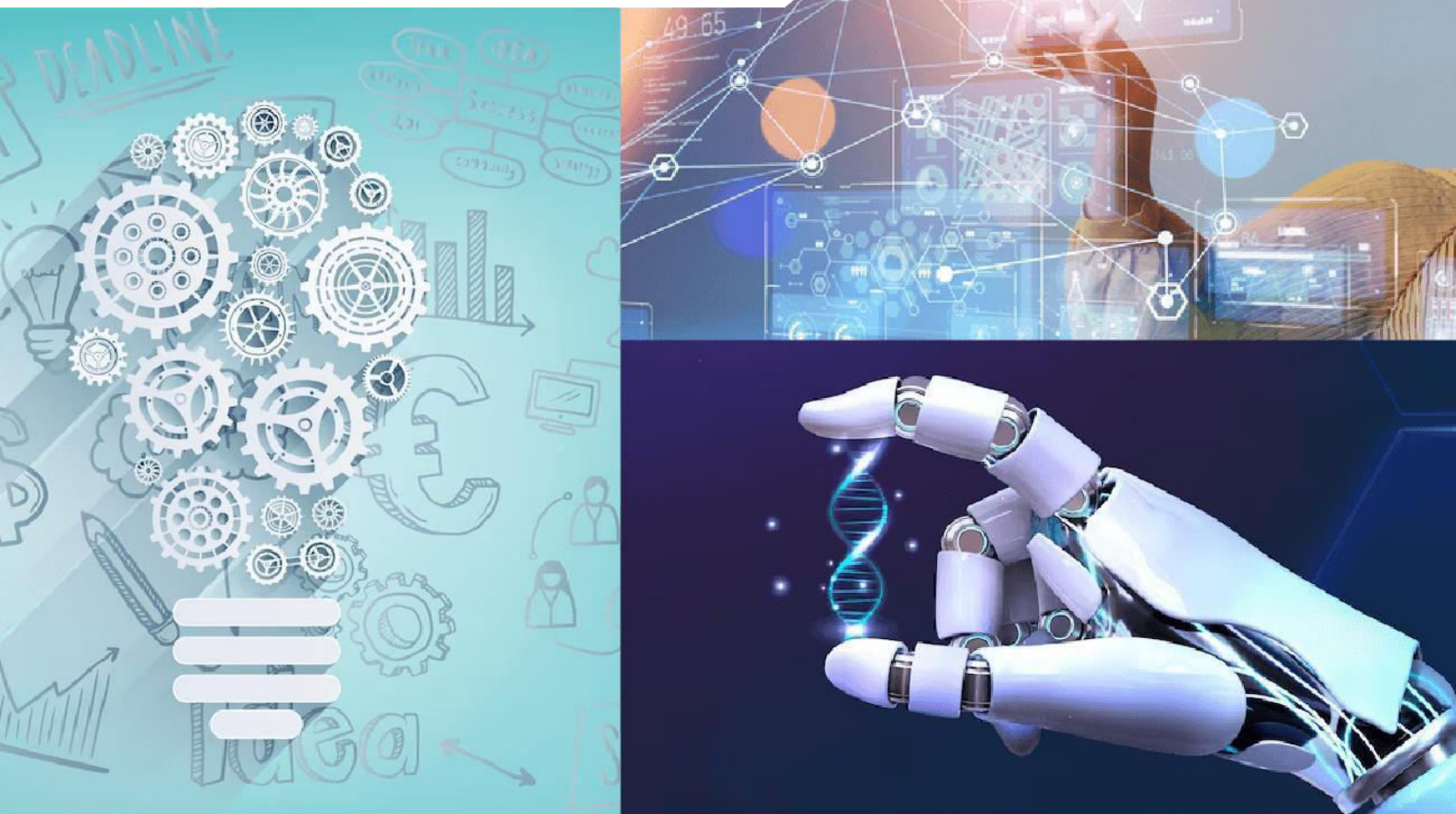




International Journal of Advanced Research in Education and TechnologY (IJARETY)

Volume 12, Issue 3, May-June 2025

Impact Factor: 8.152



AI Powered Mock Interview Coach Utilizing CNN and NLP

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ABSTRACT: AI-powered mock interview systems leverage machine learning (ML), natural language processing (NLP), and deep learning to provide objective and scalable candidate assessments. By integrating real-time video and audio analysis, emotion recognition, and convolutional neural networks (CNN), these systems dynamically adapt questions, analyze speech-to-text transcriptions, and monitor facial expressions. Real-time feedback on pacing, clarity, and confidence enhances communication skills, while post-interview evaluations offer insights on fluency, confidence, and technical accuracy. Video playback with annotated feedback and personalized learning resources further refines interview performance, ensuring a data-driven, unbiased evaluation.

