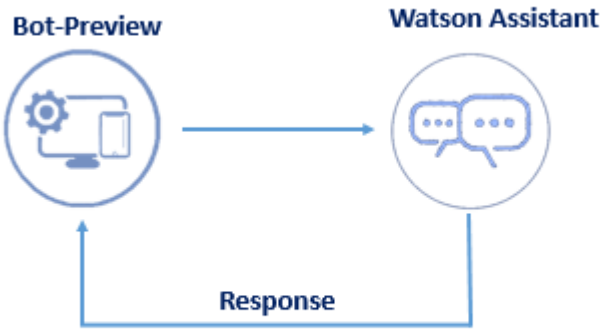
AI Based Discourse For Banking Industry Using Watson Assistant

Project Description:

In this project, we will be building a chatbot using Watson's assistant. This chat should have the following capabilities:

- The Bot should be able to guide a customer to create a bank account.
- The Bot should be able to answer loan queries.
- The Bot should be able to answer general banking queries.
- The Bot should be able to answer queries regarding net banking.

Technical Architecture:



Pre requisites:

To complete this project, you must required following software's, concepts and packages

- **Anaconda navigator and pycharm:**
  - Refer the link below to download anaconda navigator
  - Link : https://youtu.be/1ra4zH2G4o0
- **Python packages:**
  - Open anaconda prompt as administrator
  - Type "pip install numpy" and click enter.
  - Type "pip install pandas" and click enter.
  - Type "pip install scikit-learn" and click enter.
  - Type "pip install matplotlib" and click enter.
  - Type "pip install scipy" and click enter.
  - Type "pip install pickle-mixin" and click enter.

- Type ”pip install seaborn” and click enter.
- Type “pip install Flask” and click enter.

Prior Knowledge:

You must have prior knowledge of following topics to complete this project.

- **ML Concepts**
  - Supervised learning: https://www.javatpoint.com/supervised-machine-learning
  - Unsupervised learning: https://www.javatpoint.com/unsupervised-machine-learning
  - Regression and classification
  - Decision tree: https://www.javatpoint.com/machine-learning-decision-tree-classification-algorithm
  - Random forest: https://www.javatpoint.com/machine-learning-random-forest-algorithm
  - KNN: https://www.javatpoint.com/k-nearest-neighbor-algorithm-for-machine-learning
  - Xgboost: https://www.analyticsvidhya.com/blog/2018/09/an-end-to-end-guide-to-understand-the-math-behind-xgboost/
  - Evaluation metrics: https://www.analyticsvidhya.com/blog/2019/08/11-important-model-evaluation-error-metrics/
- **Flask Basics** : https://www.youtube.com/watch?v=lj4I_CvBnt0
- **What is Chatbot:** https://www.youtube.com/watch?v=38sL6pADCog&t=9s
- **Watson Assistant, Intents, Entities, Dialogs : https://www.youtube.com/watch?v=h-u-5f8fZtc&feature=emb_logo**
- **How to Build Intents :** https://www.youtube.com/watch?v=OPdOCUPGMIQ
- **How to Build Entities :** https://www.youtube.com/watch?v=o-uhdw6bIyI&feature=emb_imp_woyt
- **How to Build Dialogs :** https://www.youtube.com/watch?v=XkhAMe9gSFU

Project Objectives:

After completing this project, you will learn how to

- Work with Watson Assistant
- Create Skills in Watson Assistant
- Use Entities, Intents, Dialogues
- Deploy skill to generate a preview link

Project Flow:

- User interacts with the UI to enter the input.
- Entered input is analyzed by the model which is integrated.
- Once model analyses the input the prediction is showcased on the UI

To accomplish this, we have to complete all the activities listed below,

- Data collection
  - Collect the dataset or create the dataset
- Visualizing and analyzing data
  - Univariate analysis
  - Bivariate analysis
  - Multivariate analysis
  - Descriptive analysis
- Data pre-processing
  - Checking for null values
  - Handling outlier
  - Handling categorical data
  - Splitting data into train and test
- Model building
  - Import the model building libraries
  - Initializing the model
  - Training and testing the model
  - Evaluating performance of model
  - Save the model
- Application Building
  - Create an HTML file
  - Build python code

LITERATURE SURVEY

Existing problem

Banking is one the crucial sector, it deals with financial transactions which can be availed by everyone, but banks are not able to resolve the queries of customers at all times related to the products or services in satisfactory way 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 needs 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 centres as well as providing them with relevant suggestions.

- Who does the problem affect? A customer of the bank.
- What are the boundaries of the problem? Customers who have queries related to banking or trying to use various services of the bank.
- What is the issue? Customers need to visit banks frequently for simple queries. Banks are not able to answer huge volumes of customers queries efficiently.
- When does the issue occur? When the customer is unable to visit a bank.
- Where does the issue occur? It occurs in banking industries.
- Why is it important that we fix the problem? It addresses the queries of customers immediately and effectively in a cost efficient manner.
- What solution to solve this issue? Chatbot should be able to answer any general banking queries on account creation, loan, net banking, other services etc. AI chatbots can help the customers to complete their work quickly and efficiently.
- What methodology used to solve the issue? Artificial intelligence mimics the human brain in order to make chatting with the chatbot more life- like.

Functional Requirements

Savings Account Related Actions

- Type of Savings Account Creation Details
- Interest Rate
- Minimum Balance
- Debit Card
- Credit Card

Current Account Related Actions

- Type of Company
- Current Account Closure Steps
- Update GSTIN
- Zero Balance Current Account

Loan Account Related Actions

- Type of Loan
- How long for approval
- Available Loan Amounts
- Loan Status
- Joint Loan

General Queries Related Actions

- Bank Working Days
- List of Braches
- Storage Locker Facility
- Currency Conversion Facility
- CIBIL
- Find a nearest branch

