International Journal of Future Generation Communication and Networking
Vol. 13, No. 3, (2020), pp. 08 – 15

An Interactive Chatbot For Academic Institution Using Pattern Matching

1Mrs. R. Dharaniya 2 K. Vijayalakshmi 2Ratakonda Tejasree 2 P. Naveena

1Assistant Professor 2Undergraduate students
Department Of Computer Science Engineering,
Easwari Engineering College,Chennai,India
rdharaniya@gmail.com viji.viju7@gmail.com saitejasree@gmail.com naveenaponnaian@gmail.com

Abstract

In recent days chatbots are designed based on how human beings communicate with the systems. A chat interface helps the user communicate with the chatbot as if it is a real person. This design provides an interactive session between the user and the system. It can give answers to every question asked by the user. Our aim is to built a system that is compatible and easily understandable. This application provides additional features such as Maps and voice calls. The system works by matching the keywords in the query with the information that is already available or loaded in the database and an accurate response is generated to the end-users. Our system is specially designed for the educational institute to help and guide the students during the college admission.

Keywords- *Query Preprocessing,Pattern Matching,Voice Call.*

1.Introduction

A chatbot is an intelligent machine that knows to solve any kind of problem with an appropriate solution. It is true for knowledge-driven AI systems. The knowledge is obtained by the knowledge acquisition process which can be manual or automatic. It is complex to retrieve and maintain the obtained knowledge. Chatbots can be used anytime and anywhere. It can communicate with millions of users at a time. It is flexible and also satisfies the end-users. Natural language processing is one of the main concepts used in the building of chatbots. However, a large user base and open nature of Internet chat make it an easy target for harmful exploitation.

The development of technology has brought in serious changes in our day to day life. One of the most popular trends in the development of science and technology is Chabot .There are several tools in the internet that can help us develop a chatbot which generates an accurate response to the queries. Many business organization owns chatbots and uses the same for their development .The recent advancement in the field of chatbots have made sure that they are not only used for messages but also for other purposes .Chatbots are also popular among facebook and instagram users. Chatbots are widely used in areas where visual human interaction takes place. One of the biggest disadvantage in this field is even though chatbots are widely popular ,people and organization still do not have clear understanding and knowledge about chatbots and their consequences. Chatbots are expected to provide human like responses to the users. Hence it is necessary to load the database of the system with bulk of information and details so that the developed bot can provide an accurate and personalized response. The development and communication of artificial intelligent chatbots are thus far very complex.

ISSN: 2233-7857 IJFGCN

2.Literature Survey

The contributions of various authors are surveyed and analysed to determine the merits and demerits of the existing systems in order to make the proposed system work better

V.Selvi et.al.,[1] have discussed on chatbots which have stipulation in the business markets. They are developed and utilized for efficient communication between the end- user and the bot. chatbots are generally cost effective which is one of the main reasons behind customer satisfaction. This does not require any internet connection so that it can be used all over the world at any time which is one of the major issues that has been overcome in this system. It follows distributed architecture which is basically many users can use the chatbot at any time and still do not face any hindrance in the working of the chatbot. This particular chatbot is built using natural language processing and it also uses machine language in order to store and generate information/replies to the end-users. The chatbot was built in such a way that it can easily identify a bully word.

Jhonny Cerezo et.al.,[2] have presented a particular chatbot which provides proper guidance in solving complex tasks. This particular chatbot was specially built for Pharo software technologies. When the system was tested it was found that the developed bot was efficient but there were few drawbacks in the interaction pattern, where the clients demanded an bot that generate natural and efficient responses. Inoder to overcome these problems term frequency and inverse document frequency algorithms were brought into use.

Ke Xiong et.al.,[3] have discussed the system performance in the paper. Amongst the various layers present the application layer defines the ratio in which the information can be used as a structure depending on the interaction of the clients using the particular 5G transmission systems. It derives the results systematically for the SRC transference for that particular expression. The main aim for using these specialized systems is to mainly improve the client engagement and increase the performance of chatbots.

Sicong Shao et.al., [4] have presented an system that identifies an profile based on personal information and IRC based messages. The chatbot keeps a note on the activities of the IRC channels and then generate an exclusive profile for every end-users and customers. After testing the proposed system it was found that the system was extremely accurate and efficient. The purpose of developing this system was to help the cyber cell for identifying dangerous and unwanted messages from users and frauds. Since the proposed system maintains an exclusive profile for every user it can easily identify discrepancy in messages and report whether it is from the original user or not.

