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A Survey on Chatbot for banking application

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Abstract—There are many processes in the banking sector that are difficult for bank customers to understand at first, and it also takes a long time for customers to interact with banking staff. As a result, there is a need to build a chatbot for the banking sector that can answer all customer questions quickly. Banks have their own websites that contain all of the information about the services they provide, but customers require assistance in finding the information they need. since it is difficult for customers to obtain accurate information in a short period of time. The information provided by the existing bank chatbot system is only available in English, making it difficult for regional customers to find answers to their questions. As a result, a system that allows customers to acquire answers to their questions in their native language is required. There is a need to build a multilingual chatbot that can perform various types of interactions and interfaces so that customers can get important information from the bank system in their native language in a shorter amount of time.

Keywords—AI(Artificial Intelligence), ML (Machine Learning) , NLP(Natural Language Processing), Chatbot

I. INTRODUCTION

Now a days perspective of business communication changing rapidly. In the upcoming year their will be high demand for chatbot in industry. Chatbots are new interpreter between business and its clients. A chatbot is a computer software that allows humans to connect with technology through a variety of techniques including speech, text, gestures, and touch.Chatbots provide a mechanism to answer consumer questions by allowing them to simply ask for what they require.Chatbots are divided into two categories: rule-based chatbots and AI chatbots.Chatbots with rules provide us with fine-tuned control and versatility.

AI-powered chatbots are more complicated than rule-based chatbots, but they're also more engaging and individualised than task-oriented chatbots. Along with other sectors banking sector is also adopting chatbot technology. The Banking Chatbot project is based on artificial intelligence algorithms that analyse customer queries and comprehend their messages.

II. LITURATURE SURVEY

For building rule based chatbot apart from architecture it also require a large amount of data to train the module. On that basis work system is divided into two sections :

A. Dataset :

In retrospect, information science helps chatbots training. The chatbots information sets need associate in Nursing extortionate quantity of huge data, trained victimization many examples to unravel the user question. However, training the chatbots victimization incorrect or insufficient information ends up in undesirable results because the chatbots not solely answer the queries , however additionally converse with the purchasers, it becomes imperative that correct information is employed for training the datasets.

B. Chatbot:

Currently, chat bots are built using a number of ways, including rule-based, where rules are hard-coded in code, AI-based chat bots, and pattern-based, which can only handle the patterns provided for getting answers.

There are several frameworks for creating chat bots, but they all employ one of two techniques: rule-based or pattern-based.In rule-based chat bots, which are the simplest to create, one must define rules such as If A, then B, otherwise If C, then D, and so on.As a result, if there are 200 situations, the developer must create 200 rules for each scenario.Such procedures are tough because to the volume, diversity, and complexity of data.It is virtually impossible to draw down rules and patterns for vast amounts of data. NLP and machine learning are used to create AI bots.They are based on the human ability to understand facts, but with a lot of power.Where established or static rules or patterns do not function, Natural Language Processing (NLP) is applied.

Related to this yet many researchers studied different chatbots to provide the effective services to the users. Paper [1] refers to the intelligent assistant system which not only respond but it will self learn and will

improve the quality of customer service. Users can interact with this system using web. In this paper [2] author proposed system to use AI Chatbot technology in telecommunication sector which can help real time customer and can support customer care facility in telecommunication industry in Kenya. [3] This paper having main idea is to ensure easier banking process by helping bank customers to get there queries solved by this chatbot which can eventually result into minimize time consumption and smooth customer care support.[4] The system described in this paper having text to speech facility so that users can talk with chatbot to get realistic experience. This system can be useful to reduce workload of employee. The person who doesn't having knowledge to type can also connect with chatbot and get his queries solved. [5] This system would serve as a stepping stone toward the construction of an intelligent question management software capable of reacting and self-improving in order to improve itself in subsequent phases, hence raising the level of user support. Chatbot is getting huge impact in banking sectors. Many on the rise banks are tilting more towards advance technology to improve each and every aspect of there domain so that they can provide excellent service to the customers and chatbot is the major technology used by banks [6]. In this [7] paper author describes the survey with the help of Artificial Intelligence on reservation systems of Railways. This chatbot is used to book train tickets quickly and easily. Paper [8]'s author uses structured dataset to create chatbot which are useful for simple tasks and also which requires less memory. In paper [9], author builds chatbot which creates accurate response for the bank related queries. Paper [10] gives brief summary on chatbot which are very useful for simple tasks which requires low memory and processing and also it has a significant impact on the motivation and willingness of new learners to learn about neural networks and how they are used in AI applications. In Paper [11], Author builds AI based chatbot using NLP, flask and Dialog flow to counter mutual funds related queries. In this paper [12] author describe how deep neural network language will be able to achieve great accuracy output. In this paper[13] author emphasis on one of the most powerful engine used for regular expressions base natural language processing engine called verbot. Verbot makes it easy designer chatbot and automates conversation with user. In this paper[14] chatbot is created for student to get the information about different college activities. Questions and answers are stored in database.so that they get answered directly from the database. In this paper [15] author described survey on intelligent chatbot. This Paper describe chatbot is field which play important role in understanding human interference. Paper give information about how chatbot can increase the productivity of human and also consume the time of human. They also predict that in future their is huge use of the chatbot in every sector. The idea of this paper [16] is to create chatbot for banking system. Now a days their is lot of existing systems related to bank bot but the proper navigation for accessing service is not available. Due to large data customer cannot getting desired answers from the chatbot. In [17] this paper author proposed the