Net Banking Related Actions

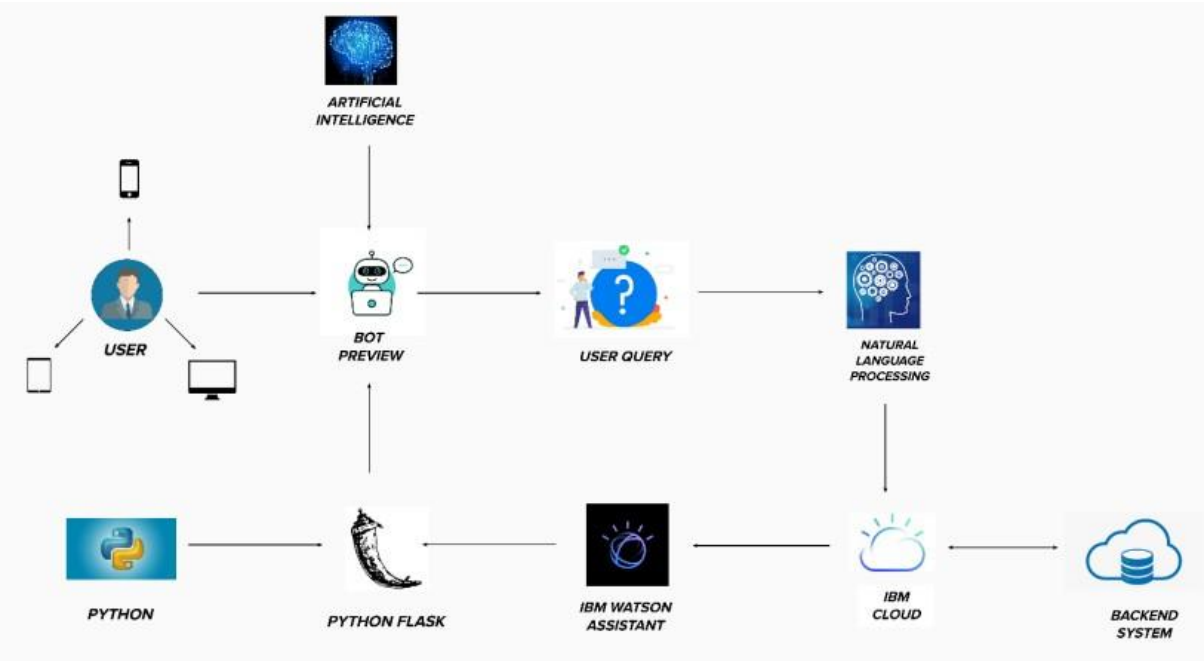
- Login Steps
- Change Net Banking Password
- Daily Limit
- Types of Fund Transfer
- Add Beneficiary

Benefits

AI will empower banking organizations to completely redefine how they operate, establish innovative products and services, and most importantly impact customer experience interventions.AI is used in banking industry to minimize the chances of fraud and scam. It is also used to carry out effective decision-making. Net-banking 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. Re-skilling the banking workforce to cooperate and collaborate effectively with Artificial Intelligence will enable not only efficiency but futuristic innovation and continuous growth.AI can be best described as the computerized processes that employ knowledge, reasoning, and communication that aids smart decision making by chatbots in banks.

THEORITICAL ANALYSIS

Block Diagram



Hardware / Software designing

Software Requirements:

- Anaconda Navigator
- Tensor flow
- Keras
- Flask

Hardware Requirements:

- Processor : Intel Core i3
- Hard Disk Space : Min 100 GB
- Ram : 4 GB
- Display : 14.1 “Color Monitor(LCD, CRT or LED)

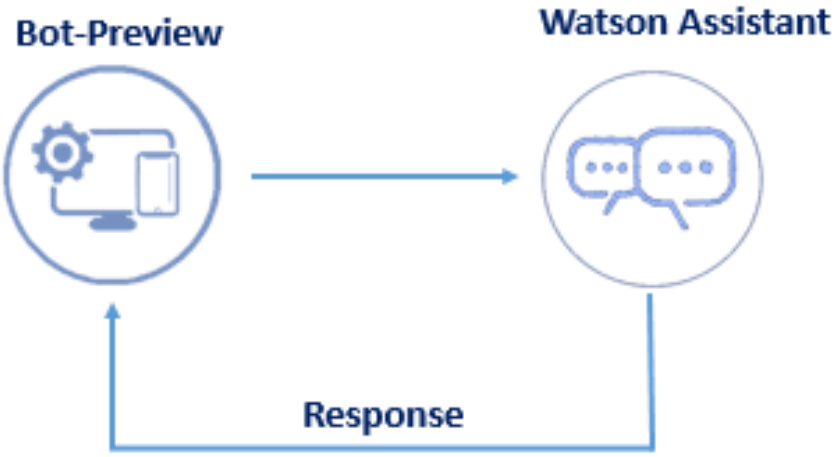
  Clock Speed : 1.67 GHz

EXPERIMENTAL INVESTIGATIONS

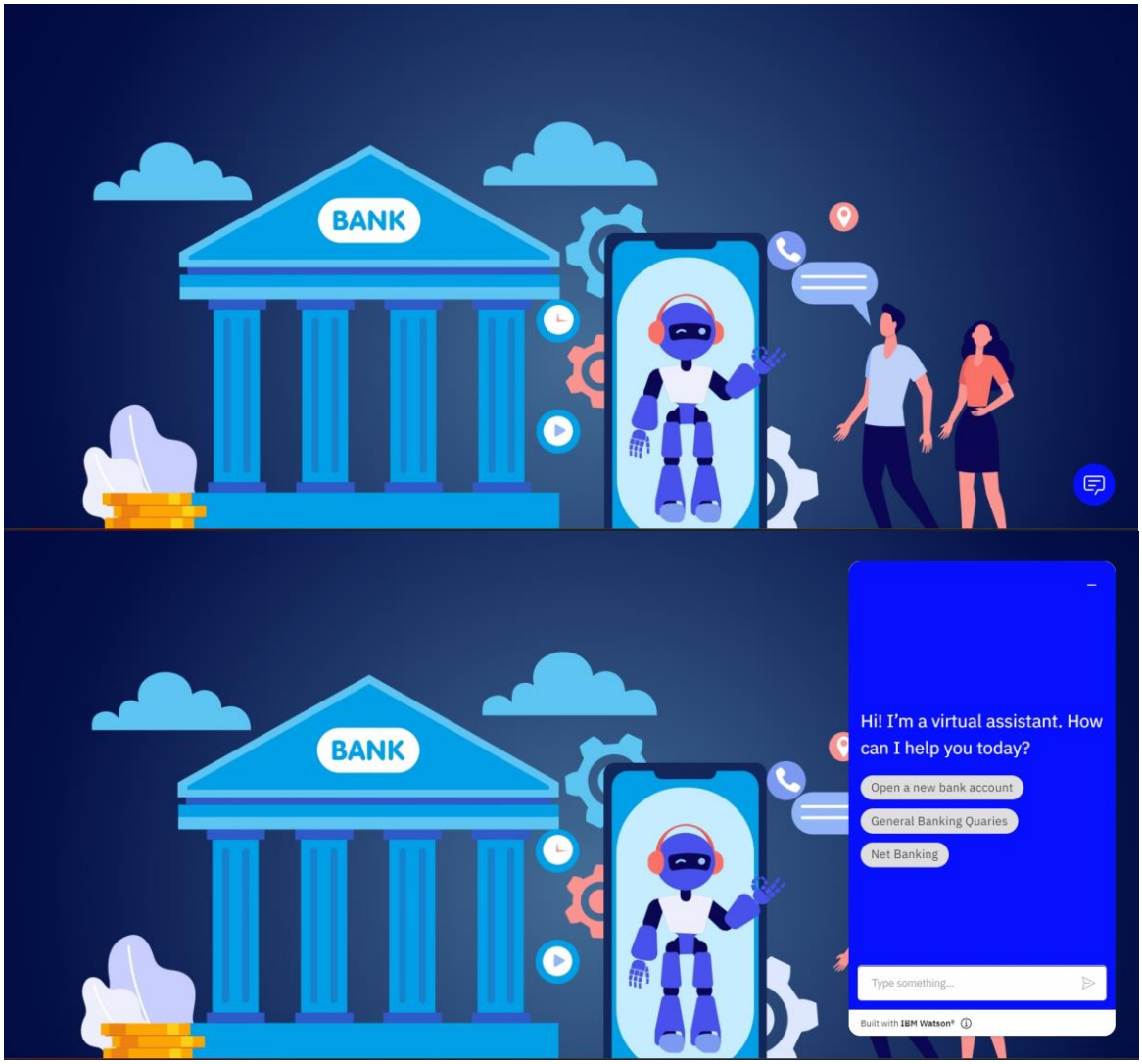
The AI Chatbot maintains a confidential conversation with customers. Chatbot will provide personal and efficient communication between the user and the bank.

