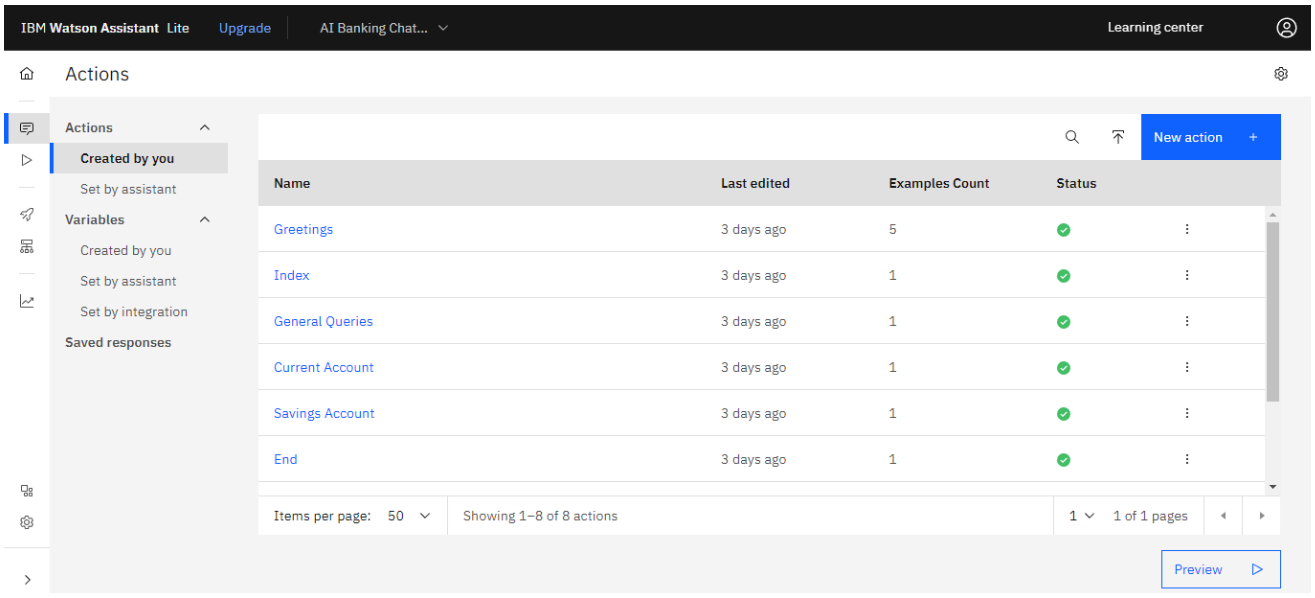
Edit response Edit validation

And then

Continue to next step

Fig.10

**In addition to this greeting, end greeting , index and end actions are also created.**



| Name | Last edited | Examples Count | Status |
|---|---|---|---|
| Greetings | 3 days ago | 5 | ✓ |
| Index | 3 days ago | 1 | ✓ |
| General Queries | 3 days ago | 1 | ✓ |
| Current Account | 3 days ago | 1 | ✓ |
| Savings Account | 3 days ago | 1 | ✓ |
| End | 3 days ago | 1 | ✓ |

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

Fig.11

## Creating Assistant & Integrate With Flask Web Page

You will be creating a banking bot in this activity that has the following capabilities

1. The Bot should be able to guide a customer to create a bank account.
2. The Bot should be able to answer loan queries.
3. The Bot should be able to answer general banking queries.
4. The Bot should be able to answer queries regarding net banking.
5. With the help of this bot, you can get all the required details related to banking.

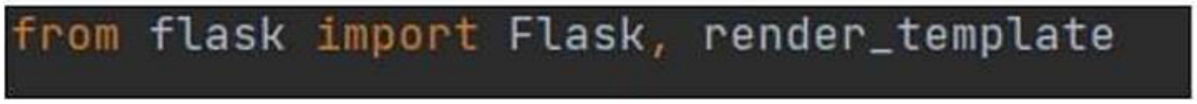
Let us build our flask application which will be running in our local browser with a user interface.

