Virtual Bank Assistance: An AI Based Voice BOT for Better Banking

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Abstract: *Chatbot, a computer program that simulates human conversation, or chat, through artificial intelligence an intelligence chat bot will be used to give information or answers to any question asked by user related to bank. It is more like a virtual assistant, people feel like they are talking with real person. They speak the same language we do, can answer questions. In banks, at user care centres and enquiry desks, human is insufficient and usually takes long time to process the single request which results in wastage of time and also reduce quality of user service. The primary goal of this chat bot is user can interact with mentioning their queries in plain English and the chat bot can resolve their queries with appropriate response in return The proposed system would help duplicate the user utility experience with one difference that employee and yet get the queries attended and resolved. It can extend daily life, by providing solutions to help desks, telephone answering systems, user care centers. This paper defines the dataset that we have prepared from FAQs of bank websites, architecture and methodology used for developing such chatbot. Also this paper discusses the comparison of seven ML classification algorithm used for getting the class of input to chat bot.*

Keywords: ChatBot, Artificial Intelligence, Web Scrapping, php, My Sql

I. INTRODUCTION

Banks play an important role in every country's economic development. In day-to-day Banks play an important role in every country's economic development. In day-to-day life, everybody needs banks. But most of the people, especially the first- timers, struggle to know various procedures and processes required to get their work done at the bank and avail of its different versed with technology or in some cases where the information is too scattered to search for simply. There are, many types of platforms provided by different banks but users are facing problems accessing them (different User Interface much navigation). Although User Care centers are available, there are lot of weight times and redirection in some cases, leaving the user with no choice but to experience considerable delays getting a simple informational query resolved.

II. LITERATURE SURVEY

Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language: Sasha Fathima Suhel; Vinod Kumar Shukla; Sonali Vyas; Ved Prakash Mishra 2020

Artificial Machine Intelligence is a very complicated topic. It involves creating machines that are capable of simulating knowledge. This paper examines some of the latest AI patterns and activities and then provides alternative theory of change in some of the popular and widely accepted postulates of today. Based on basic AI (Artificial Intelligence) structuring and working for this, System-Chatbots are made (or chatter bots). The paper shows that AI is ever improving. As of now there isn't enough information on AI however this paper provides a new concept which addresses machine intelligence and sheds light on the potential of intelligent systems. The rise of chatbots in the finance sector is the latest disruptive force that has changed the way customers interact. In the banking industry, the introduction of Artificial Intelligence has driven chatbots and changed the face of the interaction between bank and customers. The banking sector plays an important role in the development of any country. It also explores the existing usability of chatbot to assess whether it can fulfill customers' ever-changing needs [1].

An overview of artificial intelligence based chatbots and an example chatbot application: S. Nithuna; C.A. Laseena July 2020

Chatbot can be described as software that can chat with people using artificial intelligence. This Software is used to perform tasks such as quickly responding to users, informing them, helping to purchase products and providing better service to customers. In this paper, we present the general working principle and the basic concepts of artificial intelligence based chatbots and related concepts as well as their applications in various sectors such as telecommunication, banking, health, customer call centers and e-commerce. Additionally, the results of an example chatbot for donation service developed for telecommunication service provider are presented using the proposed architecture [2].

An overview of artificial intelligence based chatbots and an example chatbot application: S. Nithuna; C.A. Laseena July 2020

The growth of technologies like Artificial Intelligence (AI), Big Data & Internet of Things (IoT), etc. has marked many advancements in the technological world in the last decade. These technologies have a wide range of applications. One such application is "Chatterbot or "Chatbot". Chatbots are conversational AIs, which mimic humans while conversing. This technology is a combination of AI & Natural Language Processing (NLP). Chatbots have been a part of technological advancement as they eliminate the need of human & automates boring tasks. Chatbots are used in various domains like education, healthcare, business, etc. In the study undertaken, we reviewed several papers & discussed types of chatbots, their advantages & disadvantages. The review suggested that chatbots can be used everywhere because of their accuracy, lack of dependability on human resources & 24x7 accessibilit [3].

An overview of artificial intelligence based chatbots and an example chatbot application: S. Nithuna; C.A. Laseena July 2020

Many banks and financial service companies have been transforming the way to run their businesses and serve customers. In this paper, we present a use case for digitizing customer journeys in the area of consumer banking call centre. The main objective is to provide personalized customer service experience through an integrated solution for call centre, including the Interactive Voice Response (IVR) system, SMS system, Internet Banking platform and chatbot. Topic modeling was performed on the dialogue transcript between the customers and Customer Service Officers (CSOs) to identify [4].

