Dexter the College FAQ Chatbot

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***Abstract*— Chatbot is a new and upcoming technology that has great demand in various industries. The main goal of a chatbot is to create a human-like conversation between a human and a machine, to reduce the work stress. The chatbot can be implemented in any industry easily, unlike any other product where the products need to be developed and tested before switching platforms. In colleges, especially during the time of admission, reception gets crowded and people have to wait to get their queries solved. If any person wants to know about the college, then he/she has to travel to college. Although every college has its website, not everybody can find the answer to their query. Colleges are not working on weekends, so if someone wants to visit or call reception to get their query answered they will have to wait until any working weekday. To solve these problems, we will create an AI chatbot. This chatbot will be embedded on the college website and will be able to answer any college-related query easily. Chabot will be able to answer multiple persons at the same time, people don't have to visit the college to get their query solved and it will be available 24/7**

Keywords*— *RASA, machine learning, LSTM, RNN

I. Introduction

A Chatbot is an Artificial Intelligence (AI) software program that conducts a conversation via auditory or textual methods. Such programs are often created to convincingly simulate how a human would behave as a conversational partner, thereby passing the Turing test. Chatbots are mainly used in dialog systems for various practical purposes including customer services or information acquisition. The chatbot is a technology that is growing fast. Chatbots are being used increasingly in many other sectors, such as banking, entertainment, news, customer services as well as in the medical sector. In this project, we will be developing one such chatbot which will help solve any queries which are associated with college FAQs. Whenever a student takes admission in a new college or wants to take admission in a new college, they might have lots of queries in their mind.

Students might be reluctant to ask about the query to any faculty or reception and might end up assuming the wrong answer or it might be the case where a student is not able to take out time from his/her busy schedule. Developing a chatbot solves the issues that may arouse in gathering needed data. It will be accessed from any place at any time. It would give user-friendly interaction to the users. One such good example of chatbot will be paper [6] and [10], where the authors have created chatbots for solving queries of related to a specific topic. In college websites, most users aren't able to realize the desired data which in turn makes the website pointless. This issue can be solved with the help of chatbots So to solve all these difficulties, we have proposed an AI Chatbot. Idea for this chatbot was drawn out of paper [7], where the authors have created a chatbot for solving queries related to college. Artificial Intelligence is a technology that provides human-like intelligence to a machine. This chatbot will be using this technology to create an answer for even those queries whose answers are not available in the database.

II. Literature Survey

In literature (1), the authors have described how the number of individuals looking for well-being data from the web increments drastically. A few elements impact individuals to utilize the web for scanning for well-being data. Confided in restorative data, for example, infections, side effects, and treatment are important for individuals to deal with some broad sickness or being utilized as a bit of choice help data before visiting a specialist. In this work, the therapeutic guide framework called "MedBot" was created by utilizing Dialogflow controlled by Google's machine learning. The learning base for correspondence comprises of 16 symptoms. The chatbot can be executed in Instant Messaging (IM) application, or online for example, Facebook, Hangout, and Line by utilizing the given APIs. In this work, Line is utilized as the test framework for examination. The target of this work is to expand the administration capacity and decline the activity cost of medical consultancy administration by utilizing the chatbot. The downside to this chatbot was, there was no implementation of the neural network making it a chatbot that will only answer those questions which are fed in the chatbot's database. This restricted the knowledge base of the chatbot to the minimum value and to increase the knowledge base values had to be fed in the database manually.

In literature (2), the author describes a chatbot whose exploration displays a strategy for creating chatbots to serve their clients. All in all, these chatbots are utilized for responding to inquiries in numerous organizations, giving client data, giving train plans, making a difference client reservations, menial helpers; fill in as call focuses to serve ten million clients naturally. Profound learning-based conversational man-made brainpower procedure was utilized as apparatuses for learning discussion among machine and client. Additionally, the means required are the procedure utilized related to the convolution neural system strategy by utilizing Tensorflow preparing to improve the precision of these chatbots. From the exploratory outcomes, utilizing

profound learning for chatbots learning, the precision is superior to the customary model. This article has not used the cloud for its database storage which takes a little longer to fetch data. Hence the speed of fetching is slow.