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

**<u>Build Python Code</u>**

**1: Importing Libraries**

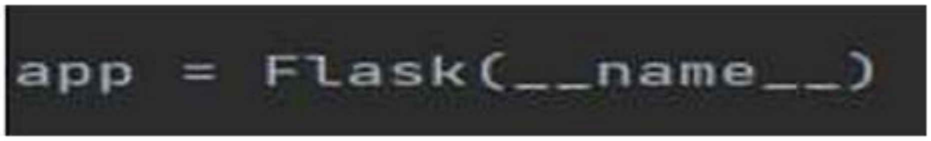
The first step is usually importing the libraries that will be needed in the program.



```python
from flask import Flask, render_template
```

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

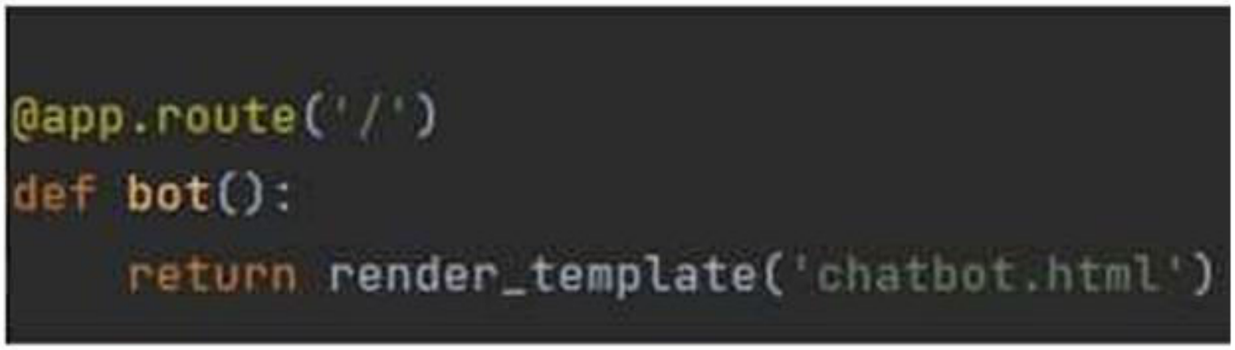
**2: Creating our flask application and loading**



```python
app = Flask(__name__)
```

**3: Routing to the Html Page**

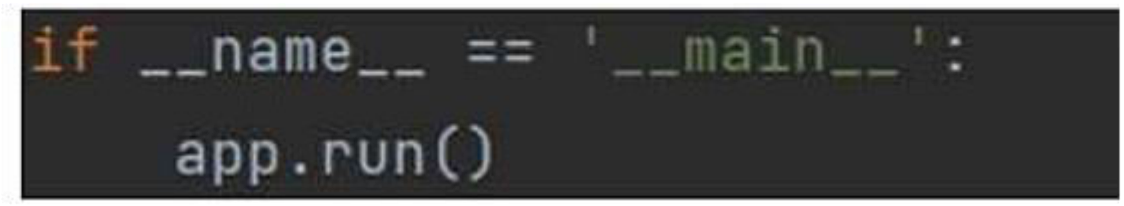
Here, the declared constructor is used to route to the HTML page createdearlier.
The '/'  route is bound with the bot function. Hence,when the home page of a web server is opened in the browser, the HTML page will be rendered.



```python
@app.route('/')
def bot():
    return render_template('chatbot.html')
```

**Main Function :**

This is used to run the application in localhost.



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

**Build HTML Code**

- We use HTML to create the front-end part of the web page.
- Here, we have created 1 HTML page-Chatbot.html
- Chatbot.html displays the home page which integrates with Watson Assistant.
- A simple HTML page is created. Auto-generated source code from IBM Watson Assistant is copied and pasted inside the body tag

**Run The Application**

- Open the anaconda prompt from the start menu.
- Navigate to the folder where your app.pyresides.
- Now type the "python app.py" command.
- It will show the local host where your app is running on http://127.0.0.1.5000/
- Copy that localhost URL and open that URL in the browser. It does navigate towhere you can view your web page.