Privacy Preserving Chatbot Conversations: Debmalya Biswas Dec 2020

With chatbots gaining traction and their adoption growing in different verticals, e.g., Health, Banking, Dating; and users sharing more and more private information with chatbots - studies have started to highlight the privacy risks of chatbots. In this paper, we propose two privacy preserving approaches for chatbot conversations. The first approach applies `entity' based privacy filtering and transformation, and can be applied directly on the app (client) side. It however requires knowledge of the chatbot design to be enabled. We present a second scheme based on Searchable Encryption that can preserve user chat privacy, without requiring any knowledge of the chatbot design. Finally, we present some experimental results based on a real-life employee help desk chatbot that validates both the need and feasibility of the proposed approaches [5].

III. EXISTING SYSTEM

1. Money Transfer Users can use chatbots to pay bills, set or cancel payments, and track monetary transactions. Chatbots can also pay off credit card bills or charge prepaid cards.
2. Answer Basic Questions Chatbots can answer several fundamental questions regarding accounts of customers or banking products. For instance, chatbots can answer questions like "How can I apply for a credit card."
3. Provides On-time Notifications and Reminders Most banks use chatbots to offer their customers timely reminders and regular notifications regarding their bank accounts. Some of the frequent reminders that customers often get are regarding their bill payment deadlines, the last day offer of loans, and so on. All these reminders intend to keep the customers aware of all the activities that can benefit them and stay with them.

4. Check Account Balance Users can ask chatbots to provide them with account balance details under their names. Chatbots can also alert customers if their account balance is in danger of falling below an average balance.
5. Provides Complete Account Details Apart from account balance, users can also ask regarding other details of the accounts, like recurring payments and expenses, card reward points, and money transfer limits. One can also recover their account details and make changes such as updating their current address or phone number.

IV. PROPOSED SYSTEM

4.1 Real-time Location Tracking
As per location, the answers to user questions may vary. For example, if a user ask's, "Where is the nearest bank branch?" In this scenario, the chatbot will answer depending on the user's location. In addition, Chatbots can track the location through mobile GPS, thus providing the correct answers every time.

4.2 Resolve Urgent Issues on Priority
Chatbots in banking industries can help customers with issues that can be non-complex but urgent. These issues include unlocking or locking cards, resetting, checking bank statements, and completing fund transfers

4.3 Assists Employees
Chatbots not only serve customers but can also be used to assist employees. They can be used to schedule meetings, send messages between employees and much more. SEB rolled out a chatbot named Amelia which assists the employees with internal IT support .
Chatbots can be used to suggest personalized investment options and offers using customer's data thereby increasing the conversion rate.
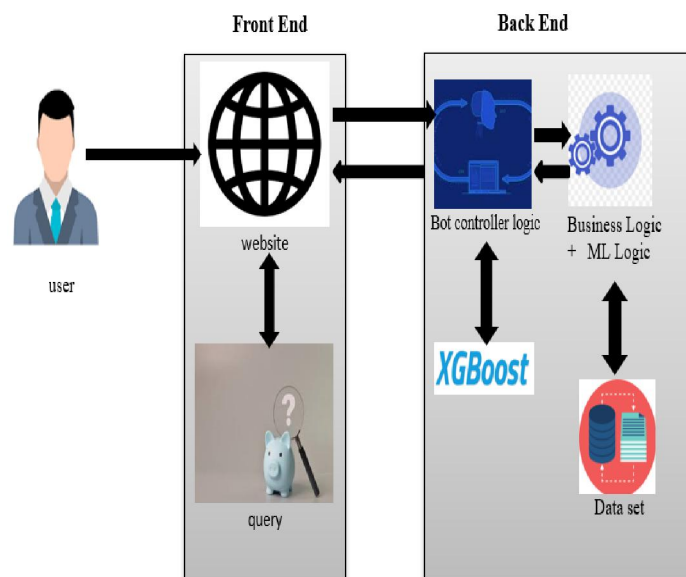

Fig -1 Architecture Diagram

V. BOT CONTROLLER LOGIC

The bot controller logic which contains the implementation of Flask framework, which has been used for handling user requests and then to sending answers to those queries as a reply response. Then, the query will be forward to the implemented Business logic and Machine learning logic. The Business logic contains basic and advanced pre-processing techniques of the user input query using Natural Language Processing (NLTK library) and its vectorization method. NLP will tokenize the query, remove unnecessary spaces, stop-words and then extract lemmas for each token. Then this text- format query will be converted to vectorized format using vectorization.

VI. ALGORITHM

6.1 Extreme Gradient Boost Algorithm

XGBoost is an optimized distributed gradient boosting library designed for efficient and scalable training of machine learning models. It is an ensemble learning method that combines the predictions of multiple weak models to produce a stronger prediction. XGBoost stands for "Extreme Gradient Boosting" and it has become one of the most popular and widely used machine learning algorithms due to its ability to handle large datasets and its ability to achieve state-of-the-art performance in many machine learning tasks such as classification and regression.

One of the key features of XGBoost is its efficient handling of missing values, which allows it to handle real-world data with missing values without requiring significant pre-processing. Additionally, XGBoost has built-in support for parallel processing, making it possible to train models on large datasets in a reasonable amount of time.