In literature (3), the author describes how the quantity of web- based business clients has expanded quickly. In 2017, the number of computerized purchasers was over 1.66 billion individuals worldwide up from 1.32 billion in 2014. The paper also gives information about online shops that regularly require administrations, for example, live talk for client's support. In any case, such live talk needs administrators to hold on to visit with clients. Then again, if shops give online clients that administrators work for just certain hours, at that point clients, need to sit tight for a response for quite a while. As the quantity of clients has expanded by about 10% every year, the interest for the client the administration additionally increments. Great online client administrations will prompt higher consumer loyalty and developing benefit. To tackle the problem of solving queries related to e-commerce, authors came up with an idea of converting online client support methodologies to a robotized chatbot to reply to clients' inquiries consequently. The chatbot will deal with client issue reports and answers about similar answers for a similar sort of issues. One of the ideal and effective online client support methodologies is to give a robotized chatbot to reply to clients' inquiries consequently. The chatbot will deal with client issue reports and answers about similar answers for a similar sort of issues.

This article researched how to structure and build up a chatbot to reply to FAQs in a particular space. Specifically, they utilized a profound learning AI model that was fit for gaining from enormous information and utilized LSTM for managing an arrangement in language. The AI model will order expressions of inquiries with each class having their answers. The downside to this article was, the chatbot developed was retrieval-based chatbot, which means it will not be able to answer anything outside its database.

In Paper [4], the authors describe chatbots as a software program used in the entertainment industry, agencies and user support. Chatbots are modeled on various strategies such as knowledge base, machine learning -based. Machine learning primarily based on chatbots yield greater practical results. Chatbot which gives responses primarily based on the context of conversation tends to be extra consumer - friendly. The chatbot they are proposing demonstrates a technique of creating chatbot which can follow the context of the conversation. This method uses Tensorflow for growing the neural network model of the chatbot and uses the NLP methods to keep the context of the conversation. These chatbots can be used in small industries or businesses for automating customer care, as user queries will be handled through chatbots, therefore, decreasing want of human labor and expenditure. The authors have created a chatbot which can be used as a reference for creating chatbots for various purpose. This chatbot will be having limited information about the purpose and will provide data to the user from its database. The database will have to be updated manually if there are any changes in the future.

In Paper (5), authors are emphasizing on the health of a person, about how people nowadays are concerned more about their work and not their health. To save the time of visiting doctor for regular checkups, authors have created a chatbot which helps in predicting the diseases from the symptoms provided from the user. It also provides a link for the treatment of identified diseases. It is an android based chatbot. To accomplish their goal, they have used a machine learning algorithm, they have used K- nearest neighbor algorithm (KNN). This algorithm maps the symptoms provided by the user with the predefined dataset.

III. EXISTING SYSTEM ARCHITECTURE

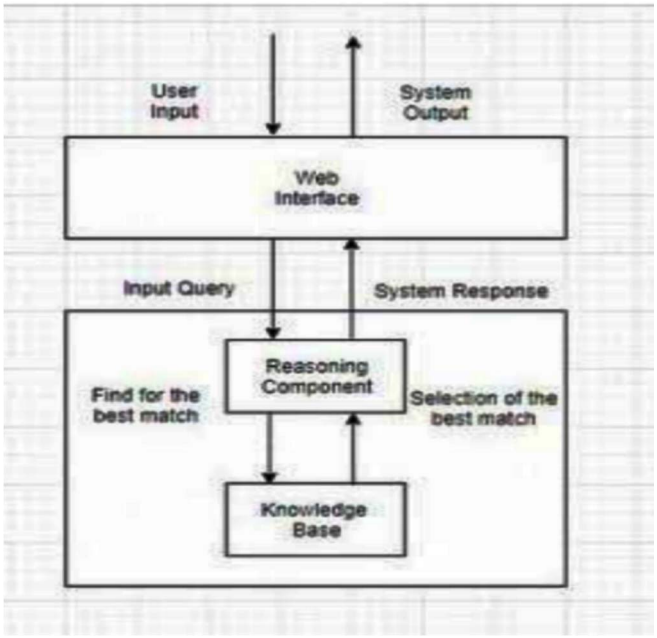

Fig.1. Existing system flow chart

The above flowchart explains about how the existing architecture of the chatbot is basic, where the chatbot checks its knowledge base for answer, if the answer is available, it gives the answer, else the user is asked to call the admin for getting the query solved. This type of chatbot is also known as retrieval-based chatbot.

We will presently talk about the engineering of existing chatbot frameworks accessible with their applications. This chatbot bot is notable and has won numerous honors also, the chatbot is called ALICE. (Artificial Linguistic Internet Computer Entity).