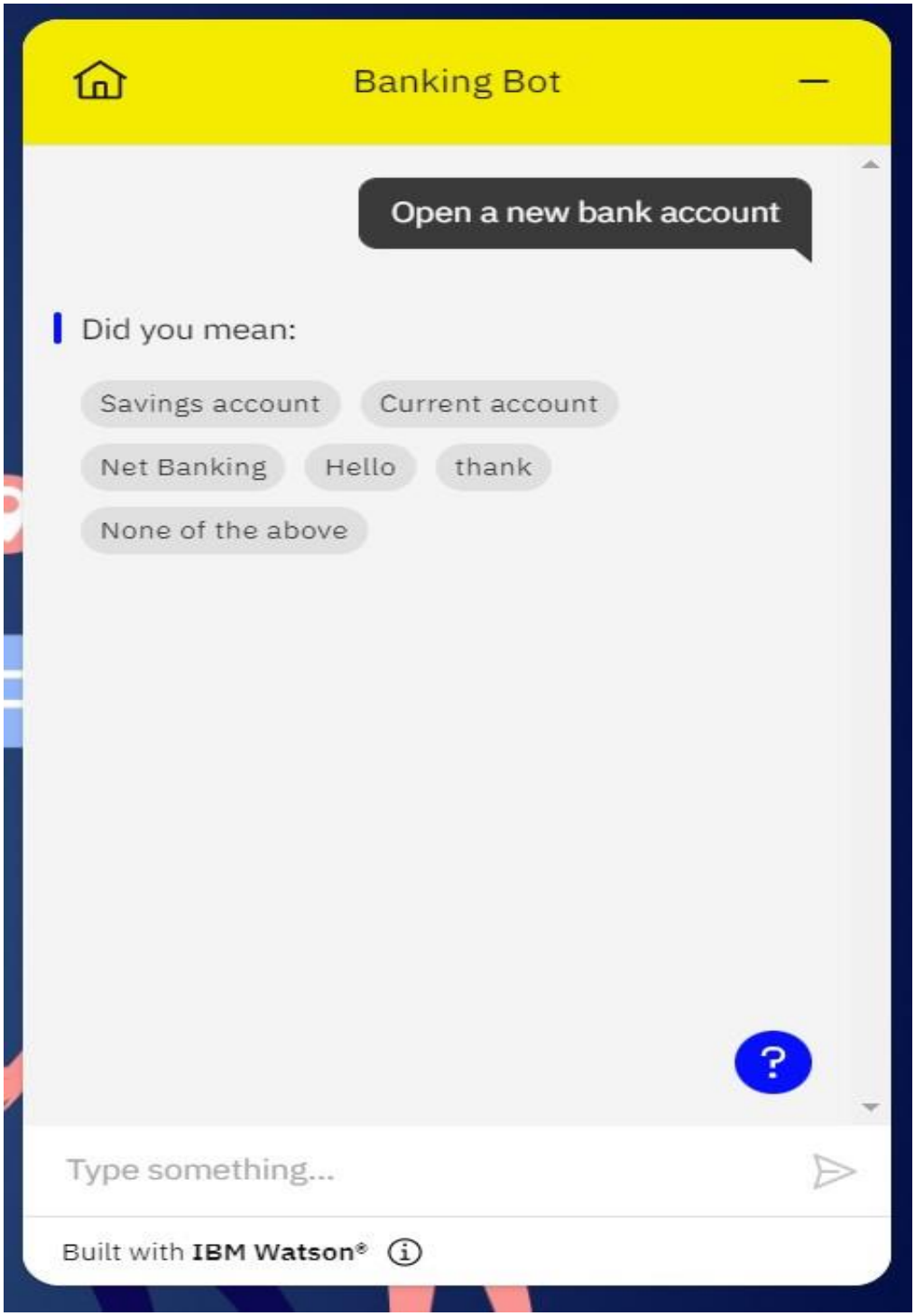
Chatbots are trained very well using AI to provide solutions for the popular and frequently asked questions, thereby providing the best suited service quickly. Thus AI Chatbots has a reliable end-user experience.
AI Chatbots are a great way to overcome the limitation of workload of humans. There can be multiple instances of a single chatbot inquiring different people at the same time. Such chatbots work in real time with no need for the customers to wait. This ensures faster, easier and more efficient face-time with customers.
AI Chatbots provide 24/7 service to clear all customer queries and guide them through all the banking processes. It is available to anyone with access to the internet with basic hardware.

