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An AI-Powered Real-Time Voice-Based Interview Platform for Adaptive Interview Practice

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Abstract: **Interview preparation is a critical factor in recruitment success; however, most existing preparation tools rely on static, text-based interactions that do not accurately represent real interview environments. While some platforms provide live mock interviews, their dependence on human interviewers makes them costly, time-consuming, and difficult to scale. This paper proposes an AI-driven real-time voice-based interview platform designed to simulate realistic interview scenarios through intelligent conversational interaction. The system dynamically generates and adapts interview questions based on candidate responses using large language models. Real-time voice communication is achieved through speech-to-text and text-to-speech technologies, enabling natural interaction between the candidate and the AI interviewer. The platform is implemented using Next.js for frontend development, Firebase Authentication and Firestore for secure user management and data storage, Vapi for real-time voice interaction, and Google Gemini for intelligent question generation, response analysis, and feedback. By automating interview conduction and evaluation, the proposed solution reduces dependency on human interviewers while maintaining interview realism. The system offers a scalable, cost-effective, and interactive approach to interview preparation.**

Keywords: *AI Interview, Voice-Based Interview System, Mock Interview Platform, Google Gemini, Real-Time Interaction, Interview Preparation.*

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I. INTRODUCTION

Interviews are a critical component of the hiring process and significantly influence career opportunities for students and job seekers. Effective interview preparation requires realistic practice environments that simulate real-world interview scenarios. Traditional preparation methods such as reading interview questions or attending classroom sessions are often insufficient, as they lack interaction and personalized feedback.

Several online platforms provide mock interview services; however, most of them are text-based or rely on human interviewers, leading to high costs, scheduling constraints, and limited scalability. Furthermore, these systems do not dynamically adapt interview questions based on candidate responses. Recent advancements in artificial intelligence and large language models provide an opportunity to address these limitations.

This paper presents an AI-powered real-time voice-based interview platform that enables interactive mock interviews. By leveraging speech processing technologies and AI-driven evaluation, the system aims to improve interview readiness through adaptive questioning and immediate feedback.

➢ *Research Objectives*

The primary objectives of this research are:

- To design a real-time voice-based interview simulation platform
- To enable adaptive interview question generation based on candidate responses
- To provide instant and constructive feedback for performance improvement
- To reduce dependency on human interviewers while maintaining interview realism

➢ *Problem Statement*

Most existing interview preparation platforms lack real-time interaction, adaptability, and scalability. There is a need

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for an AI-driven system capable of conducting voice-based mock interviews, dynamically adjusting questions according to candidate performance, and delivering immediate feedback to enhance interview readiness.

II. TAKEAWAY FROM THE LITERATURE SURVEY

Interview preparation has increasingly adopted artificial intelligence techniques to enhance realism, personalization, and feedback quality. Several studies have explored AI-based systems for mock interviews, focusing on evaluation accuracy, confidence analysis, and user engagement.

Golande *et al.* [1] proposed an AI-powered mock interview evaluator that integrates emotion and confidence analysis to assess interview performance. Their system evaluates facial expressions, speech patterns, and emotional cues to generate detailed feedback. While the approach improves communication skills and interview preparedness, it primarily focuses on post-interview evaluation rather than continuous real-time interaction during the interview session.

Jagtap *et al.* [2] introduced an AI-driven real-time interview simulation application incorporating voice recognition and facial analysis. The system provides instant feedback on both verbal and non-verbal communication, thereby improving fluency and confidence. Although this work enhances realism through real-time feedback, it relies on predefined workflows and lacks adaptive question generation based on candidate responses, which limits personalization.

Anitha *et al.* [3] presented an AI-based mock interview evaluator utilizing natural language processing (NLP) and machine learning algorithms to assess candidate responses and confidence levels. Their system achieves accurate performance evaluation and adaptive feedback; however, it does not emphasize voice-based conversational interaction and scalability for large user bases.