(Artificial Linguistic Internet Computer Entity) is an honor winning open-source natural language artificial intelligence chatbot which uses AIML (Artificial Intelligence Mark-up Language) to shape reactions to questions. It is enlivened by ELIZA and an open-source chatbot created by Dr. Wallace, which depends on common language comprehension and example coordinating. It has won Loebner prize multiple times. It creates reactions to the client's question by applying some example coordinating principles. Nonetheless, it can't finish the Turing assessment, as even the easygoing client will regularly uncover its blemishes in short discussions. The design of chatbot comprises of two isolated parts in particular "chatbot engine" and "language model" which offers us the chance to effectively execute a chatbot in

a recently created knowledge model. The language model is put away in AIML files. The essential structure highlight of AIML is moderation and from all the talk robot dialects, AIML is maybe the least complex. As talked about before, the essential unit of information in AIML is the category. Every category comprises information or question, a yield or an answer and a discretionary setting. The inquiry is known as an example. The appropriate response or reaction is the template. The two sorts of the discretionary setting are classified "that" and "topic". The example coordinating is exceptionally basic while working with AIML as it comprises just words, spaces and special case images _ and *. This is the ALICE framework design. This idea was also referred by paper [8], to create a chatbot for solving university related FAQ's.

IV. Problem Statement

The main reason behind choosing this topic as the project was that many students were facing issues regarding the updates of revaluation examinations or results, about any important notice and events going on in the college. It becomes really difficult for students who stay far away from college and they just have to come to college for inquiry purposes. Even reception becomes complete chaos during the time of admission, many students and parents visit the college reception to get their queries solved. The receptionist will only be able to handle 2 to 3 persons at a time and others will have to wait for their turn. This will also cause tiredness for the receptionist.

To overcome these problems, we are making the graphical user interface inquiry chatbot which gives 24*7 updates regarding any ongoing events or notice. The main motive is to design a chatbot that will simulate a conversation with any user and provide them suitable answers regarding any college-related queries.

V. Proposed System Architecture

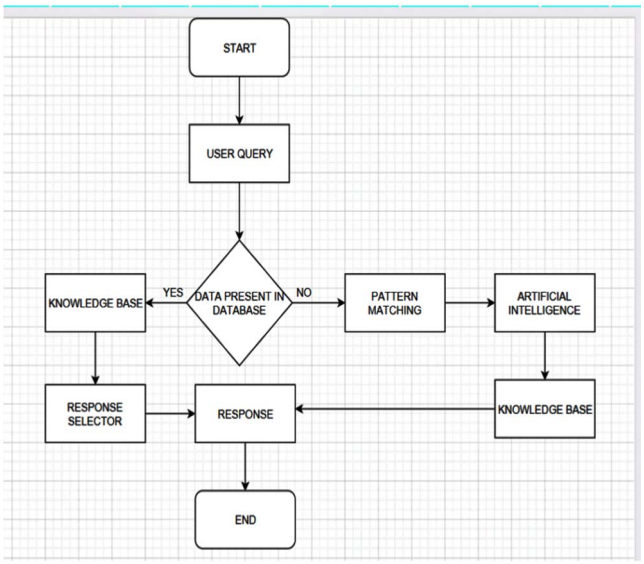

Fig. 2. Proposed System Flowchart

A. Architecture of Chatbot

The above flowchart explains about the working of the chatbot. It starts from user starting the conversation, when the user asks any question its intent will be first matched with any intent present in the database. It will check with the knowledge base of the chatbot and if the answer is present in the knowledge base, it will provide the sufficient answer. When the answer to the question is not available in the database, then with the help of pattern matching and artificial intelligence algorithm provided by Rasa, a answer close to the actual answer will be prepared and stored in knowledge base which will be provided as answer to the required question.

The chatbot to be developed will be web-based. This chatbot will provide answers to all the questions whose answers are predefined in the database. The database will be created in the cloud so that whenever we want to make any modifications in our database, we can do it without any difficulty. The chatbot will have Artificial Intelligence which will allow it to produce answers for even those questions whose answers are not defined.