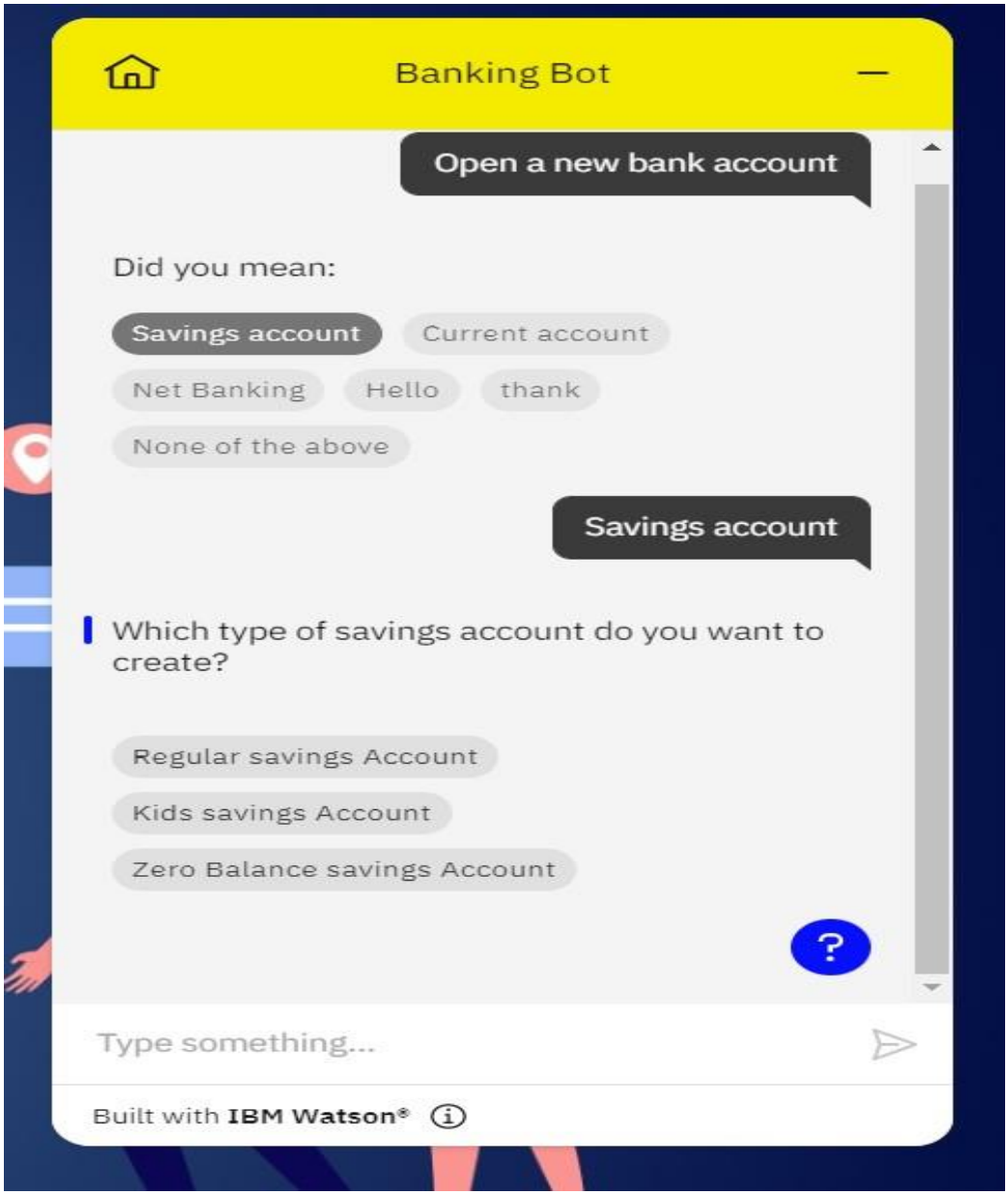
FLOWCHART

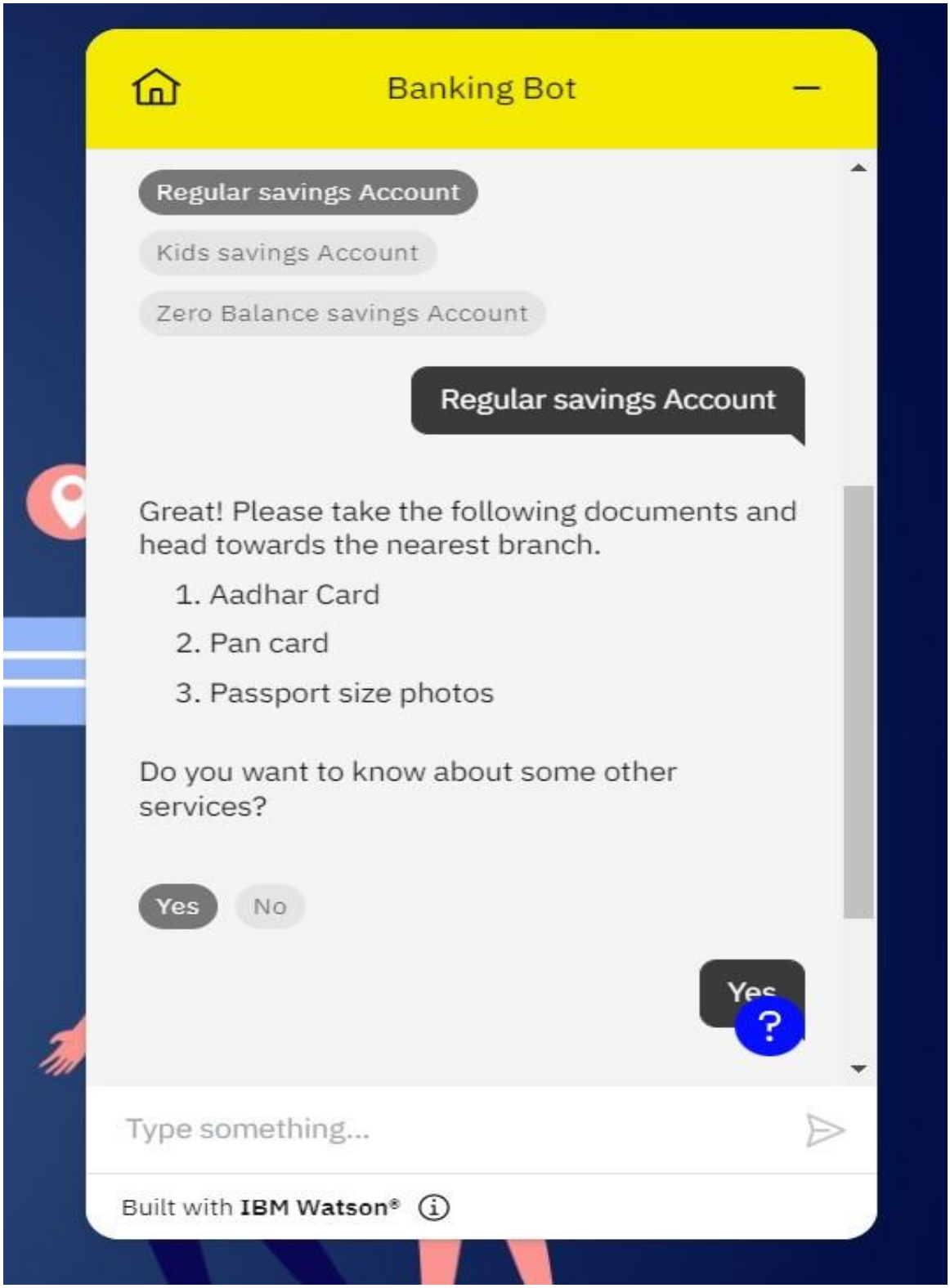


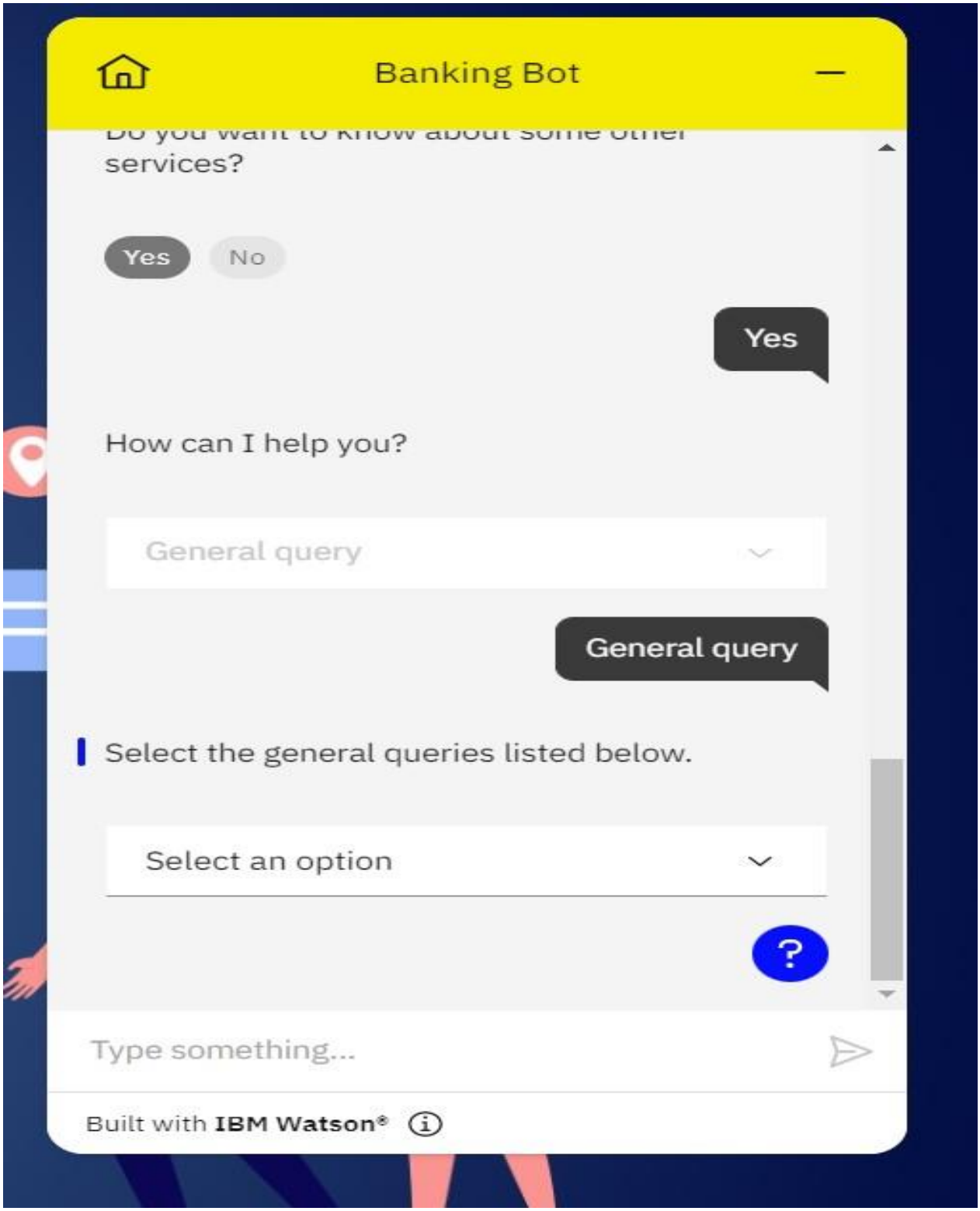
RESULTS

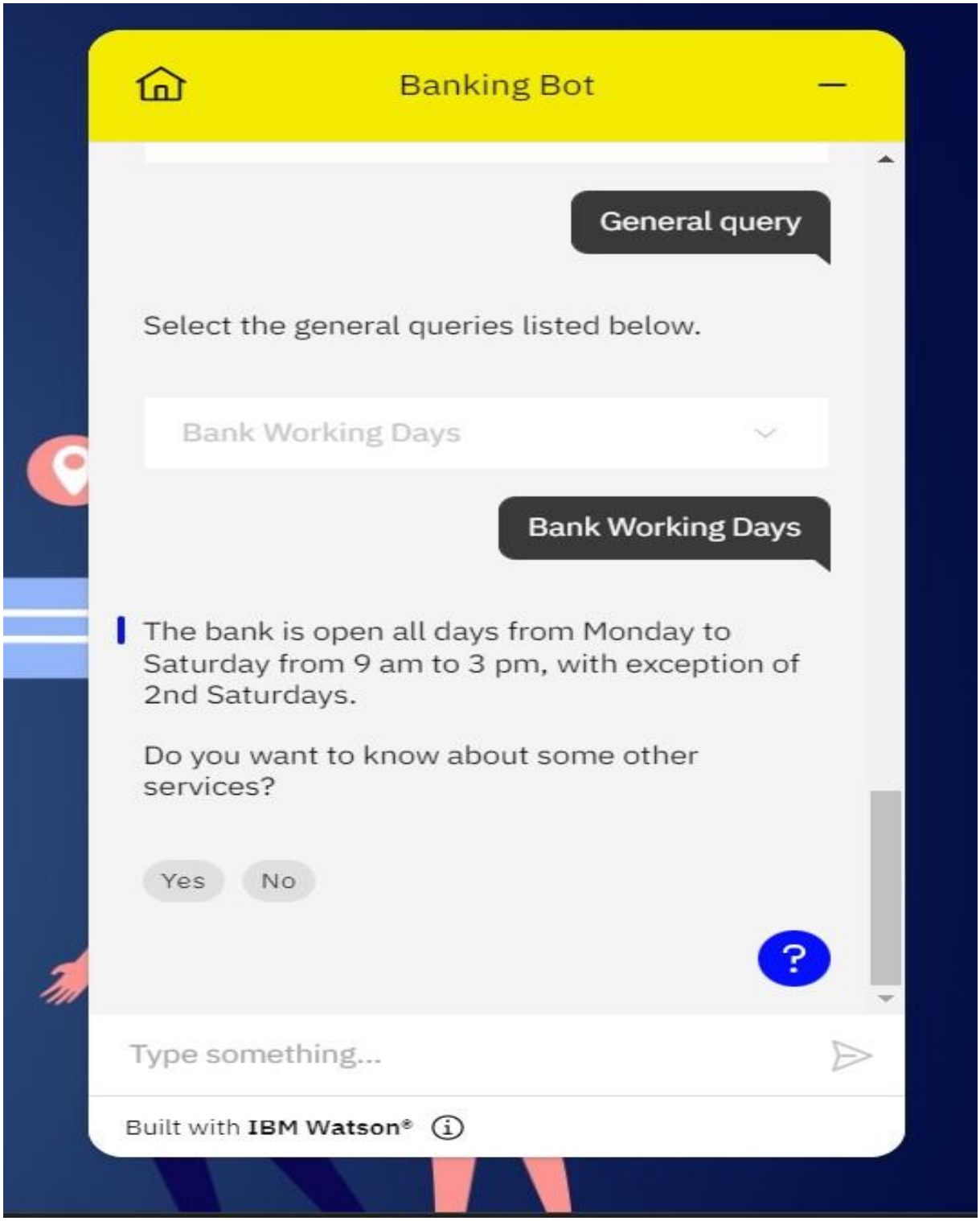

