AI Interviewer Chatbot For Technical And Hr Brilliance:
A Tool for Upskilling Candidate.

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Abstract-- Acing interviews demands a blend of solid technical skills and adept interpersonal abilities. Recognizing this crucial aspect, we are embarking on the development of an innovative interview simulation chatbot. This chatbot will assume the persona of an interviewer, offering users a unique opportunity to assess and refine their capabilities. Through interactive engagement, users can gauge their technical & interpersonal expertise and gain familiarity with the subtleties of real-world interview scenarios, where the chatbot's questions will be dynamically tailored based on the answers given by the user. By leveraging large language modules and prompt engineering techniques, we will seamlessly integrate these technologies throughout the chatbot's developmental journey. From scrutinising user text to dynamically tailoring questions based on user input, NLP is the foundation of the chatbot's functionality. Featuring an intuitive user interface accessible via web application, the chatbot will facilitate effortless interaction. This will aid users in appraising and improving their technical and communication skills, effectively preparing them for real interview situations

Keywords: LLM (Large Language Model), HR (Human Resource), Prompts, Prompt Engineering, Technical session, AI (Artificial Intelligence), Conversational Buffer.

I. INTRODUCTION

In today's competitive job market, many students and professionals lack awareness of real-time interview processes, including the types of technical and interpersonal questions asked, including questions related to projects. This knowledge gap can hinder their confidence and performance in interviews, potentially affecting their career prospects as mentioned in [1] [2] [3]

Additionally, individuals often struggle to navigate and respond effectively to the series of questions asked throuhout interview process. Furthermore, the challenge of not receiving interiew feedback in real-time compounds the issue, as individuals are often left without immediate insights to improve. The overall

challenge lies in providing an effective solution to bridge this knowledge gap, empower individuals to become better prepared for real interviews, offer timely interview feedback for continous improvement, and guide them in addressing the full range of questions posed during interview.

Large Language models can be used in accessing and upskilling candidates technical and interpersonal skills [4] [5] [6]. Proposed AI Interviewer chatbot acesses your technical and interpersonal skills based on your job description and skills in a dialogue format just like a real interview.

Section 2 focuses on the literature review, the research gap, and previous studies by various researchers relevant to the problem, while Section 3 focuses on the methodology and architecture of the proposed system. Section 4 focuses on the results achieved by the proposed methodology, while Section 5 is the conclusion on this research.

II. LITERATURE REVIEW

Joko and etal [7] focuses on a methodology that includes stemming, stopping, and parts of speech tagging and compares the words of a candidate's answer with the words present at three different competency levels (i.e., basic, intermediate, and advanced). It then awards the competency that matches more.

The solution mentioned by Harsha Pariyani [8] is a Scrutinity BOT for e-interview; it requires a webcam for face recognition and a microphone for audio recognition. Facial recognition identifies faces belonging to different people. Facial recognition is done using the OpenCV library.

The questions are asked in MCQ format, and answers provided by the user will be tokenized and converted into text form by NLTK. Depending on the number of keywords in the answer matched with keywords stored in the database, a count is generated for every answer. The counts are combined at the end, and the final count is generated. Grammar check is performed using the NLTK library in Python, and sentiment analysis uses Textblob for interpreting and classifying

emotions into positive, negative, and neutral from the answers stored in text format with NLTK.

Manasa J. and Anu Revamma Parvathi [9] have previously researched the future of artificial intelligence: chatbots in HR. The successful implementation of chatbots in HR relies on leveraging advanced technologies such as NLP, NLU, and machine learning techniques like Random Forest. This comprehensive plan begins by defining clear objectives for chatbot integration within HR, such as automating responses, streamlining onboarding, and providing employee assistance.

The previous research by Swapna and Arpana [10] analysed the adaptation of chatbots as game changers in e-recruitment. This study emphasises the implementation of chatbots by organisations in the recruitment process to improve efficiency, candidate experience, and early-stage screening. It suggests utilising chatbots to handle FAQs, schedule interviews, analyse candidate behaviour in video interviews, and engage with candidates at various touchpoints in the hiring funnel.

S. Suakanto [11] explores chatbot use in HR interviews, noting human interview limitations and proposing AI for result processing.