## Source Code:

### CHATBOT.HTML

```
<!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>AI ChatBot Discourse For Banking</title>
   <!-- Css Link -->
   <link rel="stylesheet" href="../static/css/chatbot.css">
   <!-- Favicon -->
   <link rel="shortcut icon" href="../static/images/favicon_io (1)/android-chrome-512x512.png"
type="image/x-icon">
   <!-- Font Awesome Link -->
   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/6.2.0/css/all.min.css">
</head>
<body>
   <div class="container">
      <header>
                  <a href="Project.html" class="logo"><img src="../static/images/robot.png"
alt="robot" /></a>
         <ul>
            <li><a href="#">Home</a></li>
            <li><a href="#">Other Services</a></li>
            <li><a href="#">Apply Loan</a></li>
         </ul>
         <div class="searchbox">
               <input type="text" name="search" placeholder="Search" />
               <i class="fa-solid fa-magnifying-glass"></i>
         </div>
      </header>
      <div class="content">
         <h3>This Project is about AI ChatBot Discourse <br>for Banking Industry</h3>
         <a href="login.html"><button class="btn">LogIn</button></a>
         <a href="register.html"><button class="btn">Register</button></a>
      </div>
      <div class="teamid">
        <h6>TEAM ID: PNT2022TMID42870</h6>
        <h6>TEAM MEMBERS:</h6>
        <p>SABARINATHAN R [TL] - 712219205030 </p>
        <p>IRUTHAYA VENISH DURAI S [TM1] - 712219205014</p>
        <p>RANGESH S [TM2] - 712219205028</p>
        <p>SIVASANKAR R [TM3] - 712219205034</p>
      </div>
   </div>
```

```
<script>
  window.watsonAssistantChatOptions = {
    integrationID: "8686d2f5-c1b5-4d84-8f76-2aa019b3a056", // The ID of this integration.
    region: "au-syd", // The region your integration is hosted in.
    serviceInstanceID: "998f30c7-0d37-42fc-bd14-56099a2ba361", // 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>
```

## LOGIN.HTML

```
<!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">
	<!-- Css link -->
	<link rel="stylesheet" type="text/css" href="../static/css/login.css">
	<title>Login</title>
</head>
<body>
<div class = "login-box">
	<h2>Login</h2>
	<form>
		<div class = "user-box">
			<input type = "text" name = "" required = "">
			<label>Username</label>
		</div>
		<div class = "user-box">
			<input type = "password" name = "" required = "">
			<label>Password</label>
		</div>
		<div class="button-form">
			<a id = "submit" href = "Project.html">Submit</a>
			<div id = "register">
				<p>Don't have an account ? </p>
				<a href="register.html"> Register</a>
			</div>
		</div>
	</form>
```

```
</div>
</body>
</html>
```

