Google Dialogflow based Interview Chatbot

Shraddha Bijotkar , Sanika Raul, Vidya Chitre, Saurabh Naik

Department of Infornation Technology Vidyalankar Institute of Technology,
Wadala, Dadar.
Department of Information Technology Vidyalankar Institute of Technology,
Wadala, Dadar.
Department of Infornation Technology Vidyalankar Institute of Technology,
Wadala, Dadar.
Department of Infornation Technology Vidyalankar Institute of Technology,
Wadala, Dadar

ABSTRACT— Interview Chatbot is a dialogflow based chatbot that conducts interviews in the way a normal interview is conducted such as a process consisting of Aptitude, Technical and HR rounds. The Bot calculates result at the end of each section and checks if the result is equal to or greater than 50% and if it's satisfying the condition then and then only the user is allowed to go for the next round. For each particular section a separate intent is designed that asks questions and evaluates the final result for that particular section with the help of concept of fulfillment. The Nodejs Express API is hosted on Heroku and the link of that hosted API is added in the fulfillment of our Bot. For a user to practice on our Bot it is integrated with a full stack web app with Angular as a frontend ,Nodejs as a backend and sqlite3 as a database. Using this web app, a user can practice as many number of interviews as he wishes to opt for and keep on improving his performance so that he will be capable enough to face real interview scenario.

Keywords—Dialogflow ;Chatbot ;Nodejs ;Intents ;Interview ;Virtual Interview

I. INTRODUCTION

An Interview Chatbot is a platform where an aspiring candidate can practice the most likely seen rounds in all the engineering hiring processes in the most efficient way.A chatbot can be defined as an entity that basically mimics a human conversation and makes it appear to be as natural as possible. There are several tools with which we can make a chatbot that performs specific tasks taught. Out of all of the available tools we chose to use Google-owned Dialogflow which is an NLP based platform to create conversational assistant chatbots that can be easily integrated with numerous platforms such as Facebook, messenger, slack and in fact self-designed websites.

There are numerous fields in which AI has paved its path and has created a huge difference by automating many of the tasks that previously humans used to perform. The main focus of our project is to take up the responsibility of a recruiter to conduct interviews. The Bot acts like a recruiter and takes as number of interviews as an interested candidate wants for the sake of his/her training to make him/her capable enough to face real interview processes.

Our project has three sections namely, interview pre-requisite, actual interview and result section. In the first section, we ask users about their choices and preferences in the technical areas such as preferred coding language, database, scripting language and expertise in data structures,etc.[1]Based on these preferences provided by candidate,we have designed an agent named Mr.Interviewer using dialogflow that takes interview.He starts by asking aptitude questions followed by technical and HR questions. The bot notes down the answer to each question given by candidate and at the end of each section it displays the score for that particular section.For each section tables are created consisting of questions along with their options and answer in a sqlite3 database.The questions displayed by the Bot are fetched from the database. For evaluating the answers we have created NodeJs Express Backend APIs which are hosted on Heroku Cloud Platform so that they can communicate with Google Dialogflow. And for candidate to have better visual experience the bot is integrated with full stack site with the help of third party Bot integration platform Kommunicate.io.

The Bot is designed in such a way that if any student is willing to appear for any Engineering related placement placement process then this Bot can assist that student in such a way that he will be knowing at least the basics of how an actual interview process works and can get a rough idea where exactly he stands in the current competitive recruitment environment.

Nodejs Express APIs:

For making the bot conversations more natural and real-time, we can integrate it with APIs that can handle the user responses, do some basic operations and generate appropriate responses. Nodejs can be the best option to create the same. Out of several Nodejs frameworks Express is popularly used framework for chatbots since it supports real-time messages and it's easy to learn. In our project as the interview process is divided in three main sections; a particular score is generated based on the user's performance as soon as the user is done with each section. This score generation activity and displaying respective guidelines are all handled by our Express APIs.

Dialogflow:

Dialogflow (formerly called API.AI) is Google-owned chatbot development framework. It is used for Natural Language Processing using machine learning. Dialogflow is SaaS bases product which means you don't have to worry about infrastructure. It runs on Google infrastructure, and can scaled for million users easily.