➢ *Research Gap Identified*

From the literature, it is evident that existing systems either:

- Focus on evaluation rather than interaction [1], [3], or
- Provide real-time feedback without adaptive interview flow [2].

Most solutions lack a fully voice-driven, adaptive, and scalable interview platform that dynamically adjusts questions in real-time based on candidate performance. This gap motivates the proposed AI-powered real-time voice-based interview system.

Table 1 Summarizes the Key Characteristics of Existing AI-Based Interview Preparation Systems, Including Methodology and Finding.

Authors	Journal / Year	Methodology	Key Findings
Golande *et al.* [1]	Excel International Journal of Technology, Engineering and Management, 2025	Emotion and confidence analysis using AI-based evaluation models	Improved communication skills and interview preparedness
Jagtap *et al.* [2]	Indian Journal of Science and Technology, 2025	Voice recognition and facial analysis for real-time feedback	Enhanced fluency and confidence through instant feedback
Anitha *et al.* [3]	IJARST, 2023	NLP and ML-based response and confidence evaluation	Accurate performance assessment and adaptive feedback.

The literature confirms that AI significantly enhances interview preparation; however, current approaches remain fragmented, addressing either evaluation accuracy or real-time feedback in isolation. The proposed system differentiates itself by integrating real-time voice interaction, adaptive question generation, and scalable cloud-based deployment, thereby addressing the limitations identified in existing studies [1]–[3].

III. PROPOSED SYSTEM

The proposed system is an AI-powered real-time interview platform designed to simulate realistic interview environments through voice-based interaction. The platform employs speech-to-text and text-to-speech technologies to facilitate natural communication between the user and an AI interviewer. Interview questions are dynamically generated and adapted based on the user's responses, enabling personalized and context-aware interview sessions. This adaptive mechanism allows continuous evaluation of both technical knowledge and communication skills. Upon completion of the interview, the system provides structured feedback highlighting performance strengths and areas requiring improvement. By integrating real-time voice interaction, adaptive questioning, and automated evaluation, the proposed system offers a scalable and effective alternative to traditional interview preparation methods without dependency on human interviewers.

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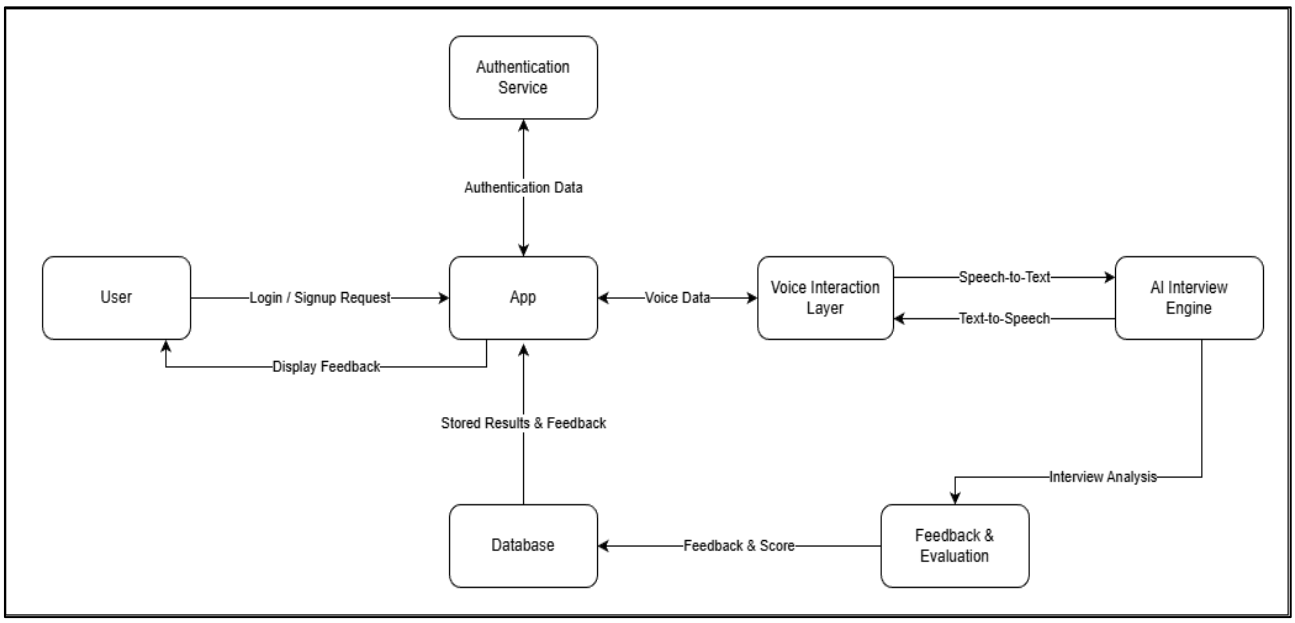

