

Chatbot for Interview



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Abstract: The advent of virtual assistants has made communicating with computers a reality. Chatbots are virtual assistant tools designed to simplify the communication between humans and computers. A chatbot will answer your queries and execute a certain computation if required. Chatbots can be developed using Natural Language Processing (NLP) and Deep Learning. Natural Language Process technique like Naïve bayes can be used. Chatbot can be implemented for a fun purpose like chit-chat; these are called Conversational chatbots. Chatbots designed to answer any questions is known as horizontal chatbots and the specific task-oriented chatbots are known as vertical chatbots (also known as Closed Domain Chatbots). In this paper, we will be discussing a task-oriented chatbot to help recruitment team in the technical round of interview process.

Keywords: Closed domain chatbot, Interview Process, Naïve bayes, Natural Language Processing.

I. INTRODUCTION

The use of chatbots has increased extensively in recent years. Many industries, hotels, and flight booking companies use virtual agents to communicate with their users. Chatbots in industries are used for various purposes. Sometimes, they are used to display information. If required, they even help in complex tasks like checking/tracking order status for e-commerce companies. This is the one of the many purposes of task-oriented virtual agents.

In this paper, we will be discussing a task-oriented chatbot, which will be useful for companies to filter out the candidates who are less suited for the job based on their scores which will be determined by the bot. Each question will contribute 10% of the total questions (100%). 10 questions in each section: Easy, Moderate and Difficult.

We are making use of Naive Bayes as a classification technique. Naive Bayes Classifier uses labels to distinguish between different intents. We will store answers for each question in a label that will be used as intent. Naive Bayes Classifier is easy and fast. It uses probability to classify text. Naive Bayes is a probabilistic classifier, which means it predicts on the basis of the probability of an object. [1].

This algorithm has a frequency table from which likelihood of the word can be predicted; When salutation is being exchanged, if the user says he is excited for the test, "excited" will be classified as a happy emotion with the help of Bayes theorem.

This goal-oriented dialog system will assist the Human-Resources team to eliminate the least suitable candidate as per the company's requirements. A Pattern matching approach is used in this chatbot to match the answers from the pre-approved answer list which will be stored in the labels. classification method applied in this research is the Naive Bayes method and compared with the Logistic Regression method to determine the class intention [1].

This paper aims at removing the candidates who score below the threshold. Thus ensuring, candidates with good knowledge of the subject shall be selected for the final interview process hence filtering out the applicants.

II. WORKING OF THE CHATBOT

The bot will be following a behavior-based approach while taking the interview of every candidate. There will be three levels of questions easy, moderate, and difficult. To start with the process there will be an introduction and formal greeting. Once the formalities are done the bot will give candidates a list of 5 technical skills as per the vacancy and the requirements of the company out of which the candidates will have to select a minimum of 2 skills there will be an option for candidates to quit the interview process if they are not interested in the options listed such candidates will be directly rejected from the interview. The interview will start with a moderate level of questions based on the technical skills selected by a candidate. There will be 10 Moderate levels of questions if the candidates are able to answer 70% of those correctly then the level of questions will rise to difficult ones in this difficult section there will be 10 more questions of the same skill set if the candidate answers more than 60% correctly then that particular candidate will end the interview with having the highest chances of getting selected on the other hand if the score is less than 60% in the difficult section then such candidates will end the interview with moderate to high chances of selection.

