INTERVIEW PRACTICE – VOICE-BASED CHATBOT

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ABSTRACT-

*Chatbots mimic human conversation using Artificial Intelligence (AI) [8] for more effective human-computer interaction to provide satisfactory answers to the user. Chatbot can be described as software that can chat with people using artificial intelligence [8].Virtualization and pandemic has led to isolation of students across the world. Interviews are taken online, but practice isn't available as it was available earlier in offline institutes. This survey paper aims at building a long-term solution for students to practice their interviews online by deploying a voice based chatbot to conduct interviews, analyse answers and generate scores based on that. The intention is to deploy a voice bot for students to practice interviews in any domain of their choice, at any time of the day. The chatbot system will be able to analyse different aspects of the candidate including accuracy of the answers and if the candidate has used any invalid means. Chatbots can be made available 24*7 for students to practice their interview skills and domain knowledge and be better at it. The aim is to create a virtual environment like an actual interview environment where questions are asked by the bot and performance of the user is evaluated, a report is generated and sent to the user.*

Keywords*: Voice Based Chatbot, Sentiment Analysis, Analyse Answers.*

INTRODUCTION-

In today's world, many web based services like E-business, Virtual Assistance and many more web based services are very user friendly and it avails everything right at our fingertips. The goal is to provide a long-term solution for students to practice interviews online by using voice-based chatbots, analysing responses and generating reports based on the responses. An interactive chatbot can lead smart conversations[9], whether by text message or voice. They are armed with machine learning[7] or neural networks to interact with humans and are becoming more flexible for every interaction. An Interview Chatbot fed by Deep Learning[9] and trained in the dataset composed of interview questions of the computer science field is proposed. Interview chatbot can be deployed online for students to practice their interview skills on different courses of computer science. The chatbot will provide challenging and engaging questions, demand answers from students and check scores and analyse areas of improvements based on them. A chatbot can be implemented and deployed based on different domains and user's requirements.

LITERATURE SURVEY-

In [1] this paper, the proposed JARO system addresses common concerns that candidates may face when attending large-scale interviews. The system includes features such as resume analysis and an automated interview process. The software also uses a natural language processing (NLP) [7]model to assist in the process of asking questions based on a candidate's previous

answers. Companies can use an interviewing chatbot to make the recruitment process easier and more convenient. The traditional interview procedure is inefficient, time-consuming, and prone to human mistakes. Companies and university recruiters can use the JARO chatbot. It can be used to first shortlist individuals based on their résumé, and then conduct interviews with them. Although only four job categories are currently available, the JARO chatbot's database can be expanded to include more. The information about the candidate can also be saved for future recruiting. The JARO Chatbot learns from all of the interviews it conducts and adjusts the questions it asks the candidates it is interviewing. The purpose of resume analysis is to determine the candidate's qualities, areas of interest, and hobbies. This information aids in the preparation of questions for the candidates. It also allows JARO to assess the candidate's areas of interest in relation to the job profile the organisation is seeking. JARO decreases the amount of time spent in a traditional human recruitment system.

This paper [2] proposes a system which automatically recognises facial expressions from images, classifies emotions and makes a final decision to recognize the user . To localize faces, the system uses a simplified method called the Viola Jones face recognition algorithm. Then, three methods are used to extract facial features: "Zernike Moments", "LBP" and "DCT transformation". The various feature vectors are combined together using a feature subset selection algorithm to improve the performance of the recognition and classification process. The combined functions are trained and categorized using the SVM, Random Forest and KNN classifiers. Experiments on the JAFFE database reveal that the system has a recognition rate (accuracy) of roughly 90.14 percent, as indicated by the ROC curve. Video sentiment analysis has the distinct advantage of expressing both audio and video reactions. The speaker's tone is determined by vocal modulation from recorded responses, but the speaker's sentiment nature is determined by visual data. Face recognition, feature extraction, and emotion classification are the three stages of the system's experimental approach, which are all performed in Matlab. The dataset for the implementation is drawn from the JAFEE database, which has 215 (256 X 256) pixel photos of 10 Japanese models expressing seven different facial expressions: happy, sad, surprise, anger, disgust, fear, and neutral. The initial stage in image categorization is to recognise each expressor's face because only the main components of the face, such as the eyes, nose, and mouth, contain feeling.

