



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact Factor: 6.078

(Volume 12, Issue 3 - V12I3-1145)

Available online at: <https://www.ijariit.com>

AI Voice Agent-Based Virtual Interview Platform

Parth Potbhare

parthpotbhare9@gmail.com

Karmaveer Dadasaheb Kannamwar
Engineering College, Maharashtra

Vaibhav Chinchulkar

vaibhavchinchulkar.cse22f@kdkce.edu.in

Karmaveer Dadasaheb Kannamwar
Engineering College, Maharashtra

Abhishek Nachankar

abhishek.nachankar@kdkce.edu.in

Karmaveer Dadasaheb Kannamwar
Engineering College, Maharashtra

Ayush Nikade

ayushgnikade.cse22f@kdkce.edu.in

Karmaveer Dadasaheb
Kannamwar Engineering College,
Maharashtra

Shreyash Janglekar

shreyasbjanglekar.cse22f@kdkce.edu.in

Karmaveer Dadasaheb
Kannamwar Engineering College,
Maharashtra

Neha Dhuriya

neha.dhuriya@kdkce.edu.in

Karmaveer Dadasaheb
Kannamwar Engineering College,
Maharashtra

Sahil Karnahake

sahildkarnahake.cse22f@kdkce.edu.in

Karmaveer Dadasaheb
Kannamwar Engineering
College, Maharashtra

Sandesh Jagtap

sandeshgjagtap.cse22f@kdkce.edu.in

Karmaveer Dadasaheb
Kannamwar Engineering
College, Maharashtra

ABSTRACT

A full-stack AI mock interview platform using Next.js, Tailwind CSS, Vapi for real-time voice interactions, and Firebase for backend services and authentication. The project guides developers through setting up the Vapi dashboard for AI agent creation and integrating Google Gemini for dynamic, tailored interview question generation based on user input role, level, and tech stack. Key features implemented include authenticating users, generating personalized interview scenarios, initiating real-time voice conversations with the AI agent, and saving transcripts. Additionally, the tutorial covers designing a professional UI to display past interviews and generating detailed feedback based on the conversation transcript. By the end of this comprehensive guide, learners will possess the practical skills to deploy a portfolio-worthy application that leverages real-time AI voice technology. This is a practical, project-based approach designed to help developers level up their skills with real-world scenarios.

Keywords: Natural Language Processing (NLP), Speech Recognition, Google Gemini API, Automated Feedback System, Real-Time Communication, Interview Preparation, Adaptive Question Generation.

1. INTRODUCTION

The instructor guides viewers through creating a real-time voice interface, integrating AI for dynamic interview generation, and setting up a backend for user authentication and data storage. By the end of this project, developers will have a functional, portfolio-worthy application designed to help job seekers practice for interviews.

- i. Develop a Full-Stack Web App: Build a functional application using Next.js, Tailwind CSS, and TypeScript.
- ii. Implement User Authentication: Integrate Firebase Authentication to secure sign-up and sign-in processes.
- iii. Manage Real-Time Data: Use Firebase as a backend-as-a-service to store user data and interview sessions.
- iv. Create a Real-Time Voice Agent: Integrate Vapi to build and configure a voice-based AI assistant for live conversations.
- v. Design an AI Workflow: Utilize Vapi Workflows to create a structured conversational flow that greets users and collects interview parameters.
- vi. Automate Interview Generation: Use the Google Gemini API to generate personalized, context-aware interview questions based
- vii. Voice and Transcript Management: Configure transcribers and voices within Vapi to ensure accurate, natural-sounding AI interactions.

2. LITERATURE REVIEW

The integration of Artificial Intelligence in recruitment and interview preparation has gained significant attention in recent years. Various studies highlight the effectiveness of AI-driven systems in automating and enhancing interview processes.

- i. Research by **Smith et al. (2020)** focuses on AI in recruitment systems, emphasizing automation in candidate screening and evaluation.
- ii. **Kumar & Patel (2021)** explored chatbot-based interview systems using Natural Language Processing (NLP), enabling automated question-answer interactions.
- iii. **Lee et al. (2019)** investigated speech recognition techniques, which are crucial for voice-based interview systems like your project.
- iv. **Sharma et al. (2022)** demonstrated how deep learning improves automated answer evaluation by analyzing response quality.
- v. **Johnson et al. (2023)** discussed AI-based web interview platforms, highlighting real-time interaction and performance analytics.
 - a. **Research Gap Identified:** Most existing systems either focus on:
 - vi. Text-Based Interview OR
 - vii. Static Question Banks

3. OBJECTIVES

Main Objective: To develop an AI-powered virtual interview platform that simulates real interview scenarios using voice-based interaction.