Artificial Intelligence will be provided with the help of machine learning. Machine Learning will be done in Python language. The chatbot will be the Generative model because of which it will be able to generate new responses from scratch. It will be done by using RNN (Recurrent Neural Network) and LSTM (Long Short Term Memory). We will use the Rasa Stack for the development of our chatbot. Rasa Stack is an open-source development tool that provides a platform for developing a chatbot. It provides the facility of building our components, it learns from real-time conversations i.e. we don't need to add any extra rules. It can be easily be deployed on the cloud and easily set up the backend system since the process is automated. The chatbot will have an appealing GUI which will draw interest in the user to use the chatbot.

B. Working of the Chatbot

User will first ask their query to the chatbot The chatbot will check if the answer to that query is available in the database or not If the answer to the query is available, it will provide the respective answer If the answer is not present, it will perform pattern matching and artificial intelligence to build an answer and will send an alert to admin to add this query to the database. After that, it will respond and ask if the user has any more query. If not the chatbot closes. The technology and working of the chatbot was referred from paper [9], where the authors have researched on some of the best technologies available for building a chatbot.

The above functionalities are achieved using RASA Framework. Rasa Open Source is a framework for natural language understanding, dialogue management, and integrations. Rasa X is a free toolset used to improve contextual assistants built using Rasa Open Source. Together, they include all the features to create great text- and voice-based assistants and chatbots. Rasa provides various features for creating chatbot. It can understand messages i.e it can turn free-form text in any language into structured data also it supports single and multiple intents and both pre-trained and custom entities. It provides interactive learning which is a feature that allows the developer to train it manually and give the assistant feedback whenever it makes an error. It supports commonly used messaging channel like Slack, Facebook,

Google Home and more. This framework provides option to write custom actions to integrate API calls. It provides a optimal a way to manage version control of all the trained models and helps switch between models with a simple click. The important files of RASA framework are as follows.

```
## intent:about_us
- info about clg
- info about college
- about college
- about the college
- can you tell me about the college

## intent:affiliate
- MU Affiliated ?
- Is this college MU affiliated ?
- ap shah mu affiliated ?
- is this college mu affiliated ?
- this clg affi with mu ?
- affiliate
- affiliated
- is this collge affilaited with mu

## intent:affirm
- yes
- indeed
- of course
- that sounds good
- correct
- perfect
- [yes](affirm) thanks
```

Fig. 3. NLUmd File

NLU.md file consist of all the intents i.e. all the possible intentions of user are provided in this file.

```
## new content 1
* greet
    - utter_greet
* username{"username": "Aditya"}
    - slot{"username": "Aditya"}
    - utter_greet_name
* email{"email": "adityahuddar06@gmail.com"}
    - slot{"email": "adityahuddar06@gmail.com"}
    - utter_happy
* seats_in_it
    - utter_seats_in_it
* placement
    - utter_placement
* fees_st
    - utter_fees_st
* feedback+did_that_help
    - utter_did_that_help
* goodbye
  - utter_goodbye

## new content 1
* greet
    - utter_greet
* username{"username": "Arun"}
    - slot{"username": "Arun"}
    - utter_greet_name
* email{"email": "arunbhosle06@gmail.com"}
    - slot{"email": "arunbhosle06@gmail.com"}
    - utter_happy
```

Fig. 4. Stories.md File

Stories.md file is responsible for dialogue management between users and Chatbot. It is used by the Chatbot to understand the intents of the user and reply with a particular action to the user. Stories.md file contains conversation flow between user and chatbot

```
session_config:
  session_expiration_time: 0.0
  carry_over_slots_to_new_session: true
intents:
- username
- affiliate
- feedback+did_that_help
- facilities
- email
- greet
- choose
- placement
- seats_in_it
- fees_obc
- goodbye
- affirm
- about_us
- greet_name
- seats_in_mech
- how_to
- vision
- fees_general
- ask_name
- reach_us
- mission
- fees_sc
- fees_st
- seats_in_comp
- seats_in_extc
```

Fig. 5. Domain.yml File

The Domain describes the world in which the chatbot operates. It has four parts i.e. the intents, entities, slots and actions. The Domain has all the information that is needed by the chatbot to understand what the user wants to convey and provide an appropriate answer to the query raised by the user.