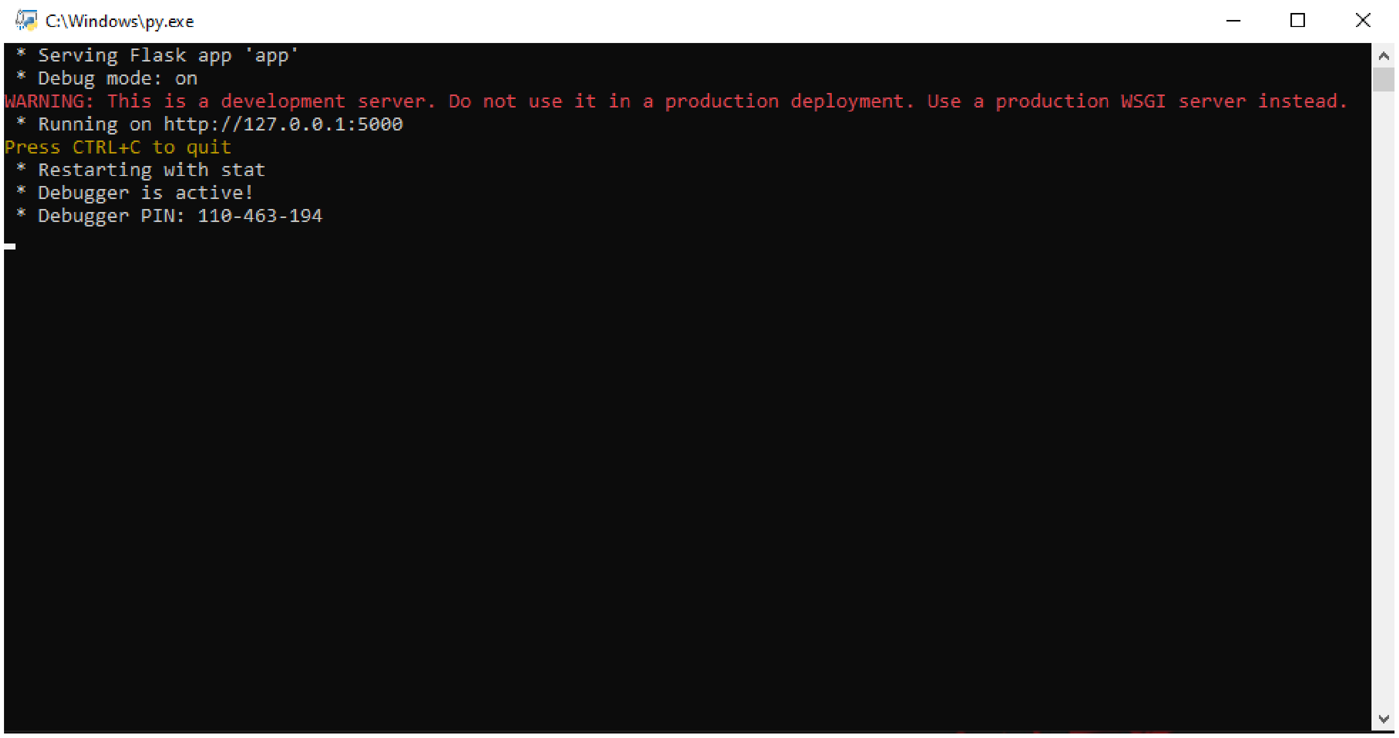
## REGISTRATION.HTML

```
<link rel="stylesheet" type="text/css" href="../static/css/register.css">
<div class="register-box">
        <h2>Register</h2>
        <form>
                <div class="user-box">
                        <input type = "text" name = "" required = "">
                        <label>Enter Name</label>
                </div>
                <div class = "user-box">
                        <input type = "Email" email = "" required = "">
                        <label>Enter Mail ID</label>
                </div>
                <div class = "user-box">
                        <input type = "password" name = "" required = "">
                        <label>Enter Password</label>
                </div>
                <div class = "user-box">
                        <input type = "password" name = "" required = "">
                        <label>Confirm Password</label>
                </div>
                <div class="button-form">
                        <a id = "register" href = "Project.html">Register</a>
                        <div id = "login">
                                <p>Already have an account ?</p>
                                <a href="login.html"> Login</a>
                        </div>
                </div>
        </form>
</div>
```

## app.py :

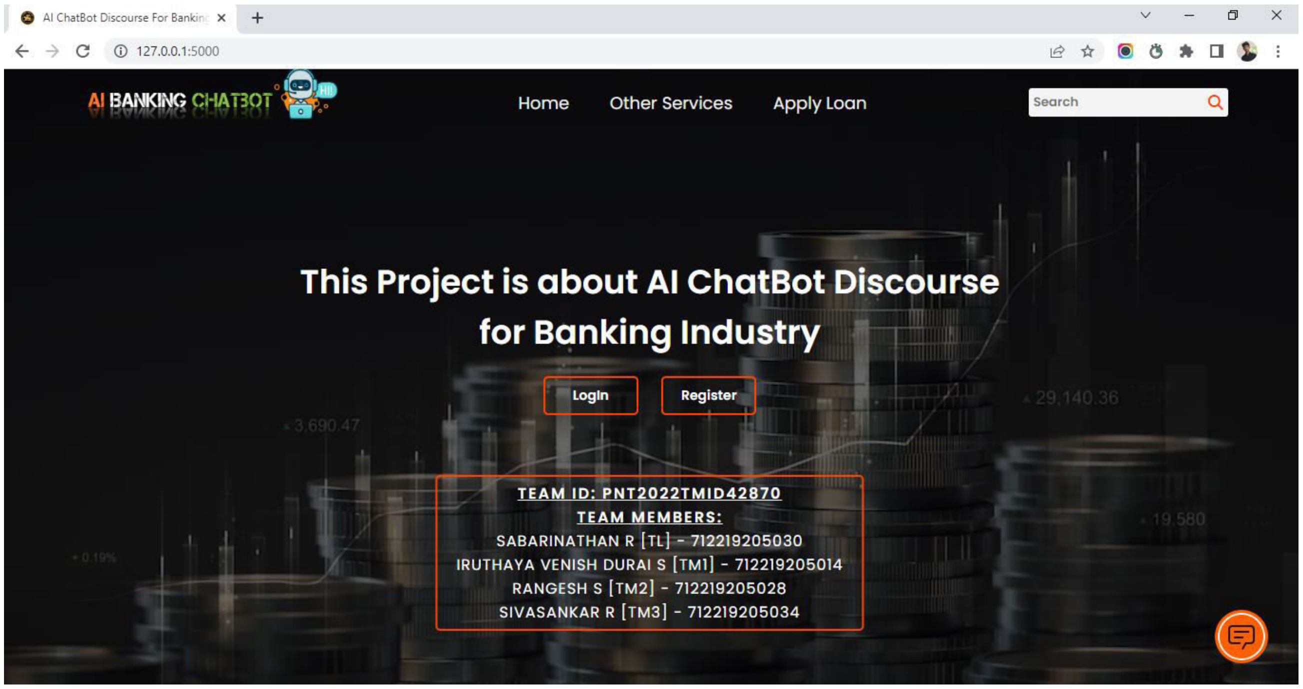
```
from flask import Flask,request,redirect
from flask import render_template
app = Flask(__name__,template_folder='templates')


@app.route('/login.html')
def login():
   return render_template("login.html")

@app.route('/register.html')
def register():
   return render_template("register.html")

@app.route('/')
def bot():
   return render_template('Project.html')
if __name__ == "__main__":
   app.run(debug=True)
```