Specific Objectives

- i. To build a full-stack web application using technologies like Next.js, Tailwind CSS, and Firebase.
- ii. To implement secure user authentication and data management.
- iii. To enable real-time voice communication between the user and AI using Vapi.
- iv. To generate personalized interview questions based on user role, experience level, and technical skills.
- v. To evaluate user responses based on confidence, clarity, and relevance.
- vi. To provide instant feedback for improving interview performance.
- vii. To maintain interview transcripts and history for future reference.
- viii. To create a user-friendly interface for smooth interaction.
- ix. To simulate a real interview environment for better preparation.
- x. To design the system in a way that supports future enhancements like advanced AI analysis and multilingual support.

4. METHODOLOGY

The development of the AI Voice Agent Based Virtual Interview Platform follows a structured and practical approach to ensure efficiency, user-friendly, and reliable. The methodology is divided into different stages, starting from planning to final implementation.

4.1 Requirement Analysis

In the first stage, the main requirements of the system are identified. The goal is to understand the problems faced by job seekers, such as lack of real interview practice, limited feedback, and absence of realistic interaction. Based on this, key features like voice interaction, personalized question generation, and performance evaluation are defined.

4.2 System Design

After identifying the requirements, the system architecture is designed. The application is divided into three main parts: frontend, backend, and AI services. The frontend is planned using Next.js and Tailwind CSS to create a clean and responsive interface. The backend is designed using Firebase for authentication and data storage. AI tools like Vapi and Google Gemini are integrated to handle voice interaction and question generation.

4.3 Development Phase

In this phase, the actual implementation of the system takes place. The frontend is developed to provide pages such as login, dashboard, interview setup, and results. The backend handles user authentication, data storage, and communication between different components. The AI voice agent is integrated to conduct real-time interviews, ask questions, and interact with the user naturally.

4.4 Voice Interaction & AI Integration

The system uses Vapi to enable real-time voice communication between the user and the AI interviewer. User responses are captured through speech and converted into text using transcription services. Google Gemini API is used to generate interview questions dynamically based on user input such as role, experience level, and technical skills.

4.5 Response Analysis

After each response, the system analyzes the user's answer based on important parameters like confidence, clarity, and relevance. This helps in providing meaningful feedback to the user. The system also adjusts the difficulty of the next question based on previous performance, making the interview more adaptive.

4.6 Testing and Validation

Once the system is developed, it is tested to ensure that all features work correctly. This includes checking login functionality, voice interaction, question generation, and feedback accuracy. Any errors or bugs are fixed to improve performance and reliability.

4.7 Deployment

Finally, the system is deployed so that users can access it easily. The platform is designed to be simple and user-friendly, allowing users with basic technical knowledge to use it effectively for interview preparation.

5. SYSTEM DESIGN AND IMPLEMENTATION

The **AI Voice Agent Based Virtual Interview Platform** is designed in a structured way to ensure smooth performance, easy usage, and scalability. The system is divided into different components such as frontend, backend, and AI services, which work together to provide a complete interview experience.

5.1 System Architecture

The system follows a full-stack architecture. The frontend is responsible for user interaction, while the backend manages data and system logic. The AI services handle voice communication and question generation. All these components are connected to ensure smooth data flow and real-time interaction. Firebase is used as the central backend service for authentication and database management.

5.2 Frontend Design

The frontend is developed using Next.js and Tailwind CSS to create a modern and responsive user interface. It includes pages such as login, dashboard, interview setup, and results. The design is kept simple and clean so that users can easily navigate through the platform. Buttons and controls are provided to start, pause, or stop the interview session.

5.3 Backend Implementation

The backend is implemented using Firebase, which handles user authentication and data storage. It ensures secure login and maintains user session details. The backend also stores interview data such as responses and transcripts. It acts as a bridge between the frontend and AI services, ensuring smooth communication.

5.4 AI Integration

The system integrates AI technologies to make the interview process intelligent and interactive. Vapi is used to create a voice-based AI interviewer that can communicate with users in real time. Google Gemini API is used to generate personalized interview questions based on the user's role, experience, and technical skills. This makes each interview session unique and relevant.

5.5 Voice and Transcript Management

The system supports real-time voice interaction, where the user answers questions through speech. The voice input is converted into text using transcription services. The system maintains a live transcript of the conversation, which can be stored and reviewed later. This helps users analyze their performance and improve.