Eko Handoyo et.al.,[5] have proposed a system that does tasks like booking a ticket, placing orders through internet etc. The user will be able to make more than one request at a time in this chatbot. This chatbot is available twenty four hours a day which is a great advantage. Keyword matching is the concept behind building this particular bot. There are certain important principles used in this concept. Using this we can classify the required keywords

ISSN: 2233-7857 IJFGCN

such as date, time from the query and perform the above mentioned task. The above system has made tasks like booking of tickets easier and efficient.

Venkatesh Subramanian et.al.,[6] have built a chatbots that helps the engineers to develop their knowledge and skills. This chatbot also provides accurate feedback based on the performance of the end-users. The authors have also discussed about the various features that can be added to this system in order to improve the efficiency of that chatbot.

Milla T Mutiwokuziva et.al.,[7] have proposed a strategy to train the system in such a way that it can understand words used by humans and perform tasks. The strategy consists of different levels. Each level gives us an idea about how the text that need to be identified and processed. So this process is implemented step by step by using two important concepts 1.neural network framework 2.word2vec.Experimental results shows that this system has successfully achieved the goal of the project.

Belfin R V et.al., [8] have proposed a chatbot exclusively for cancer patients. This chatbot performs tasks like diagnosing cancer providing treatment, medicines etc.It also provides information about the symptoms of cancer so that users with an hectic lifestyle can also benefited by having access to this chatbot. The developed system has proven to be very useful for the medical domain. The chatbot works by using an graph like strategy.

3.Proposed System

3.1 Architecture of the Proposed System

In our paper we propose an interactive chatbot for academic institution using pattern matching technique. This system provides immediate response to the queries raised by the users. Chatbots are highly used to build interactive sessions with user and it is one of the raising field in IT industry. The chatbots are highly appreciated if they provide accurate and interesting replies to the users. Generally for the response retrieval mechanism from the database we use pattern matching technique. The main motivation of this project is to help the students and the parents get a better insight about our college, make an application that is less complex and develop an user friendly and cost effective chatbot. This operation is divided into several steps.

- Designing a chat interface.
- User posts the question in the chat interface.
- Query Pre Processing takes place to check whether the entered question matches with the predefined pattern.
- The next step is to perform pattern matching between the question raised by the user and the information stored in the database.
- If the required result is found in the database user receives an reply.
- If the required result is not available in the knowledge user goes for the call option

Finally an response is generated to the user as a result of pattern matching. Incase if an accurate response is not available user goes for the call option. This chatbot is used by academic institutions to provide the students and parents an clear insight about the college, and keep that updated about the recent happenings in the institution. In fig1,the overall working of the chatbot is shown.

ISSN: 2233-7857 IJFGCN

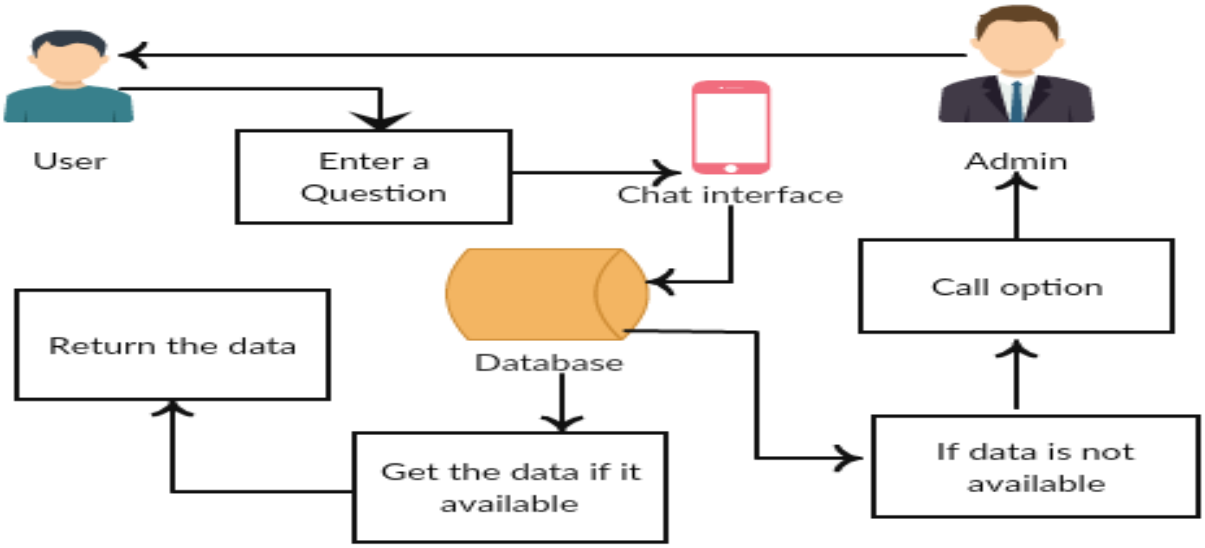

Figure 1: Architecture of the proposed system

3.2. Modules

The implementation involves the following list of modules:

- Designing a chat interface
- Response Retrieval Module
- Call forwarding Module

3.2.1 Designing a chat interface

In fig 2,the overall operations performed in module 1 is shown. This module deals with designing a chat interface using java and the query preprocessing process which happens once the user enters the query in the chat interface.

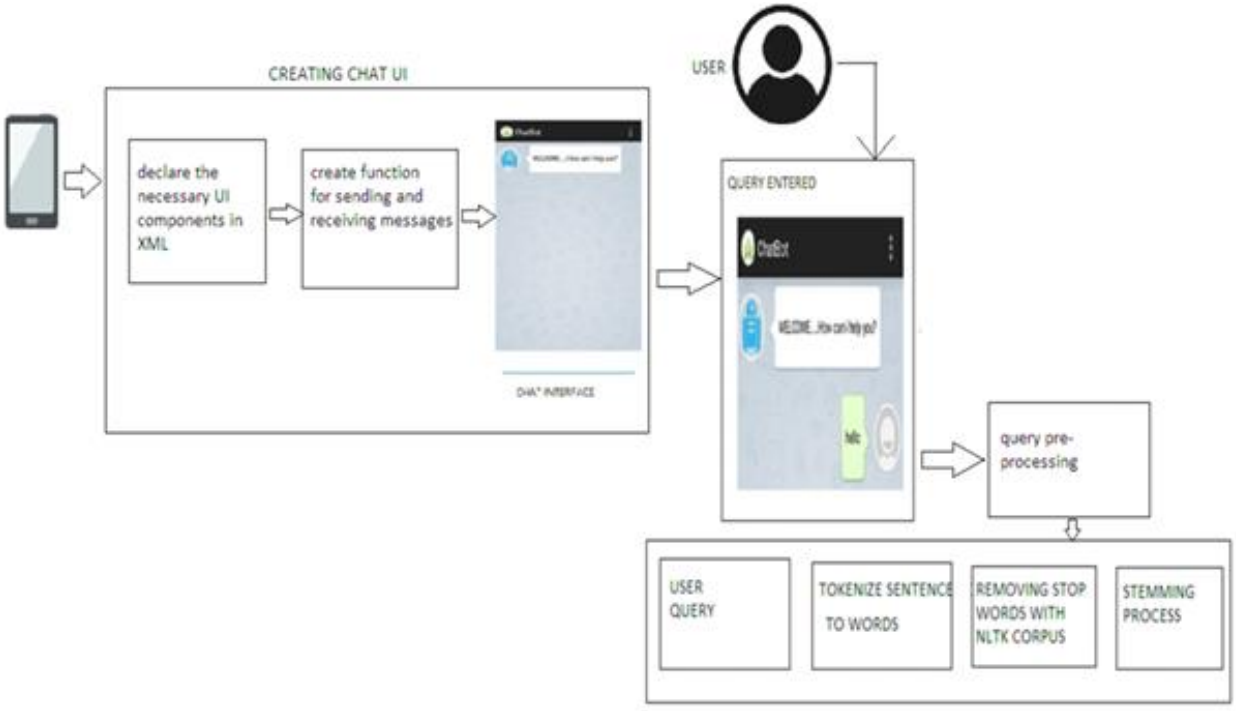

Figure 2: Designing a chat interface

Designing a chat interface in java is a simple process, initially declare the necessary UI components in the XML. Then build the necessary functions required for sending and receiving messages in the chat interface using the drag and drop tools available in java. Once the chat interface is ready the user is allowed to post their queries in the interface after which the query preprocessing operation takes place. Query preprocessing is divided into 4 steps which are as follows.

Tokenization

Each tweet is broken down into separate using white space as delimiter and as such unwanted non-textual data are removed using split() method of NLTK library.

URL removal

Tweets are often riddled with hyperlinks to blogs and other websites, such data is removed by defining regular expressions and using re (regular expression) python package to remove URLs.

