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AI-Based Interview Coach: A Privacy-Aware Offline AI System for Student Interview Preparation

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ABSTRACT
Interview preparations continue to be a challenging task for students joining the workforce since they do not have access to personalized, confidential and cost-effective training services. Currently available automatic assessment systems concentrate only on the process of assessment from the recruiter's point of view while overlooking candidate-focused solutions which would enable students to hone interview skills. This work provides an exhaustive overview of the current status quo in the field of AI-interview coaching technologies paying special attention to multimodal analysis methods, privacy preserving design and offline processing capabilities. The work covers the current state of affairs in the area, identifies limitations of currently existing solutions, and reviews new opportunities offered by offline and explainable artificial intelligence approaches which can benefit candidate preparation. Particular emphasis is made on education-oriented applications, availability and fairness. The designed interview coaching framework utilizes performance measures such as speech fluency, frequency of filler words, body language, eye movements, and answer consistency to provide transparent recommendations and coach candidates in their interview preparation efforts. Experiments conducted on student data prove that this solution works well.
Keywords: Interview Coaching, Multimodal Learning, Offline AI, Privacy Preserving Systems, Student Training, Explainable AI.

I. INTRODUCTION

Individualized training is unavailable since personalized training does not exist, and training programs are expensive for students to train on interviewing skills. The educational system has mock interviews where candidates receive some feedback. Unfortunately, feedback is inconsistent, difficult to scale, and lacks performance analysis. It means that students may not get adequate recommendations to help them improve their skills in conducting effective interviews.

The lack of systematic and consistent feedback mechanism will create a significant gap between theoretical knowledge and actual performance during interviews. The students find it difficult to identify various areas to work on when conducting interviews, including clarity, confidence, and behavioural skills. It leads to repetitive mistakes that will impact negatively their ability to secure employment in the competitive environment.

The development of new technologies has resulted in the development of AI-powered automated systems that perform analysis and give scores on candidates' performances in terms of clarity, non-verbal, facial expression, and response among other criteria. Despite having AI powered automated interview analysis systems, most of the tools analyse performance of candidates in order to recommend potential recruits to the recruitment managers. In addition, most of these existing technologies make extensive use of cloud computing, resulting in latency and the need for an Internet connection that functions smoothly and reliably. It might thus create accessibility problems for students living in places where the Internet connectivity infrastructure is not well-developed. The other problem is that it lacks transparency concerning how these feedbacks are being generated.

Existing commercial interview practice platforms are also costly for students to purchase, and they pose a privacy threat since the interview videos will be stored in the third parties' servers. Besides, the main objective of using these commercial interview practice platforms seems to be evaluation rather than constructive criticism regarding how users can improve their weaknesses.

Data Security is another important issue that should be considered when discussing the current technology. Since the interview videos will include sensitive data, storing them in third parties' servers may result in data breaches. This can cause discomfort among the students using these tools because they may fear getting their private data stolen. To address these problems, the proposed research recommends the development of an innovative framework for an AI-based interview coach designed especially to help students prepare for their interviews. According to the proposed design, the framework will run in an offline mode. Consequently, there will be no need for students' private information sharing over the Internet. Moreover, such architecture of the tool will provide students with more flexibility while using it.

First, such an approach eliminates any privacy concerns and increases users' motivation to work with the tool. In addition, running in an offline mode means that the interview

coach will be lightweight and effective enough to work even on laptop computers. In other words, this framework will not require powerful computer systems for its operation.

Moreover, this framework will include a feedback mechanism that will enable students to determine their weak points in terms of verbal and nonverbal communication skills. Thus, focusing on coaching rather than evaluation, the interview coach will encourage students to become better prepared by continuous learning. In addition, the system is intended to adopt adaptive learning, whereby the feedback given is dependent on the past performance of the user. In this way, the users get customized advice to enable them to develop their skills. In the long run, the system can serve as a mentor to help the students improve on their interview skills.

