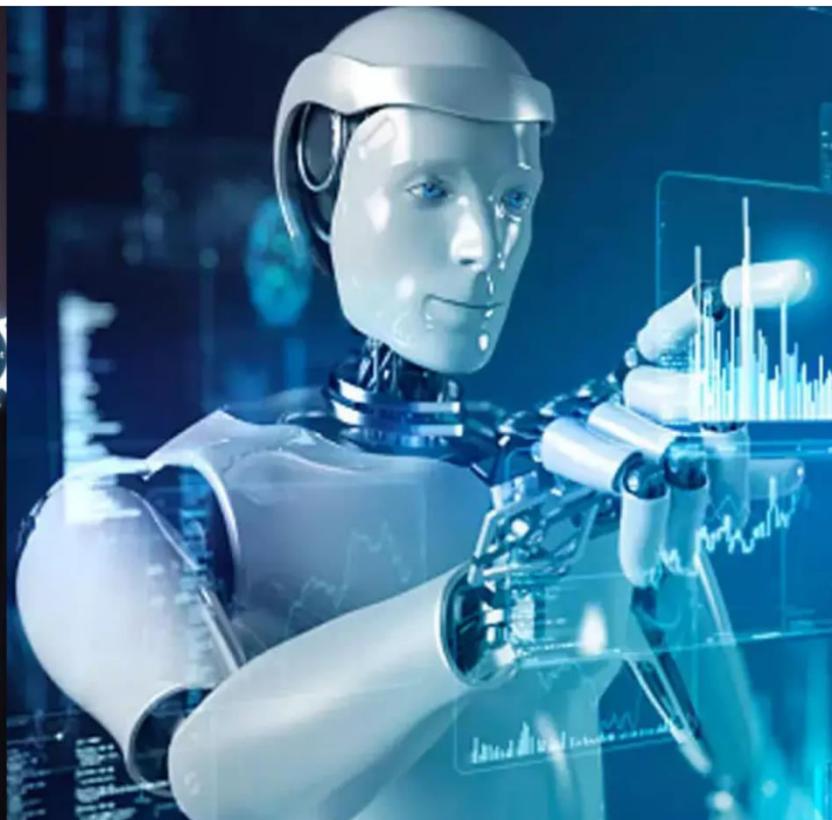




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# AI-Powered Smart Interview Preparation and Evaluation System

**Dr. D. Praveena<sup>1</sup>, Ramya A<sup>2</sup>, Rashmi S<sup>3</sup>, Sowmya V<sup>4</sup>**

Associate Professor, Department of Information Technology, R.M.D Engineering College, Chennai, TamilNadu, India<sup>1</sup>

U.G. Student, Department of Information Technology, R.M.D Engineering College, Chennai, TamilNadu, India<sup>2,3,4</sup>

**ABSTRACT:** An AI-driven interview preparation platform is introduced to enhance candidates' technical competence and communication confidence through a structured, interactive learning process. The platform follows a step-by-step approach, beginning with automated skill extraction from the candidate's uploaded resume to identify relevant technical competencies. Based on the extracted skills, candidates are evaluated through aptitude assessments, coding challenges, and live interview simulations. To closely replicate real interview scenarios, the system integrates real-time response analysis and emotion recognition during live interviews. Facial expression analysis is used to detect emotional states such as confidence, stress, nervousness, and hesitation, enabling candidates to gain awareness of their non-verbal communication. Personalized feedback is generated by combining technical performance metrics with emotional behavior analysis, helping candidates improve both knowledge and self-confidence. Administrators are provided with tools to manage skill-based question banks, monitor candidate progress, analyze emotional patterns, and review assessment results. By combining automated assessments, live interaction, emotion detection, and detailed feedback mechanisms, this platform serves as a comprehensive and adaptive solution for effective interview preparation and professional skill development.

**KEYWORDS:** Artificial Intelligence, NLP, Facial Emotion Recognition, CNN, Resume Skill Extraction, Interview Simulation, Performance Analytics.

## I. INTRODUCTION

In today's competitive job market, effective interview preparation is essential for candidates to demonstrate both technical knowledge and communication skills. However, traditional interview preparation methods often lack realistic practice environments and personalised feedback. Many candidates struggle with confidence, communication, and understanding their behavioural performance during interviews. As technology advances, Artificial Intelligence (AI) has emerged as a powerful tool to enhance learning and evaluation by providing automated assessments and intelligent feedback. The proposed AI-Powered Smart Interview Preparation and Evaluation System aims to address these challenges by integrating technologies such as Natural Language Processing (NLP), machine learning, and facial emotion recognition. The system analyses resumes to extract skills, generates aptitude and coding assessments, and simulates live interview environments. During interview sessions, facial expressions are analysed to detect emotions such as confidence, stress, and hesitation, enabling candidates to understand their behavioural performance. By combining technical evaluation with emotional analysis, the system provides personalised feedback that helps candidates improve their interview readiness and overall professional skills.

