Project Report on

Chatbot for Placement Cell

As a Project Work for Course
Artificial Intelligence
(INT 404)

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Student Declaration

This is to declare that this report has been written by us. No part of this report is copied from other sources. All information included from other sources have been duly acknowledged. We aver that if any part of the report is found to be copied, we shall take full responsibility for it.

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Bonafide Certificate

Certified that this project report "Chatbot for Placement Cell" is the bonafide work of "Tushar Agrawal, Rohan Tejeswar, Mridul Mishra, and Sneh Srivastava" who carried out the project work under my supervision.

1. Background and Objectives of the Project

Chatbot is an application used to conduct a conversation via text in the form of a chat instead of a live human agent. It is designed in such a way that it can answer any query of its domain in a convincing way to simulate a normal human conversation. These systems typically require a lot of tuning and testing, but even the most complex and advanced systems are unable to pass the industry standard Turing test.

Chatbots are typically used in dialog systems for various purposes like customer service, request routing, or information gathering. They use Natural Language Processing (or NLP) to understand what the human has said and use either a probability model to pick an appropriate response, or Deep Learning to generate a response on the go.

The Motivation behind this project was to understand how NLP is used by a computer to understand what a human would say in natural language, extract meaning from it, and use probability to pick the response with highest probability to be the correct one. Artificial Neural Networks help us in building a model based on expected questions and responses based on these questions.

Our objectives were

- to create a chatbot which can introduce itself,
- describe the functions can perform,
- and perform those functions to the best of its ability.

This brings us to the outcome of this project. We used Keras to build a model to generate responses based on input from processed natural language. We successfully made a program which takes input from a human, both written or speech, and converts it into machine understandable bits consisting mainly of necessary root forms of words from the given sentence to extract meaning. This is then used by Keras which compares the input to the preexisting model to generate probabilities and picks the response with the highest probability to be correct.

2. Description of Project

The project is made of distinct modules, and they are -

1. Model Training -
   The cornerstone of this project is the model. Model is generated based on a set of expected inputs. For instance - "Hi", "Hello", "Good Morning", all specify similar intent, that is to greet someone (or something). To any one of the above-mentioned greeting, one response will suffice. But for the sake of variety (and a human touch) we provide the model with multiple responses. The model trainer can then use this data and convert it into such a form which can be used to reverse-engineer it based on input and generate an output.

2. Retrieving Response -
   Much like before, we have to follow the same process of converting the natural language input from the user into a machine understandable set of tokens (or words). These tokens can be used to reference the model and understand the intent of the user. That intent is understood by probability. Our input is compared to each one of the expected inputs we used to train the model and the probability of match is generated. We pick the expected input with the highest output and retrieve the outputs. We randomly pick one of the outputs and send it to the user.
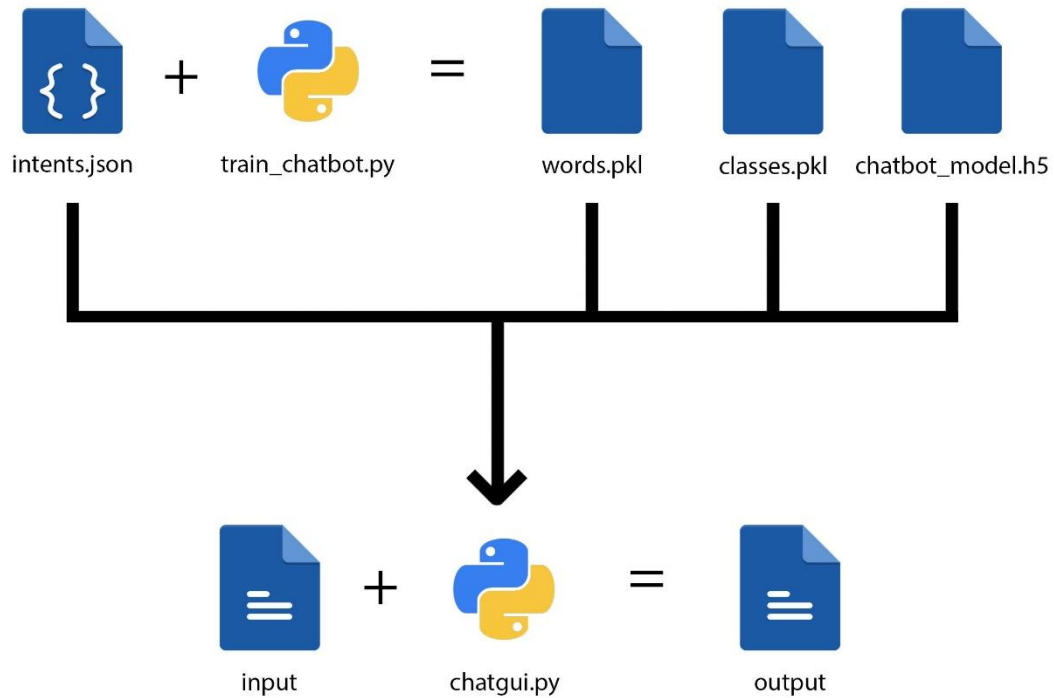
3. Speech Recognition -
   Since we are dealing with natural language, it is only fair that we also include speech. Arguable, speech is more natural than text. This module simply converts the speech received from the default audio device into text.