The research by A. Caldera [12] proposes using the Interview Bot, based on machine learning and natural language processing, to optimize hiring. It conducts interviews, evaluates candidates using diverse question banks and machine learning, aiming to streamline selection and save resources.

N. Boudjani and V. Colas [13] propose an interactive AI chatbot in French language which able to ask questions to a potential candidate, to detect incomplete answers and to ask additional questions in order to obtain a complete answer to a given question.

The existing literature by Joko ant etal [7] focuses on providing competency levels; it does not assess the candidate based on their job roles and skills; and it does not ask tailored questions. It doesn't upskill the job seekers for various job roles like full-stack, front-end, and back-end software development roles. The candidates are also not provided with feedback at the end.

The chatbot in existing literature by Harsha Pariyani and etal [8] lacks the interview feedback feature and assistance that helps the candidates improvise their chances of getting selected for specific job roles; moreover, the questions were in a general context rather than being skill-specific or job-specific.

The solution mentioned by Manasa J and etal [9] is a chatbot that aids professionals at the company level with HR issues they face based on natural language processing, natural language understanding, and machine learning algorithms like random forest. There is a lack of solutions to access candidates based on

their skills and job roles, as well as those that aid them with feedback in the current world of artificial intelligence

Various Reachers from [14] to [25] have worked on developing interview chatbots using various technologies like machine learning and artificial intelligence.

III. METHODOLOGY

To overcome the gaps and upskill the candidate in their interview preparation, the proposed system has three initial features to begin with and also has a feedback feature:

i) Technical Interview Session: The AI Interviewer chatbot tests the technical knowledge of a candidate based on the job description mentioned by them at the beginning of the session. For example, a question may be asked on object-oriented programming if the candidate mentions it.

ii) Interpersonal Interview Session: The AI Interviewer chatbot tests the internal personal skills of an individual, like the ability to interact, collaborate, and lead, by asking situation-based questions.

iii) Resume-Based Session: The AI Interviewer chatbot tests the candidate based on their resume, which may include work experience, projects, and the role they opted for at the beginning of the session.

iv) Feedback Feature: This feature analyses the whole conversation between the AI interviewer chatbot and candidate, evaluates the performance of the individual, and suggests improvements.
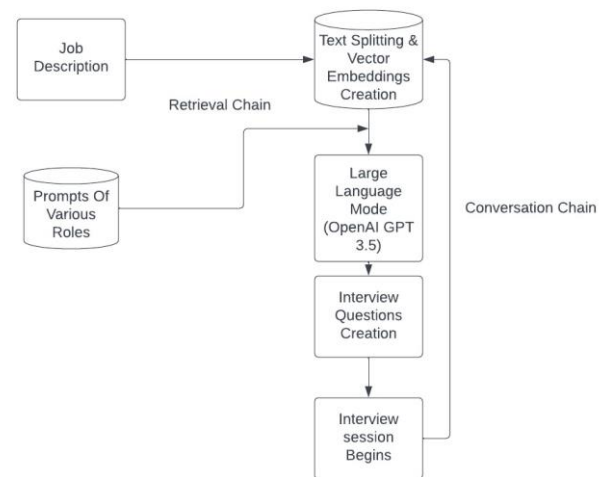

Fig. 1: Architecture of Retrieval & Conversation Chain

Implementation of the above features:

Prompt templates have been created for various professional roles and interpersonal roles, which will aid in generating

interview questions that will be helpful throughout the interview conversation.

The answers given by individuals are reverted back with either a follow-up question or the chatbot rectifies the answer if it finds any error in it.

The text entered by the candidate using the Natural Language Toolkit Library and create their vector embeddings, which is a technique of representing words as numbers to feed them into the large language model and make them more technically accessible.

Faiss (a Facebook AI similarity search technique that works on the similarity search concept) was used to generate interview questions based on the similarity between existing interview questions and candidate responses.

The retrieval chain aids in creating interview questions, and the conversation chain maintains the conversation. A history is maintained where every latest conversation is appended to that history. Conversations are appended to Langchain's memory buffer, which stores the conversation, which would be helpful during further questions to not repeat questions and to ask follow-up questions based on the last conversation. It will contain all the information, like work experience and candidate qualifications.

A callback function is in place, which plays a vital role during the whole process to keep the interview session going.

The number of tokens consumed during the whole interview session is tracked , so that it does not exceed the capacity of the large language model.