intelligent chatbot system which uses artificial intelligence and deep learning. The system will try to have an interesting and enriched conversation featuring searched information from Google. Other objective of this paper is that they will attempt to build a chatbot that may incorporate a standard sense database to supply simple but relevant responses while chatting. [18]This paper describes the idea of AI based chatbot for college management system. The authors used various techniques to build this bot such as NLP Processing and Sentiment Analysis for Complaints, Porter Stemmer Algorithm and Word Order Similarity Between Sentences. Authors of [19] this paper have done study on the dataset for chatbots. They have collected lot of data related to different chatbots and the dataset used for train the chatbots such as dialogues. They proposed how the dialogues and input data for chatbots have been changed by the time.[20] This papers author had a review on the implementation of rules based chatbots. They conclude that every Chatbot framework have its unique features. Author presented detail study and analysis on Google Dialogflow and IBM Watson. At present IBM Watson is more popular than Dialogflow Chatbot system. Authors also stated limitations and advantages of both such as IBM Watson is expensive platform is one of the limitation of it. [21] The goal of this research is to look at the deep neural network's ability to interact in human spoken communication while avoiding some of the limitations of applied math models and implementation mechanisms.

III. OBSERVATION ON SURVEY

There is a lot of work and research is going on related to chatbot. The idea behind this project is to create a intermediate between user and organization so that it can answer all the queries asked by users related to organization. In above papers researchers have been studied on various types of chatbots and chatbots in various domains as well. Most of the bots have been built using AI, machine learning and deep learning. Many have worked on the database for chatbots but there is not that much work has been done for multilingual chatbots so that area can be consider as future scope of this project.

IV. TAXONOMY OF CHATBOTS

1. Knowledge-based Chatbot :

Nowadays most people use a chatbot first with virtual assistants such as Cortana, Alexa, or Siri. These chatbots use their resources of knowledge to respond comprehensively to the user queries. They seems really Intelligent because of their ability and capability to provide trustable information to simple queries.

2. Service-based Chatbot :

A customer service chatbot is a computer programme that combines artificial intelligence and machine learning to respond to consumer questions via a commercial messaging system.

Existing resources and information, such as knowledge-based articles and FAQs, are used by AI chatbots to address and answer client concerns.