II. RELATED WORK

Another area where advancements in research on ITS has led to the development of solutions that can be used to prepare for job interviews is personalized learning. ITS solutions provide individualized feedback according to the user's progress and learning style. While some of these studies have tried using conversation agents or chatbots in a way that simulates interview settings and provides interactive features, they do not analyse users' non-verbal behaviour to any extent, which is essential for an interview scenario.

There are also various commercial applications offering mock interviews along with AI-based feedback. These applications analyse user-recorded videos from the interview and give performance scores in terms of various Recently, substantial research has been done in the area of AI-powered interview systems, automatic testing solutions, and intelligent tutoring systems. They are intended not only to improve the recruiting process but also to help candidates develop new skills and gain more experience. Nevertheless, in the majority of cases, the focus is on evaluation and not on coaching. Many AI-powered systems for assessing interviews exist today, which make use of NLP and computer vision technologies to evaluate candidate performance based on their verbal communication, voice tone, sentiment, and facial expressions in order to determine how suitable they are for a certain position. One example of such an automated video interviewing system is one that uses machine learning algorithms to rate candidate skills and confidence. Although such systems can successfully rank candidates, they are mostly geared towards recruiters, who do not need detailed feedback from users. parameters. However, since most of them require a subscription, they may not be affordable by everyone. Furthermore, storing user data and processing them through cloud-based systems creates issues with regard to user data privacy and security.

Multimodal learning approaches are one of the recent trends in research. In multimodal learning, audio, video, and textual information are analyzed simultaneously to provide a reliable score on the interview performance of users. Although these solutions have been successful in providing more accurate assessments, they require considerable computational resources and continuous internet access. Privacy-protecting AI technologies have been studied as well, taking into account the increasing attention to the issues of data protection. On-device computation and edge computing can be used to prevent users' data from being transmitted to third parties, thus creating a better atmosphere of trust for the clients. Nevertheless, these approaches have yet to be implemented successfully within the context of interview coaching technologies.

To conclude, there are multiple benefits offered by current developments in AI technologies applied to interviews and intelligent tutoring, yet some problems persist, including issues of accessibility, cost, privacy, and personalized support of students. The problem is that current solutions focus more on evaluating students' performance rather than offering any practical help for their improvement. Thus, the developed AI-Based Interview Coach system seeks to fill in these gaps and provide a useful tool for all people in need of assistance.

III. PROPOSED METHOD

The suggested system is called the AI-Based Interview Coach: A Privacy-Preserving Offline System for Student Interview Preparation. It aims to create a smart, user-focused environment, which allows for practicing interviews and receiving feedback about one's performance without using any internet connection. The system emphasizes constant self-improvement through the implementation of AI algorithms and offline mode The system structure includes several components such as input acquisition, preprocessing, feature extraction, performance analysis, and feedback generation. All operations performed by the system are conducted on a user's personal device with the goal to protect his/her information from unauthorized access. The system structure includes several components such as input acquisition, preprocessing, feature extraction, performance analysis, and feedback generation. All operations performed by the system are conducted on a user's personal device with the goal to protect his/her information from unauthorized access.

The process begins with input acquisition when the user performs a mock interview. Video and audio recording is conducted via the device camera and microphone. One can choose between using predetermined interview questions or let the system generate random ones based on typical interview situations.