XGBoost can be used in a variety of applications, including Kaggle competitions, recommendation systems, and click-through rate prediction, among others. It is also highly customizable and allows for fine-tuning of various model parameters to optimize performance.

VII. IMPLEMENTATION

7.1 Preparing Data Set

We have started to prepare our own data set as questions and answers that banking customers used to ask the bank staffs, at customer care centers or enquiry desks. In this we have referred a number of banking websites and collected FAQs as our data. We have used different web scrapping tools for this task

7.2 Data-set format

The Queries that customers requested were entered, the entered queries will get the approximate desired answer from the model by using Natural language.
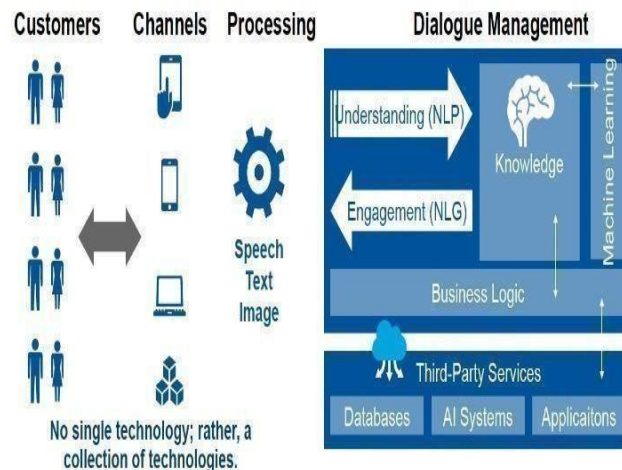

Figure 2: Data Set Diagram

7.3 Web Scrapping

To get the dataset we used a python library called Beautiful Soup. By using this library web pages can be downloaded using get requests method. Then the downloaded page was passed to the soup method. Soup element can be used to access the elements of the webpage. Web scraping will automatically then extracts the data and in an easy format that you can make the matters easily.

7.4 Pre-processing

By using the NLTK library, the library which has been used for the purpose of Natural Language Processing. On because of the user input, will bein English , we have to let the machine to understand the query language that we used

for the Natural Language Processing. then to decrease further processing and also to removing the ambiguity caused due to use of same word of different forms, we are using this pre-processing technique.

Those steps included in this task are
1. **Tokenization:** The method Tokenization that we have used in the process is used to generate a sequence of words from user's input query. Removing stop words - Most of the common words like 'want', 'are', 'can', which we don't need to be considered while processing is removed for improving the performance of system.
2. **Lemmatization:** By using the Word Net Lemmatize method for getting all the lemma (which means root form of the word) of each token. e.g., 'processing' and 'process' should be considered as equal while processing. So, for getting 'process' from 'processing', the method lemmatization is used.
3. **Vectorization:** On using the Bag of Words (BOG) We have converted our text data to vectorized format concept. BOG is a method, ehich has been used for preparing text for input to our machine learning algorithm. This BOG model develops a vocabulary from all of the documents which has been used and then models each document by counting number of times.

VIII. MODULES

8.1 Connector Module
Customer queries can be sent via Slack messaging platform and also customers canuse chatbot using the bank website. Both the interfaces (slack and the website) are connected to the connector module. This is a two-way connection slack, and the website can send messages through the connector plus both interfaces can receive messages through the connector module.

8.2 Natural Language Understanding Unit
The connector module will send customer queries to the Natural Language Understanding (NLU) unit. NLU unit includes two processes, they are Entity Extractor and Intent Classifier. Intent of the customer query and the entities in the query will be carried out using those Entity extractors and Intent classifier.

8.3 Entity Extractor
The first thing of this NLU unit is to tokenize user queries to understand a meaningful pattern of the user's input. To understand the meaning of the sentence, tokenizer will split the full sentence into smaller units. We are developing a domain specific AI assistant therefore, the best option for the tokenizer is Whitespace Tokenizer. This tokenizer will look for a white space of the sentence and create a token for every white space separated character sequence.

8.4 Dialog Management Unit
Once the entities and intent are extracted, that data will be fed into the dialog management unit. Dialog management unit includes three layers. They are Dialog state, Dialog Policy, and Actions.

IX. CONCLUSION

A chatbot is a piece of software that can have a conversation with a person. They listen and respond with relevant information. There are digital assistants that are voice activated, and there are chatbots, voice or text activated. Bots can vary according to the back-end integration of artificial intelligence. This allows brands to do more for the customer than respond with basic logic. Chatbots are supposedly better than chat software which often feels like one dimensional conversation. Chatbots are more conversational whereas digital or intelligent assistants go beyond bots to perform tasks that assist the user. Most customers have very low expectations when it comes to the self-service offered by banks because often it is terrible. Many self-service transactions result in a customer having to contact the call center anyway, not a great customer experience.

X. ACKNOWLEDGEMENT

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