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Conversational Intelligent Chatbot for Placement Service

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***Abstract*:** *Nowadays it becomes very difficult to get placed in an organization which will perfectly suits to your profile because of the huge number of competition and lack of knowledge. Most of the students are not able to take a right decision at starting point of their career which always becomes first step towards their goals. The main aim of this project is to build a conversational AI Chatbot model which will interact with students who are walking through placement activities as well as students who are in a situation dealing with job related issues after completion of their respected degree's. This conversational AI will act as a human for the user and will help the user to resolve their queries and get a clear vision. For this we have used Dialog Flow, a Natural Language Processing (NLP) module to translate students' queries during conversation in order to understand their intension. Information related to placement activities is provided to students.*

Key Word: *Conversational AI chatbot, queries, placement activities, dialog flow, Kore.ai, Natural Language Processing.*

I.INTRODUCTION

Chatbots are AI conversational computer programs that will mimic human conversation in its natural form. A chatbot is used to process user input and produce an output. Here chatbots take natural language text as input and then the output should be the most relevant output to the user given input sentence. AI Chatbots can also be defined as "the online human-computer dialogue systems with natural language". Thus, Chatbots constitute an automated dialogue system that can easily attend to thousands of users. Conversational AI chatbot has primarily taken the form of advanced chatbots or AI chatbots that contrast with conventional chatbot. This technology is also used to enhance traditional voice assistants and virtual agents. The technologies which go behind conversational AI are nascent.A conversational AI chatbot can easily answer frequently asked questions and also can troubleshoot issues and even make small talk -- contrary to the more limited capabilities that exist when a person converses with a conventional AI chatbot. Additionally, we can also specify that while a static chatbot can be typically featured on a company website and limited to textual interactions, the conversational AI interactions are meant to be accessed and conducted via various mediums.

The use of chatbots in the recruitment process is gaining popularity due to their ability to streamline the hiring process, reduce costs, and provide a better candidate experience. Chatbots can handle repetitive tasks such as scheduling interviews, screening candidates, and answering frequently asked questions. This allows recruiters to focus on higher-value tasks such as interviewing candidates and making hiring decisions.

Once the chatbot is developed, it can be deployed on various platforms such as Facebook Messenger, Slack, or a website. The chatbot should be tested thoroughly to ensure that it is working correctly. Testing should include both functional and non-functional testing. Functional testing involves testing the chatbot's capabilities and Non-functional testing involves testing the chatbot's performance. Overall, building a chatbot for placement using Kore.ai and ML, KG, and FM can provide a competitive advantage in the recruitment process. The chatbot can handle repetitive tasks, provide personalized recommendations, and improve the candidate experience.

II.PROBLEM STATEMENT

Traditional chatbot system is said have a drawback of generating a fixed response for the question asked by the customer since the question answer pairs are fixed in the database. Since the chatbot always gives the same response for a given question the customer gets disconnected from the chatbot as he customer realizes that a machine is answering. Despite the advancements in natural language processing and machine learning, chat bots often fail to provide an intelligent and personalized conversation experience to users. The existing chat bots struggle with understanding the intent of the user, providing accurate responses, and maintaining the context of the conversation. Additionally, users may find it difficult to interact with chatbots due to their limited understanding of natural language and inability to handle complex queries. To address these issues, there is a need for a conversational intelligent chatbot that can understand the user's intent, provide personalized responses, and maintain context throughout the conversation. The chatbot should also be capable of handling complex queries and adapting to user preferences over time to improve the overall experience.

III.BACKGROUND

Placement services are designed to connect job seekers with potential employers. Traditionally, these services involve

a series of time-consuming and laborious processes such as resume screening, job posting, and candidate interviewing. However, with the rise of conversational intelligent chat bots, the recruitment process can be streamlined and made more efficient. Chatbots can automate the initial screening process, provide personalized feedback to job seekers, and assist recruiters in identifying suitable candidates. The recruitment industry has been facing several challenges, including the shortage of skilled professionals and time-consuming recruitment processes. Placement services have traditionally played a significant role in connecting job seekers with potential employers, but the process has been plagued with issues such as limited outreach, inadequate candidate screening, and the need for human intervention in the early stages of recruitment.