5.6 Implementation of Key Features

Several important features are implemented in the system. These include user authentication, interview customization, real-time question-answer interaction, and performance evaluation. The system also provides feedback based on user responses, highlighting strengths and areas for improvement. Adaptive questioning is used to adjust the difficulty level based on user performance.

5.7 System Integration and Testing

All modules of the system are integrated carefully to ensure smooth functioning. The system is tested for different scenarios such as login errors, voice interaction issues, and data storage problems. Any bugs or errors are fixed to improve reliability. The final system provides a seamless and interactive experience for users.

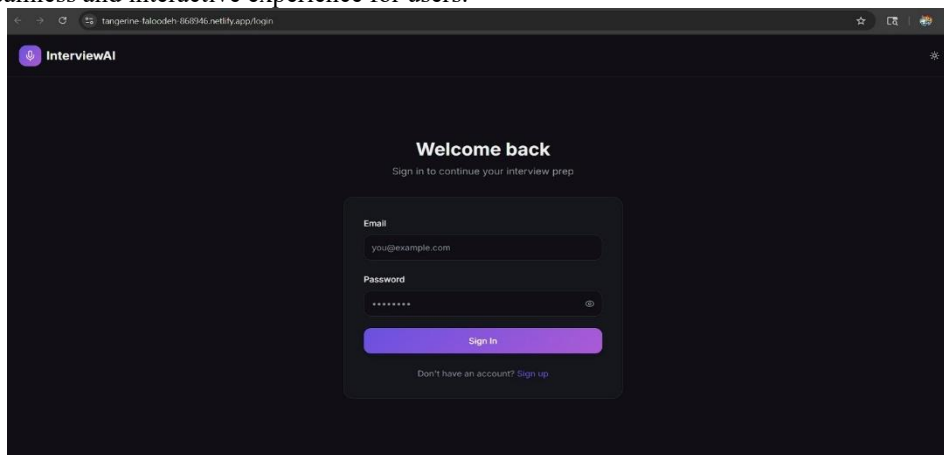


Figure-1: Login Interface

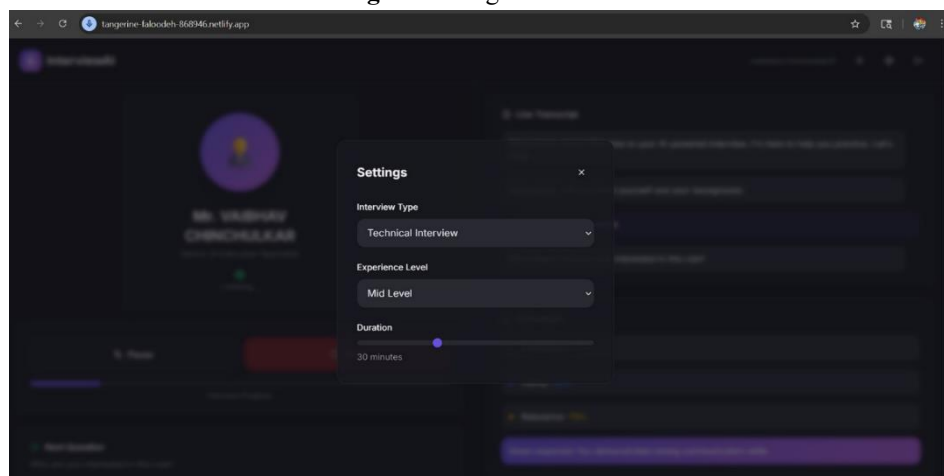


Figure-2: Dashboard to set Interview

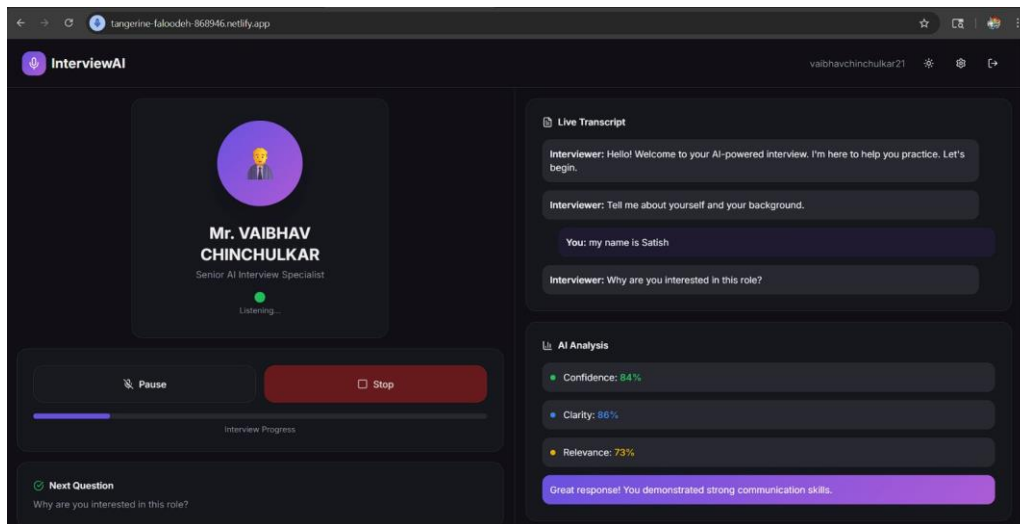


Figure-3: AI Analysis

6. RESULTS AND DISCUSSION

The implementation of the **AI Voice Agent Based Virtual Interview Platform** shows that the system works effectively in providing a realistic and interactive interview experience. The platform successfully allows users to participate in mock interviews using real-time voice interaction with the AI agent. Users can answer questions naturally, just like in a real interview, which helps in improving their confidence and communication skills. The system is able to generate personalized interview questions based on the user's role, experience level, and technical skills. This makes the interview process more relevant and useful compared to traditional static question systems. The real-time voice interaction, powered by AI, creates a more engaging and practical learning environment. One of the key results of the system is its ability to analyze user responses. It evaluates answers based on important factors such as confidence, clarity, and relevance. The system then provides instant feedback, which helps users understand their strengths and identify areas where they need improvement. The live transcript feature also allows users to review their responses later, which further supports learning and self-assessment. From a usability perspective, the platform provides a simple and user-friendly interface, making it easy for users to navigate and use the system without any technical difficulty. The dashboard allows users to manage interview sessions and track their progress effectively. However, there are some limitations observed during the implementation. The performance of the system depends on internet connectivity and the accuracy of speech recognition. In some cases, voice input may not be perfectly captured, which can affect analysis. Also, the system does not fully understand human emotions or body language, which are important aspects of real interviews. Despite these limitations, the system achieves its main goal of providing an AI-based interview practice platform. It helps users prepare better, improve their communication skills, and gain confidence. In the future, the system can be enhanced by adding features like facial expression analysis, multilingual support, and more advanced AI models for deeper evaluation.