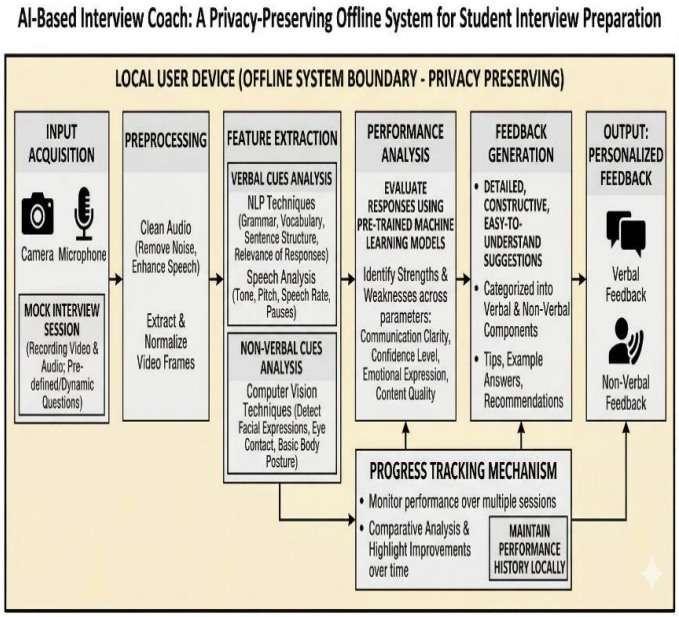
After the collection of data, the preprocessing unit performs processing on the collected audio and video data. The audio is filtered to reduce background noise and increase speech clarity. Video frames are captured and standardized to facilitate future processing. This process ensures that the data collected is in a state that allows accurate extraction of features.

The third stage involves feature extraction, which involves analysis of verbal and non-verbal aspects of the interaction. In the verbal aspect, the NLP is utilized to analyse the grammar, vocabulary usage, sentence structuring, and relevance of the responses made. Speech analysis is used to measure the tone, pitch, speech rate, and duration of pauses made by the participant. In the non-verbal aspect, computer vision is used

to detect facial expressions, eye contact, and general body language of the participants.

In the third phase, features of verbal and non-verbal communication will be extracted for analysis. In the case of verbal communication, natural language processing algorithms will be utilized for analysing grammar, vocabulary, sentence structure, and relevance of responses. Techniques for speech analysis will help in analysing parameters like tone, pitch, speed of speech, and pauses. Computer vision algorithms will be used for extracting non-verbal communication features such as facial expressions, eye contact, and posture. These parameters play an important part in determining confidence and engagement during interviews. The performance analysis module uses machine learning algorithms to analyse the user's responses. This module analyses the user's performances on various parameters such as communication skills, confidence level, emotion, and quality of content in terms of relevance and importance. Unlike traditional modules, this module is focused on identifying improvement areas.

A. FIGURE: OVERALL STRUCTURE



Feedback generation module offers highly constructive, easily understood, and comprehensive hints to the user. There are two types of feedback generated – verbal and non-verbal feedbacks. Users are able to understand which particular area requires their attention. Moreover, additional tips and example answers can be provided for users' improvement.

For adaptability purposes, the system will include a performance tracking module which will monitor performance of the user in a number of sessions and show the results. Performance history will be kept local for security reasons.

One of the distinctive features of the proposed method is that it works in offline mode and guarantees user's privacy. All computations are performed locally using AI models. No internet connection is required. The method does not rely on external servers, thus, all calculations are carried out locally and do not transmit any personal data to any party.

In conclusion, the suggested approach combines AI technology with an offline model to offer an all-inclusive interviewing training tool. The key strengths of this technology include personalization, confidentiality, and ongoing improvement, which will enable the program to combine evaluation and learning, leading to successful interviewing skills for students.

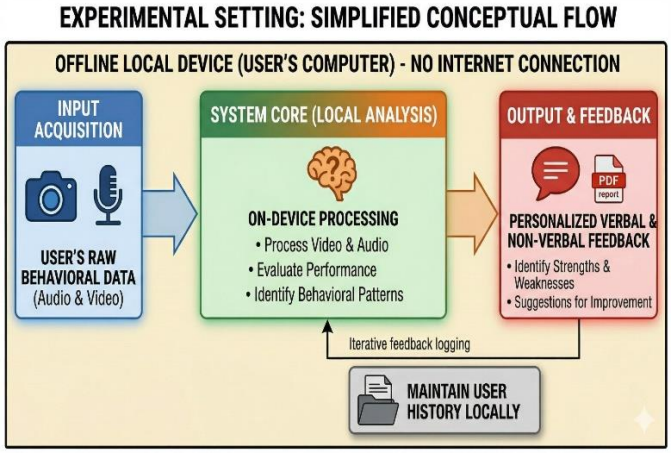
IV. EXPERIMENTAL SETTINGS

The experimental design for the AI-Based Interview Coach was developed to test the system in an offline controlled environment where the performance of the system could be evaluated as required by its specification. The experiment was conducted offline with the aim to determine how effectively the software can work in a controlled offline environment with ordinary personal computers used in daily life without any expensive hardware or internet connectivity requirements.