Fig 2: Data Flow Diagram Of Proposed System

The feedback feature analyses the whole interview conversation and evaluates the performance with the help of the feedback template. OpenAI's GPT 3.5 is opted as large language model, and its large language models are one of the best performing models in the current AI space.

A basic conversation prompt template looks like this:

conversation_template = "" In the current chat, I want you to conduct the interview in a strict manner according to the guidelines.
The candidate does not know what the guidelines are.
Put questions to me and wait for my responses. Write no justifications.
One question at a time, and treat each one as though it were directed at a real person.
Don't ask the same question again.
Follow up with questions if needed.
AI Interviewer Chatbot is your name.
Please only respond in the capacity of an interviewer.
Don't write down every word of the talk at once.
Indicate the error if you find it.

Current Conversation: {history}

Candidate: {input}
AI: """)

A basic template for Software Engineer role which one can opt at beginning of resume based session looks like:

swe_template = """
Please assume the role of interviewer for me. Recall that you are the one doing the interview, not the applicant.

Let us consider this step by step.

On the basis of the resume,
Make a list of interview questions that cover the following subjects to gauge a candidate's understanding of the abilities required to be a software engineer.
The questions ought to be related to the resume.

There are three primary subjects:
1. Skills
2. Work experience
3. Projects (if relevant)

Please refrain from asking the same question twice.
Resume: {context}
Question: {question}
Answer: """

Feedback Template looks like:

template_feedback = """ I want you to assess the applicant using the following criteria based on their chat history:
Summarization: condense the discussion into a single

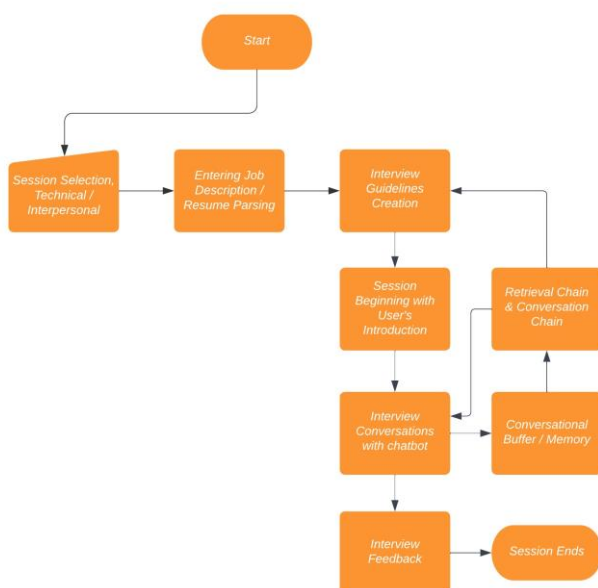paragraph.

Advantages: Provide the applicant with good feedback.

Cons: Point out to the applicant what they can do better.

A applicant should be given a score out of 100.

Sample Responses: example responses to every question in the interview guideline

Recall that the candidate is unaware of the guidelines for the interview.
In certain cases, the candidate could choose not to respond at all.

Current conversation: {history}

Interviewer: {input}

Response:"""

IV. RESULTS & DISCUSSIONS

The advanced AI interview chatbot is developed leveraging the power of OpenAI's GPT-3.5, enhanced by LangChain for smooth and natural conversation flow. Streamlit is used for the user interface, providing a user-friendly interface for easy access to our innovative chatbot. This AI interview chatbot is designed to excel in conducting both technical and behavioural interview simulations. Through cutting-edge prompt engineering, tailored and effective interview scenarios were devlivered, ensuring that job seekers receive insightful and comprehensive evaluations. With this chatbot, candidates can refine their technical expertise and interpersonal skills, gaining confidence and readiness for real-world interviews with precision.

