IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 9, June 2025
Impact Factor: 7.67

Virtual Interview Conduction and Evaluation System Using Artificial Intelligence

Mr. Sahil Sheikh, Mr. Vinit Urgonda Ms. Heena Bhendarkar, Ms. Mamta Kale
Shri Sai Engineering Collage, Bhadrawati

Abstract: *In the evolving landscape of education and recruitment, the demand for scalable, unbiased, and efficient interview practice solutions has increased significantly. This paper presents a system titled "Virtual Interview Conduction and Evaluation System Using Artificial Intelligence," which aims to replicate a real-world interview environment using AI-driven voice agents. Built using Next.js, Firebase, and the Vapi AI API, the system conducts mock interviews and provides automated feedback on the user's performance. Key evaluation metrics include confidence, clarity, speech patterns, and overall communication. This paper explores the design, implementation, and effectiveness of the system in enhancing interview preparedness for students and job seekers.*

Keywords: *recruitment*

I. INTRODUCTION

Interview preparation is a critical component in academic and professional success. Traditional methods of interview coaching often involve manual practice sessions, peer evaluations, or human mentors, which can be biased, expensive, or inaccessible to all. The integration of artificial intelligence and machine learning in virtual training systems has shown promising results in overcoming these challenges.

In recent years, AI-powered systems have been successfully deployed in fields such as customer service, healthcare, and education, with significant improvements in efficiency and accessibility. In the context of interview preparation, AI can provide scalable, 24/7 availability for practice sessions, immediate feedback based on linguistic and paralinguistic cues, and consistent evaluation standards that reduce human bias. Moreover, voice technologies combined with natural language understanding allow users to simulate interview scenarios that closely mimic real-life interactions.

This project proposes an AI-powered platform that conducts mock interviews and evaluates performance metrics in real time using natural language processing, speech recognition, and ML-driven evaluation models. The objective is to offer students and job seekers an intelligent, interactive system that supports continuous learning and improvement in communication skills through automated assessments.

II. LITERATURE REVIEW

The use of AI-powered interview systems has gained traction in educational and recruitment settings. Golande et al. (2025) introduced an AI-based mock interview evaluator that uses facial and speech recognition to provide feedback on emotional cues and confidence levels. Sharma et al. emphasized the effectiveness of voice-based assessments in quantifying attributes such as tone, clarity, and confidence. Furthermore, a survey by IJARCCE (2024) highlighted the scalability and objectivity of NLP and voice-driven interview tools. Several studies also explored the use of ML and deep learning (DL) techniques to analyze candidate behavior patterns and predict performance levels.

Kumar and Patel (2023) investigated the use of convolutional neural networks (CNNs) in evaluating video-based mock interviews, which enabled emotional state recognition and confidence scoring. Another study by Li et al. (2022) integrated ML algorithms with real-time speech emotion recognition (SER) models to assess a candidate's stress levels during interviews. These models were found to improve the fairness and consistency of interview evaluations. Additionally, Bansal et al. (2021) proposed a hybrid DL model combining LSTM and transformer architectures to track hesitation, pitch variation, and lexical richness in spoken responses.

DOI: 10.48175/IJARSCT-28212

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Collectively, these studies validate the potential of AI, ML, and DL in creating accessible, adaptive, and data-driven interview practice platforms. They form the theoretical foundation and practical relevance for the development of this project.

III. METHODOLOGY

The proposed system architecture comprises four main components: user interface, AI- powered interviewer module, real-time evaluation engine, and cloud-based storage. The methodology follows a modular, iterative approach to ensure reliability and scalability:

User Interaction Layer

Built with Next.js and React.js to ensure responsive and accessible UI/UX.
Allows users to register/login, select interview categories (e.g., HR, Technical), and initiate interview sessions.

Voice-Based AI Interviewer

Utilizes the Vapi API to simulate realistic voice-based interactions.
Interviews are conducted with AI-generated voices that ask domain-specific questions and wait for spoken responses.

Speech Analysis and ML Evaluation Engine

Speech input is processed using NLP and emotion detection algorithms to evaluate tone, pace, sentiment, and clarity.
ML models assess fluency, pause duration, vocabulary strength, and stress markers.
Leveraging deep learning architectures like LSTM and attention mechanisms for more nuanced evaluation.

Real-Time Feedback Generation

Generates detailed performance scores and qualitative feedback.
Includes metrics like confidence level, articulation quality, and time taken per question.
Visual dashboards are created using graphs to aid self-analysis.

Cloud Integration and Storage

Firebase handles authentication, real-time database operations, and secure storage of transcripts, scores, and feedback logs.

Iterative Learning and Feedback Loop

The system adapts over time using feedback data to improve the ML models.
Future versions plan to include reinforcement learning for better personalization.
This methodology ensures a highly interactive, feedback-oriented mock interview experience powered by modern AI technologies, with the flexibility to extend and integrate additional modules such as facial expression analysis, resume parsing, and adaptive questioning.

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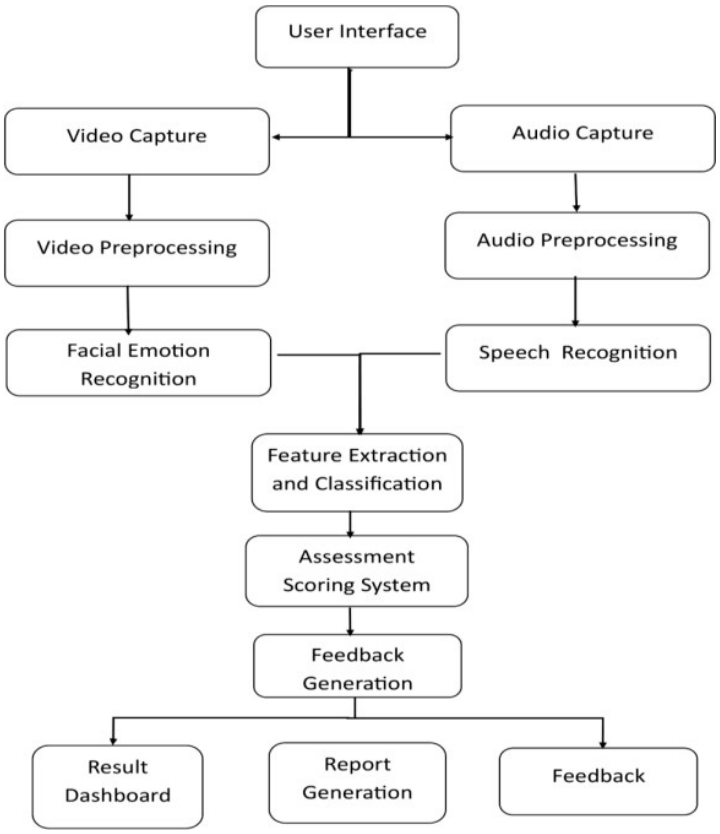

IV. CONCLUSION

This study demonstrates the potential of artificial intelligence in enhancing virtual interview experiences through real-time simulation and automated evaluation. By leveraging voice- based interactions, speech analysis, and natural language understanding, the system provides scalable and unbiased feedback to improve candidate communication and confidence. The findings highlight the importance of AI-driven training platforms in preparing users for real- world interviews and emphasize the need for further refinement and personalization to adapt to diverse user profiles and evolving industry standards.

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