Fig 1 Block Diagram of the AI-Powered Real-Time Voice-Based Interview Platform

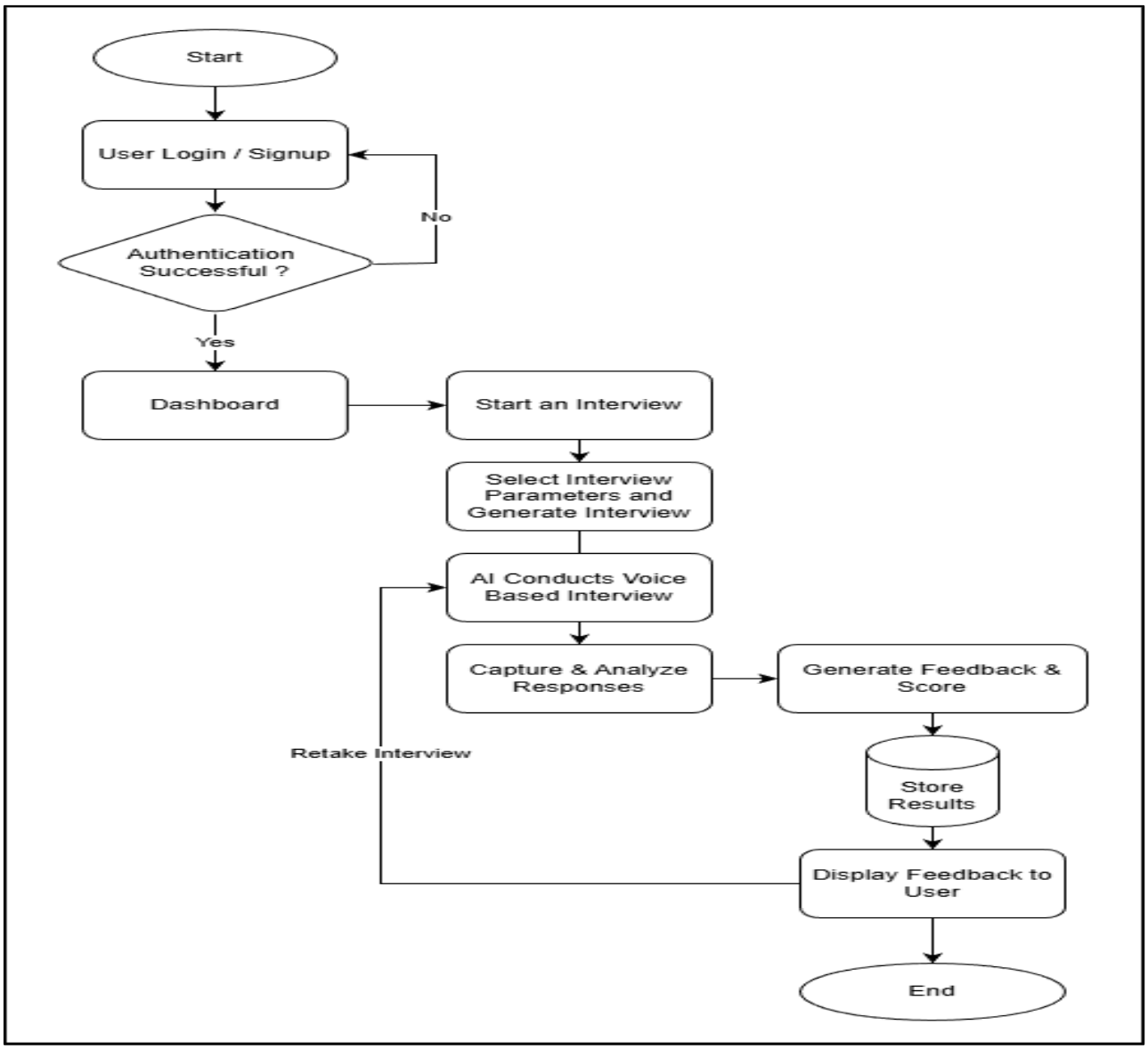

Fig 2 Flow Diagram of the AI-Powered Real-Time Voice-Based Interview Platform

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➢ *Technologies Used*

The proposed platform utilizes the following technologies to ensure efficiency, scalability, and real-time performance:

- *Frontend Technologies:*

Next.js used to build a responsive and interactive user interface, while Tailwind CSS ensures consistent and modern styling.

- *Backend and Authentication:*

Firebase Authentication provides secure user login and session management, and Cloud Firestore serves as a scalable NoSQL database for storing user and interview data.

- *Voice Interaction Technology:*

Vapi Voice AI enables real-time speech-to-text and text-to-speech processing, allowing natural voice-based communication.

- *Artificial Intelligence:*

Google Gemini is used for intelligent interview question generation, response analysis, adaptive follow-up questioning, and feedback generation.

➢ *Advantages of the Proposed System*

The proposed AI-powered interview platform offers several advantages over traditional interview preparation methods. The system enables real-time voice-based interview simulation, allowing users to experience realistic interview scenarios through natural conversational interaction. Adaptive and dynamic question generation tailors the interview flow based on individual candidate responses, thereby improving personalization and evaluation accuracy.

By automating interview conduction and feedback generation, the platform significantly reduces dependency on human interviewers, making it a cost-effective solution. The cloud-based architecture ensures scalability and supports multiple concurrent users without performance degradation. Furthermore, real-time interaction combined with instant feedback enhances user engagement and improves overall interview preparedness.

IV. METHODOLOGY

➢ *Flowchart-Aligned Process Description*