Kommunicate:

Kommunicate is a BotBuilder platform that provides facility to integrate bots with our own websites. The bots that are supported by Kommunicate include dialogflow bot and Amazon Lex bot. It provides an easy integration option with smart rich messaging templates. It can even hand-off the conversation to a human if bot stops responding. We have used Kommunicate to integrate our Dialogflow bot with our Angular site by including the integration code in the home page of our website.

II. LITERATURE SURVEY

Various authors have worked on the similar systems. Here is the detailed review of some of their work:

Jitendra Purohit, Aditya Bagwe, Rishabh Mehta, Elizabeth George, Ojaswini Mangaonkar Purohit [1], proposed a system called JARO which addresses the common concerns that a candidate faces when it comes to attend the mass interviews. JARO accelerates the interview process towards an unbiased decision-making process by proposing a chatbot that would conduct interviews by analyzing the candidates Curriculum Vitae (CV), based on which, it then prepares a set of questions to be asked to the candidate. The system will consist of features like resume analysis and automatic interview processes. The software would also ask questions based on the previous responses of the candidate by utilizing a Natural Language Processing (NLP) model which is very helpful in this process. After the interview process, the software would analyze the data collected to determine the right choice for the position offered. Thus, the project, JARO chatbot mainly intends to streamline the process of hiring employees.

Muhammad Laiq, Oscar Dieste [2] objective was to develop an AI-based interview simulator for helping novice requirements engineers in gaining interview skills. So their research is based on the Design Science Methodology for Information Systems. The simulator is the outcome of six cycles; in each cycle, a proof of concept with additional features is created. Each cycle finishes with evaluation and improvement suggestions. This simulator been tested with students and results have been promising. The interview simulator understands context-free questions, retrieving the right information related to RE concepts such as goals, tasks, users, benefits, and constraints. The simulator also answers questions based on the context, makes summaries of the conversation, responds to meta-questions, and adds ambiguity and incompleteness to the conversation.

Siddhant Wade, Abhishek Bisht, Abhishek Yadav, Vidya Chitre [3] explain that university or college admissions processes are one of the most important and daunting phases of a student's academic cycle. And largely these processes are extremely rigid and often students have to rely on here say and in consistent news and peer information which leads them to make un-informed decisions causing the loss of opportunity. Their paper proposes a solution in the form of a chatbot to address this problem on the user end and highlights the nuances of developing and deploying such a solution successfully..

Iulia Stanica, Maria-Iuliana Dascalu, Constanta Nicoleta Bodea,[4] realized the issue that people have to face many challenges when going to an interview: introversion, insecurity, lack of technical or social skills. Training becomes highly recommended in order to improve interview performances. So their paper presents VR Job, an application which proposes an innovative way of training for an interview. By combining the advantages of various technologies, such as virtual reality and chatbots, their application creates an interactive way of helping software engineers train for their interviews. Emotion recognition techniques are also included, helping provide accurate feedback for the user.

Ghose, S., & Barua, J. J. [5] focus on creation of a FAQbot which can be beneficial for university students to acquire knowledge and get clear idea about the admission and courses. The system consists of vital components namely a semantic mapper to map semantics from user input,context mediator, topic navigator which guides the bot while searching the information repository written in AIML and response generator.The most important aspect of this paper is to analyze the

dialogue design with conversation knowledge in a domain-specific chatterbot

Aliv Faizal Muhammad, Dwi Susanto, Akhmad Alimudin, Farah Adila, Moh. Hasbi Assidiqi, Salim Nabhan [6] have developed chatbot for English conversations, using speech recognition and artificial intelligence technology with google dialogflow as the artificial intelligence engine. This chatbot can prove to be boon for people willing to learn English as they can practice conversations anytime. As the vocabulary data set varies and conversation expands, the accuracy of agent's response also increases. The paper has thrown light on the google based dialogflow platform in an effective approach.

III. PROPOSED SYSTEM

The Bot is designed and implemented on the Dialogflow platform. The Bot basically acts as an Interviewer and performs the tasks conducted in normal placement process. As normally seen in various placement processes most of the companies prefer to have Aptitude, Technical and HR round and based on the performance of candidate the candidate is evaluated and allowed to opt for further rounds.

The same tasks are done by our Interview Bot also. First it starts taking interview by asking Aptitude questions and for each answer given by candidate it keeps on evaluating the result.
And once the aptitude round is done it displays the score and if it's greater than 50% then and then only the candidate is allowed to go for Technical round. The same rules are applied for Technical as well as HR round.