VI. RESULTS

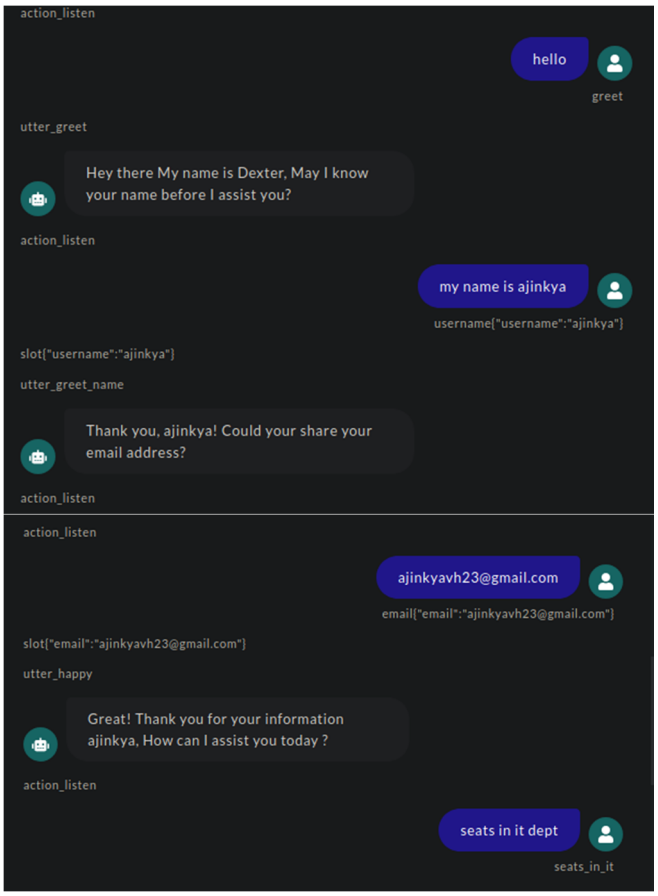

Fig. 6. Conversation between User and Chatbot

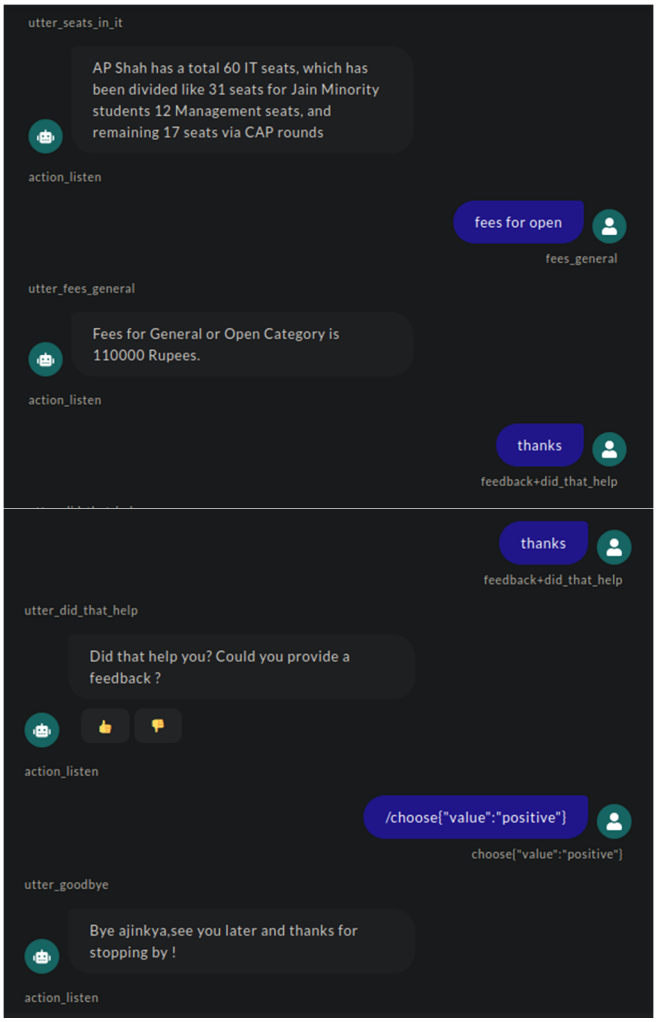

Fig. 7. Continued Conversation between User and Chatbot

The above conversation is a result of partially trained dataset where the chatbot is able to correctly identify intents of the user and provide answers from database. The more the model is trained the better will be the accuracy of the bot.

VII. Conclusion

The development of this chatbot will provide an easier way for students and any person to solve their queries faster and in an easier way. Not only it will help people to get their queries solved easily but it will also help reduce the work stress of the receptionist. The chatbot will be developed using RNN and LSTM, because of which the chatbot will be able to frame its answer if the answer for that particular question is not available in the database.

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