Stop word removal

Stop words are those words that hold no emotion. The words include articles, non-lexicals etc. Hence, it is favorable that they be removed. This is done by importing stop words package from the NLTK library

ISSN: 2233-7857 IJFGCN

Stemming
It is a process of mapping an inflection of a word back to its root word. This highly reduces the complexity of the data. This is done using the Porter Stemmer package available in the NLTK library.

3.2.2 Response Retrieval Module

In fig 3,the overall operations performed in module 2 is shown. This module deals with the retrieval of the solution from the database and the process undergone while matching the queries with the database namely Pattern matching.

Initially a query is entered in the chat interface and in order to retrieve the answer for the entered query the database is checked and following are the process which happens while checking for the solution 1.substitution normalization 2.sentence splitting normalization 3. pattern fitting normalization.

Substitution normalization aims to retain the meaning in the sentence so that there is no data loss during sentence splitting. Sentence splitting normalization is that each word in the entered query is split into separate meaningful token of words and considers them as a possible subdivision which can be easily matched with the root class which is loaded in the database in order to retrieve the solution. Pattern fitting normalization is a process which happens to convert the entered alphabets to lower or uppercase. Finally pattern matching takes place. Incase if the matching fails the user goes for the call option which is clearly explained in the upcoming module.

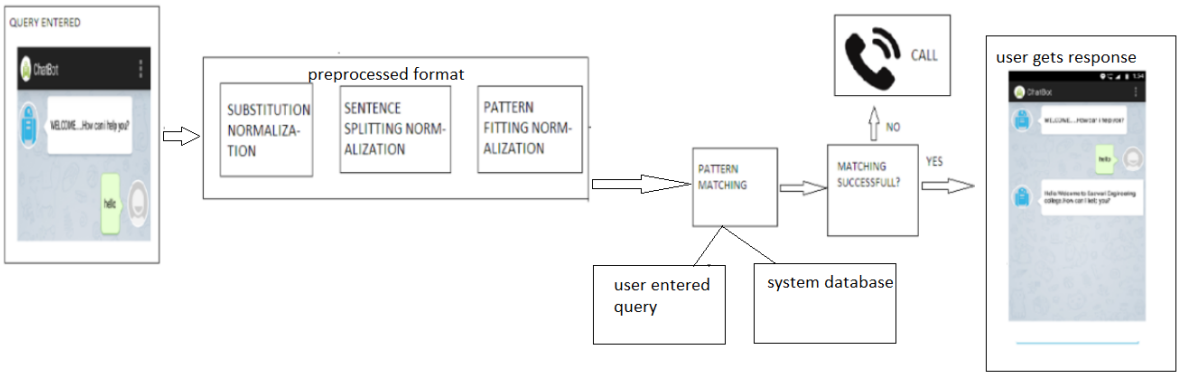

Figure 3: Response Retrieval Module

3.2.3 Call Forwarding Module

This module leads to the conclusion of the process where it basically deals with the call option facility ,which happens to be used by the user when the response received in the chat-interface is not sufficient or not appropriate enough. This module is a continuation of the previous module when matching in the database is not successful. There are three functions which takes place in order to invoke the call option which are 1.intent action call 2.call phone permission

3.Phone state listener .Firstly the intent action call is a call button designed in the chatbot for further inquiry ,this is done by invoking call intent option used in android applications. Secondly the call phone permission programmed so that the user is able to make the particular call from his or her own mobile phones without any hindrance during the call. Lastly the phone state listener helps user to return back to the original page of the chatbot after the client or the particular user has finished talking to the admin through a phone call. Finally the user leaves the page by receiving all the information needed in order to join this particular reputed institution.