KEYWORDS: Machine learning, Natural language processing, Convolutional neural networks.

I.INTRODUCTION

In today's highly competitive job market, securing employment in the tech industry requires more than just academic qualifications—it demands strong technical knowledge, effective communication, and the ability to perform well under pressure during interviews. Traditional interview preparation methods, such as studying question banks or attending coaching sessions, often lack personalization, real-time feedback, and the ability to assess soft skills like confidence, clarity, and emotional intelligence. To bridge this gap, the AI-Powered Mock Interview Coach offers an innovative and intelligent solution that simulates real interview scenarios using advanced technologies such as Machine Learning (ML), Natural Language Processing (NLP), Deep Learning, and Computer Vision. This platform is designed to help candidates improve their performance by analyzing both verbal and non-verbal communication cues in real time. It focuses on four major areas of interview preparation: Object-Oriented Programming (OOP), Data Structures, Database Management, and Theoretical Concepts.

The system leverages tools like OpenAI's ChatGPT for dynamic question-and-answer interactions, Google's Speech-to-Text API for accurate voice transcription, and Convolutional Neural Networks (CNNs) for facial and emotional analysis. These technologies work together to create a highly interactive and adaptive interview experience. Unlike static preparation methods, the AI-powered system responds to user behavior and performance, tailoring questions and feedback accordingly. It captures voice tone, speaking pace, facial expressions, and body language to assess a user's confidence and communication skills. Moreover, it provides instant feedback, allowing users to identify their strengths and areas for improvement. With a user-friendly interface and a seamless integration of AI technologies, the platform not only enhances technical readiness but also builds soft skills critical for interview success. The AI-Powered Mock Interview Coach transforms the way candidates prepare, making the process more effective, engaging, and aligned with industry expectations.

II.SYSTEM MODEL AND ASSUMPTIONS

The AI-powered mock interview coach is designed as a modular and intelligent system that integrates several advanced technologies to deliver a realistic and effective interview simulation. At its core, the platform features an interactive user interface (UI) through which candidates participate in mock interviews. This UI captures user inputs such as video, audio, and verbal responses, and displays real-time feedback. The system utilizes AI services that include speech-to-text conversion for processing verbal answers and video analysis tools powered by computer vision to evaluate facial expressions, body language, and eye contact. Additionally, it employs deep learning and natural language processing (NLP) to assess emotions, communication skills, and personality traits.

The question generation module consists of both predefined questions and a dynamic generator that adapts questions based on user responses and difficulty levels. Performance analysis is conducted using multimodal data — including

speech characteristics (such as rate, volume, and pitch), visual cues (like head pose and facial expression), and textual content analysis. The feedback system provides real-time insights and generates a detailed post-interview report highlighting areas such as fluency, confidence, technical accuracy, and behavioral traits.

Underlying the system are several key assumptions. Technically, it is assumed that users have access to devices with functioning cameras and microphones and possess a stable internet connection capable of supporting real-time processing. The system is built to be compatible across Windows, Linux, and macOS platforms. From a user behavior standpoint, it is presumed that users will participate in interviews in a quiet environment and will exhibit natural behaviors suitable for accurate analysis. Modeling assumptions include the belief that non-verbal and audio cues reliably indicate confidence and communication ability, and that personality traits can be inferred through speech and facial analysis. Finally, it is assumed that user data will be securely stored, with appropriate encryption and privacy controls in place to ensure compliance with data protection regulations.

