

The College Chatbot

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ABSTRACT

A lot of metadata, information about data, is stored in the world that can help us in gathering significant patterns and forming complex relations among data. This information can be utilised carefully to extract some meaningful and marketable products. A very common example of metadata is information about students in a university. This data is used by our system, The College Chatbot (CC), to provide quick and smart replies to queries provided by students as well as teachers. The CC will remove the redundancy of teachers sending information or notifying students of something via a middleware such as Whatsapp or a middle agent i.e the class representative. It will also allow the students to search for their seniors information regarding their future decisions or information related to their colleagues or their teachers. The system also provides an easy access to all the placement information a student requires in a convenient and efficient manner.

Keywords

Intent analysis, Entity analysis, Chatbots

1. INTRODUCTION

The chatbot hype originates from a mixture of two factors; The fast growth of communication apps and the increased effect of artificial intelligence and natural language processing in our daily life. We are somehow more comfortable communicating over messaging apps rather than face to face interaction. This is true because communicating over apps is much more accessible, cheaper and faster. [2] Chatbots provide an innovative way of combining messaging and artificial intelligence to provide faster and more responsive systems. Chatbots can scrape data from anywhere and in any form and present it in the most suitable format[1]. This means that the knowledge base of a chatbot can be expanded in many ways like dedicated database servers, social media content such as tweets, facebook posts, LinkedIn updates and so on.

It is often impossible to get all the data on a single and simple interface without the complications of going through multiple forms and windows. The College Chatbot aims to remove this difficulty by providing a common and user friendly interface that uses natural language processing to interact and solve queries of college students and teachers. Some of the major features of this chatbot are:

- a. Viewing user profiles of existing and passed out students, retrieve placement details of students, grades/ pointers of students.
- b. Sending notifications to groups of students.

Users of the system can be divided into three classes

- a. College students who would want to check out the latest updates of their seniors and also get notifications from teachers about the concerned subjects.
- b. Teachers who want to use the application to inform students of upcoming assignments.

- c. Alumni of the college who want to log in and make changes to their profile.

The paper is organized as follows. The next section gives the related work. The fifth Section describes the approach used for the CC along with an example. The sixth section will further highlight the results and conclusions derived from the project and the later sections will give a brief on the future enhancements that can be applied to the CC.

2. RELATED WORK

Currently chatbots generate responses using a variety of approaches. Some of the popular approaches is to use machine translation, retrieval based response selection and recurrent neural network sequence generation[7]. Every chatbot uses a huge corpus to gather inferences from it. Most recent chatbots use social media content for their database. Microblogging sites such as twitter can be used as a rich source of data but no real work has happened using this source because of insufficient evaluation. [6]Each chatbot follows almost a common methodology. The first step will involve preprocessing, followed by identification of intent and entities. Since the responses are generated statistically they can get repetitive after a while. An intelligent bot must be able to react to the context and change its answer according to changes in the environment. [4]Further studies are going on in this field of AI.

3. METHODOLOGY

The approach to creating a chatbot that offers the features mentioned above we do the following steps.

3.1 Data Extraction

There are two ways in which we are extracting data for our chatbot.[3] We have a dedicated database server connected that supplies the chatbot with information about registered users. To get updates from the non registered alumni of the college we are using linkedIn dump. This is a very powerful yet restrictive tool to get information from linkedIn. Since extracting data from using techniques like web crawling had certain limitations so we developed a script for downloading the PDF and extracting the information from it.

3.2 Data preprocessing

The first step of the approach is obtaining the input from the user. For this we have used the facebook messenger api. The user will enter some text and based on the type of text, the system will decide whether or not preprocessing is required. For example, if the user enters a generic query like 'Hey Good Morning', the system does no further preprocessing and replies with a ready made response like 'Good Morning ?How can I help you?'. If the user makes a specific request like 'What is Sam's pointer?' or 'Who is the current topper of the class?' the system gathers that natural language preprocessing is required. The various methods of preprocessing are applied to the sentence[6].

- a. Sentence Preprocessing is done using stemming and lemmatization. This involves mapping similar words

to one entity. For example dance, dancing, danced are all mapped to one word, i.e. dance.

- b. Stop words removal - This involves removal of common words like the, an, of and so on.

3.3 Identification of Intent And Entity

The main concepts in our chatbot are Entities and Intent [5]. To illustrate this, let us consider a sample query that the chatbot might get.

Input: 'Hey can you tell me about Aayush and Darshils Pointer?'