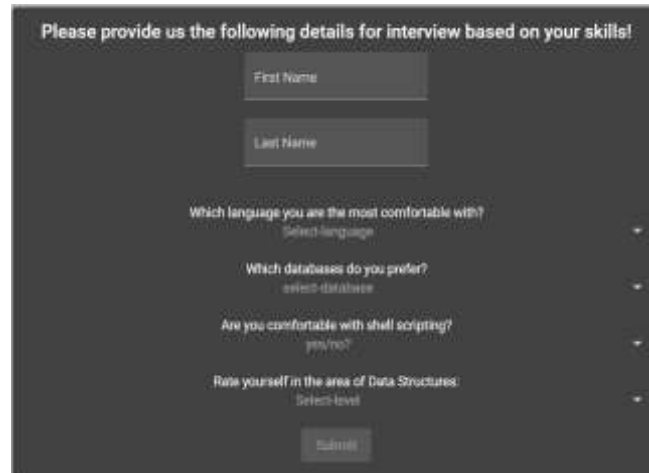The following figure gives the basic idea of how the bot works.
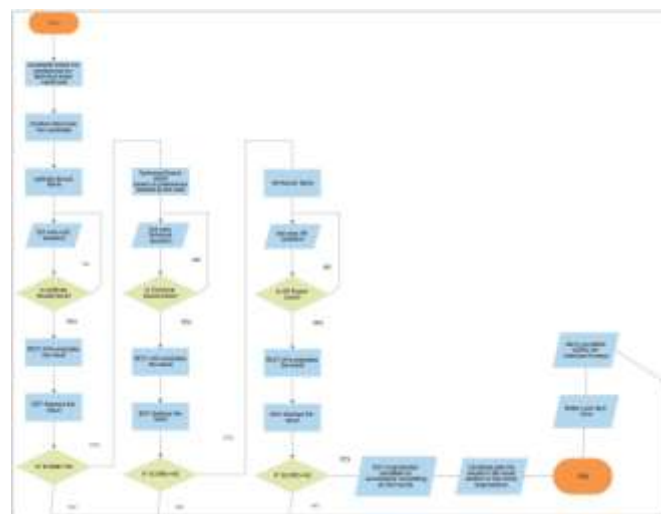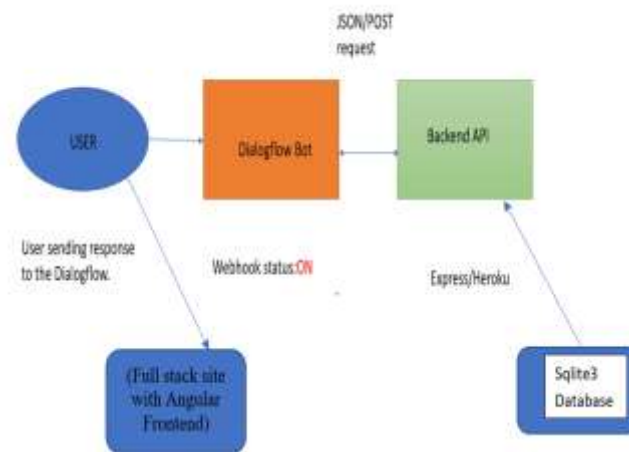
During the interview to deal with the responses to complex questions given by candidate we implemented the concept of web hooks by enabling fulfillment. For that we created a Nodejs and express API that handles the POST requests of given by Dialogflow Bot and based on the answer given by user the API evaluates the final result and displays it to the user at the end of each section.

The Bot is integrated with a sqlite3 database and full stack app. And for the Bot to communicate with

Express Server , entire code is deployed on the Heroku cloud platform.