BANK
BANK
Hi! I'm a virtual assistant. How can I help you today?
Open a new bank account
General Banking Quaries
Net Banking
Type something...
Built with IBM Watson®

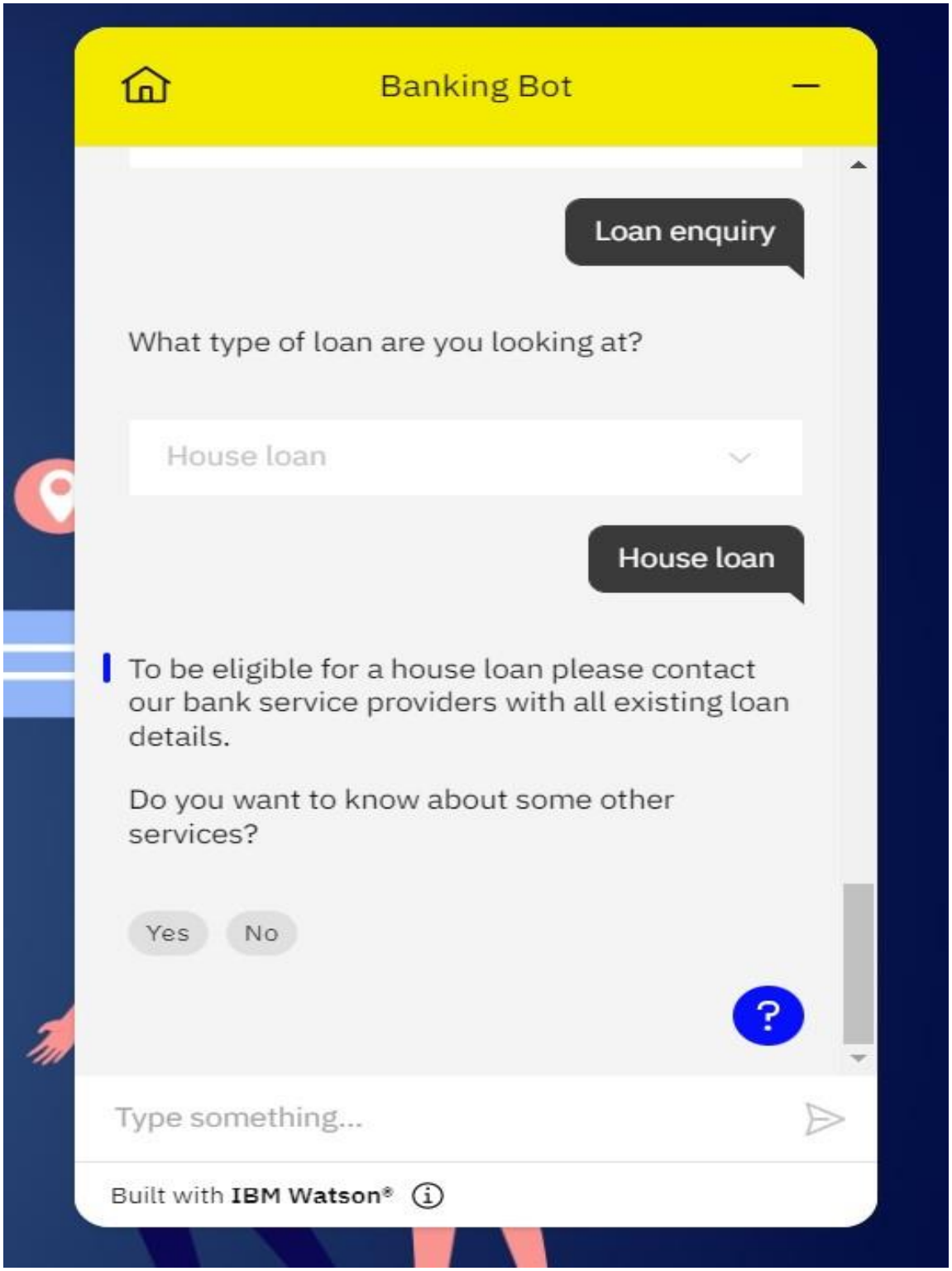

Banking Bot
Open a new bank account
Did you mean:
Savings account
Current account
Net Banking
Hello
thank
None of the above
Type something...
Built with IBM Watson®