In this example, the main intent is the pointer and entities for this intent are Aayush and Darshil. So when you query the system you have some intention. This is called the intent of the message. Each query has some parameters. For example, to show pointer information, the system need to know persons name. These parameters are called entities. To build an interactive system, we have to define a set of intentions that the chatbot must be able to understand. For each intent we must

have a standard format. Further we just fill the standard answer with the parameters provided in the query. When user queries your system, the system need to determines the intention of the message, jots down the parameters listed in the message. So the first issue that the system has to solve is to determine the intention of the query. This can be done using various classification models. The intents recognized by the chatbot are:

- a. Pointer(Grades)
- b. Registration Number
- c. Contact Details
- d. Contact Address
- e. Email Address

The second issue is to appropriately determine the parameters or entities and map them to the appropriate intents[5]. This is solved using Named Entity Recognition task. Entities inference task is called Entity Filling and it is similar to NER[4] task After Classification of the entities the answers are mapped according to the intents identified and are also mapped with their entities.

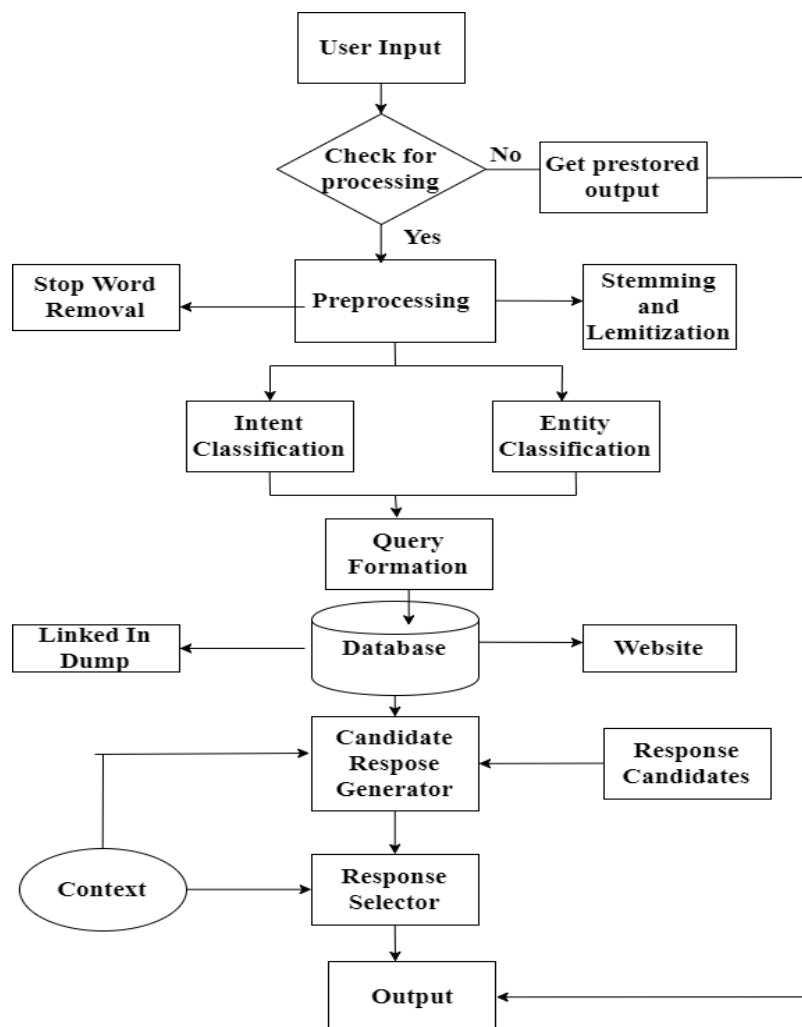


Fig. 1 System Architecture

3.4 Query the database

As soon as the intents and entities are identified the chatbot looks for the details in database with the help of an API call. The api Response is the form of JSON.

3.5 Candidate Response Generator

From the set of context and responses from database the candidate response generator generates a set of response candidates[5]. Each response is associated with a probability that gives the probability that the given response is the right answer. For example, some of the sample responses generated can be:

Ram's pointer is 8.92 with probability = 0.8

The pointer of Ram is 8.92 with probability =0.75

Ram's pointer is same as Shyam's pointer with probability = 0.2

3.6 Response selector

Response selector selects the best response based on a number of attributes such as grammar, accuracy, suitability in response to the question and context in which the question is asked to select the best of the possible responses[5]. The selected response is converted in a form suitable to be displayed on the screen.

