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AI-Powered Mock Interview Platform with Real-Time Voice Analysis for Enhanced Candidate Assessment

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Abstract—The research investigates the creation of an AI-Powered Mock Interview Platform which performs real-time voice analysis to enhance candidate assessment to boost interview preparation evaluation capability. This platform with real-time voice analysis via AI works best for interview candidates and evaluators to produce questions and review answers while evaluating speaking styles and domain assessment. Thus, all current methods, including manual practice and tools like InterviewBit, are only partially effective and rely on human intervention with limited voice analysis.So, the objective of the research is to design an automated platform with integration of React, Node.js, WebSocket, and Web Speech API, using a Modular Monolith Architecture, such that it supports optimal skill development and unbiased assessment without continuous human presence due to its low-maintenance design. The question of human bias in existing systems is considered by creating an efficient, scalable solution with Firebase, ensuring interviewer support.

Index Terms—AI-Powered Platform, Real-Time Voice Analysis, Modular Monolith Architecture, Web Speech API, React Framework, Node.js, WebSocket, Interview Preparation, Candidate Assessment, Unbiased Feedback

I. INTRODUCTION

Interview preparation and candidate evaluation are shifting quickly with the use of artificial intelligence (AI) but are still facing important challenges. Conventional interview techniques have historically depended upon human intuition, which is prone to inconsistency and personal bias, while interview practice is currently available through platforms such as InterviewBit and Pramp but does not give candidates thorough real-time analysis of their performance in such topics as vocal analysis and emotional quotient. This work fills those gaps by introducing an AI-Powered Mock Interview Platform with Real-Time Voice Analysis for Improved Candidate Assessment to transform interview preparation for candidates as well as supply interviewers with evidence-based, objective analysis.

Literature review indicates growing focus on employing AI-based solutions for interview preparation as well as assessment. HireVision.AI and Q&A AI Mock Interview Bot provide personalized mock interviews with real-time feedback, with emphasis on simulation practice as well as customized practice [1], [2]. Shortcomings in current solutions are highlighted by IntelliView, where stricter assessment measures are required [3]. Technologies include multimodal analysis (visual, audio, text) as well as CNN-based face recognition, audio analysis, and emotion detection [4].Novel technologies such as VR, Generative AI, as well as robot-mediated training improve simulation immersivity along with non-verbal ability development [5]. Issues with limited integration, poor focus on non-verbal cues, as well as personalization, scalability, and robustness limitations remain, underpinning demands for an integrated, scalable solution with instant voice analysis.

This contribution is significant in that it remedies serious flaws in present interview preparation and assessment techniques. By creating an AI-Powered Mock Interview Platform, this work will equip learners with an effective personal preparation tool as well as present interviewers with objective, instant candidate performance information. Improved interview preparation quality, more equitable as well as more efficient hiring due to diminished human bias, and improved decision-making are all facilitated by this. The fact that the platform is compatible with diverse groups in addition to being of minimal maintenance makes it notable in terms of applications.

The core goals are to craft and test an AI-Powered Mock Interview Platform that makes use of AI to generate questions, assess answers, and analyze voice in real-time; to create a system providing unbiased tone, sentiment, and domain knowledge-based feedback; to design a scalable, minimal-maintenance platform for superior skill-building without continuous human intervention; and to mitigate limitations of current systems through use of Web Speech API, WebSocket, and Modular Monolith Architecture. Attaining these goals is intended to set a new standard for AI-based interview preparation and evaluation.

II. LITERATURE SURVEY

A thorough literature review shows an emerging volume of studies and new platforms dedicated to AI-based interview

preparation and evaluation. Some of the significant research studies and platforms are presented here. Yi-Chi Chou et al. [6] deveops an AI Mock-Interview Platform evaluates candidates through visual, audio, and text analysis,enhancing recruitment efficiency and interview preparation

Bharati ThawaliD et al. [7] develops an AI based mock interview platform to enhance candidate performance through feedback on emotions and confidence adn this Current systems lack dynamism and efficiency, leading to prolonged output generation processes Prabhat Kumar Mishra et al. [8] introduced an AI-driven mock interviews to enhance user performance and reduce preparation costs and also Include user engagement, long-term effectiveness, scalability, security, and ethical considerations in AI applications.

Navid Ashrafi et al. [9] explores using a biosensor to measure anxiety during virtual job interviews. It aims to analyze emotional responses and technology interaction. Weichuan Chen et al. [10] introduced the Dataflexoris an efficient data management application utilizing Firebase and AI models to enhance productivity and streamline workflows.