4. Graphical User Interface (GUI) -
   GUI simply marries everything together so that they work together seamlessly.

The diagram below explains the interactions between the files of the project -
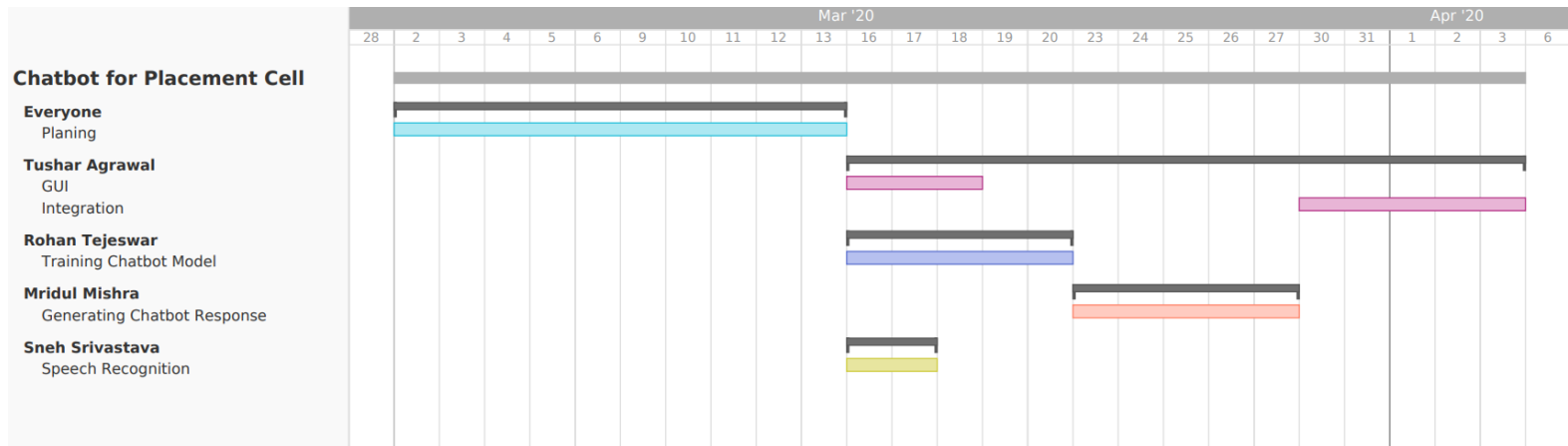
3. Work Division

- Tushar Agrawal – GUI and integrating all modules together
- Rohan Tejeswar – Training chatbot model
- Mridul Mishra – Generating chatbot response
- Sneh Srivastava – Speech Recognition

4. Technologies Used

1. Python
2. nltk
3. Keras
4. TensorFlow
5. SpeechRecognition

5. Scheduled Work

6. SWOT Analysis

1. Strength – The project uses both voice and text as input. Having multiple ways of used this makes it accessible to a much larger group of people, many of whom might use these accessibility features often. Being able to provide placement related services to a student without any human interaction is most useful in answering frequently asked questions, which is exactly what our bot does.

2. Weakness – The major drawback of this is perhaps our chatbot model. It is quite difficult to train the bot with all possible expected inputs. For this reason, when the bot encounters something it is not trained to deal with, it picks an answer it feels is the right one, which is almost always an incorrect response.

3. Opportunities – To deal with the above-mentioned weakness, we can instead use a Deep Learning model to generate responses naturally. But for that to work, we need a very large dataset which is perhaps outside the scope of this project.

4. Threats – No apparent threats identified.