## OUTPUT :



C:\Windows\py.exe

```
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 110-463-194
```



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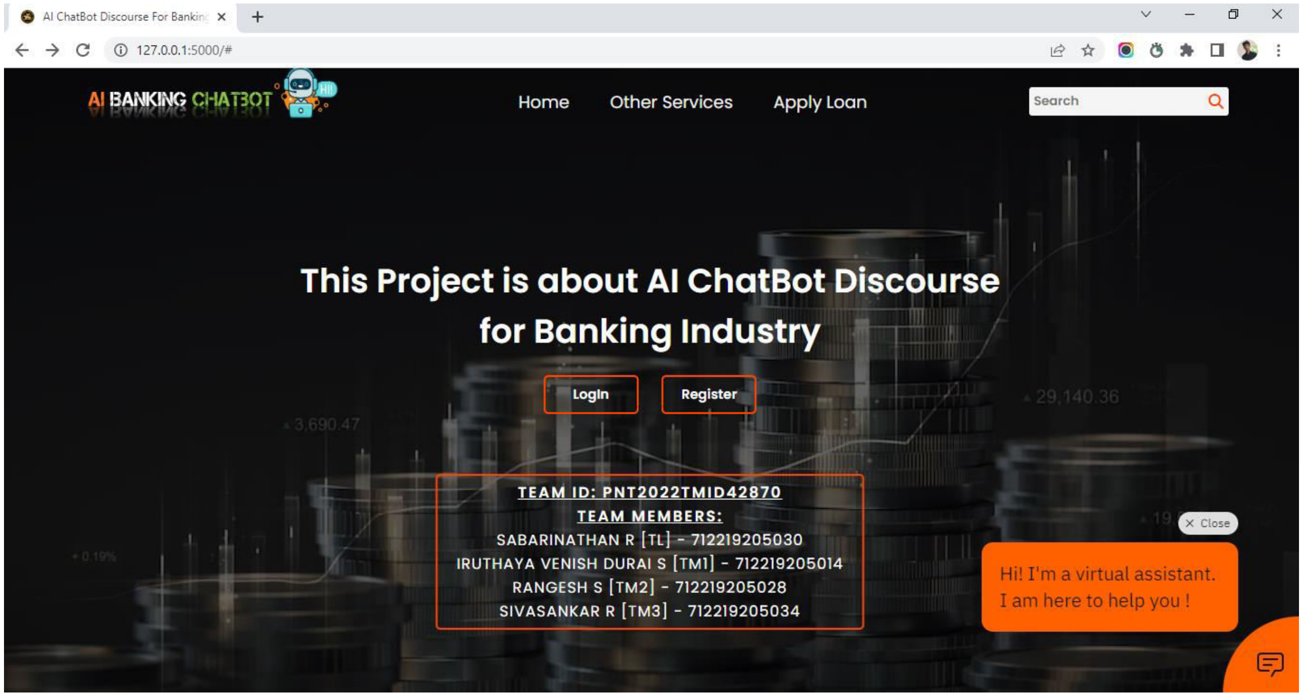