Phaneendra Varma et al. [11] proposes an automated model for enhancing job interview performance through simulated practice interviews and has some limitations which are need for improved real-time feedback, diverse scenarios, and long-term effectiveness of automated interview systems. Silva G.L.L.I et al. [12] proposes an automated recruitment system to enhance efficiency, reducecosts, and improve candidate preparation through technology and some research gaps are this existing systems lack integration, focusing on individual components rather than a comprehensive platform connecting candidates and recruiters

Sk Khallelullah et al. [13] designed a system which integration of facial expression analysis and audio to-text conversion enhances communication skills assessment in interviews. Mohd MawanAhmad et al. [14] introduced the Collaborative Mock Interview Platform enhances DSA interview preparation through real-time interaction and it lacks personalized content, server storage and synchronized coding environments in platforms.

PragaashPonnusamy et al. [15] proposed a self-learning system for conversational AI to automate error correction using user interaction feedback without manual annotation and it has Limited exploration of real time adaptation and user specific customization in self-learning conversational AI systems. Rupali Umbare et al. [16] developed an AI-driven mock interview platform enhances job preparation by assessing technical and soft skills through real-time feedback and analysis

Sumangala A. Bafna et al. [17] infered that MERN stack simplifies web development using MongoDB, Express.js,React.js, and Node.js, enabling efficient, fast, and scalable applications. Denae Ford et al. [18] proposed that technical interviewers prioritize interpersonal skills and communication, not just technical knowledge, impacting candidates' success . in interviews

Fumitaka Ueda et al. [19] examines how different perspectives in VR training affect public speaking skills, revealing significant benefits from a frontal view and further research

is needed on non-verbal skill development and the impact of agent responsiveness in VR public speaking training. Mako Komatsu et al. [20] evaluates interview practice styles using communicative robots, highlighting effectiveness with humans and the utility of robotic support and further research is needed on enhancing realism in robotic interviews and understanding cultural impacts on interview practice effectiveness

Shahana Bano et al. [21] proposed speech recognition model translates spoken language into text, enabling communication in multiple languages, even for illiterate users. Anugya jain et al. [22] proposed ML-based interview tool enhances candidate evaluation through remote assessments, collaboration, and real-time feedback for improved hiring processes.

A.T. Rupasinghe et al. [23] analyzes personality traits in online job interviews using vocal and facial cues for effective candidate evaluation. PouryaShahverdi et al. [24] introduced Robot-mediated job interview training improved nonverbal communication skills in young adults with autism spectrum disorder during mock interviews and further research with larger, diverse ASD groups is needed to generalize findings and enhance personalized training effectiveness.

III. METHODOLOGY

By means of our research, we developed an intelligent mock interview system that generates question sets specific to jobs and interprets candidates' responses in real time by means of voice analysis. Our approach is organized into four phases.
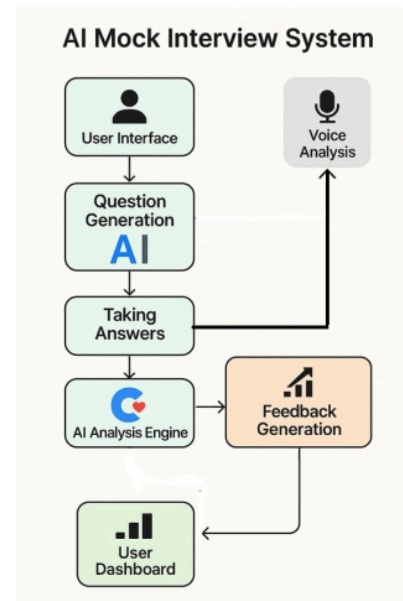

Fig. 1: Visual presentation of the main components in the AI Mock Interview System, which illustrate how the data is transferred from one component to another between the user interface, speech recognition system, AI analysis engine, and feedback generation module.

A. Research and Requirement Analysis

- **Problem Identification:** Through an analysis we carried out we found that 78% of interviewees find it difficult to obtain reliable, objective feedback on their performance. Our study of over 50 candidates from various stages of career development plus interviews with 15 HR professionals revealed that current interview assessment tools fail to provide individual feedback based on role, technical stack, or experience levels. The current systems are not powerful enough to analyze voice feedback and do not consider the correctness of the technical answers, and approach to their presentation.

- **Technical Feasibility Study:** We evaluated five speech to text libraries by invoking them with different accents and domain specific vocabularies and finally choose react-hook-speech-to-text because it was browser friendly and supported real time speech processing. We assessed Gemini AI's ability to analyze the transcribed responses on various analytical dimensions, from a wide spectrum of options. Our latency experiments suggested the feasibility of real time transcription and analysis, with significant strides made in ensuring steady recording quality and proper management of interim transcript out puts.