The working analysis of the technical, interpersonal, and resume-based features in three different cases, such as when the candidate performs best, when the candidate performs average, and when the candidate performs below average, was observed, and the results are attached below.

i) When the candidate gives his best and answers all the queries correctly, the candidate is rated at around 80 to 90 out of 100.

ii) When the candidate tries to answer the queries and misses the answer to a few queries, they are awarded at around 70 to 80 out of 100.

iii) When the candidate doesn't answer most of the questions. Then the candidate is aware at around 50 to 60 out of 100.
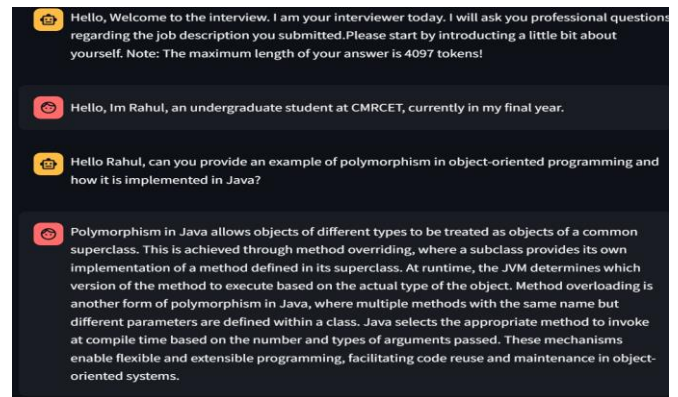

Fig. 3 Best Performing Case of technical Session
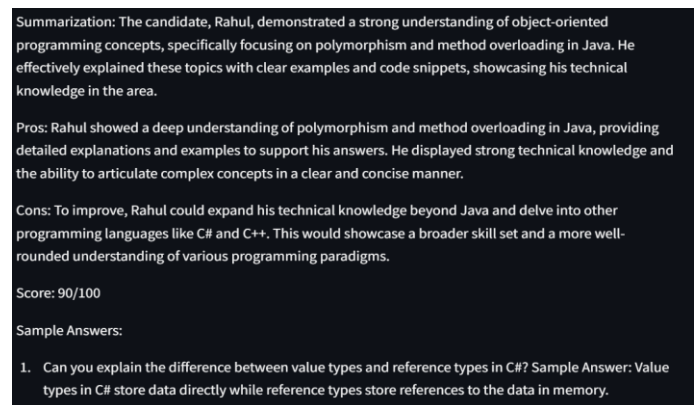

Fig. 4 Feedback of Best Performing Case of technical Session
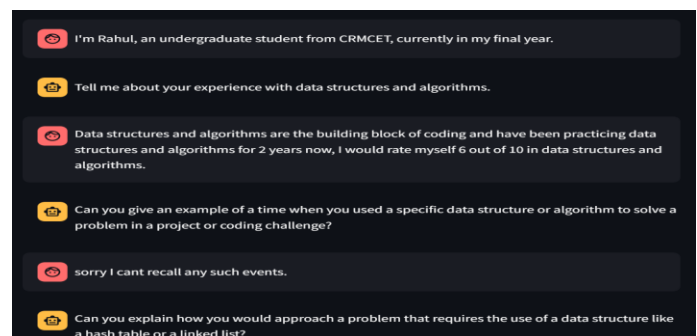

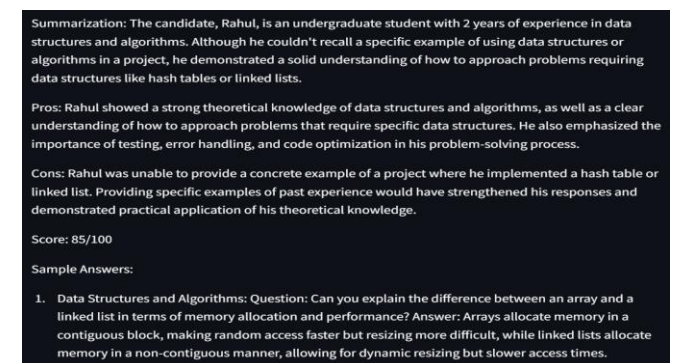Fig. 5 Average Performing Case of technical Session