III.EFFICIENT COMMUNICATION

Efficient communication is a critical component of the AI-Powered Mock Interview Coach, as it directly influences the accuracy of assessments and the quality of user experience. The system promotes effective communication by analyzing both verbal and non-verbal cues during mock interviews. Verbal communication is evaluated through speech-to-text transcription, which assesses clarity, fluency, tone, and speaking pace. Filler words, hesitations, and speech disfluencies are identified to help users improve articulation and coherence. Non-verbal communication is assessed through video analysis, focusing on facial expressions, eye contact, head movements, and posture. These cues help determine the user's confidence, engagement, and emotional state. The platform provides real-time feedback on these aspects, guiding users to maintain a confident tone, appropriate facial expressions, and professional body language. By combining AI-driven analysis of speech and visual behavior, the system ensures a comprehensive understanding of communication effectiveness. It empowers users to refine their presentation and interpersonal skills, leading to more impactful and professional interview responses.

IV.SECURITY

Security is a fundamental aspect of the AI-Powered Mock Interview Coach, ensuring that all user data and interactions are protected throughout the interview process. The platform implements robust security measures to maintain the confidentiality, integrity, and privacy of sensitive user information. Data such as video recordings, audio inputs, performance metrics, and personal details are encrypted both in transit and at rest using industry-standard encryption protocols. Access to user data is strictly controlled through authentication and authorization mechanisms, allowing only authorized personnel or systems to handle the information. The system complies with relevant data protection regulations, such as GDPR, to ensure ethical data usage and user privacy rights. Additionally, anonymization techniques may be used to further protect identities in data analysis and model training. Regular security audits and updates are conducted to identify and mitigate vulnerabilities, ensuring that the platform remains secure against emerging threats. By prioritizing data security, the system builds user trust and provides a safe environment for effective interview preparation.