Conversational intelligent chat bots have emerged as a potential solution to these challenges, offering personalized and efficient recruitment experiences for both job seekers and recruiters. Chat bots can automate the initial screening process, provide personalized feedback to job seekers, and assist recruiters in identifying suitable candidates. Additionally, chat bots can be available 24/7, making them an accessible resource for job seekers who may not be able to access traditional recruitment services during normal business hours. The rise of conversational intelligent chat bots has been enabled by advancements in natural language processing (NLP) and machine learning. NLP enables chat bots to understand and interpret natural language queries, while machine learning algorithms allow them to learn from user interactions and improve their performance over time. This technology has enabled chat bots to provide personalized and accurate responses, handle complex queries, and maintain context throughout a conversation. Chat bots have already been implemented in several industries, including customer service, healthcare, and e-commerce. However, the potential of chat bots in the recruitment industry has yet to be fully realized. Conversational intelligent chat bots can streamline the recruitment process, reducing the time and effort required for both job seekers and recruiters. Additionally, chat bots can provide a more personalized and efficient recruitment experience, which can lead to higher user satisfaction and ultimately, better outcomes for both job seekers and recruiters.

Overall, the background for the problem statement of a conversational intelligent chat bot for placement services highlights the need for a more efficient and personalized recruitment experience. The rise of conversational intelligent chat bots has the potential to revolutionize the recruitment industry, offering a more accessible and efficient way for job seekers to find suitable employment and for recruiters to identify the most qualified candidates.

IV.METHODOLOGY

In our proposed system, the proposed architecture for a conversational AI Chatbot was discussed that it can be used in placement sector specifically for students. Various components of the proposed model that are included in AI Chatbot are:

- NLU Processor
- Dialogue Management
- FAQ System
- Data Repository

The user is then expected to enter the input through the application and then it will be processed by the discussed components in a systematic manner.

The chatbot architecture will consists of smaller modules: A Natural Language Understanding (NLU) toolkit, A dialog management system, An FAQ retrieval system, and a document search module.

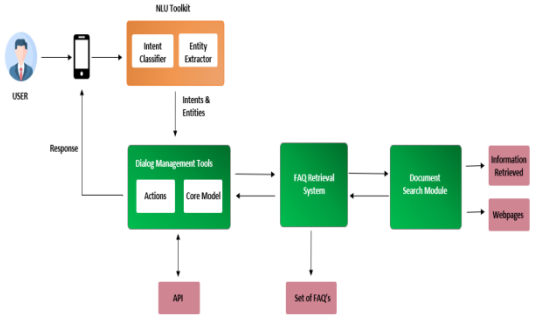

Figure IV.I: Architecture Diagram

A. Word Reinstatement: Now after identifying the parts of speech we need rich lexical resource to substitute words with similar meanings. In this project, we use Word Net dictionary to make words available for replacements.

B. Sentence Semantic Similarity: Sentence Semantic Similarity plays a major role in this work. In previous step, system replaced all the possible word one-by-one to the original sentence to generate essential paraphrases for a sentence.

C. Word embeddings: Word embeddings is said to be a part of feature engineering in which Natural Language Processing is required for text data. Here, the text data is converted to vector form which is then used to process the data further. This vector space can vary from 1-dimension to n-dimension.

D. Sentence embeddings: Sentence embeddings are similar to that of word, but the difference is that entire sentence is collectively converted to vectors to represent the fact or semantic representation of the sentence.