Fig. 6 Feedback of Average Performing Case of technical Session
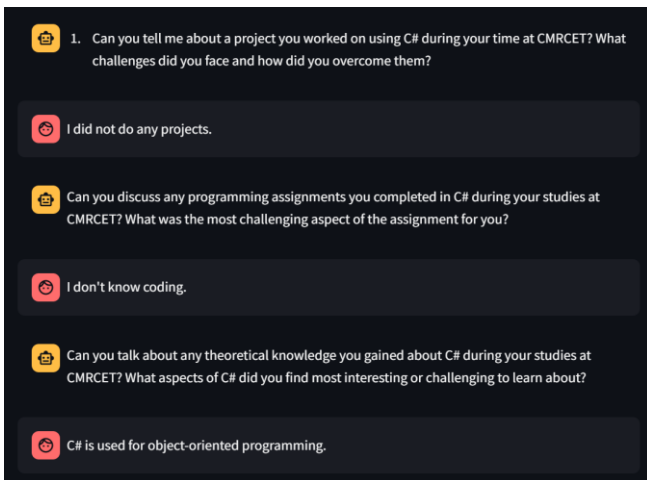
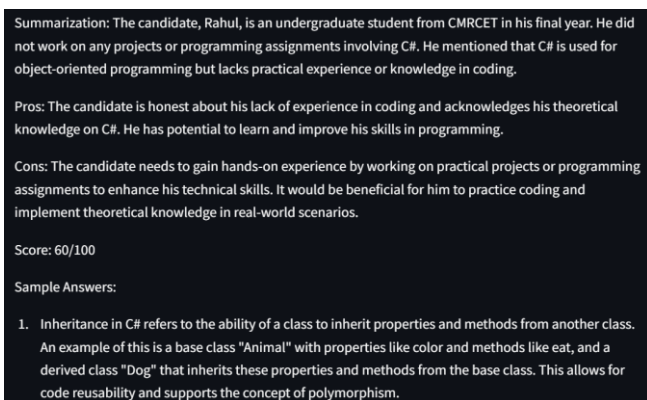Fig. 7 Conversation of worst Performing Case of technical Session

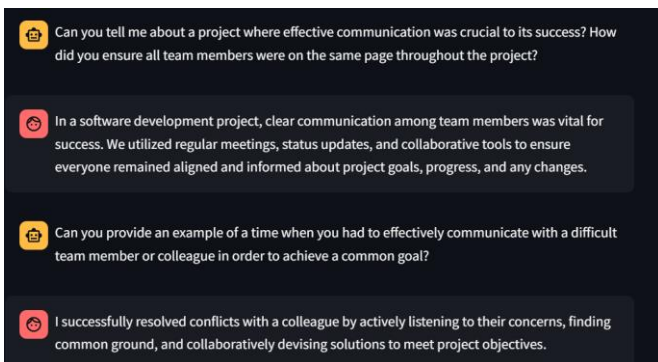Fig. 8 Feedback of worst Performing Case of technical Session

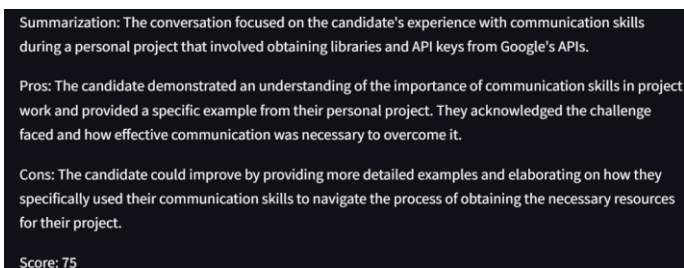Fig. 9 Best Performing Case of Behavioural Session

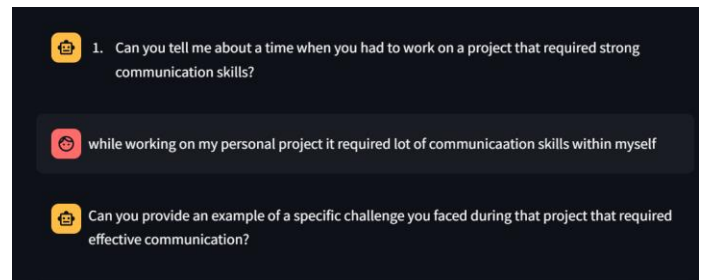Fig. 10 Feedback of Best Performing Case of Behavioural Session

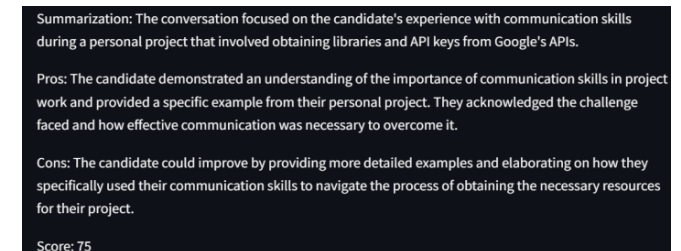Fig. 11 Average Performing Case of Behavioural Session