The proposed AI-powered real-time interview platform follows a structured and sequential workflow, as illustrated in **Figures**, to simulate realistic interview scenarios. The process begins with user interaction through a web-based interface, where candidates register or log into the system. User authentication and session management are securely handled using Firebase Authentication.

Once authenticated, the user selects the desired interview type, such as technical, HR, or behavioral. Based on this selection, the system initiates a mock interview session. The AI interviewer then begins the interaction by presenting interview questions using voice-based communication.

User responses are captured through real-time voice input and processed using speech-to-text conversion. The converted textual responses are forwarded to the AI processing module, where the Google Gemini large language model analyzes the content, evaluates response quality, and generates context-aware follow-up questions. This adaptive questioning mechanism continues throughout the interview, allowing the system to dynamically adjust the interview flow according to the user's performance.

After the interview session concludes, the feedback engine evaluates the overall interaction and generates structured feedback, including performance insights, improvement suggestions, and confidence indicators. All interview data, responses, and feedback are securely stored in the Firestore database. Finally, the processed results are presented to the user through a dashboard interface, enabling progress tracking and performance review.

➢ *Algorithm: AI-Powered Interview Workflow*

- *Input:*

User voice responses during an interview session

- *Output:*

Structured interview feedback and performance assessment

✓ *Step 1:*

Initialize the interview preparation system.

✓ *Step 2:*

Authenticate the user through a secure authentication mechanism.

✓ *Step 3:*

Present available interview options and allow the user to select interview parameters such as role, category, and experience level.

✓ *Step 4:*

Generate interview questions dynamically using an AI language model based on the selected parameters.