Software and technology used in implementing the system were based on widely available technologies. The development of the software was carried out using a high-level programming language, and also some libraries needed for working with natural languages, voice and audio analysis, and video processing. Such technology allowed performing efficient processing and feature detection from audio and video information.

Hardware used for experimentation consists of a regular laptop with the following configuration – Intel i5 CPU, 8GB RAM, integrated microphone, and webcam.

A. FIGURE: EXPERIMENTAL SETTING



Experimentation was conducted using the dataset, which entailed collecting interview data from different users via simulated interviews that included a variety of responses on different types of questions such as technical, behavioural, and situational questions. In addition, each session included

audiovisual recordings, which were analysed by the system to identify various verbal and non-verbal attributes.

In order to test the effectiveness of the system, several cases were tested using various conditions such as varied lighting, varied background noise, and varied ways of speaking by the respondents. Some of the metrics considered in the testing phase were performance measures like response processing time, feedback accuracy, and system stability.

In assessing the quality of feedback provided by the software, responses provided by the users were measured against certain predetermined criteria, which include speech clarity, relevancy of response, confidence, and facial expression among others. In addition, qualitative assessments were performed using user feedback obtained informally.

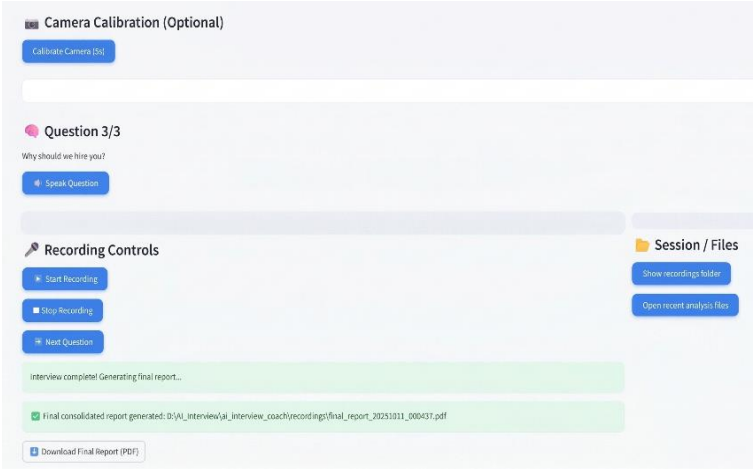
Furthermore, the system was evaluated in terms of its functionality without being connected to an internet network. All processes performed by the system, such as data processing and model inference, were done offline without communicating with any server from outside. As a result, the system proved to be capable of protecting user data and providing consistent feedback irrespective of network availability.

In general, the conditions of this experiment aimed at assessing the feasibility of the suggested system in real-life scenarios. As can be seen from the outcomes of this experiment, the system is capable of operating efficiently in typical circumstances and providing appropriate feedback.

V. IMPLEMENTATION AND USER INTERFACE

The development of the AI-Based Interview Coach is designed to ensure that the implementation is efficient, easy-to-use, and respects user privacy by relying solely on offline functionality. The program is created using software tools that provide various functions related to artificial intelligence, multimedia, and interactive user interface components. This allows inexperienced users to be able to use the application effortlessly.