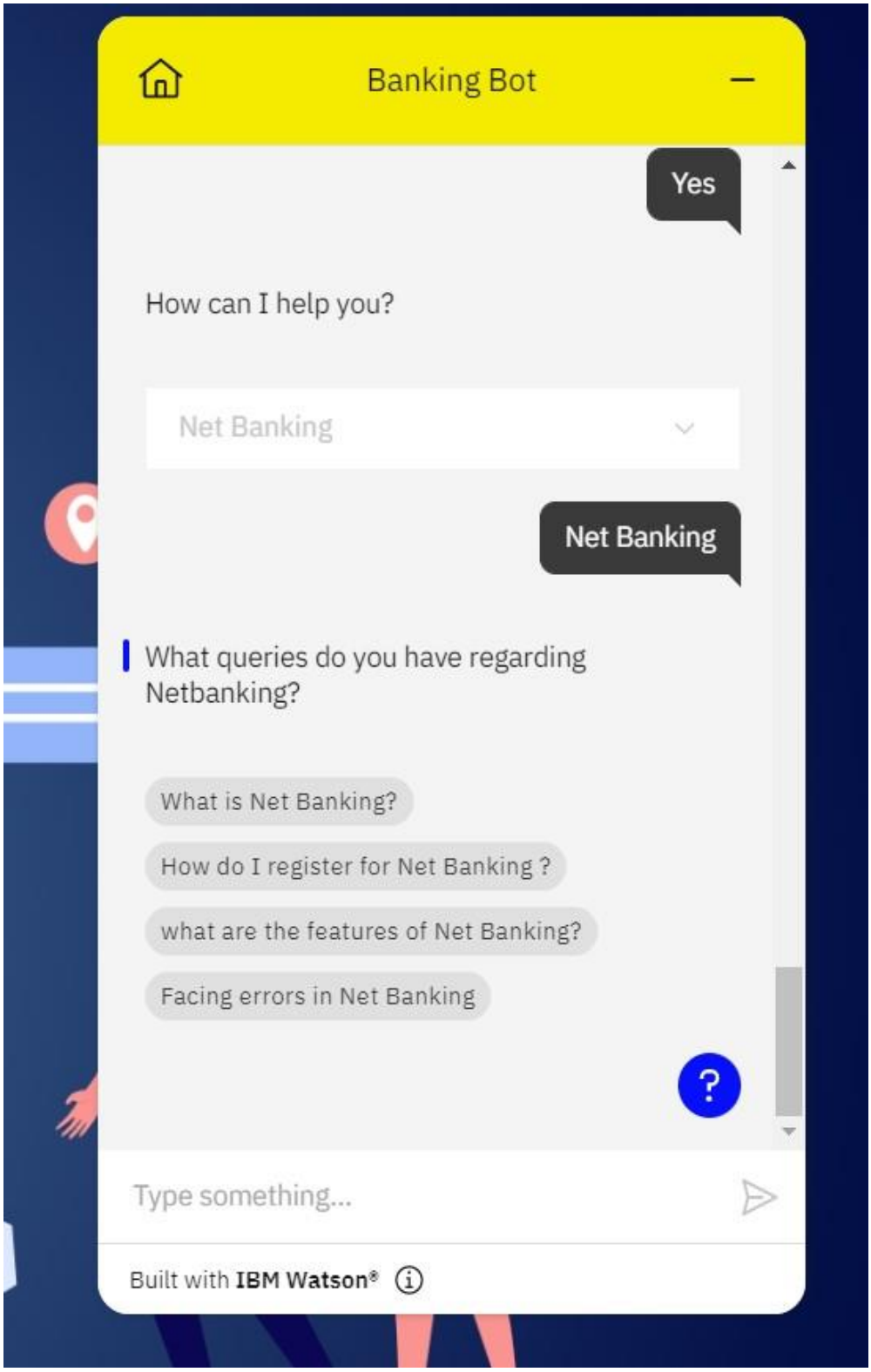

Banking Bot
Open a new bank account
Did you mean:
Savings account
Current account
Net Banking
Hello
thank
None of the above
Savings account
Which type of savings account do you want to create?
Regular savings Account
Kids savings Account
Zero Balance savings Account
Type something...
Built with IBM Watson®


Banking Bot
Regular savings Account
Kids savings Account
Zero Balance savings Account
Regular savings Account
Great! Please take the following documents and head towards the nearest branch.
1. Aadhar Card
2. Pan card
3. Passport size photos
Do you want to know about some other services?
Yes
No
Yes
Type something...
Built with IBM Watson®


Banking Bot
services?
Yes
No
Yes
How can I help you?
General query
General query
Select the general queries listed below.
Select an option
Type something...
Built with IBM Watson®


Banking Bot
General query
Select the general queries listed below.
Bank Working Days
Bank Working Days
The bank is open all days from Monday to Saturday from 9 am to 3 pm, with exception of 2nd Saturdays.
Do you want to know about some other services?
Yes
No
Type something...
Built with IBM Watson®


Banking Bot
Loan enquiry
What type of loan are you looking at?
House loan
House loan
To be eligible for a house loan please contact our bank service providers with all existing loan details.
Do you want to know about some other services?
Yes
No
Type something...
Built with IBM Watson®



APPLICATIONS

- AI technology is considered as one of the key technology used in vehicle damage detection.
- It presents the results obtained by processing input from communicating with bot.

WHY AI IN BANKING INDUSTRY?

- Enormous challenges in the banking industries
- Thrust for a process-driven operation
- Initiate self-service in the branches
- Customer desire to deliver different personalized solutions
- Build functional efficiencies
- Escalating the productivity of employees
- To support focus on productivity and efficiency
- Visualization to extend human function with the use of robotics tools