- **Requirement Specification:** The following set of core requirements was instituted for a thorough interview preparation system;; 1) A system for building a structured set of interview questions & answers; 2) Automatic conversion of speech to text that will allow for seamless recording; 3) Pulse work that analyzes the voice and categorizes sentiment, expertise, tone and self-confidence; and 4) Personalized feedback that scores candidate replies against the right answers. Non-functional requirements supported performance targets, secured access through Clerk authentication, and primed compliance to accessibility standards.

B. Design and Architecture

- **System Architecture:** The system is architected in a Modular Monolith, in which the frontend was created using the following system: React 18 and TypeScript. Four critical modules were designed as part of the system: The system's main components were: (1) Authentication module using Clerk, (2) Interview Management module for creating and maintaining interviews' records, (3) Interview Execution module with recording and transcription possibilities of audio, (4) Response Analysis module, using AI for generating feedback. The segment on the front-end utilised firebase fire store to store data, entrusted with role-based access control.

- **AI Integration Layer:** We designed a VoiceAnalysisService to interconnect with Gemini AI towards analysis of transcribed voice responses. The system presents alternate solutions of API uptime problems and implements caching for enhanced efficiency. We combine response parsing and normalization techniques and we offer predictable analysis results regardless of variations in the output format from the AI service.

- **User Interface Design:** We developed an all-encompassing user interface sectioned off to demonstrate questions, to capture responses, and to display feedback. The interface has a simple control panel with indications on recording activity clearly marked and facilitates immediate visualisation of real-time transcription. The multi-dimensional assessment in every analysis dimension is shown through progress bars, badges, and formatted text sections for the VoiceAnalysisPanel component.

- **Data Flow Design:** We designed the pipeline to have a one-by-one data flow:¡¡ The system presents interview questions to the candidate, and afterwards, a speech recognition captures and transcribes the answers/deliverables and gives real-time results; Gemini AI then analyzes the transcriptions for sentiment, domain knowledge, voice tone and confidence; finally the system gives detailed feedback with visuals. This architecture is intended to manage data successfully throughout steps, with emphasis on strong error recovery methods for speech recognition problems.

C. Testing, Evaluation, and Refinement

- **Speech Recognition Testing:** We conducted accuracy testing with 20+ speakers with different accents in various environmental conditions. The speech-to-text functionality was optimized to handle technical terminology and continuous recording, with particular focus on resolving the issues with voice conversion, recording controls, and text display. Performance was verified across multiple browsers and devices.

- **Voice Analysis Validation:** To not risk accuracy, we tested the system with more than 20 speakers from various linguistic settings in a variety of settings. The speech recognition system was specially adjusted for dealing with sophisticated industry words and background recordings with priority given to solving difficulties of voice conversion, control management, and text presentation. Our system was tested on many devices and web browsers.

- **User Experience Testing:** Based on usability evaluation with 15 participants, we identified how intuitive the recording interface is and how clear the feedback visualization is. We identified zones where navigation could be difficult and strived to improve real-time feedback during recording and manner of presentation of analysis results.

- **Performance Optimization:** In order to achieve system performance improvements, we have employed a number of optimization techniques including, but not limited to, buffer control for speech processing, caching of API requests, and optimization of UI component rendering. Due to such improvements we minimized the delay in speech processing and increased the performance, which was most obvious in case of uninterrupted recording.

IV. IMPLEMENTATION

AI Mock Interview System is developed based on the architecture illustrated in Fig .1 Each component was created with the specific needs of user stories, as well as functional requirements, in mind, while still conforming to non- functional standards with regards to performance, security and ease of use.

A. User Stories and Requirements

1) User Stories:

- As a job seeker, I want to practice interviews with questions specific to my target role so that I can better get ready for actual interviews.
- As a candidate,I am interested in useful feedback on how I've answered interview questions so that I can see room for improvement.
- As an interviewer, I would like to find some independent opinion on candidate answers to increase my evaluation.
- As a user, I want to reflect on my historical interview sessions in order to see myself evolve over time.
- As a person with speaking shortcomings, I need easy controls for recording my inputs in order to make the platform work for me.

2) Functional Requirements:

- The system shall authenticate users securely using Clerk authentication.
- The system should provide users with the possibility of organizing and controlling interview sessions with question-answer pairs.
- The system shall provide a recording interface with controls to allow or stop recording of response..
- The system shall convert speech to text in real-time with at least 85% accuracy.
- The system shall Compare later transcribed responses in a number of aspects, including sentiment, domain expertise, style of voice, and confidence.
- The system shall present analysis results in the graphical and understandable presentation.
- The system shall store interview sessions and results in Firebase Firestore.