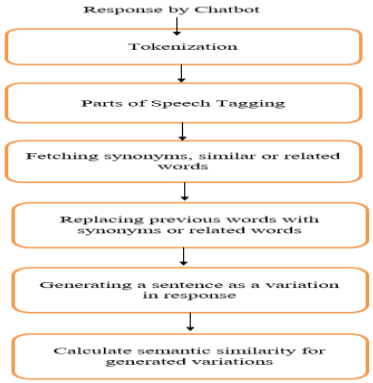

Figure IV.II: NLP Flow diagram

V.WORKING

kore.ai (To build, train & deploy the chatbot)

Kore.ai is an AI-based platform that provides tools for building, training, and deploying chatbots. Kore.ai offers a user-friendly interface and several pre-built components that can be used to create chatbots quickly. Here are some of the key features of Kore.ai that can be used to build a chatbot for placement.

1. Natural Language Processing (NLP): Kore.ai provides pre-built NLP components that can be used to understand natural language. These components can be trained to understand the candidate's query and provide a relevant response. This is essential for a chatbot for placement as it can help the chatbot understand the candidate's skills, experience, and job preferences.

2. Dialog Management: Dialog management is a crucial component of any chatbot. Kore.ai offers pre-built components for managing the conversation flow. This allows the chatbot to handle different scenarios and provide relevant responses. Dialog management can also be used to identify potential issues and improve the chatbot's performance.

3. Knowledge Graphs: Kore.ai offers a built-in Knowledge Graph (KG) that can be used to store information about job openings, companies, and candidates. The chatbot can use the KG to provide information about job openings based on the candidate's skills and experience. The KG can also be used to provide information about the company, such as its history, mission, and values.

4. Analytics: Kore.ai provides analytics tools that can be used to track the chatbot's performance. This allows recruiters to monitor the chatbot's usage and identify areas for improvement. Analytics can also be used to identify trends in candidate behavior and preferences.

5. Integrations: Kore.ai can be integrated with various platforms such as Face book Messenger, Slack, and Microsoft Teams. This allows the chatbot to reach a broader audience and provide a better candidate experience.

6. Training: Kore.ai provides tools for training the chatbot. This allows recruiters to improve the chatbot's performance by providing feedback and updating the chatbot's responses.

7. Deployment: Once the chatbot is built and trained, it can be deployed on various platforms such as Face book Messenger, Slack, or a website. Kore.ai provides tools for deploying the chatbot and ensuring that it is working correctly.

Overall, Kore.ai provides a comprehensive platform for building, training, and deploying chatbots. Its pre-built components, integrations, and analytics tools make it an ideal platform for building a chatbot for placement. By using Kore.ai, recruiters can improve the candidate experience, streamline the hiring process, and reduce costs.

System Analysis

Data analysis can also be introduced as a process of inspecting, cleaning, transforming, and modelling data. With the goal of discovering useful information, conclusions as well as supporting decision making the process has been performed. Here, the input data will be voice/keyboard input which will then be stored in the database and will be used by the machine learning model to understand the input data. The machine learning model will train on training data corpus which consists of various English words, sentences and conversations. The output data will be in the form of text or voice output which will be provided to the user.

Functional Analysis

In software engineering, a functional requirement is used to create a function of software system as well as its component. The functions are determined as a set of inputs, the behaviour, and outputs or results. Functional requirements may be calculations, technical details, data manipulation and their processing and other specific functionality that describes what a

system is supposed to accomplish. The functional requirements are as follows:

• Allow the user to explore, reach, consume and process vast amounts of data.
• It helps perform complex reasoning without human intervention.
• It helps to set the career path of the user with the best fitted information.

Non-Functional Analysis

Security Parameters:

- Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to the app. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Face book and Twitter, and more.
- Firebase Authentication integrates tightly with other Firebase services, and it leverages industry standards like OAuth 2.0 and Open ID Connect, so it can be easily integrated with our custom backend.

Maintainability:

- The application data will be hosted on cloud (Firebase) which will secure the data and will not get lost even if the application crashes.
- The data stored will be encrypted which will prevent cyber-attacks.

