International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 04 | April - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

SKILLSPEAK: AN AI POWERED MOCK INTERVIEW PREPERATION

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ABSTRACT: *This paper presents an AI-powered mock interview preparation system designed to enhance users' interview skills through personalized and interactive practice sessions. The system generates role-specific interview questions by analyzing user-provided resumes and job descriptions, ensuring relevance to the targeted position. Leveraging advanced speech recognition and Natural Language Processing (NLP) techniques, the application evaluates users' responses in real time. It assesses key aspects such as grammar, clarity, fluency, and confidence, providing immediate and actionable feedback. Additionally, the system tracks user performance over time, enabling continuous improvement and helping candidates identify their strengths and ar-eas for development. By simulating real interview scenar-ios and offering data-driven insights, the proposed solution aims to increase user confidence, improve communication skills, and enhance overall interview readiness. This AI-based approach provides an accessible, efficient, and scalable platform for job seekers to prepare effectively for interviews.*

INDEX TERMS: *AI-Based Mock Interviews, Speech Recognition, Natural Language Processing, Machine Learning, Personalized Interview Practice, Performance Feedback, Employability Enhancement.*

1. INTRODUCTION

In the modern competitive job environment, effective interview preparation plays a crucial role in securing employment opportunities. SkillSpeak is an AI-powered web application designed to assist students and job seekers in enhancing their interview skills through a smart and interactive platform.

The system generates role-specific interview questions by analyzing information extracted from the user's CV and job description, thereby providing a personalized mock interview experience aligned with individual career goals. During the interview session, the user's spoken responses are captured using speech recognition technology and con-verted into text for further processing.

SkillSpeak leverages advanced Natural Language Processing (NLP) and Machine Learning (ML) techniques to evaluate candidate responses. The platform analyzes key aspects such as grammar, fluency, and clarity, offering meaningful insights into communication effectiveness. In addition, progress tracking features enable users to monitor their performance over time, helping them identify strengths and areas for improvement.

By integrating interview simulation, automated evaluation, and real-time feedback, SkillSpeak enhances overall interview readiness. The system provides a smart, scalable, and accessible solution that empowers users to improve their confidence and perform effectively in real-world interviews. It begins by analyzing the user's CV and job description to extract relevant information about skills, experience, and target roles, which is then used to generate role-specific interview questions. The platform simulates a real interview environment where users can practice answering questions, with their spoken responses captured through speech recognition technology and converted into text. Using Natural Language Processing (NLP) and Ma-chine Learning (ML), the system analyzes the responses by evaluating grammar, fluency, clarity, and relevance. Based on this analysis, SkillSpeak provides instant feedback and suggestions for improvement, while also assessing the user's confidence and communication effectiveness. Additionally, it tracks user performance over time, allowing individuals to monitor their progress and identify areas for improvement. By offering a personalized and adaptive learning experience along with accessibility through a web-based platform, SkillSpeak serves as a smart, scalable solution to improve interview readiness and boost user confidence.

2. LITERATURE SURVEY

"Prepmania: An AI-powered Mock Interview Platform for Skill Evaluation and Performance Feedback" [1] presents a system that delivers a complete AI-driven mock interview experience with real-time feedback and progress tracking. The platform dynamically generates interview ques-tions based on user inputs such as job role, skills, and expe-rience using advanced APIs. It captures spoken responses, converts them into text, and analyzes body posture and ges-tures using computer vision techniques. The system evalu-ates responses based on clarity, relevance, and confidence, storing all data securely for performance review. While the system offers a comprehensive evaluation, its dependence on real-time video analysis may increase computational com-plexity.

"AI-Based Interview Preparation Platform" [2] focuses on improving interview readiness through personalized and adaptive AI-driven simulations. The system generates role-specific questions and evaluates user responses using Natural Language Processing techniques. It also analyzes tone, emotional expression, and communication skills to provide detailed feedback. Unlike traditional systems, it offers real-time evaluation and personalized guidance; however, it may rely on predefined emotional mappings that may not suit all users equally.