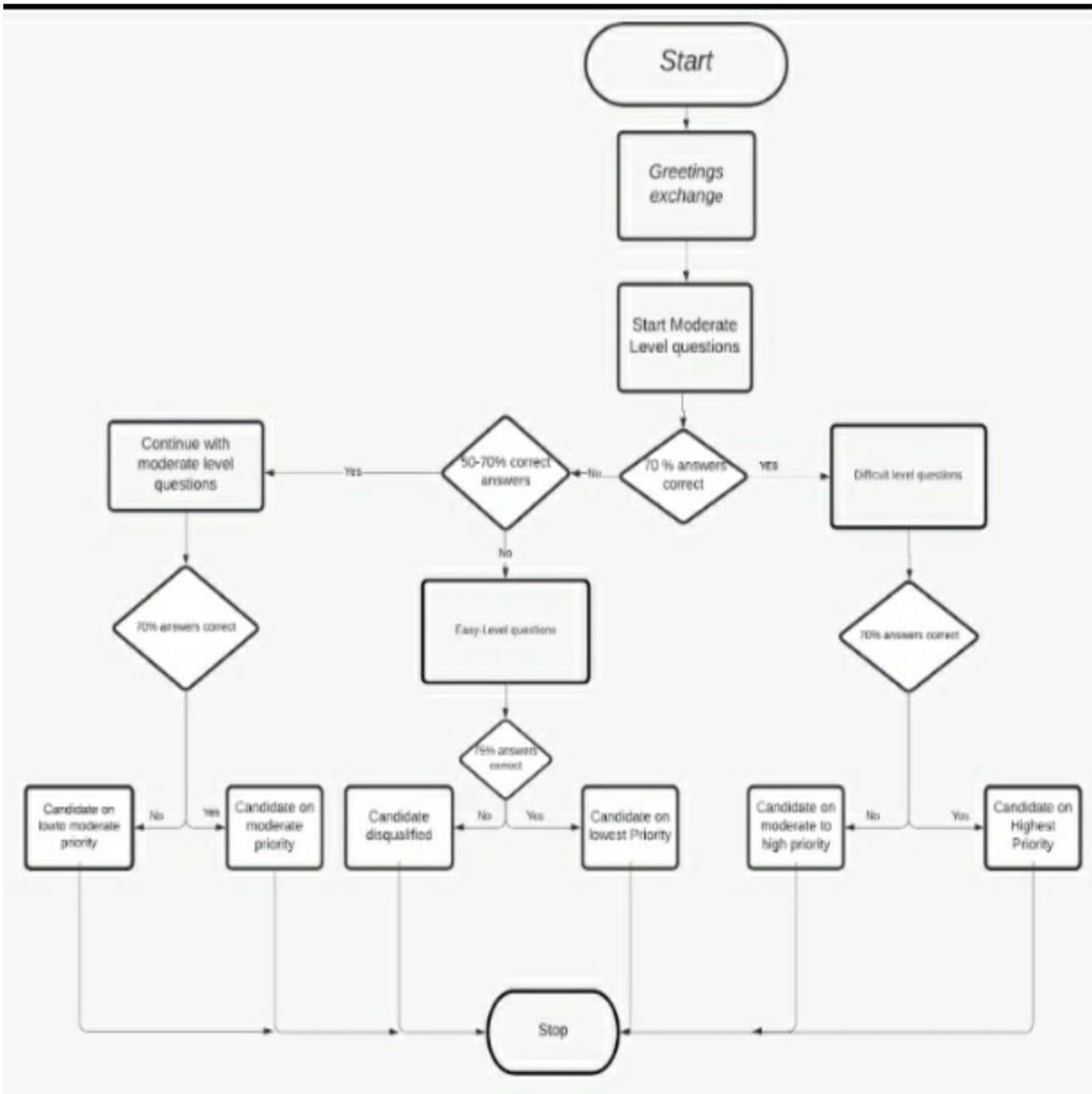
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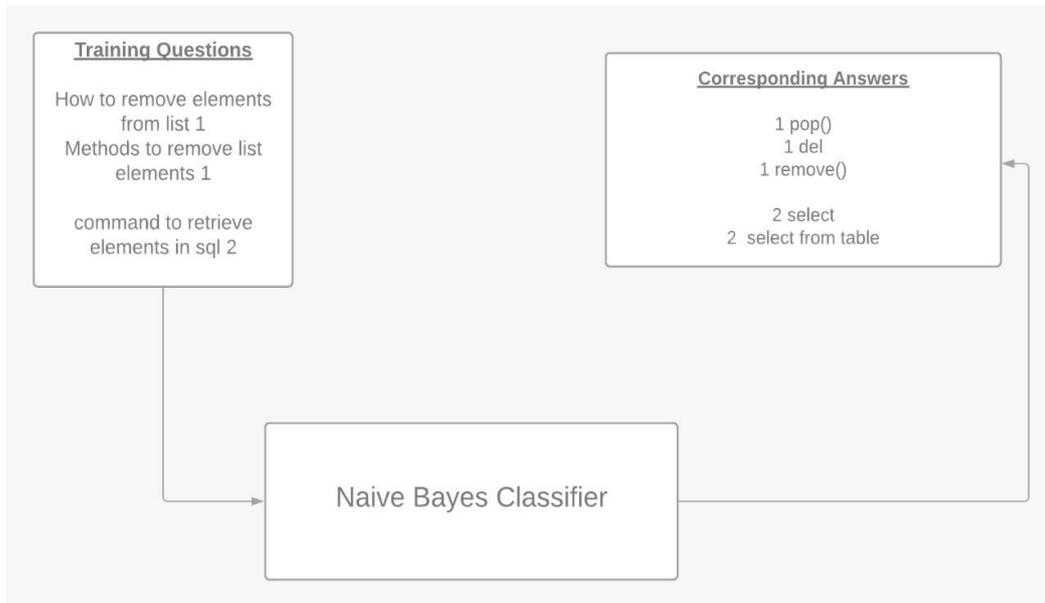
If the score of the moderate level of questions is between 50% to 70% then such candidates will get 10 more questions of the same level and if in this section, they are able to score more than 60% they will end the interview with having moderate chances of getting selected but if the score is less than 60% then such candidates will have low to moderate chances of getting selected. The candidates whose scores were less than 50% in the first round of moderate level questions will get 10 questions of easy level and that if they are able to score 75%, they will end the interview with the lowest chances of getting selected. The candidates who score less than 75% in the second round then such candidates will be rejected by the bot.