3. Response Generated-based Chatbot :

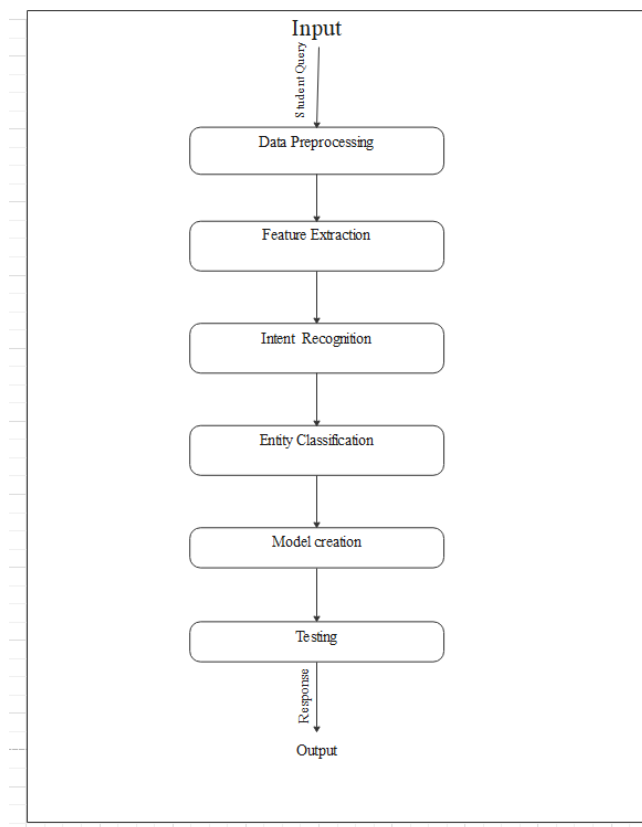
Dialogue manger of this chatbot uses four models to create a responses those are :

- i. Template-based Model
This model contains AIML algorithms it also helps in Pattern Matching, Fact Generator, Initiator Model , Story Bot Model.
- ii. Generative Model
Generative Model uses Seq2seq (sequence to sequence) model , Deep Q Network , LSTM Classifier , Pipeline Method
- iii. Retrieval-based Model
Retrieval-based Model uses End-to-End Method ,Row Escape Plan ,VHRED Model to generate a response
- iv. Search Engine Model
Deep Classifier Model and Guage Model helps Search Engine Model to generate responses.

4. Goal-Based Chatbot :

A goal based chatbot try to unravel a selected problem for a user. These chatbots can help users find a reservation, book a ticket, etc. We can train GO chatbot using 2 ways: Supervised learning with an encoder-decoder which directly joins user dialogues to answers and reinforcement learning which teach chatbot via trial-and-error conversations with rule based simulator or real users.

Chatbot contains following Modules :



- **Data pre-processing**

Model cannot take raw data as it is. It has to go through preprocessing for machine to understand. Many preprocessing techniques are there to convert textual data such as tokenizing, Lemmatization and classification method in machine learning.

- **Feature extraction**

It is the part of dimensionality reduction process . In this raw data is going to divide and reduced to more manageable groups such as data related to different loans is going to divide in different groups and so on.

- **Intent recognition**

In Intent classification we are going to figuring out what the user's intent like if user asks the question as how are you? then it recognized as greeting intent likewise it figure out the intents of all the queries.

- **Entity classification**

In this module we are going to use different entities to get accurate answers for

questions asked by users. With the help of entities, we can get to know about intent of user's query and it will be helpful for model to give user an accurate as well as an appropriate answer. Different banking loans, interest rates and may be used as entity.

- **Model creation**

We have created a simple model for our chatbot using seq2seq model and various python libraries such as NLP, NLTK, Keras etc. In seq2seq model it takes input as sequence and generate output as sequence.

- **Testing**

We tested a model which we created it gives an accuracy up to 90% and above.

- **Dialogue manager**

Dialogue manager is very important for flawless conversation between chatbot and user. The role of Dialogue manager in generating an appropriate response is big. Dialogue manager go through following procedure

1. Collect user responses
2. Check for priorities if defined in the list of user responses and select the response which having higher priority.
3. If priority is not defined Dialogue manager will select response on the basis of model selection policy which rate all user responses.

VI. CHALLENGES

Chatbots are only as clever as their programming allows them to be. A large sample size might have increased the data's reliance. Chatbots might find it difficult to handle many languages and dialects. It takes a long time to collect data, sanitise it, and train the chatbot with it. Empathy, which is considered the backbone of the business-customer connection, is lacking in chatbots. They're destined to fail. AI is still in its infancy, but over the next several decades, a chatbot with human-level intelligence might be created.

VII. CONCLUSION

The purpose of this study is to present ways for dealing with dialogue in the banking and financial industry. Although this study has not yet been thoroughly evaluated, the existing results are encouraging. The framework will be completed, and a chatbot will be developed in the future. For the bank, we are going to create an intelligent chat bot system that will provide a satisfactory response to the user's enquiry. It is a smart

system that can think like a human brain. This technology will assist bank personnel in lowering their burden. According to the findings, it is vital to train for both complete sentences and key phrases because both are often utilised by users.

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