”InterviewEdge: A Smart Interview Assistant” [3] introduces a system that uses advanced NLP models such as BERT and LLAMA to evaluate candidate responses. It converts answers into vector embeddings and compares them with reference data to assess accuracy, completeness, and clarity. The platform provides detailed scores and improvement suggestions through a performance dashboard. Although it ensures objective evaluation, the system depends heavily on the quality of training data and reference materials.

”Enhancing Interview Evaluation: AI-based Emotion and Confidence Analysis in Mock Interviews” [4] focuses on analyzing emotional intelligence and confidence levels using machine learning and deep learning techniques. The system evaluates facial expressions, speech patterns, and tone to de-tect emotions such as confidence and enthusiasm. Models like CNN and RNN are used for accurate prediction. While the approach provides deep insights into non-verbal communication, it requires high-quality input data and may be affected by environmental conditions.

”Artificial Intelligence Powered Mock Interview Genera-tor: Revolutionizing Interview Preparation with Real-Time Feedback” [5] describes a scalable and efficient system that generates interview questions using APIs and evaluates responses in real time. It incorporates speech-to-text conver-sion, sentiment analysis, and structured feedback mecha-nisms. The system demonstrates high user satisfaction and performance stability under concurrent usage. However, it primarily focuses on verbal responses with limited emphasis on non-verbal cues.

”Smart Prep: AI-Based Interactive Interview Preparation System” [6] proposes a multi-agent chatbot-based system that provides domain-specific interview practice. It allows users to interact using text and voice while receiving adaptive and context-aware feedback. The system tracks user progress and adjusts question difficulty based on performance. Although it offers flexibility and personalization, managing multiple agents may increase system complexity. ”AI-Powered Interview Preparation System: Integrating Resume Analysis, HR Simulation, and Technical Skill Assessment” [7] integrates multiple modules such as resume analysis, chatbot-based HR interviews, and technical assessments into a unified platform. It provides holistic evaluation and continuous feedback to improve user skills. The system effectively bridges the gap between academic learning and industry requirements, but integration of multiple modules may require higher computational resources.

”AI-Powered Mock Interview Preparation” [8] addresses limitations of traditional systems by providing dynamic question generation, real-time feedback, and secure authentication mechanisms. It uses modern frameworks and APIs to ensure scalability and accuracy. The system enhances user experience with fast response times and reliable performance, though it may require continuous updates to maintain accuracy.

”AI-Based Mock Interview Simulation System for Job Preparation” [9] presents a system that evaluates not only technical knowledge but also communication skills, confidence, and emotional expression. It uses video recording, speech-to-text conversion, and sentiment analysis to provide detailed feedback. The system offers a realistic interview environment, but requires good hardware support for optimal performance.

”Mock Interview Evaluator Powered by AI” [10] introduces a layered architecture system that evaluates candi-dates based on communication, confidence, and emotional state. It provides structured feedback reports and perfor-mance metrics through an intuitive interface. The sys-tem improves objectivity and reduces dependency on hu-man evaluators, though its effectiveness depends on accu-rate emotion detection models.

In conclusion,these studies highlight the growing importance of AI in interview preparation systems. Most approaches focus on role-specific question generation, speech and text analysis, and performance evaluation using NLP and ML techniques. Some systems also incorporate emotion detection and non-verbal behavior analysis to enhance accuracy. However, challenges such as computational complexity, dependency on data quality, and limited multimodal integration still exist. These limitations motivate the development of more comprehensive and efficient systems like SkillSpeak.

3. METHODOLOGY

SkillSpeak is an intelligent AI-powered mock interview system utilizing resume analysis, speech recognition, and Natural Language Processing along with Machine Learning techniques.