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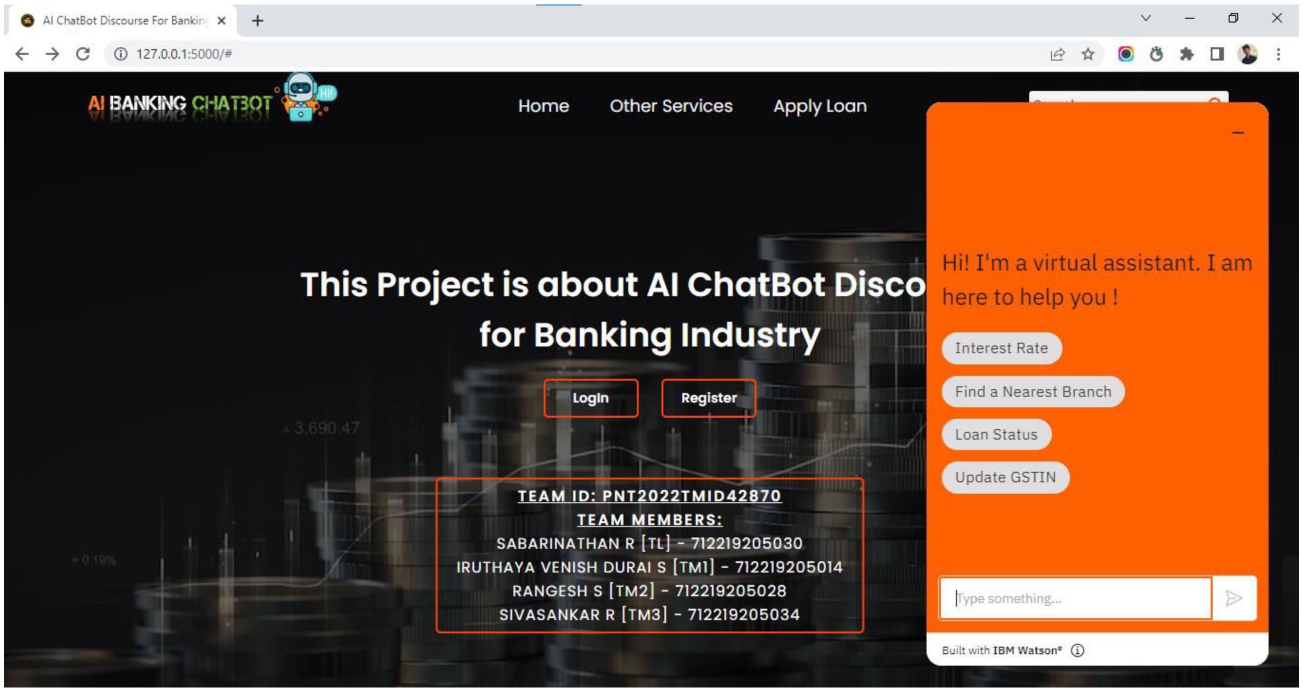
Hi! I'm a virtual assistant.
I am here to help you !



AI ChatBot Discourse For Bankin

127.0.0.1:5000/#

AI BANKING CHATBOT

Home Other Services Apply Loan

This Project is about AI ChatBot Disco
for Banking Industry

Login Register

TEAM ID: PNT2022TMID42870
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RANGESH S [TM2] - 712219205028
SIVASANKAR R [TM3] - 712219205034

Hi! I'm a virtual assistant. I am here to help you !