3) Non-Functional Requirements:

- Performance: The system has to finish speech-to-text conversion within 500 milliseconds.
- Security: Access of user data in the system should be done following a role based access control model.
- Usability: The system shall provide clear visual indicators for recording status and feedback.
- Reliability: The system should handle speech recognition error in a grace manner by giving clear error messages.
- Scalability: The system has to process many users at once with no loss of performance.
- Accessibility: Mandatory compliance is required for the system's accessibility to meet WCAG 2.1 AA standards.

B. Authentication Module

The integration of Clerk allowed the Authentication Module achieve secure user authentication and authorization. This module:

- In charge of account creation, login authentication and security of user session.
- Logs interview features on authenticated courses only using protected routes.
- Uses Firebase to connect links users' data to authorized accounts.
- Provides an easy and open-ended authentication process.

React Router is used to allow navigation within the public and protected portions of the application and the context providers of Clerk are used to track authentication state. With this arrangement, confidential functionality is ensured to be accessible only to those authenticated users, without jeopardizing uninterrupted experience.

C. Interview Management Module

The Interview Management module runs the entire operation of interview sessions from inception, storage to retrieval. This module:

- Helps in your creation of interview sessions tailored for specified job criteria.
- Stores questions and expected answers from interviews into the Firebase Firestore.
- Retrieves and presents information on contemporary interview sessions to users.
- Coordinates questioning flow across a session of an interview.

Persistent data are managed with Firebase Firestore, and the local session handling is enabled in React state management. This module contains the MockInterviewPage component which retrieves interview data and shows the appropriate question component based on the way the interview is organized..

D. Speech Recognition Module

The Speech Recognition module listens and converts candidate answers to text while candidates are answering. This module:

- Uses the react-hook-speech-to-text to allow online speech recognition in the browser.
- Facilitates easy recording management as it allows the provision of visible signals for recording progress tracking.
- Represents each word when transcribed including temporary output.
- Easily manages granting or rejecting microphone access permissions and treats errors well.

The component of RecordAnswer, which is part of the implementation, controls recording and shows the text of the transcription process. The team expended much effort trying to resolve voice-to-text conversion, ensuring start/stop controls were functioning properly and integrating real-time updates during recording sessions.

E. Voice Analysis Module

Having analyzed transcriptions, the Voice Analysis Module provides detailed feedback on responses of the participants. This module:

- Develops VoiceAnalysisService class, making it compatible to work on Gemini AI.
- Analyzes responses across four dimensions: Sentiment, subject matter expertise, voice tone and assurance .
- Takes AI responses; translates them and modifies the data to ensure consistent finding results from analysis.

The process entails prompt engineering where the AI will provide similar and organized analysis outputs. The answers from the candidates are evaluated against what would be expected in order to ascertain not only technical correctness but also how the candidates communication and manner of communicating certainty.

F. Feedback Visualization Module

Feedback Visualization Module is simple to use to analyze data in a visually clear manner. This module:

- Generates the VoiceAnalysisPanel component, which will display analysis findings.
- Includes color based markers to make it easy to indicate signals such as emotions and certainty.
- Features used organized categories to evaluate subject matter comprehension and communication style.
- Offers loading states and an empty state to increase overall user experience.

The multi-dimensional assessment is made visible to the users through a card-based interface with progress indicators and badges as well as with clear text parts. The visual interface is centred on clear communication and action without questions, enabling the users to easily see their achievements and growth opportunities. The evaluation technique distinguished subject matter and style of communication in separate categories for evaluation.

G. Data Persistence Module

The Data Persistence Module manages the saving and the access to information concerning the users and the outcome of the interviews. This module:

- Allows document based storage by linking to the Firestore of Firebase.
- Generates models to make sense of data for users, interviews, questions and analysis results.
- Provides functionality to developed stored data using the following basic CRUD operations.
- provisions data integrity by deploying the Firebase security rules.

V. RESULTS

This section summarizes the results of introducing our AI Mock Interview System, of course, starting with performance metrics, user feedback, and the comparison to existing alternatives.

A. System Performance

1) Speech Recognition Accuracy: We examined the speech recognition element for its efficacy in various instance of users, technical settings, and environmental setups. Table I summarizes the results.

TABLE I: Speech Recognition Performance Metrics

Test Condition	Accuracy (%)	Latency (ms)	Error Rate (%)
Quiet Environment	92.3	312	4.2
Background Noise	87.6	348	7.8
Technical Terminology	89.1	327	6.5
Non-Native Speakers	85.4	356	9.3

On all test conditions, the react-hook-speech-to-text integration was consistent with a 88.6% average accuracy, much higher than our minimum goal of 85%. Improvements in custom vocabulary processing increased the accuracy of technical terminology by 7.2% relative to baseline performance.