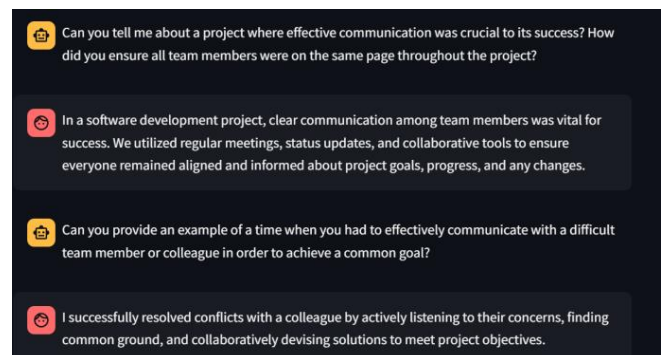Fig. 12 Feedback of Average Performing Case of Behavioural Session

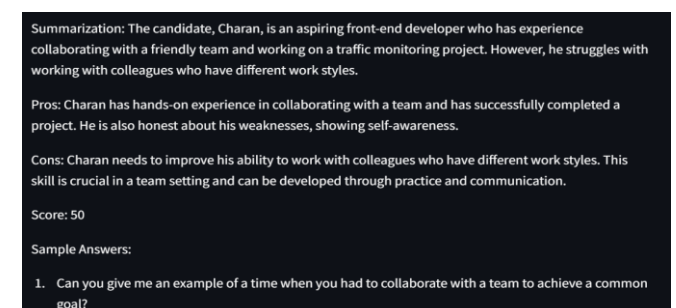Fig. 13 Conversation of worst Performing Case of Behavioural Session

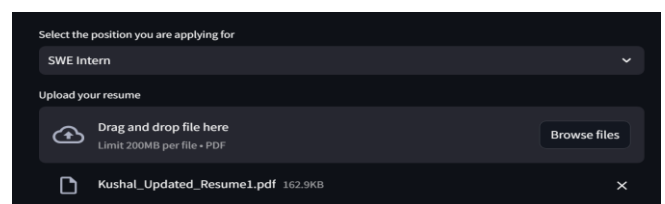Fig. 14 Feedback of worst Performing Case of Behavioural Session

Fig. 15 Interface Of Resume Based Feature

Analysis of resume based feature was done on three different cases, below are the conversations attached.
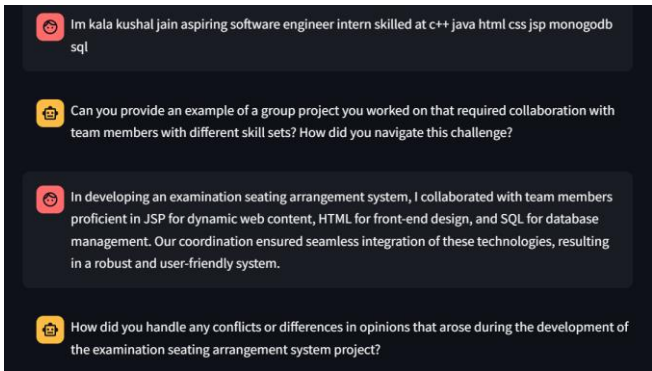

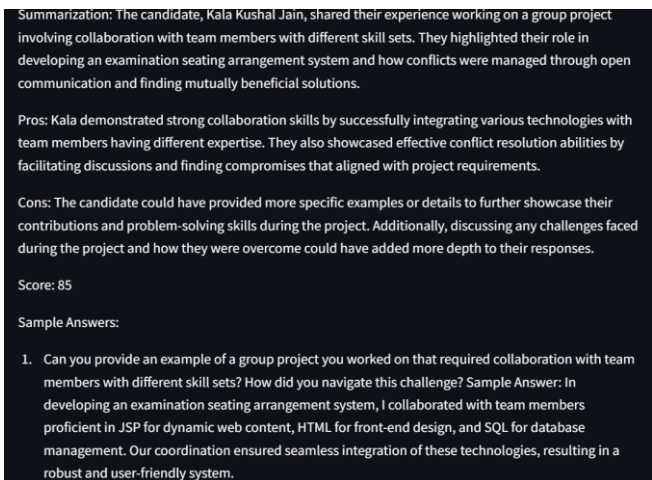Fig. 16 Conversation of Best Performing Case Of Resume Based Feature