## II. LITERATURE SURVEY

Recent advancements in Artificial Intelligence have enabled the development of automated interview assessment systems that analyze both technical performance and behavioral patterns. Nagasawa et al. (2024) proposed an adaptive interview strategy for interview robots that uses social signal recognition to identify a candidate's speaking willingness. Their system analyzes non-verbal cues and adjusts interview questions accordingly, enabling more natural and interactive interview experiences. This research highlights the importance of analyzing behavioral signals during interview processes.

Similarly, Kim et al. (2023) introduced a fairness-aware multimodal learning approach for automated video interview assessment systems. Their work focuses on reducing bias in AI-based evaluation by combining multiple data sources

such as video, speech, and text responses. The study emphasizes the need for reliable and unbiased AI models when evaluating candidate performance. These research works demonstrate the growing importance of integrating artificial intelligence, emotion recognition, and automated evaluation techniques to improve the effectiveness and fairness of modern interview preparation and assessment systems.

### III. METHODOLOGY

The proposed system follows a structured methodology to provide an intelligent and automated interview preparation platform. The process begins with resume upload and skill extraction, where candidates upload their resumes through the web interface. Natural Language Processing (NLP) techniques are used to analyze the resume content and extract relevant technical skills and keywords. Based on the identified skills, the system generates personalized aptitude tests and coding challenges to evaluate the candidate's technical knowledge and problem-solving abilities.

After completing the assessments, candidates participate in a live interview simulation that mimics real interview conditions. During the interview session, the system records candidate responses and analyzes facial expressions using a Convolutional Neural Network (CNN)-based emotion recognition model. The model detects emotions such as confidence, stress, and hesitation to evaluate behavioural performance. Finally, the system integrates technical scores with emotional analysis to generate comprehensive performance reports and personalized feedback, helping candidates improve both technical proficiency and interview confidence.

### IV. EXPERIMENTAL RESULTS

Figures illustrate the functional outcomes of the AI-Powered Smart Interview Preparation and Evaluation System, including resume skill extraction, aptitude and coding assessment, live interview simulation, emotion detection, and performance analytics. Fig. 1 (a) shows the User Login and Registration Interface (b) presents the Resume Upload Module (c) illustrates the Skill Extraction Interface, where the system uses Natural Language Processing (NLP) techniques to identify technical skills, qualifications, and keywords from the uploaded resume. (d) displays the Aptitude Assessment Interface, where candidates answer multiple-choice questions generated according to the extracted skill set. (e) shows the Coding Assessment Panel (f) represents the Candidate Dashboard, where users can view assessments, track progress, access interview sessions, and monitor performance reports.

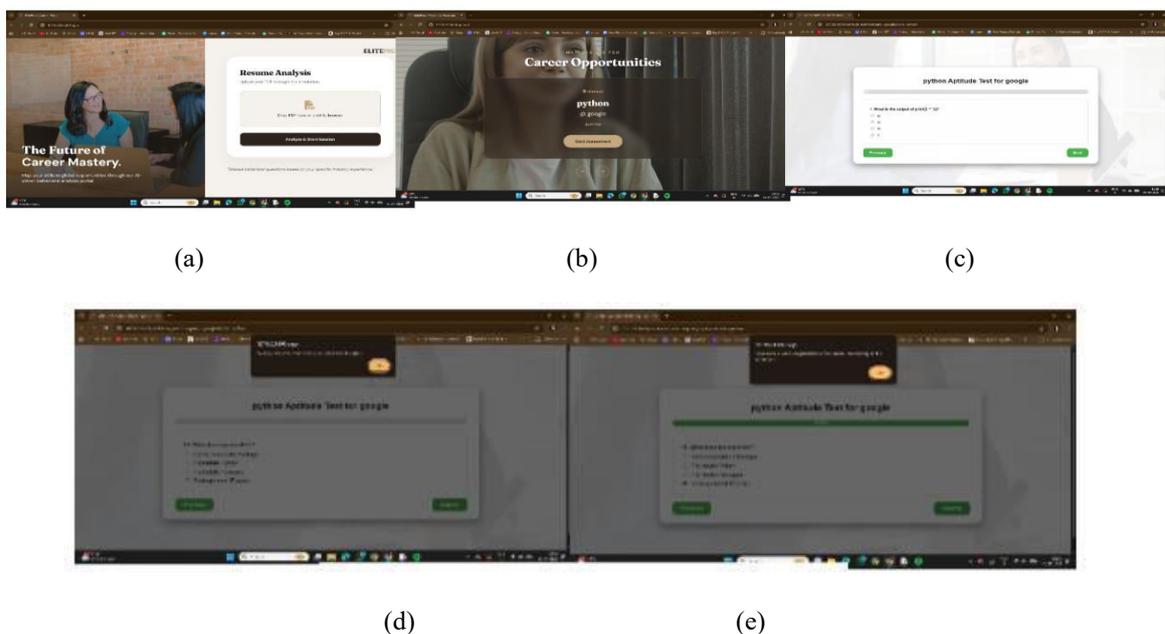


Fig. 2 illustrates the System Architecture of the AI-Powered Interview Preparation Platform. The system follows a layered architecture in which users access the platform through a web-based frontend interface developed using HTML

and CSS. User requests are processed by the backend server implemented using Python and Flask. The backend handles resume processing, skill extraction using NLP, aptitude and coding evaluation, and interview session management. The emotion recognition module uses a Convolutional Neural Network (CNN) combined with the InceptionV3 model to detect facial expressions during live interviews. The processed results are stored in a centralized database and analyzed through the performance analytics module to generate detailed feedback and recommendations.