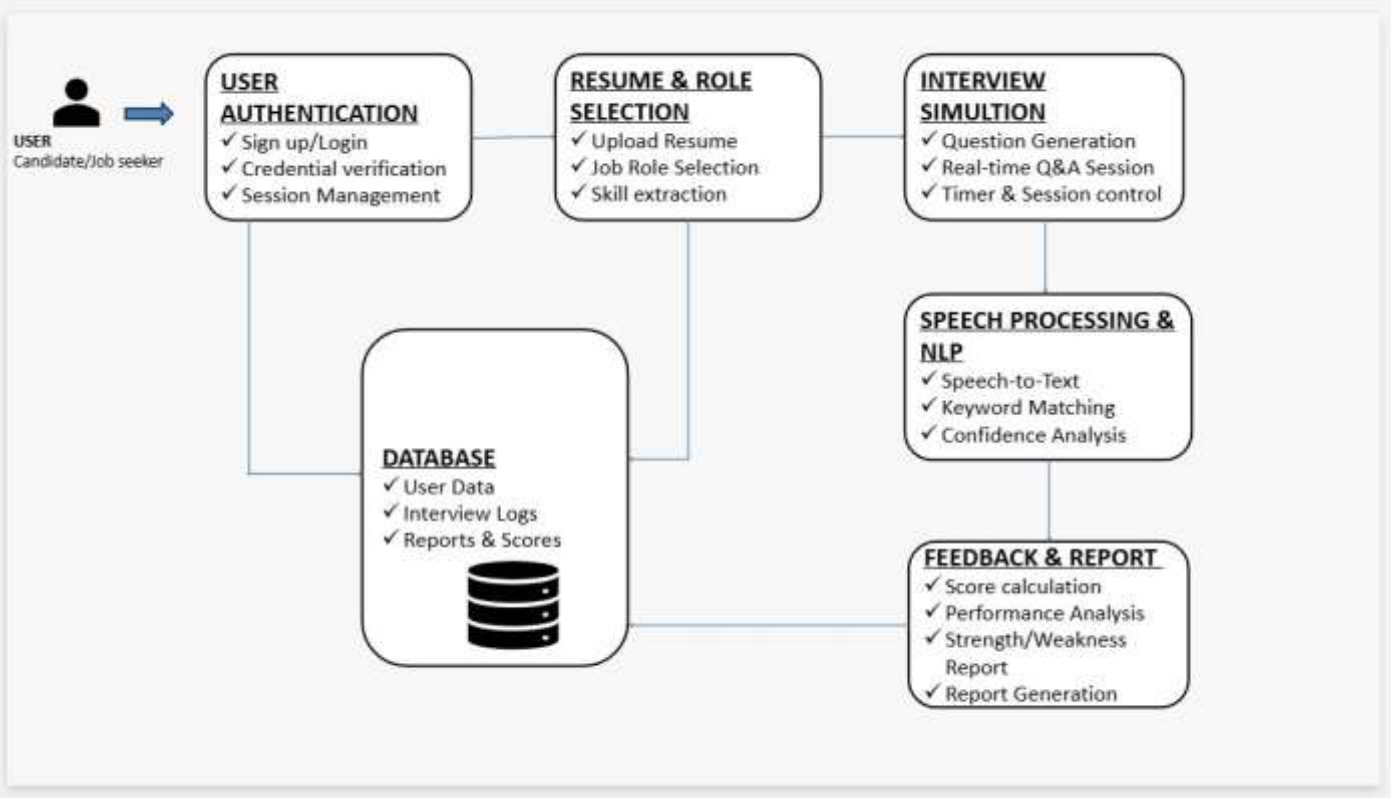

Figure 1: System Architecture

The system uses Artificial Intelligence techniques such as Natural Language Processing (NLP), Machine Learning (ML), and Speech Recognition to deliver a personalized and interactive mock interview experience. The methodology ensures a smooth and structured workflow as follows:

1. User Authentication and Access: The workflow of the SkillSpeak system begins with user authentication. A candidate or job seeker registers through the sign-up module or logs into an existing account. During this stage, credential verification is performed to ensure secure access. Once authenticated successfully, the user is identified as a valid user and granted access to the system dashboard, where they can initiate mock interview sessions.