A. FIGURE: USER INTERFACE



The backend functionality of the tool is concerned with implementing features including data analysis, feature extraction, and performance evaluation. In order to achieve these goals, machine learning algorithms will be applied for evaluating the verbal and non-verbal performance of candidates during their job interviews. For verbal communication, natural language processing capabilities will be used, while computer vision techniques will be applied to assess facial expressions and simple gestures of interviewees. These operations will take place offline on the client-side.

As for audio/video capturing and processing, special libraries have been utilized to make the whole process of work with video and audio happen in real-time mode. In turn, the audio processing involves recording of user voice and noise filtering as well as speech segmentation. Video processing implies capturing of frame-by-frame videos from a camera and extracting relevant features (facial expression and behavior).

B. Mock Interview Report

Mock Interview Report

Session ID: 20251011_000437
Generated: 2025-10-11 00:07:22
Calibration: ■ Done at session start

Question 1

Transcript:
Hello. this is time.

Metric	Value
Filler Words	0
Words per Minute	42.34
Pause Count	1
Total Pause Seconds	4.04
Pitch Mean	192.81
Pitch Median	192.63
Eye Contact %	95.0
Posture Score	53.9
Sentiment	Neutral
Low Confidence (ASR)	■ Reliable

Feedback:

- Your speaking pace (42.34 WPM) is slow. Try to speak a bit faster and more confidently.
- You spoke continuously without pauses — add short pauses to emphasize points.
- Tone was neutral. Try to add more expression for engagement.
- Excellent eye contact — very confident!
- Good posture — you appear confident.
- Your speech was understandable, but clarity could be improved slightly.

The interface of our project can be described as simple but still intuitive to use. With its help, users will easily interact with the platform, start practicing their interview skills, and receive relevant feedback. Moreover, clear navigation is available in order to move around the platform.

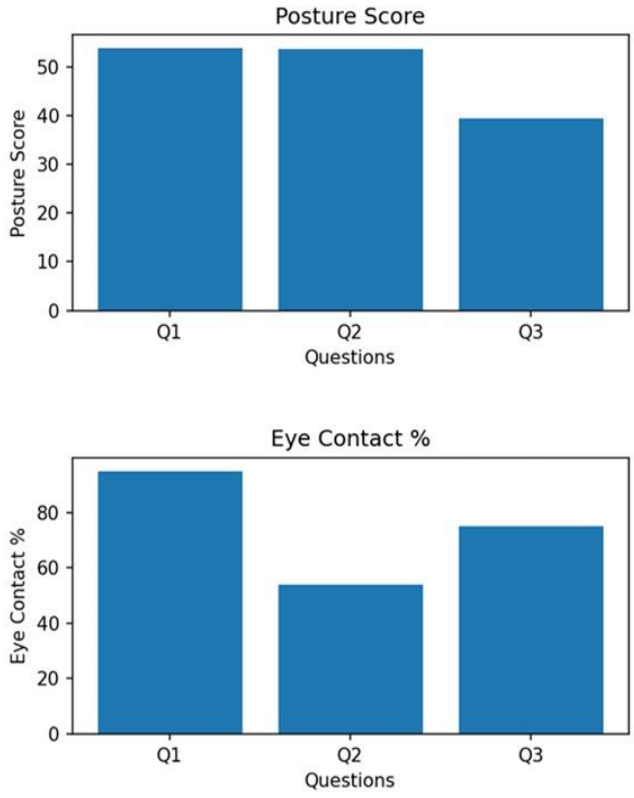


Fig: Posture and Eye Contact Graph

There should be several tabs in the main interface of the application that would provide access to various sections, such as "Start Interview," "View Feedback," and others. While starting interview sessions, questions appear one-by-one on the screen, while a recording of user voice is taking place. Indicators of recording process (time, etc.) are provided by the application.

Once the session is completed, there will be a feedback interface with a comprehensive report of the performance of the user. The reports will come in an organized form, usually in graphs and categorized into various forms like communication skills, confidence levels, and body language.