The paper [3] provides a detailed overview of some recent chatbot systems/articles developed in various fields. These papers specifically refer to the types of knowledge given to these systems, the domains in which they are designed, and other parameters to understand recent trends in chatbot system development have been reviewed. Despite the fact that many research papers have been written and chatbot systems have been developed for a variety of domains, the majority of the papers fail to mention the language processing technique used, the type of knowledge used, whether or not machine learning[7] algorithms were used, and whether or not unstructured data was processed. The majority of the publications are more concerned with the installation and adaption of the chatbot system than with natural language processing research. Many alternative ML (Machine Learning) [7]or deep learning methods can be investigated in order to improve the accuracy of chatbot systems.

In fact, the basic natural language processing jobs can be investigated further to improve the data's suitability for future research. In addition, the topic of unstructured data processing, which is text data presented as knowledge, has yet to be fully investigated. As a result, it is clear that there is a lot of room for research in the field of NLP [7](natural language processing).

The approach proposed in this paper [4] implements enhanced recognition of voice emotions through the six basic emotions of anger, happiness, sadness, neutrality, surprise, and fear. As a representative research method, preprocessing was carried out using the PRNN and KNN algorithms, and feature extraction was carried out using MFCC and GLCM cascading structures. The results obtained were compared to standard algorithms such as GMM and HMM in terms of accuracy and f-measurement, and were recognized as superior output to the standard algorithms. Audio clips (stanzas) of numerals spelled with varied emotions were used to test the proposed method. With well-known speech emotion detection approaches such as Gaussian Mixture Model (GMM) and Hidden Markov Model(HMM), the results were obtained and assessed for accuracy, precision rate, and f-Measure .

In this paper [5], it is explained that Chatbot applications using Python programs can have different models. The BiLSTM model is used explicitly in this paper. The output produced by the chatbot program using the BiLSTM model has a good amount of accuracy and also has the dataset that corresponds to the information that the user entered in the chatbot's input dialog box. In addition, support attributes such as the seq2seq model are important elements of a program that ensure that data processing meets the criteria for reuse in data processing**.** The BiLSTM model, several parameter pairs, and the Greedy approach can be used to develop a chatbot programme using a series of sentences from datasets. The user's input can be commands to execute the chatbot programme, which results in the form of phrases that provide information based on the user's initial input. It uses The Cornell Movie Dialog Corpus which is a dataset that contains a corpus that contains a large collection of metadata-rich fictional conversations extracted from film scripts, with 220,579 conversation exchanges between 10,292 pairs of movie characters, 9,035 characters from 617 films, and a total of 304,713 sayings.

This paper [6] proposes a smart social therapy chatbot that differentiate emotion labels: happiness, joy, sadness, guilt, shame, anger, disgust and fear texts. In addition, it identifies the user's mental state based on emotional labels, such as: Stressed or depressed based on the user's chat data. It used three popular deep learning classifiers to recognize emotions: Convolutional Neural Networks (CNN), Hierarchical Attention Networks (HAN) and Recurrent Neural Networks (RNN)[10]. In this paper, they proposed an intelligent therapeutic chatbot to reduce the mental illness of youth. They present an intelligent chatbot in this paper that accepts users' talk as input and, after processing, returns the users' mental state, such as normal, stressed, or depressed. When a user's chat is sent into the proposed chatbot, it is trained to classify the text into many emotions, including Happy, Joy, Shame, Anger, Disgust, Sadness, Guilt, and Fear. It also calculates the positive and negativity percentages of each chat text based on the emotions. Based on the chat data, bot will identify emotions of the user to calculate the percentage of negativity in chat. Further, with the help of negative content in the chat, bot will classify the level of mental status as normal, stressed or depressed.

PROPOSED SYSTEM

This paper mainly focuses on the interview practice for the students rather than conducting company recruitments. This paper aims at deploying an interview practice chatbot for students to practice their interview skills and get their scores analyzed at any given time of the day without the need of a physical interviewer. Students will get to know where they are lagging by the report generated post interview. By conducting interviews using voice-based chatbots, assessing responses and emotions, and creating evaluations based on the responses, the purpose is to provide students with a long-term solution for practicing interviews online. The chatbot system can analyse various aspects during the interview like emotions, correct answers, and whether the candidate used invalid means.