4. RESULTS AND CONCLUSION

The chatbot is designed with the help of the facebook messenger API. This saves us the time to design a chat window and since

everyone knows how to operate facebook nowadays it gives a more comfortable user interface to work with. The request is sent via an api call to the server where the processing of the query is done. We are using a MySQL database at the backend for the knowledge gathering. On top of this we are using the LinkedIn dump to get the data of members who are not currently registered with the system. For the existing users we have provided a website, as shown in Fig. 2, where existing users can login and update their profile or query the system for results. As shown in Fig. 3 multiple queries which have the same meaning are being recognized as the same and proper result is being displayed on the console.

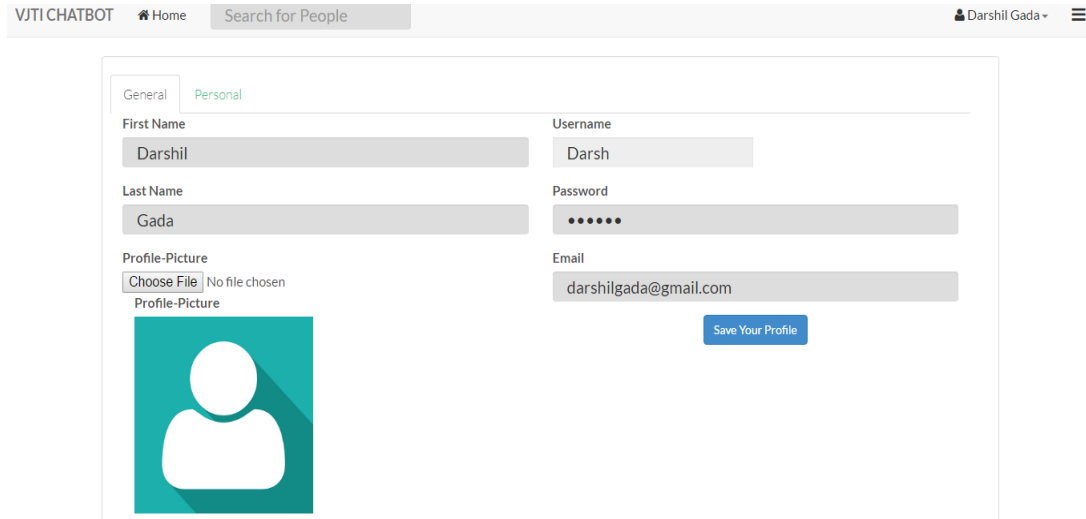


Fig. 2 User Interface for website login

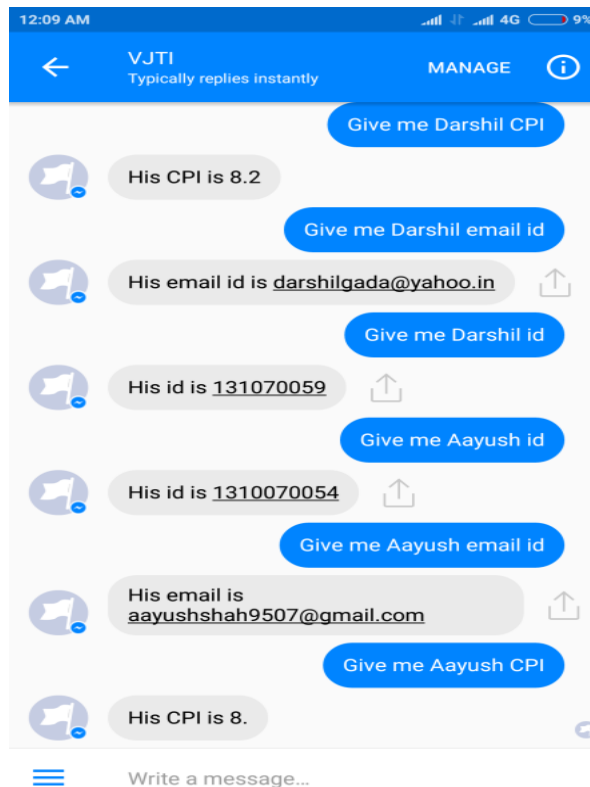


Fig. 3 Output for various queries

5. FUTURE ENHANCEMENTS

- a. Removing the latency associated with the response time in hosting the chatbot on a popular messaging or social network platform.
- b. Providing chat functionality in terms of a small user window, but on the official college web site or the college web site.
- c. Providing a mechanism to scrape data off LinkedIn or to make users dump data periodically in order to get updates related to the information.

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