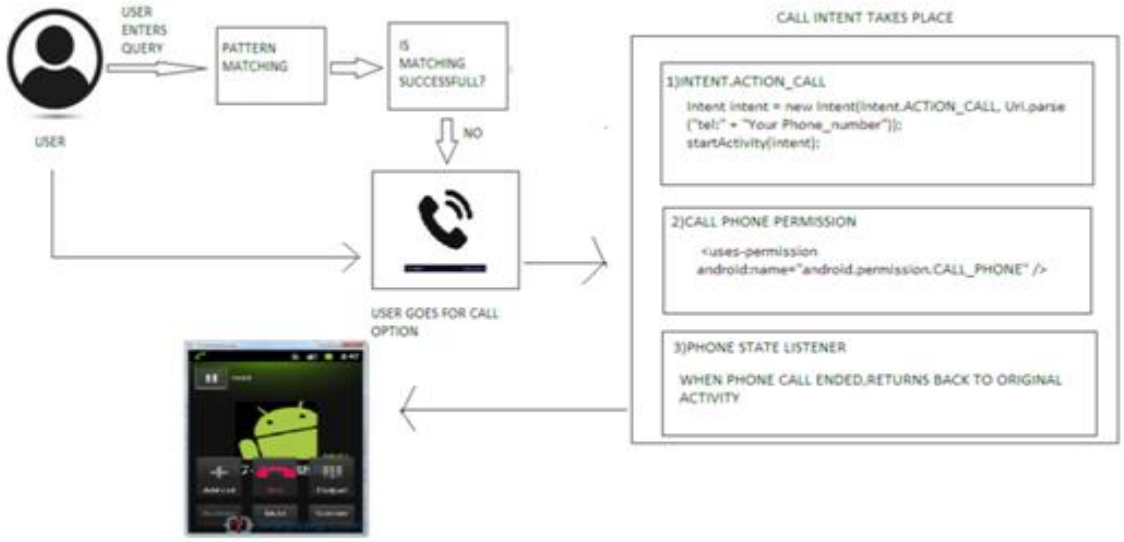

Figure 4: Call Forwarding Module

4.Results and Discussions

The proposed system provides efficient and accurate results. The required algorithms and techniques were used to increase the efficiency of the Chatbot. The accuracy of the proposed system was compared with accuracy achieved through neural network based framework in literature survey 4 shown in table 1. The proposed system is found to achieve better accuracy by using naive bayes pattern matching algorithm.

Algorithm	Neural network based framework	Naïve bayes pattern matching algorithm
Efficiency(in %)	64	75.3

Table 1: Comparison of Efficiency in different algorithms

5.Conclusion and Future work

Chatbots are in high demand in business markets due to the growing technology needs. It provides communication between the human and the system thus by making the interaction

ISSN: 2233-7857 IJFGCN

efficient and interesting .In additions chatbots are also cost effective. Chatbots can also act as an great source of entertainment. It is also used in personality analysis for author detection. In this application, the queries which are not answered by the chatbot are answered by a human through voice calls. In future this chatbot can be used to enhance student engagement by providing smart and secure feedbacks based on their performance. It also provides efficient teaching assistance, instant help to student and keeps the students and staffs updated about the institution.

6.References

[1] Mrs.V.Selvi, Ms.Saranya ,Ms.Chidida , Ms.Abarna," Chatbot and bullyfree Chat"
Proceeding of international conference on system computation automation and networking 2019.
[2]JhonnyCerezo, JurajKubelka, RomainRobbes, AlexandreBergel, Building an Expert Recommender Chatbot,2019 IEEE/ACM 1st International Workshop on Bots In Software Engineering
[3] Ke Xiong1,2, , Yu Zhang3 , Pingyi Fan4,Hong-Chuan Yang5 ,Beijing Jiaotong ; Evaluation Framework for User Experience in 5G Systems: On Systematic Rateless-Coded Transmissions ;2019 IEEE conference on e- managements and services.
[4] Sicong Shao, CihanTunc, Amany Al-Shawi, Salim Hariri," Autonomic Author Identification in Internet Relay Chat (IRC)" 15th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA 2018) 2018 .
[5]EkoHandoyo, M.Arfan, Yosua Alvin AdiSoetrisno, MamanSomantri, AghusSofwan, EndaWistaSinuraya, Ticketing Chatbot Service using Serverless NLP Technology, 2018 5th Int. Conf. on Information Tech., Computer, and Electrical Engineering
[6]Venkatesh Subramanian, NishaRamachandra, Neville Dubash, TutorBot : Contextual learning guide for Software Engineers, 2019 IEEE/ACM 1st International Workshop on Bots in Software Engineering.
[7] Milla T Mutiwokuziva, Melody W Chanda, Prudence Kadebu, Addlight Mukwazvure, Tatenda T Gotora, A Neural-network based Chat Bot, Proceedings of the 2nd International Conference on Communication and Electronics Systems (ICCES 2017)
[8] Belfin R V ,Shobana A J ,MeghaManilal ,Ashly Ann Mathew ,BlessyBabu ; A Graph Based Chatbot for Cancer Patients ; 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS)

ISSN: 2233-7857 IJFGCN