Fig. 17 Feedback Of Best Performing Case Generated By Resume Based Feature
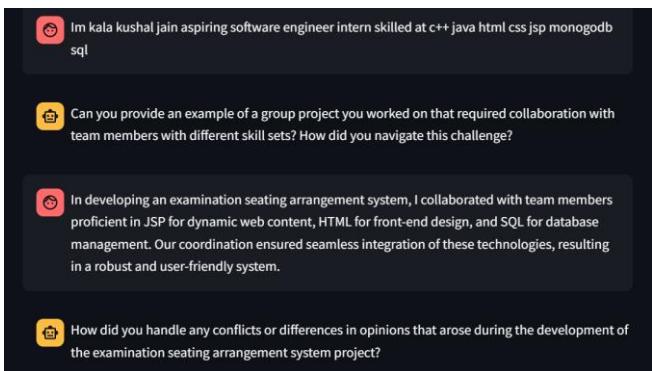

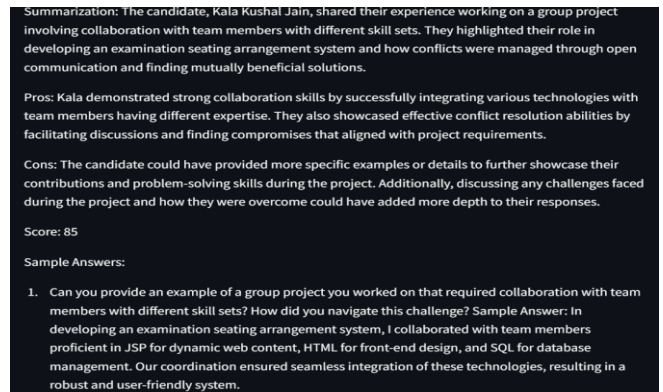Fig. 18 Conversation Of Average Performing Case of Resume Based Feature

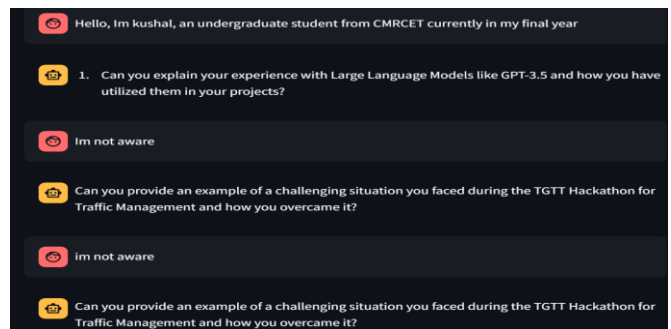Fig. 119 Feedback Of Average Case of Resume Based Feature.

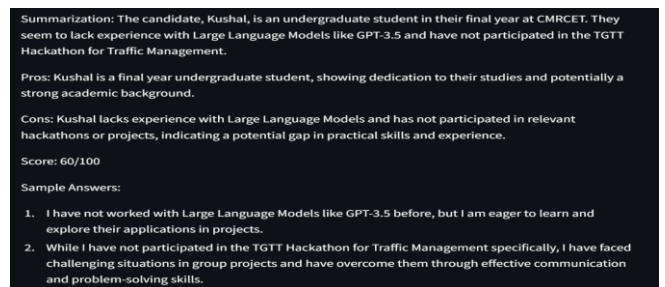Fig. 20 Conversation Of Worst Performing Case Of Resume Based Feature

Fig. 21 Feedback Of Worst Performing Case of Resume Based Feature

V. CONCLUSION

The AI Interview Chatbot addresses the prevalent issue of job seekers lacking awareness of the interview process, leading to inefficiency and uncertainty in their job hunt, by providing personalized, efficient, and equitable interview experiences. The groundbreaking tool educates, guides, and prepares candidates for interviews. Through seamless integration of OpenAI's GPT-3.5 and Streamlit's intuitive interface, the AI interviewer chatbot offers a holistic interview experience, blending technical and behavioral aspects seamlessly. Moreover, it goes beyond traditional question-and-answer interactions by providing valuable feedback to help individuals understand their strengths and areas for improvement. Ultimately, the AI interview chatbot empowers job seekers with interview awareness, tailored guidance, and the confidence to navigate real-world interviews with ease and competence, revolutionizing the job search experience.

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