Interest Rate

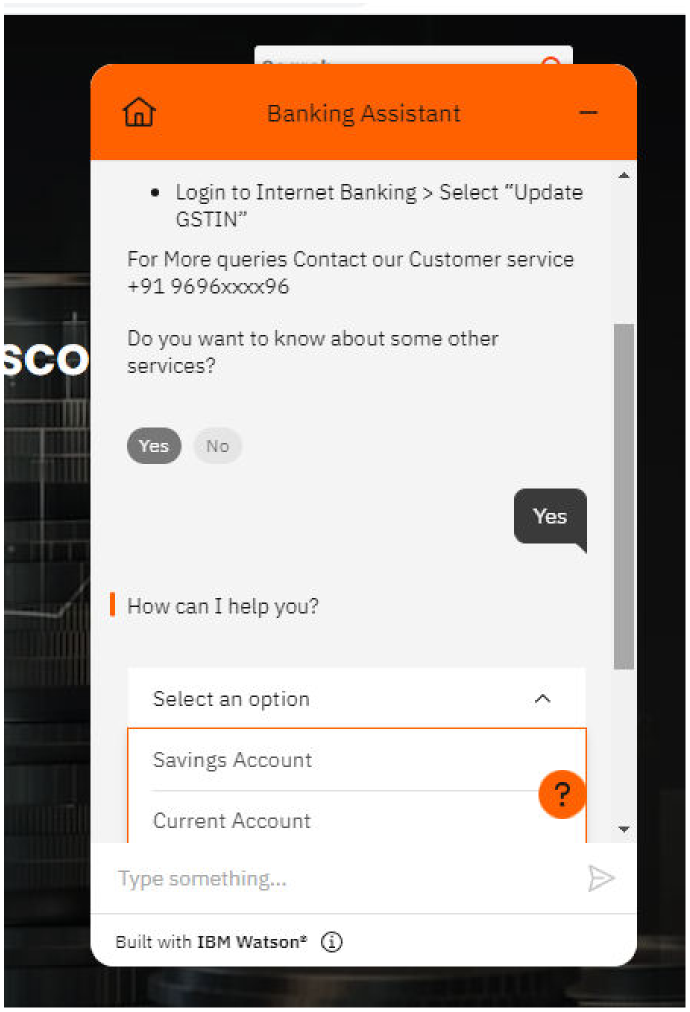
Find a Nearest Branch

Loan Status

Update GSTIN

Type something...

Built with IBM Watson®



Banking Assistant

- Login to Internet Banking > Select "Update GSTIN"

For More queries Contact our Customer service +91 9696xxxx96

Do you want to know about some other services?

Yes No

Yes

How can I help you?