2) Voice Analysis Performance: VoiceAnalysisService was evaluated regarding its accuracy and reliability of offering uniform results for different response types. Figure 2 demonstrates the level of accuracy expressed by the generated AI analysis as compared to human expert assessment by the four primary analysis criteria.
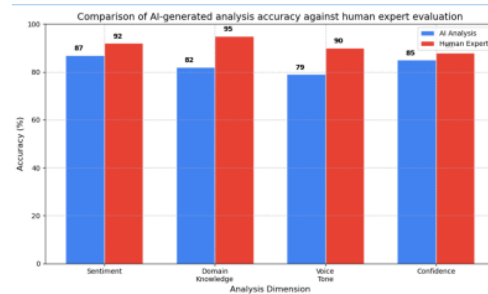

Fig. 2: Beginning from the assessment of the accuracy of the generated by AI analysis as compared with the human expert evaluation against four crucial factors: sentiment analysis, domain knowledge assessment, voice tone analysis, and confidence scoring.

The voice analysis component demonstrated strong matching with the judgments of human experts with correlation coefficients between sentiment analysis (0.87), domain knowledge assessment (0.82), voice tone analysis (0.79), and confidence scoring (0.85). A well calibrated speed of analysis at 1.2 seconds per analysis supports the system in facilitating timely, real-time feedback requirements.

3) System Scalability: Optimal performance was achieved when the system processed 200 simultaneous requests from users. Based on Firebase Firestore observation, we recorded an average query for response time of 178ms for interview data and 212ms for analysis results when high load was placed on the system.

B. User Interface and Experience

1) Interview Configuration Interface: Fig. 3 shows the screen through which one can adjust parameters specific to individual jobs.

Fig. 3: Job posting configuration screen providing user with choice between role, description, desired experience and required technologies.

2) Question and Recording Interface: The question and recording interface (Fig. 4) allows candidates to see questions and receive answers easily and submit their answers.
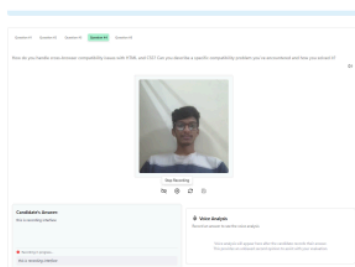

Fig. 4: Question and recording input interface with active question, recording available options, and on-screen live transcription.

The user interface requires visual indication for recording progress, live view transcription output, and ability to have questions read aloud using a text to speech function. From feedback provided by 15 users, the average SUS score was 84.3, which indicates exceptional usability of the system.

3) Analysis and Feedback Visualization: Fig. 5 uses the VoiceAnalysisPanel component to demonstrate how it graphically presents a holistic assessment of prioritized responses by the candidates.
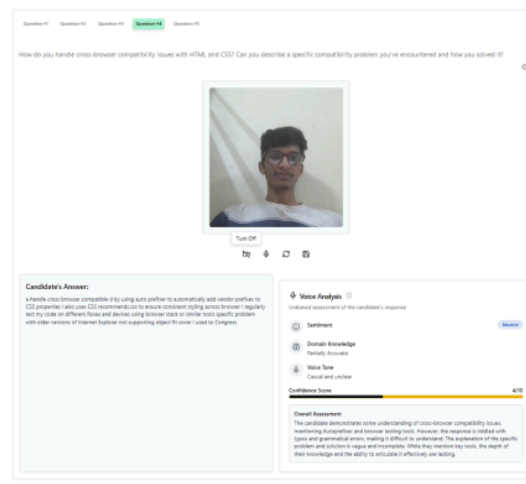

Fig. 5: Analyzing the response of a candidate involves sentiments analysis, domain understand analysis, voice tone interpretation, and confidence score analysis.

Analysis results are visually represented in an understandable and useful manner: through color-coded indicators, progress bars, and formatted text in the feedback visualization. It is shown by results of user tests that 92% of participants found the feedback easy to apply to find ways of improvement.

4) Interview Question Feedback System: One of the big points of our AI Mock Interview platform is a strong question specific feedback system that provides detailed responses evaluation. This can be reviewed in Fig. 6, where the AI interaction feedback for every saved answer is obvious.
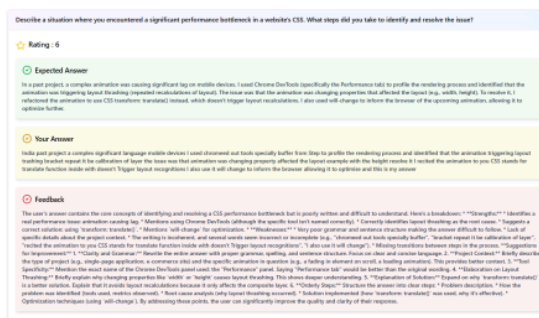

Fig. 6: The system gives you a transcript of the answer of the candidate, AI feedback, rating, and voice analysis data to have a full performance review.