Process of determining the Correct answer.

The correctness of the answers will be determined by using the Naive byes approach. The bot will look for keywords in the candidate's response and will match it with the actual answer and accordingly the result will be shown.

Naive Byes. Classifier

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It is a classification technique based on Bayes' Theorem with an assumption of independence among predictors. In simple terms, a Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature.[2]

For example, a fruit may be considered to be an apple if it is red, round, and about 3 inches in diameter. Even if these features depend on each other or upon the existence of the other features, all of these properties independently contribute to the probability that this fruit is an apple and that is why it is known as 'Naive'. [3]

The naive Bayes model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.[4]

There is an easy and efficient approach for creating a closed domain chatbot that uses the Naive Bayes classifier. In this approach a closed domain dataset containing questions/user-responses and corresponding answers is made, in which each question/user-response is given a label, this label relates the question to its answer. Because of multiple questions could have the same response, there can be multiple questions having the same answer.[5]

Pros of Naive Bayes:

It is easy and fast to predict the class of test data set. It also performs well in multi-class prediction.

When the assumption of independence holds, a Naive Bayes classifier performs better compared to other models like logistic regression and you need less training data.

It performs well in the case of categorical input variables compared to a numerical variable(s). For numerical variables, the normal distribution is assumed (bell curve, which is a strong assumption).

3 Applications of Naive Bayes Algorithms

Real-time Prediction: Naive Bayes is an eager learning classifier and it is sure fast. Thus, it could be used for making predictions in real-time.

Multi-class Prediction: This algorithm is also well known for its multi-class prediction feature. Here we can predict the probability of multiple classes of the target variables.

Text classification/ Spam Filtering/ Sentiment Analysis: Naive Bayes classifiers mostly used in text classification (due to better results in multi-class problems and independence rule) have a higher success rate as compared to other algorithms. As a result, it is widely used in Spam filtering (identify spam e-mail) and Sentiment Analysis (in social media analysis, to identify positive and negative customer sentiments) The answers given by the candidates will also be stored in a database with their name, contact details, and a unique I'd. The managers and HR will be able to review the database if required and can contact the candidates as per the requirement of the company

III. FUTURE ENHANCEMENT

As the world is moving towards automation and with the advent of ML and AI, machines are replacing humans in almost every field and helping humans to carry out their work smoothly and efficiently so similarly in the years to come we can design a smart bot which will reduce the work load of the HR team and hire candidates completely on its own.

The backend of the bot can be directly connected to fetch the vacancy list of a particular company the bot then with the help of AI can look for the skills required for that particular job and will be focusing on the candidates possessing those types of skill set. The bot can further be trained to determine the quality of the candidate on the basis of their scores in graduation, the college and the University of the candidate.

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AUTHORS PROFILE



Vineet Agarwal: Completed Engineering in the field of Information Technology from Terna Engineering College, Mumbai University in 2020. During an internship with L&T Infotech in the year 2018-2019, I designed a basic chatbot. Post engineering, I was hired by Tata Consultancy Services where I am still working as a web developer and after completing 1.5 years with the organization, the role of Automation QA was also assigned to me. Previously I have completed two paper publications in the journal IJECET in the year 2018 which was based on IoT and in Test Management and Engineering, this was my final year project.



Anjali Shukla, BSc, MSc (Machine Learning), MAS CS I received my BSc Computer Science and MSc Computer Science with my major in Machine learning degrees from Somaiya Institute in Mumbai. Currently pursuing a MAS CS from the Illinois Institute of Technology in the United States. In addition to my Masters, I work as a Graduate Assistant at the university, where I assist the admissions team in recruiting students. I have 1.8 years of teaching experience, where I taught Python Programming Language, Mobile Application Development to undergrad students, and Web Development to grade 12 students. My primary research interests are in machine learning, data science, and artificial intelligence.