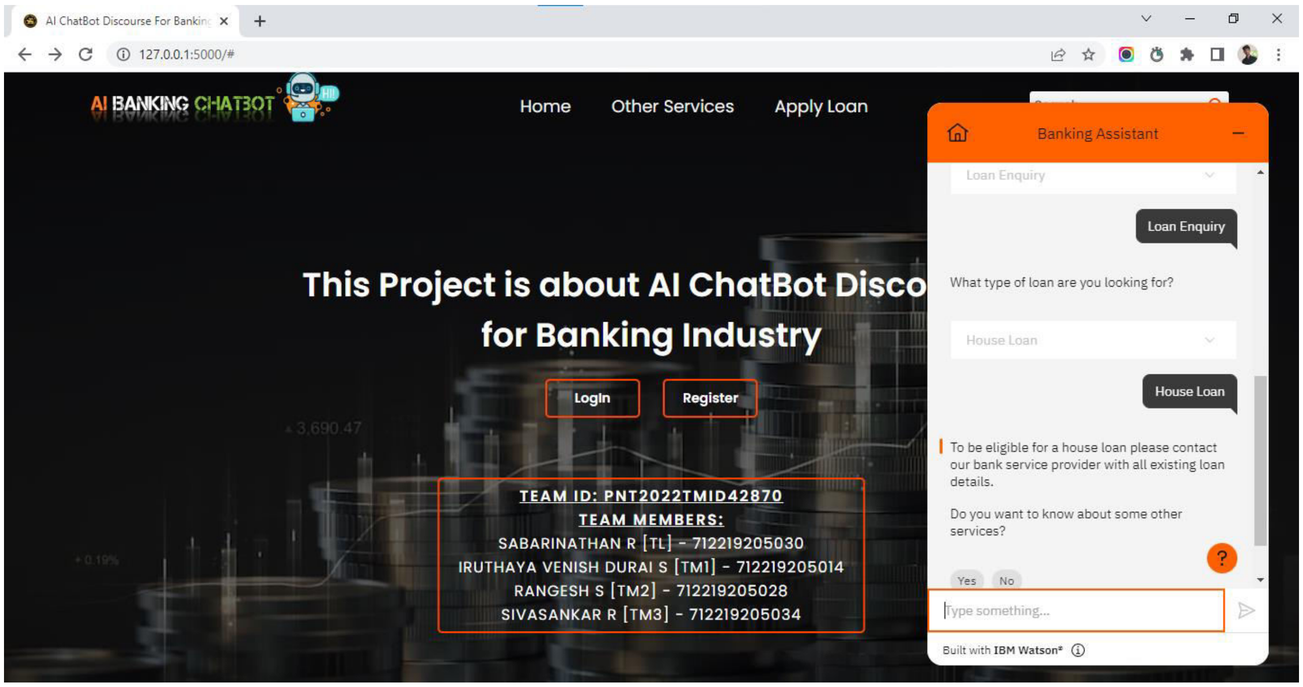
Select an option

Savings Account

Current Account

Type something...

Built with IBM Watson®



This Project is about AI ChatBot Disco
for Banking Industry

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Loan Enquiry

Loan Enquiry

What type of loan are you looking for?

House Loan

House Loan

To be eligible for a house loan please contact our bank service provider with all existing loan details.

Do you want to know about some other services?

Yes No

Type something...

## AI BANKING CHATBOT:

### PREVIEW OF CHATBOT:

https://web-chat.global.assistant.watson.appdomain.cloud/preview.html?backgroundImageURL=https%3A%2F%2Fau-syd.assistant.watson.cloud.ibm.com%2Fpublic%2Fimages%2Fupx-998f30c7-0d37-42fc-bd14-56099a2ba361%3A%3A8cbfa33c-7ee8-472e-85b4-437e2020bd5a&integrationID=8686d2f5-c1b5-4d84-8f76-2aa019b3a056&region=au-syd&serviceInstanceID=998f30c7-0d37-42fc-bd14-56099a2ba361

## REFERENCE:

1. Jiao, Anran. (2020). An Intelligent Chatbot System Based on Entity Extraction Using RASA NLU and Neural Network. Journal of Physics: Conference Series. 1487. 012014.10.1088/1742-6596/1487/1/012014.

2. Fathima, Sasha & Student, Suhel & Shukla, Vinod & Vyas, Dr Sonali & Mishra, Ved P. (2020). Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language.10.1109/ICRITO48877.2020.9197825.

3. Singh, Netra& Singh, Devender.(2019). Chatbots and Virtual Assistantin Indian Banks.Industrija. 47. 75-101. 10.5937/industrija47- 24578.

4. Petr Lorenc, "Joint model for intent and entity recognition" in arXiv:2109.03221v1 [cs.CL]7 Sep 2021

5. The Rasa documentation. [Online].Available: https: //rasa.com/docs/rasa/2.x

6. Django documentation. [Online]. Available: https://docs.djangoproject.com/en/4.0/
7. Adamopoulou, Eleni, and LefterisMoussiades. "An overviewof chatbot technology." In IFIP International Conference on Artificial Intelligence Applications and Innovations, pp. 373-383. Springer, Cham, 2020.
8. Cahn, Jack. "CHATBOT: Architecture, design, & development." University of Pennsylvania School of Engineering and Applied Science Department of Computerand Information Science (2017)
9. Hien, Ho Thao, Pham-Nguyen Cuong, Le Nguyen Hoai Nam, Ho Le Thi Kim Nhung, and Le Dinh Thang. "Intelligent assistants in higher-education environments: the FIT-EBot, a chatbot for administrative and learning support." In Proceedings of the ninth international symposiumon information and communication technology, pp. 69- 76. 2018.

10. Waterman, Chinia. 2018. "Consumer Online Banking Trends 2018". Humley. https://humleyai.com/2018/09/18/consumer-online-banking- trends-2018/.

11. "Chatbots, A Game ChangerFor Banking & Healthcare, Saving $8 BillionAnnually By 2022". 2017. Juniperresearch.Com. https://www.juniperresearch.com/press/chatbots-a-game-changer- for- banking-healthcare.

12. Pal, Singh Netra, and Devender Singh."Chatbots and virtualassistantin Indianbanks." Industrija 47, no. 4 (2019): 75-101