2. Resume and Role Selection: After logging in, the user proceeds to upload their resume and select a desired job role. The system processes the uploaded resume using AI techniques to extract relevant skills, qualifications, and experience. Based on this information, the system prepares a personalized interview setup tailored to the selected role and the candidate's profile.

3. Interview Simulation Workflow: Once the setup is complete, the system initiates the interview simulation module. It dynamically generates role-specific questions and presents them to the user in a real-time question-and-answer session. The module also includes timer and session control features to replicate a realistic interview environment, helping users practice under timed conditions.

4. Speech Processing and NLP Analysis: During the interview, the user's spoken responses are captured through a microphone and processed using speech recognition technology. The audio input is converted into text using a speech-to-text mechanism. The converted text is then analyzed using NLP and ML techniques to evaluate various parame-ters such as keyword relevance, grammar, clarity, and confi-dence level. This module plays a key role in understanding the quality of the candidate's responses.

5. Database Management: All user-related data, including profile information, interview responses, session logs, and performance scores, are stored in a centralized database. This ensures efficient data management, easy retrieval, and continuity of user progress across multiple sessions.

6. Feedback and Report Generation: After the analysis phase, the system generates detailed feedback through the feedback and report module. It calculates scores based on performance metrics and provides insights into strengths and weaknesses. The system also generates structured re-ports that help users understand their progress and areas that require improvement.

Overall, the SkillSpeak system integrates authentication, personalized interview generation, speech analysis, and automated feedback into a unified workflow. This ensures a seamless, scalable, and effective platform for improving interview skills, boosting confidence, and enhancing employability.