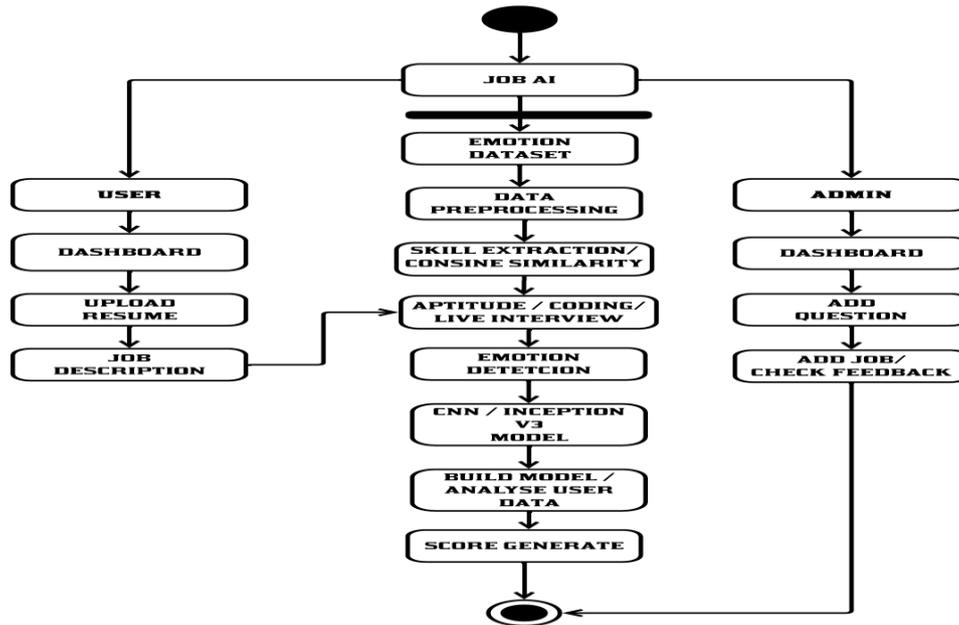
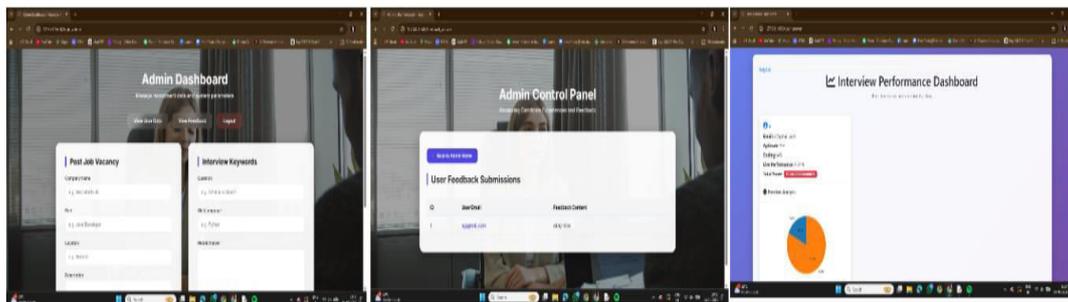


Fig. 3 demonstrates the Live Interview Simulation and Emotion Detection Module.

(a) shows the Live Interview Interface, where the system presents technical and behavioral questions to the candidate while recording responses. (b) illustrates the Facial Emotion Detection Panel, where the camera captures facial expressions during the interview session. The deep learning model analyzes emotions such as confidence, stress, nervousness, hesitation, and neutrality. (c) presents the Response Analysis Module, where candidate answers are evaluated using Natural Language Processing techniques to assess relevance and accuracy. (d) shows the Performance Analytics Dashboard, which combines technical scores and emotional behavior analysis to generate overall interview performance metrics. (e) illustrates the Feedback and Recommendation Interface, where the system provides personalized improvement suggestions and learning resources to help candidates enhance their interview skills.



(a)

(b)

(c)

**V. CONCLUSION**

The proposed **AI-Powered Smart Interview Preparation and Evaluation System** provides an effective solution to improve interview readiness by combining technical assessment with behavioral analysis. The system uses Natural Language Processing (NLP) to extract skills from candidate resumes and generate personalized aptitude and coding assessments. In addition, the live interview simulation module creates a realistic interview environment that helps candidates practice answering questions and improve their communication skills.

Furthermore, the integration of facial emotion recognition using deep learning techniques allows the system to analyze non-verbal cues such as confidence, stress, and hesitation during interview sessions. By combining technical performance with emotional analysis, the system generates detailed feedback that helps candidates identify their strengths and areas for improvement. Overall, the proposed system enhances interview preparation by providing an intelligent, interactive, and comprehensive platform that supports candidates in developing both technical competence and professional confidence.

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