✓ *Step 5:*

Initiate the interview session and present questions through voice-based interaction.

✓ *Step 6:*

Capture the user's spoken responses during the interview.

✓ *Step 7:*

Convert speech input into textual format using a speech recognition module.

✓ *Step 8:*

Analyze the textual responses using an AI evaluation model to maintain conversational context.

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✓ *Step 9:*
Generate adaptive follow-up questions to continue the interview flow.

✓ *Step 10:*
Repeat Steps 5–9 until the interview session is completed.

✓ *Step 11:*
Perform automated evaluation of the complete interview transcript.

✓ *Step 12:*
Generate structured feedback including performance scores and improvement suggestions.

✓ *Step 13:*
Store interview data and feedback securely in the system database.

✓ *Step 14:*
Display the feedback report to the user.

✓ *Step 15:*
Terminate the interview session.

V. EXPERIMENTATION

The experimentation phase was conducted to evaluate the performance, usability, and functional reliability of the proposed AI-powered real-time voice-based interview platform. The experiments focused on validating real-time interaction, adaptive question generation, and automated feedback mechanisms under realistic usage conditions.

The system was deployed on a cloud-based environment using Vercel hosting, Firebase Authentication, and Cloud Firestore for secure data management. Testing sessions were performed using multiple user accounts to simulate real interview scenarios. Participants interacted with the AI interviewer through voice input using microphones, while the Vapi voice platform handled speech-to-text and text-to-speech communication. Google Gemini was used to dynamically generate interview questions and analyze user responses during each session.

Several experimental scenarios were designed, including technical interview simulations, behavioral interview sessions, and repeated interview retake tests. The evaluation focused on system responsiveness, conversational continuity, feedback accuracy, and overall stability during prolonged interaction. Additionally, experiments verified the ability of the system to generate structured feedback automatically after interview completion.

The experimentation confirmed that the system successfully maintained conversational flow, processed voice input in real-time, and dynamically adapted interview questions according to candidate responses.

VI. RESULTS AND ANALYSIS

The experimental results demonstrate that the proposed AI-driven interview platform effectively simulates realistic interview environments through adaptive conversational interaction. The system successfully conducted multiple voice-based interview sessions without significant latency, indicating efficient integration between frontend components, AI services, and cloud infrastructure.

During testing, interview questions were generated dynamically based on user-selected parameters such as role, experience level, and technology stack. The AI interviewer maintained contextual awareness throughout the session, allowing follow-up questions to align with candidate responses. The speech processing pipeline accurately converted voice input into text and delivered natural voice output, enhancing the realism of the interview experience.

Feedback generation was evaluated by analyzing structured outputs such as category-wise scores, strengths, and improvement suggestions. The results showed consistent feedback formatting and meaningful evaluation insights. The automated scoring mechanism enabled objective assessment without manual intervention.

From a usability perspective, users reported smooth navigation, clear interaction flow, and an intuitive interface. The cloud-based architecture ensured reliable performance across multiple sessions, demonstrating scalability and robustness. Overall, the analysis confirms that the proposed system achieves its goal of providing an interactive, adaptive, and scalable mock interview platform.

VII. CONCLUSION

This research introduced an AI-powered real-time voice-based interview platform designed to enhance interview preparation through intelligent conversational interaction and automated evaluation. By integrating large language models, voice processing technologies, and cloud-based services, the system successfully simulates realistic interview scenarios without requiring human interviewers. The platform enables dynamic question generation, adaptive interview flow, and structured feedback, providing users with an accessible and scalable interview practice environment.

Experimental observations indicate that the proposed system maintains smooth real-time interaction, consistent feedback generation, and reliable performance across multiple interview sessions. The results demonstrate that AI-driven voice-based platforms can significantly improve user engagement and interview readiness while reducing manual effort. Future enhancements may focus on advanced personalization, multilingual support, and deeper behavioral analysis to further improve the effectiveness of AI-assisted interview preparation systems.

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