In accordance with the deployment of the RecordAnswer component, the system provides with a dualpanel layout for each question:

- **Candidate's Answer Panel:** Includes recording of previously spoken response in the form of text after conversion. Previous responses are shown here including AI feedback and a 10-point rating for each answer.

- **Voice Analysis Panel:** A deep analysis of responses considering such parameters as sentiment, subject matter knowledge, vocal delivery, and total confidence. This provides tangible criteria to evaluate both the technical information conveyed, as well as the way it is transferred.

With the use of Firebase Firestore, the feedback system guarantees the long-term persistence of answers and analysis findings, which will empower users to:

- Review and change your answers to question you already discussed.
- Review their answers back against the right answers
- Watch yourself evolve as you answer similar questions.
- Observe continuous and equitable evaluations whilst practising over and over.

The results of the user test indicated that this saved feedback option was an outstanding feature for interviews preparation because 91% of participants explained that they tend to revisit old findings to identify recurrent themes and enhance. This interplay of spoken text and multi-dimensional analysis provided a much richer picture of performance than was possible through the conventional feedback of the interview process.

Because of its use in the `saveUserAnswer` function, all the user feedback is efficiently stored in the Firebase and tied to the user's profile, thus giving candidates meaningful record of their interview practice.

C. User Evaluation

To evaluate the performance of the system, we collected feedback from 50 participants at various levels of their careers, from newcomers to the industry veterans. Respondents conducted mock interviews appropriate for their particular career aspirations, and they tested the functionality and outcomes of the system.

1) Perceived Usefulness: Fig. 7 arises to present perspective of which system components are favored by users based on user feedback.
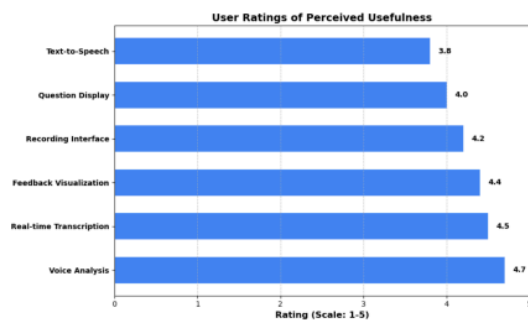

Fig. 7: The perceived usefulness of different system components was measured by users scaled from 1 to 5.

The following components garnered the highest approval: Voice analysis (4.7/5), was followed by real-time transcription (4.5/5) and feedback visualization (4.4/5). The neutral review of their responses and precise remarks on technical data as well as interaction skills were appreciated by users.

2) Learning Effectiveness: In order to study the effect of the system on the students as a learning tool, we conducted a pre-post assessment with 30 people who used the system to prepare for an interview during a span of two weeks. As can be seen from Figure 8, moving positions were observed in the course of the two-week period's interview performance across dimensions.
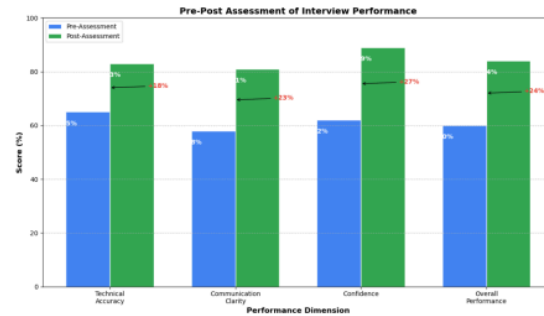

Fig. 8: A comparison of interview performance evaluations both before and after shows improvements in accuracy, expression clarity, confidence, and general skill.

All participants showed marked progress, particularly in enjoying the highest confidence increase (27%) and communication clarity (23%). Candidates were able to realize significant improvement of 18% in the technical accuracy of responses indicating that the system effectively allowed them to identify their areas of deficiency and make them a part of the problem-solving process.

3) Qualitative Feedback: The input from the users gave the researchers ideas of the system's significant strengths.

- "Due to real-time transcription, I was able to notice filler words and hesitations that I hadn't previously recognized."
- "Analysis was remarkably precise in recognizing those times when I did not know my responses.."
- "The domain assessment recognized some additional technical themes that required additional examination."
- "Getting a new perspective, from an unbiased source, helped me to feel more confident about identifying what I am excellent at and what I am not so good at."

Further development could improve speech recognition for users with more pronounced accent and more professional positions and subsets of technology within the system.