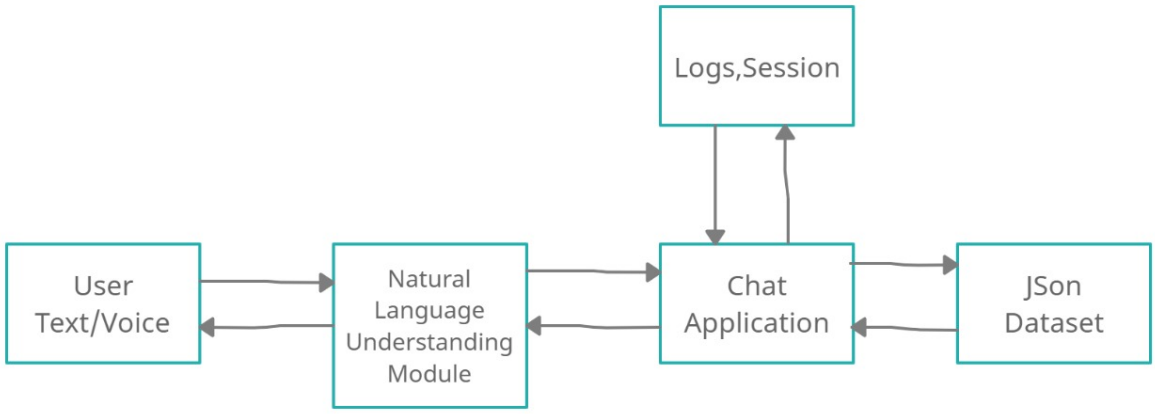

Fig1. Proposed Architecture Diagram

In the architecture diagram mentioned above,User input as voice or text, will be understood by the natural language understanding module. This NLU module will process the utterances of the user and send it to the chat application for further process in accordance with Json dataset to ask the next related question and also check if the user utterance is right or wrong.Each user session will be mentioned in the logs which will be maintained by the chatbot application to generate and send reports.

I- Speech Recognition

Speech recognition is the process of recording and understanding what a user says. The voice signal is picked up by the microphone and must be understood by the system. PyAudio is a python library that can be used. It's a Python wrapper for PortAudio, a cross-platform audio I/O library. PyAudio makes it easy for anyone to play and record audio on a variety of platforms using Python. SpeechRecognition is a python library for performing speech recognition, with online and offline support for a variety of engines and APIs the Google Speech Recognition API and the Python SpeechRecognition package can both be used to recognise speech in Python. The language is, of course, the initial component of voice recognition. A microphone is used to transform physical sound into electrical signals, which are subsequently converted to digital data using an

analogue-to-digital converter. Once digitized, several models can be used to convert speech to text.

II- Natural Language Understanding Module (NLU)-

Natural language processing is a technical process that allows a computer to extract values from user input. In doing so, it tries to capture the object and understand its intent. Tokenization to capture entity Tokenization consists of obtaining a list of words (tokens) from the statement. These tokens can be used to determine the user's desires. Word vectorization is a natural language processing (NLP) [7]technique for converting a dictionary word or phrase into a vector of real numbers, which can subsequently be used for word prediction, word similarity/meaning, and word prediction.

III- RNN Classifier-

Long-term dependencies are studied using LSTMs, a type of RNN[10]. The model Encoder Decoder includes a two-part encoder that transfers a vector representation of an input sequence to an encoded input representation. The output is subsequently generated by the decoder. Long short-term memory (LSTM) networks are a sort of recurrent neural network that can determine the dependencies of learning sequencer interviews online in various domains of computer science. This chatbot can be extended to different domains of study and CS in sequence prediction problems. This behaviour is required in tough problem domains such as machine translation and speech recognition. LSTM is a complex area of deep learning[9]. They work very well with a variety of sequence modelling problems and are widely used today. LSTMs are specifically designed to avoid long-term poisoning problems. Basically, it remembers information for a long time.

CONCLUSION AND FUTURE SCOPE

In this paper, we have a solid outlook at the chatbot system to be developed for students to practice interviews in the computer science field which can then be implemented for other domains for students to practice their interviews online. This interview practice chatbot can be proctored by developing a system to monitor user’s activity. Features like face recognition and sentiment analysis can be added to the project to make a more genuine and real world environment for practicing the interviews and generating better reports.This chatbot can be made available across different geographic regions and can be made available to multiple users across the globe . Basically, the chatbot can be made to scale up and down as per requirements. This chatbot can also be used as a helping hand in online real-time interviews.Offline support can also be added to the chatbot in case the chatbot is down or under maintenance.This will ensure availability and extensibility of the chatbot.

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