V. RESULT AND DISCUSSION



Fig5.1 Home Page



Fig5.2 Feature Session



Fig5.3 Registration Page

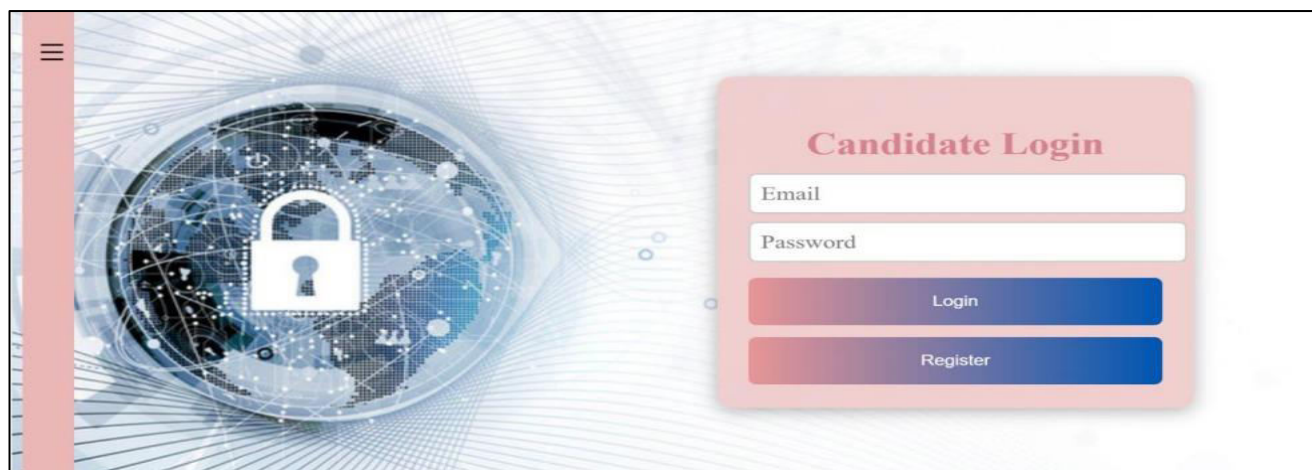


Fig5.4 Candidate Login Page



Fig 5.5 Questions for Orientation Sessions

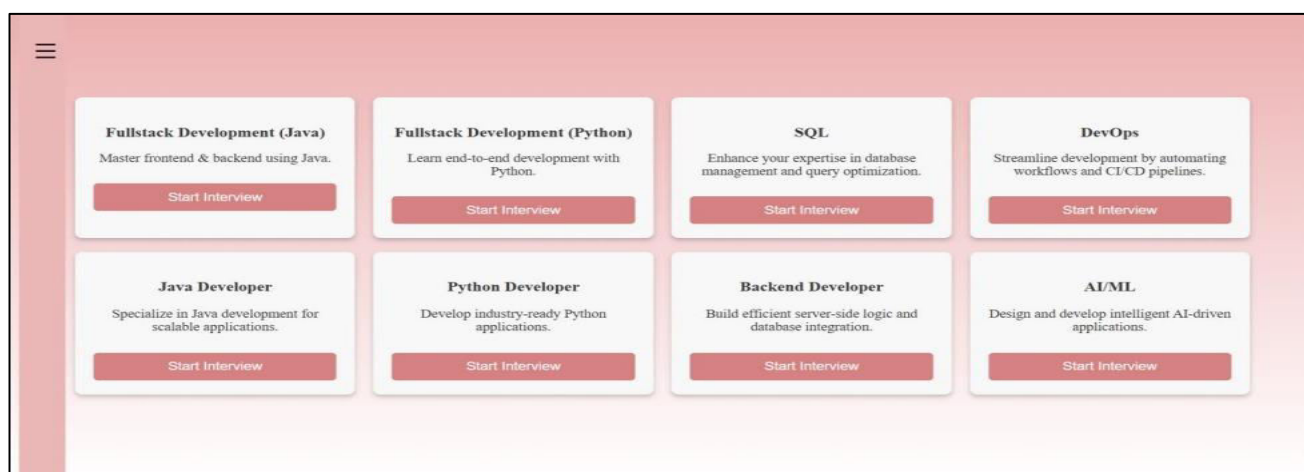


Fig5.6 Domain for Interview

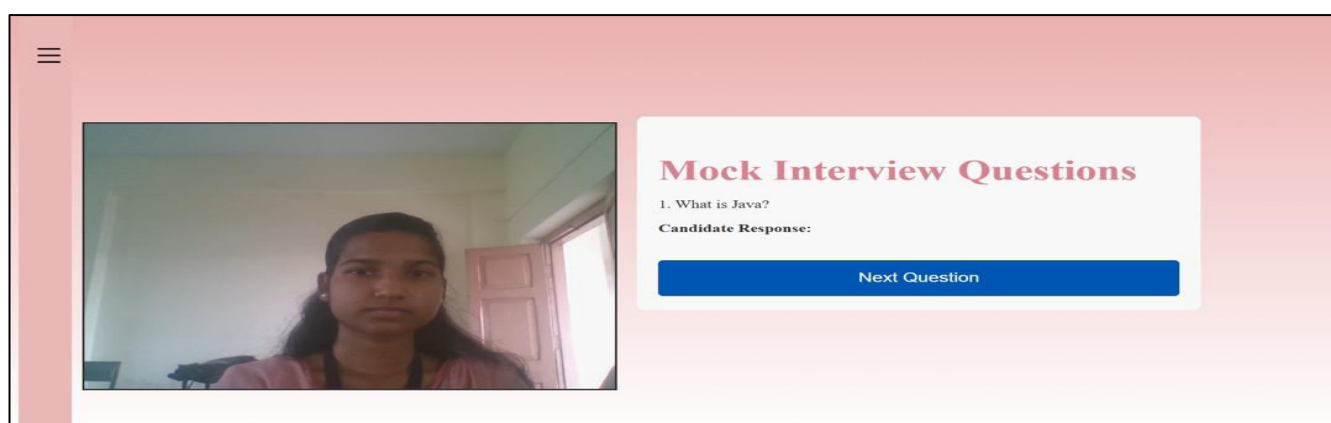


Fig5.7 Mock interview session

VI. CONCLUSION

The AI-Powered Mock Interview Coach represents a significant advancement in modern interview preparation by combining artificial intelligence, machine learning, and natural language processing to deliver an interactive, personalized, and data-driven experience. Through real-time video, audio, and text analysis, the platform offers detailed insights into both verbal and non-verbal communication, helping users improve their confidence, clarity, and overall

interview performance. Its adaptive question generation, comprehensive feedback system, and secure data handling make it a reliable and effective tool for candidates preparing for technical, behavioral, and HR interviews. By continuously learning from user interactions and refining its assessment models, the system ensures ongoing improvement and relevance, ultimately empowering users with the skills needed to succeed in competitive job markets.

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International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975

Impact Factor: 8.152