CONCLUSION

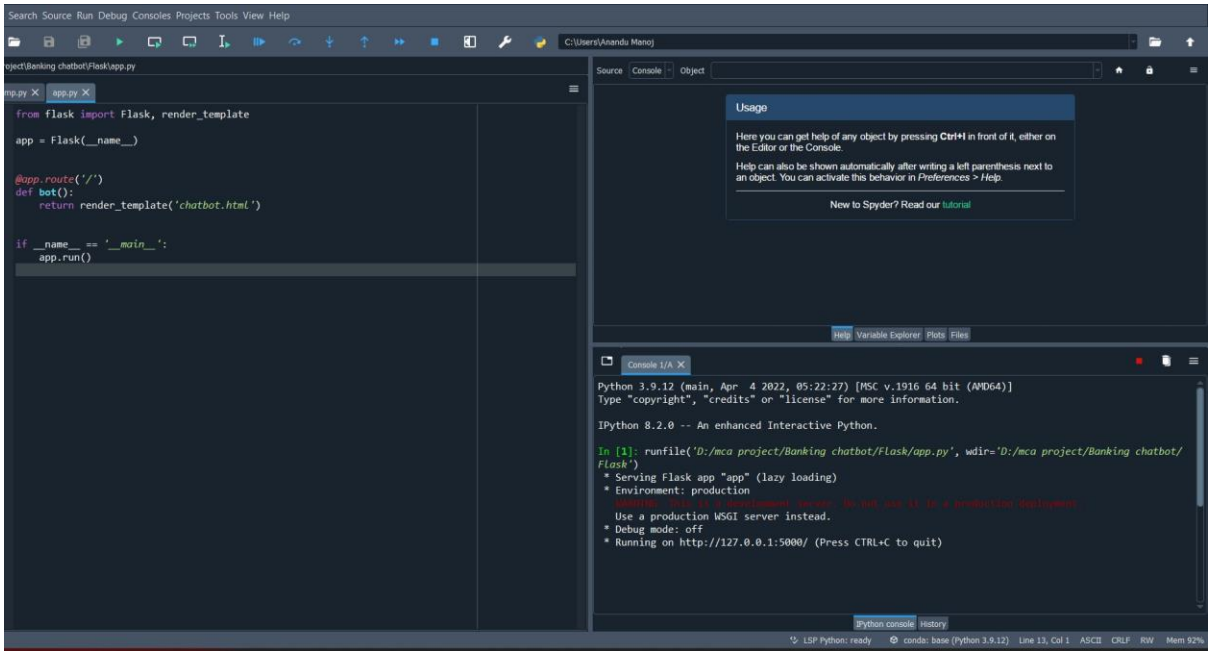
The world of banking is shifting faster than ever, with Artificial Intelligence (AI) leading the way in bringing in sea change in the banking industry. Various AI technologies have been applied in banking in fields such as core banking, operational performance, customer support and analytics. For AI, banking is no longer just physical branches, but a brand-new world of modern banks. The introduction of new banking services by modern day banks is helping them to grow and expand.

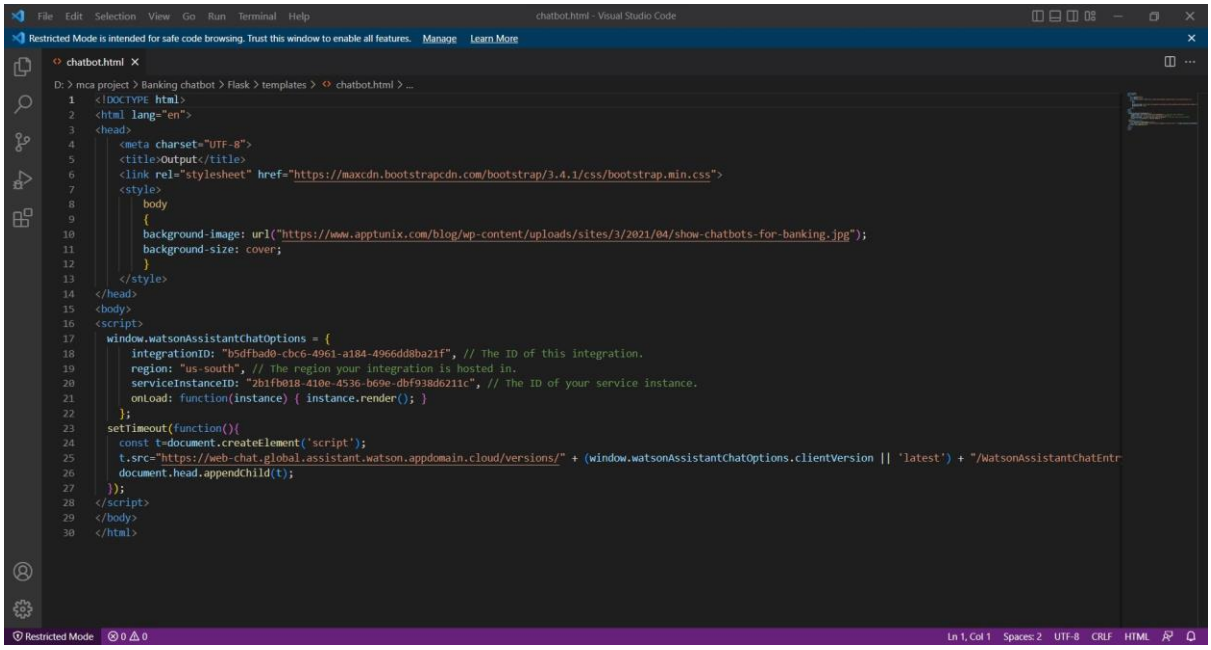
AFUTURE SCOPE

Not only is the AI revolution limited to the financial sector and banking industry, a variety of other sectors have also experienced the effects of AI. Some of the industry highlights include robotic (automated) distribution of anesthesia for routine treatments, while helping to minimize costs, improved patient support, digital guidance to the introduction of self-driving vehicles. All these would allow the companies to replace boring and tedious work, such as form filling and back-end testing.

APPENDIX

Source Code


Search Source Run Debug Consoles Projects Tools View Help
C:\Users\Anandu Manoj
oject\Banking chatbot\Flask\app.py
app.py
from flask import Flask, render_template
app = Flask(__name__)
@app.route('/')
def bot():
return render_template('chatbot.html')
if __name__ == '__main__':
app.run()
Source Console Object
Usage
Here you can get help of any object by pressing Ctrl+I in front of it, either on the Editor or the Console.
Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in Preferences > Help.
New to Spyder? Read our tutorial
Help Variable Explorer Plots Files
Console 1/A
Python 3.9.12 (main, Apr 4 2022, 05:22:27) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.
IPython 8.2.0 -- An enhanced Interactive Python.
In [1]: runfile('D:/mca project/Banking chatbot/Flask/app.py', wdir='D:/mca project/Banking chatbot/Flask')
* Serving Flask app "app" (lazy loading)
* Environment: production
Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
IPython console History
LSP Python: ready
conda: base (Python 3.9.12)
Line 13, Col 1
ASCII
CRLF
RW
Mem 92%


File Edit Selection View Go Run Terminal Help
chatbot.html - Visual Studio Code
Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More
chatbot.html
D: > mca project > Banking chatbot > Flask > templates > chatbot.html > ...
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>Output</title>
<link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">
<style>
body
{
background-image: url("https://www.apptunix.com/blog/wp-content/uploads/sites/3/2021/04/show-chatbots-for-banking.jpg");
background-size: cover;
}
</style>
</head>
<body>
<script>
window.watsonAssistantChatOptions = {
integrationID: "b5dfbad0-cbc6-4961-a184-4966dd8ba21f", // The ID of this integration.
region: "us-south", // The region your integration is hosted in.
serviceInstanceID: "2b1fb018-410e-4536-b69e-dbf938d6211c", // 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') + "/WatsonAssistantChatEntr
document.head.appendChild(t);
});
</script>
</body>
</html>
Restricted Mode
0 0
Ln 1, Col 1
Spaces: 2
UTF-8
CRLF
HTML