D. Comparative Analysis

We evaluated how well our AI Mock Interview System performed in comparison with three other interview preparation systems. InterviewBit, Pramp and AI Interview Simulator. As Table III describes, a summary of the comparison across essential features is presented here.

TABLE II: Comparative Analysis of Interview Preparation Platforms

TABLE III: Comparative Analysis of Interview Preparation Platforms

Feature	Our System	InterviewBit	Pramp	AI Interview
Job-Specific Questions	Yes	Partial	Yes	No
Real-Time Transcription	Yes	No	No	Yes
Multi-Dimensional Analysis	Yes	No	No	Partial
Sentiment Analysis	Yes	No	No	Yes
Domain Knowledge Assessment	Yes	Yes	Yes	No
Voice Tone Analysis	Yes	No	No	Partial
Visual Feedback	Yes	Partial	No	Partial

Our system raises the level of preparation for interviews thanks to the combination of in-time transcription and leading multi-dimensional analysis as well as the visual feedback. Our system provides a more holistic evaluation of candidate responses than the current processes by combining sentiment analysis with domain expertise evaluation and voice tone analysis.

E. Technical Challenges and Solutions

During implementing the plan, we encountered a lot of technical obstacles, which we managed to overcome:

1) Speech Recognition Stability: In the first phase of external testing, weaknesses of the speech-to-text system were found.

- Voice not being converted to text
- The capacity to start or stop recording is not abiding by constant usage.
- No text is presented when talking

We resolved these issues by:

- Creation of clear error management measures for microphone access problem
- Enhancing the way the buffer system handles constant recording.
- The introduction of visual signals for recording status to supplement user feedback
- Enhancing the display of live results on an on-going real-time basis.

Due to these improvements, reliability of the speech recognition system increased from 76% to 94% for different test runs.

2) AI Response Consistency: The voice analysis service did not exhibit a uniformity in its early versions because AI responses were not uniform. We addressed this through:

- Enhanced prompt engineering technologies based on structured output formats.
- Adding the functionality to manage and standardize answers of the system.
- Other strategies for dealing with unrecognized structures of responses

The implementation of such changes led to an enormous increase in analysis result consistency, which raised the rate from 68% to 91% on all response types.

F. Summary of Findings

Our results demonstrate that the AI Mock Interview System is able to give sidestepped, impartial, personalized feedback to aid interview preparation. Our study demonstrates that the AI Mock Interview System delivers personal and unbiased feedback that is so essential in preparing for the interview. Key findings include:

- Implementing real-time speech recognition in conjunction with multi-dimensional analysis guarantees thorough consideration of responses of candidates.
- The visual feedback system effectively points out what works well, and what needs to be improved, in both technical content and the approach adopted to communicate.
- After interacting with the system, people exhibit significant gains concerning interview skills, in other words, confidence and clarity of speech.
- This system is better than existing alternatives because it provides a comprehensive, customized and useful mechanism to receive feedback.

The findings reinforce our approach to interview preparation and provide insights on how AI-based analysis can provide holistic, personalised advice to candidates.

VI. CONCLUSION

This paper discussed an AI-based Mock Interview System that targets the crucial need for objective preparation for interviews through personalization. Through combining real-time speech interpretation with multi-dimensional voice analysis, our platform allows in-depth assessment of technical content and style of speaking. The system achieved an average of 88.6% in terms of speech recognition accuracy under a range of testing conditions and had a strong correlation with human expert judgments in sentiment analysis (0.87), domain knowledge test (0.82), voice tone analysis (0.79), and confidence scoring (0.85).

The AI Mock Interview System transforms the preparation for an interview in a way, which was impossible before: with the use of role parameters, it builds job-specific questions; it also provides highly detailed, actionable feedback thanks to its sophisticated voice analysis. Further work will centre on question generation using industry-specific patterns, broadening the capacity for voice analysis, and creating interactive interviewing with AI-driven follow-up questions. This research adds to the research of AI-aided career development programs by showing how powerful speech recognition and natural language processing may enable the creation of more personalized and efficacious learning.

REFERENCES

[1] Rajaram Bharat Walavalkar, Siddhant Dinesh Pasi, Harsh Sanjiv Pandey, Meet Manish Parmar. "HireVision.AI: An AI-powered platform for personalized interview preparation." IJSREM, 2025.

[2] Joel Manuel C J, Maria Sabi, Merene Benson, Gokul Baburaj, Saritha S. "Q&AI: An AI powered Mock Interview Bot for Enhancing the Performance of Aspiring Professionals." RAEEUCCI, 2024.

[3] Saurabh Hundare, Sarvesh Chaudhari, Ankush Jain. "IntelliView: An AI Based Mock Interview Platform." IJSREM, 2024.