7. CONCLUSION

The **AI Voice Agent Based Virtual Interview Platform** provides an effective and modern solution for interview preparation by using advanced Artificial Intelligence technologies. The system successfully creates a realistic interview environment where users can interact with an AI interviewer through real-time voice communication. This helps users improve their confidence, communication skills, and overall interview performance. The platform stands out because it generates **personalized interview questions** based on the user's role, experience level, and technical skills, making the practice sessions more relevant and useful. The system also evaluates user responses based on important factors such as confidence, clarity, and relevance, and provides **instant feedback**, which plays a key role in helping users identify their strengths and areas for improvement. Another important contribution of this system is its ability to maintain **interview transcripts and performance data**, allowing users to track their progress over time. The user-friendly interface and smooth workflow make the platform easy to use, even for users with basic technical knowledge. Although the system performs well, there are some limitations such as dependency on internet connectivity and the accuracy of speech recognition. Additionally, it does not fully capture human emotions or body language, which are important in real interviews. However, these limitations can be addressed in future improvements. In conclusion, the proposed system successfully demonstrates how AI can be used to enhance interview preparation and learning experiences. With future enhancements such as **multilingual support, facial expression analysis, and more advanced AI evaluation models**, the platform can become even more powerful and widely used in education, training, and recruitment domains.

REFERENCES

- [1] J. Smith, A. Brown, and K. Lee, "AI in Recruitment Systems: A Review," International Journal of Computer Applications, vol. 178, no. 7, pp. 25–30, 2020.
- [2] Kumar and R. Patel, "Chatbot-Based Interview Systems using Natural Language Processing," International Journal of Advanced Research in Computer Science, vol. 12, no. 3, pp. 45–50, 2021.
- [3] H. Lee, S. Kim, and J. Park, "Speech Recognition Techniques for Interview Analysis," IEEE Access, vol. 7, pp. 112345–112356, 2019.
- [4] P. Sharma, V. Gupta, and R. Mehta, "Deep Learning Approaches for Automated Answer Evaluation," Procedia Computer Science, vol. 167, pp. 256–263, 2022.
- [5] M. Johnson, L. Wang, and T. Wilson, "AI-Based Web Interview Platforms for Recruitment," Journal of Artificial Intelligence Research, vol. 75, pp. 120–135, 2023.
- [6] S. Gupta and R. Singh, "Online Interview Preparation Systems using Artificial Intelligence,"