4. RESULTS AND DISCUSSION

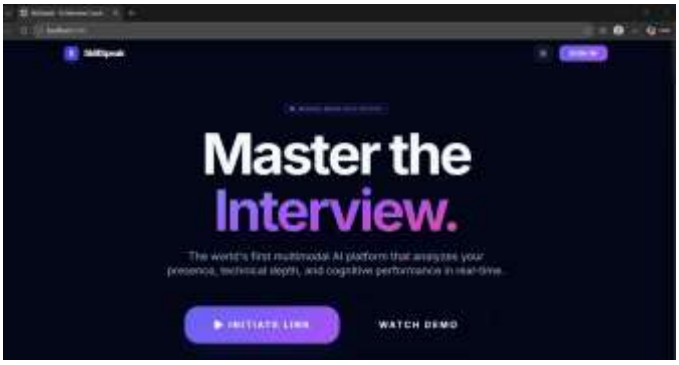

Figure 2: home page

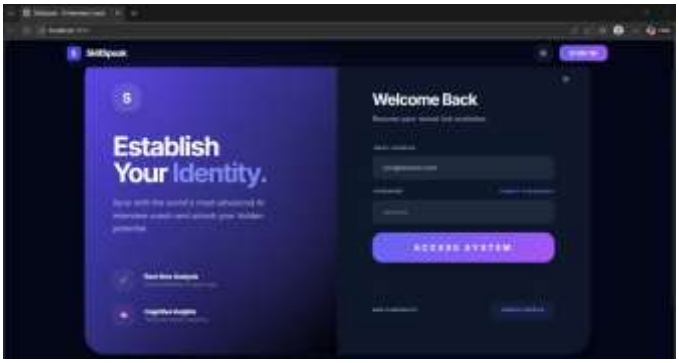

Figure 3: Signup page

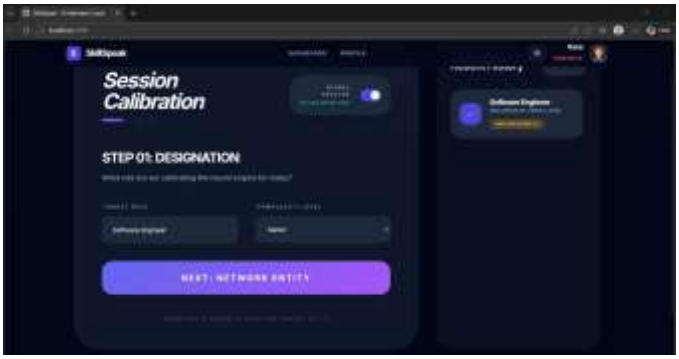

Figure 4: designation Page

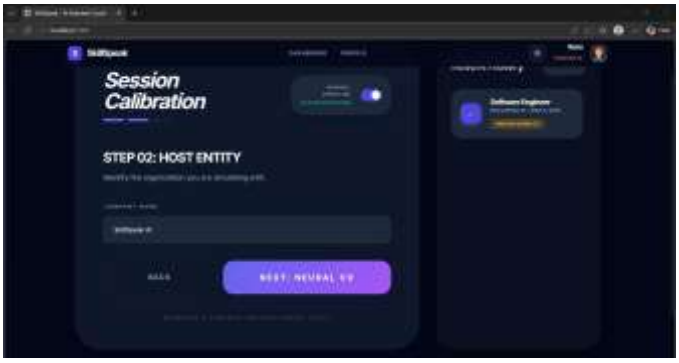

Figure 5: host identification Page

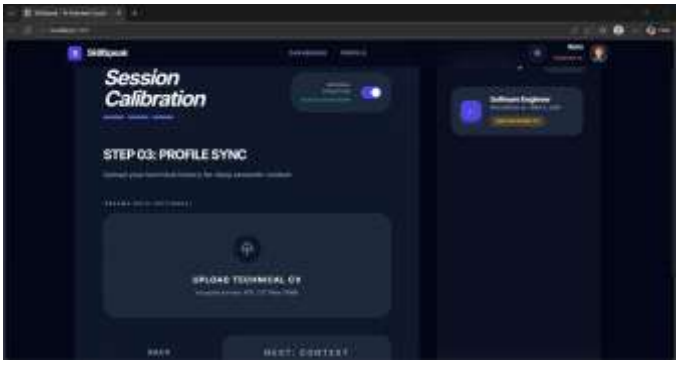

Figure 6: cv uploading Page

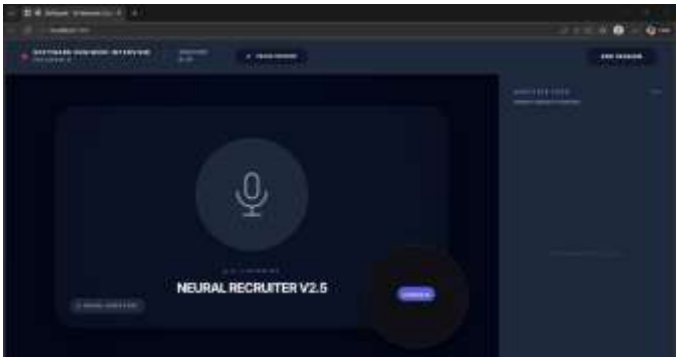

Figure 7: interview session Page

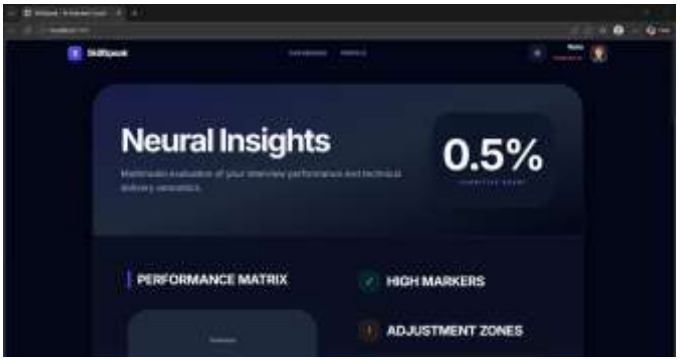

Figure 8: performance analysis Page

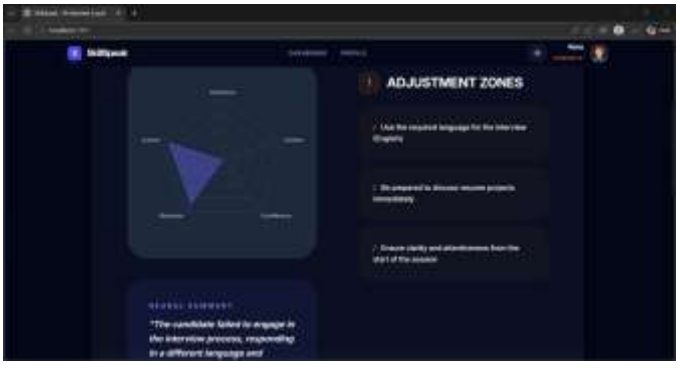

Figure 9: feedback Page

SkillSpeak usage has been effective in providing an interactive and intelligent mock interview preparation plat-form through AI-based question generation, speech recog-nition, and NLP-based evaluation. The system success-fully analyzes user responses and provides real-time feed-back, thereby enhancing interview readiness and commu-nication skills. Additionally, progress tracking and perfor-mance analysis features contribute to continuous improve-ment and user confidence.

The Welcome Screen serves as the initial interface of the SkillSpeak web application, shown in Figure 2. It presents a clean and modern design with options to get started, offering users an engaging entry point into the platform.

Figure 3 shows the sign-up screen for users, where they can create a new account. The interface follows a structured layout with clearly labeled input fields for user credentials, ensuring ease of use and accessibility. The presence of a prominent sign-up button encourages quick registration.

Figure 4 displays the designation selection page, where users choose their job role. This step is crucial for personalizing the interview experience, as the system uses this informa-tion to generate role-specific questions tailored to the user's career goals.

Figure 5 illustrates the host identification page, which is used to verify the user before initiating the interview ses-sion. This step ensures proper session setup and enhances system reliability by confirming user identity.

Figure 6 shows the CV uploading page, where users can upload their resumes. The system extracts relevant skills and experience from the uploaded document, enabling accurate and personalized interview question generation. The interface is designed to be simple and user-friendly, ensuring a smooth upload process.