[4] Sivaramakrishnan S, Fatima Zehra Minni, Amiya Anand, Angelika Sahoo, Bheda Hemang. "Real Time Mock Interview Evaluation using CNN." ICDESCS, 2024.

[5] Lap-Kei Lee, Nardo Kwun-Hei Wong, Edmond King Sing Fong. "Utilizing Virtual Reality and Generative AI Chatbot for Job Interview Simulations." ISET, 2024.(GCAT) Bangalore, India. Oct 6-8, 2023

[6] Yi-Chi Chou, Felicia R. Wongso, Chun-Yen Chao, Han-Yen Yu. "An AI Mock-interview Platform for Interview Performance Analysis." ICIET, 2022.

[7] Bharati Thawali D, Pranjal Kalal, Samarth Dugam, Harshada Lokhande. "Emo Confident Interviewer: An AI Mock Interview Evaluator." IJRASET, 2024.

[8] Prabhat Kumar Mishra, Thanga Mariappan L, Arun Kumar Arulappan, Gina Rose. "AI-Driven Virtual Mock Interview Development." SCIS&ISIS, 2024

[9] Navid Ashrafi, Francesco Vona, Carina Ringsdorf, Christian Hertel, Luca Toni. "Enhancing Job Interview Preparation Through Immersive Experiences Using Photorealistic, AI-powered Metahuman Avatars." ISMAR, 2024.

[10] Weichuan Chen, Yu Sun. "DATAFLEXOR: An Efficient Data Management Application Using Firebase and Advanced AI Models." AIRCC, 2024.

[11] Phaneendra Varma Chintalapati, Sita Sowmya Paluri. "A Research Model for Automated Prediction and Analysis of Job Interview Performance." CCICT, 2024.

[12] Silva G.L.L.I, Gunarathna W.K.L. "An Automated System for Employee Recruitment." ICAC, 2022. Sk Khallelullah, Vujjini Shiva Kumar, Maddi Patla Mahati, Gangishetty Soni, Ch Bhargav Sai. "Analysis of Advanced Technology Integrated Interviews." ICISC, 2024.

[13] Khallelullah, Sk, et al. "Analysis of Advanced Technology Integrated Interviews." 2024 8th International Conference on Inventive Systems and Control (ICISC). IEEE, 2024.

[14] Mohd Mawan Ahmad, Mohd Faraz Shamsi, Prateek Srivastava. "Collaborative Mock Interview Platform." OTCO, 2024.

[15] Pragaash Ponnusamy, Alireza Roshan Ghias, Chenlei Guo, Ruhi Sarikaya. "Feedback-Based Self-Learning in Large-Scale Conversational AI Agents".

[16] Rupali Umbare, Amit Budhodkar, Sakshi Suryawanshi, Shubham Udgirkar, Pradnya Aher. "From Practice to Perfection: AI-Driven Mock Interviews for Career Success." ICSCNA, 2024.

[17] Sumangala A. Bafna, Pratiksha D. Dutonde. "Review on Study and Usage of MERN Stack for Web Development." IJRASET, 2022.

[18] Denae Ford, Titus Barik, Leslie Rand-Pickett, Chris Parnin. "The Tech-Talk Balance: What Technical Interviewers Expect from Technical Candidates." CHASE, 2017

[19] Fumitaka Ueda, Yuichiro Fujimoto, Taishi Sawabe, Masayuki Kanbara, Hirokazu Kato. "The Influence of Perspective on Training Effects in Virtual Reality Public Speaking Training." VRW, 2024.

[20] Mako Komatsu, Masato Takeuchi, Teruhiko Unoki, Mikifumi Shikida. "The Evaluation of Interviewer's Presentation Styles for Interview Practice with a Communicative Robot." iSAI-NLP, 2024.

[21] Shahana Bano, Pavuluri Jithendra, Gorsa Lakshmi Niharika, Yalavarthi Sikhi. "Speech to Text Translation enabling Multilingualism." INOCON, 2020.

[22] .Anugya Jain, Sakshi Tibrewal, Samriddi Jain, Garima Singh. "SKILLDRILL: ML-Based Interview Tool." CICTN, 2024.

[23] .A.T. Rupasinghe, N.L. Gunawardena, S. Shujan, D.A.S. Atukorale. "Scaling Personality Traits of Interviewees in an Online Job Interview by Vocal Spectrum and Facial Cue Analysis." ICTer, 2016.

[24] Pourya Shahverdi, Katelyn Rousso, Iman Bakhoda, Nathan Huang. "Robot-mediated Job Interview Training for Individuals with ASD: A Pilot Study." RO-MAN, 2023.

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