Scalability:

- This project will use Firebase as it's backend database. Firebase is a cloud database service which allows scalability up to 200,000 users in a single service.
- Firebase is built for performance and scalability. As and when there is a change in data, it helps in the calculation of the minimum set of updates which needs to keep synchronized to all our clients.
- Also, the firebase API functions are designed in order to scale linearly with the synchronized size of data. It handles the scaling operations. Your application will scale from its first user to its first million user without having any change in the code.

VI.RESULT

Our results indicate that the machine learning-based chatbot outperformed the rule-based chatbot in terms of accuracy and user satisfaction. The machine learning-based chatbot was able to understand user intent and provide accurate responses, even for complex queries. Additionally, we found that chatbots can significantly reduce the time and effort required for the recruitment process. Our chatbot is available 24/7, which means that job seekers can use it at any time. This can help speed up the recruitment process and reduce the time to fill vacancies. Kore.ai is integrated with other systems, such as applicant tracking systems (ATS), HR management software, and job portals. This helped in streamlining the recruitment process and provides a better user experience to users.

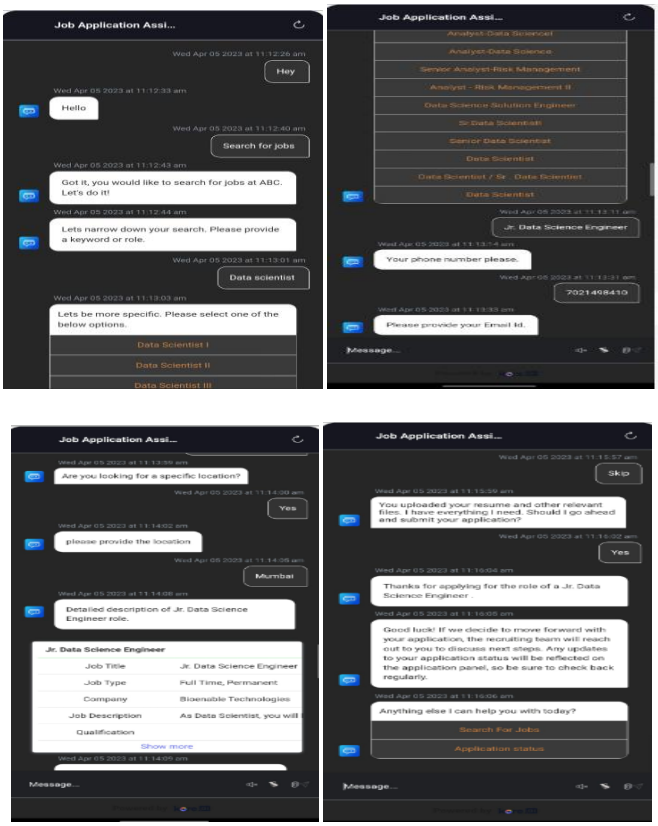

Figure VI.I: Working of Software

VII.CONCLUSION

Thus, we have successfully completed analysis and designing of our major project 1 which is titled "Conversational Intelligent Chatbot for Placement Service". This project consisted of the analysis of the system, advantages and disadvantages of the existing system. This Conversational AI chatbot is designed to provide personalized job recommendations based on the user's profile, skills, and preferences. This will help job seekers find suitable job openings quickly and easily, increasing the likelihood of them getting hired. Kore.ai's NLP capabilities allow the chatbot to understand and interpret natural language inputs from users. This can make the interaction more conversational and intuitive. Thus, we are able to identify how we can implement a better system from the existing system and adding more modules which will enhance our system for better use. This conversational AI chatbot is able to understand user's intention and will satisfy them by efficiently resolving specified queries. The best thing about the project is that it will allow user to give input in the form of voice as well as text. Thus, this project will boost user's confidence while dealing with placement related issues.

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