Figure 7 represents the interview session page, which simulates a real-time interview environment. The interface includes microphone input for capturing user responses, along with session controls that enhance realism. This module allows users to practice answering questions in a structured and timed setting.

Figure 8 displays the performance analysis page. It pro-vides insights into the user's performance using AI-based evaluation metrics such as confidence score, clarity, and re-sponse quality. The visual representation of results helps users easily understand their performance.

Figure 9 shows the feedback page, where detailed feedback is provided based on the analysis. The system highlights strengths and weaknesses and suggests areas for improvement. The structured layout ensures that users can clearly interpret the feedback and take necessary steps to enhance their interview skills.

5. .CONCLUSION

In conclusion, SkillSpeak, an AI-powered mock interview preparation system, introduces an effective and innova-tive approach to improving interview readiness for stu-dents and job seekers. The application analyzes user re-sponses through speech recognition and Natural Language Processing techniques while generating role-specific ques-tions based on resumes and job descriptions. By providing real-time feedback on grammar, clarity, and confidence, the system ensures a personalized and interactive learning ex-perience. This intelligent evaluation mechanism enhances user engagement and supports the growing demand for AI-driven career preparation tools.Future enhancements can focus on improving the accuracy of response analysis by incorporating advanced deep learning models and expanding evaluation to include non-verbal cues such as facial expressions and body language. Additionally, integrating adaptive feedback mechanisms based on user performance over time can further personalize the learning experience. Enhancing compatibility across multiple platforms and incorporating more sophisticated machine learning models to predict performance trends can improve system efficiency and scalability. By refining feedback quality, expanding features, and improving adaptability, SkillSpeak can evolve into a more comprehensive and intelligent solution for interview preparation, ultimately boosting user confidence and employability.

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