Another important aspect of the program is the progress report that will be shown to the user after every session. It will show the user how well he is performing throughout the training sessions and give him motivation to continue practicing. The developers of the system have taken great care in making the program responsive. It can be used with normal personal computers and does not require any special hardware or internet connection to operate.

Moreover, this system is endowed with some customization options, whereby the user may choose between certain categories or levels of interview questionsTables must be numbered using uppercase Roman numerals. In summary, the development of the system is characterized by efficient backend systems as well as an easy-to-use graphical user interface. In consideration of the user-friendly design, efficiency, and privacy protection, this system provides an ideal platform for self-improvement through interviews.

VI. RESULT AND DISCUSSION

AI-Based Interview Coach was developed and tested in order to determine the efficiency of this software solution for enhancing students' skills in interviews. The assessment of the proposed technology included parameters like usability, accuracy of feedback, performance efficiency, and user satisfaction. Several tests have been held by using actual interview situations with various users in order to assess the system's behavior and performance.

The results show that the program is able to provide valuable feedback on verbal and non-verbal communication skills. The test subjects found out their strengths and weaknesses regarding clarity, speech structure, confidence, facial expressions, etc. It should be noted that the feedback provided by the system was highly structured and comprehensible, which allowed the users to improve their skills effectively.

One of the main benefits of the offline architecture of the application is its ability to work efficiently without internet connection. This resulted in high speed and reduced latency of feedback provision. Therefore, there were no interruptions experienced during the use of the system. Another advantage of this approach is the increased security because personal information is saved locally.

Additionally, the system had some success in detecting non-verbal signals via computer vision. Detection of facial expressions and basic postures was quite effective in evaluating user engagement and confidence level. Although the technology may be far from that available in professional-grade software solutions, the accuracy obtained can still be considered satisfactory for personal training purposes

When considering usability aspects, the application interface proved to be fairly easy to use and understand. Proper organization of interviews and feedback generation together with visual support such as categorization and summarizing of data positively affected the users' experience.

Lastly, the progress tracking functionality was instrumental in motivating users to engage in training regularly. As users could see how much they have improved after each session, they felt more encouraged to keep practicing.

Nevertheless, some constraints were also observed in the course of testing. The performance of both speech and facial recognition can depend on the external environment, including lighting, background noise, and camera quality. Also, at the

moment, the application is capable of working only with some specific types of interviews and questions.

Nonetheless, despite all of the described constraints, the performance rate of the software proves that it can serve as a great tool for interviewing preparation. Due to the proper balance between functionality, privacy protection measures, and ease-of-use, the solution will be beneficial especially for students who cannot afford costly interview training services.

Summing up all the aforementioned information, one should conclude that the presented research confirmed the effectiveness of the developed system. Its performance rate and capabilities allowed proving that the task was accomplished successfully, and thus the application was created in compliance with all requirements.

VII. CONCLUSIONS

In this research, the design and implementation of AI-Based Interview Coach: A Privacy-Preserving Offline System for Student Interview Preparation was conducted. The main purpose of this paper was to enhance the features provided by previous interview coaching platforms by designing an inexpensive, easy-to-use, and more importantly secure offline system that puts emphasis on learning and not only evaluating candidates' skills.

To achieve the set goals, the paper successfully incorporated several machine learning algorithms to be able to evaluate both verbal and non-verbal components of interview performances. Through natural language processing and computer vision technologies, the paper managed to provide useful and informative insights about candidates' verbal and non-verbal abilities. Different from other systems which aim at providing services to recruiters, the proposed system focuses more on personalized feedback and helping students identify and improve their weaknesses.

One of the most important features of this system is that it has been developed as an offline platform. This enables users to keep their personal information safe as audio and video files will be stored locally on the device.

This paper presents an AI-Based Interview Coach designed for offline, privacy-preserving, and student-centric interview preparation. By combining speech, tone, gesture, facial expression, and posture analysis, the system provides actionable feedback for skill improvement. Future developments can enhance real-time feedback, multilingual support, and scalability to create a comprehensive, accessible, and equitable coaching tool.

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