The sequence in which the Bot works is as follows.
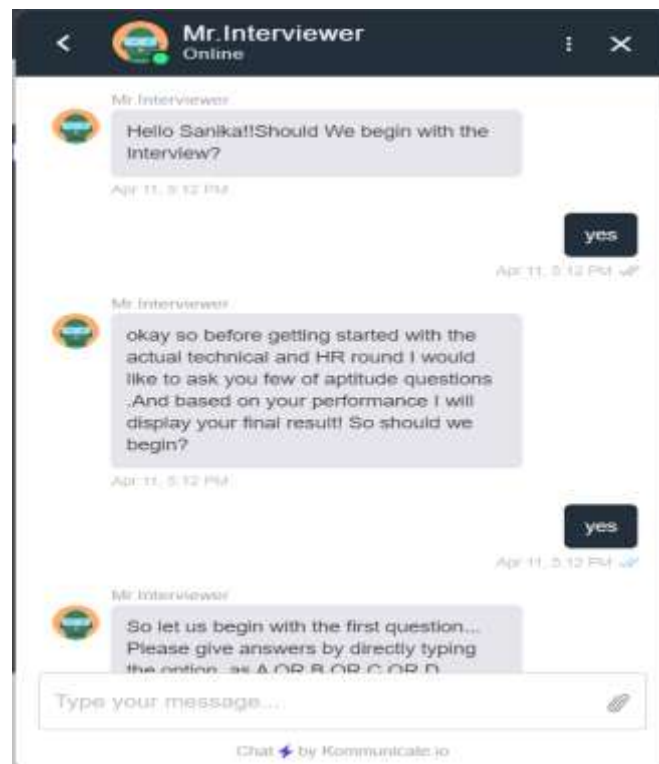
IV. METHODOLOGY

• First consider an appropriate approach of how the interview process will work and then accordingly create an agent on Google owned Dialogflow.
• Depending on the various tasks that the Bot will handle define respective intents with their exact follow-up and fallback intents. For each intent depending on its requirement define respective entities.

• For bot to communicate with external APIs; enable the fulfillment option.
• Design APIs in Nodejs Express on any preferred IDE (in our case it is MS visual studio) and deploy those APIs on any hosting platform (in our case it is Heroku) so that the bot will be able to communicate with them.
• Create respective tables containing questions in sqlite3 database for various sections included in the

interview process.And integrate the database with express backend which will post the questions back to the bot and evaluate the answer by matching the answer stored in it.

• For users to get better visual experience the Dialogflow provides several integration options such as Facebook, Messenger, Slack, Web demo. So we have integrated our bot with full stack (Angular, node.js, sqlite3) site with the help of bot integration platform called as Kommunicate.

V. RESULTS AND ANALYSIS

Having developed a dialogflow chatbot that can make a candidate familiar with the interview process is the biggest advantage. Along with this it can be easily integrated with a platform that you think is suitable out of so many available options. In this project the Bot is designed from the point of view of student who wants to practice at his own pace. But it can also be used in actual interview processes as well. So kthat right candidates can be found out from pool of students reducing the extra stress that HR, managers and recruiters have during placement processes..

VI. CONCLUSION

In the current era of replacing roles of Humans with AI chatbots this bot stands different. As every field is progressing by taking advantage of AI. The process of placement is also making its own progress path with the help of AI.This web app is capable enough to automate the entire process of placement.And at the same time developing and nourishing confidence within candidate who are preparing themselves to face actual interviews and aptitude test.

REFERENCES

[1]. Jitendra Purohit, Aditya Bagwe, Rishabh Mehta, Elizabeth George, Ojaswini Mangaonkar Purohit "Natural Language Processing based Jaro-The Interviewing Chatbot", 2019 3rd International Conference on Computing Methodologies and Communication, August 29, 2019.

[2]. Muhammad Laiq, Oscar Dieste, "Chatbot-based Interview Simulator: A Feasible Approach to Train Novice Requirements Engineers", 2020 10th International Workshop on Requirements Engineering Education and Training (REET) , Issue October 07, 2020

[3]. Siddhant Wade, Abhishek Bisht, Abhishek Yadav, Vidya Chitre, "Developing chatbots to solve college admissions processes and counselling pain points.", Issue 11 Nov 2014

[4]. Iulia Stanica, Maria-Iuliana Dascalu, Constanta Nicoleta Bodea, "VR Job Interview Simulator: Where Virtual Reality Meets Artificial Intelligence for Education", 2018 Zooming Innovation in Consumer Technologies Conference (ZINC),Issue May 2018

[5]. Ghose, S., & Barua, J. J. (2013). Toward the implementation of a topic specific dialogue based natural language chatbot as an undergraduate advisor. 2013 International Conference on Informatics, Electronics and Vision (ICIEV).

[6]. Aliv Faizal Muhammad, Dwi Susanto, Akhmad Alimudin, Farah Adila, Moh. Hasbi Assidiqi, Salim Nabhan, "Developing English Conversation Chatbot Using Dialogflow", The 22nd International Electronics Symposium (IES), Issue September 30, 2020