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AI BASED MOCK INTERVIEW EVALUATOR

[1]B. Anitha, [2]G. Bhavani, [3]B. Divya, [4]M. Jyoshna

[1]Assistant Professor, Department of Information Technology, Bhoj Reddy Engineering College for Women, Vinay Nagar, Hyderabad
[2,3,4] Student, Department of Information Technology, Bhoj Reddy Engineering College for Women, Vinay Nagar, Hyderabad

ABSTRACT

The "AI-Based Mock Interview" project aims to transform the traditional interview process by utilizing artificial intelligence to automate and enhance candidate evaluations. This AI-powered system assesses candidates across multiple dimensions, such as verbal responses, body language, eye contact, and emotional expressions. By incorporating cutting-edge technologies like machine learning, natural language processing, and facial recognition, it offers a more efficient and objective approach to candidate assessment. The project seeks to overcome the inherent biases and subjectivity often present in traditional interviews by adopting a data-driven, impartial evaluation process.

The methodology centers around real-time video and audio analysis, leveraging emotion recognition and sentiment analysis through convolutional neural networks (CNN) and long short-term memory (LSTM) models. The system ultimately provides a comprehensive score that reflects both the emotional and intellectual aspects of a candidate's performance. Designed to streamline recruitment, this AI-driven system aims to optimize resource usage, reduce time, and enhance hiring precision.

I. INTRODUCTION

Artificial Intelligence (AI) has transformed numerous fields, including healthcare, finance, and education. In recruitment, AI introduces innovative ways to assess candidates, enhancing the traditional hiring process. While traditional interviews have their merits, they often lack fairness and efficiency, prompting a shift towards skills-based assessments aimed at improving accuracy and impartiality in candidate evaluations. By utilizing advanced technologies like facial recognition and machine learning algorithms, these AI systems evaluate candidates' skills, personalities, and emotional responses. They analyze key aspects such as speech patterns, facial expressions, and body language to deliver a more thorough assessment of a candidate's fit for a job. This approach not only reduces the time and resources needed for recruitment but also minimizes human bias, ensuring a more holistic evaluation. Additionally, AI-powered systems streamline the hiring process by simultaneously managing multiple candidates.

The goal of this concept is to leverage AI in identifying suitable candidates by analyzing facial and vocal cues. This strategy addresses the limitations of current interview practices by offering a more intelligent and efficient way to evaluate candidates. For instance, research by Su Yusheng et al. (2021) introduced a real-time AI agent that combines support vector machines (SVM) and convolutional neural networks (CNN) to predict job applicants' behavioral potential through facial analysis. Similarly, Hung-Yue Suen and colleagues (2020) proposed an asynchronous video interview system with intelligent decision-making capabilities to predict communication and behavior from video recordings. Despite these advancements, current systems still face challenges,

including time consumption, the need for manual data input, and difficulties in measuring behavior across different individuals.

To overcome these issues, the plan is to develop a smart conversational system that integrates facial and voice analysis to better understand and evaluate candidates' personalities. The integration of advanced data communication, deep learning models, and data processing techniques will further enhance the accuracy and efficiency of candidate evaluations. The overarching aim is to revolutionize the interview process by using AI to create a more reliable, unbiased, and effective system.

II. REVIEW OF LITERATURE

1) Paper 1: AI-Based Mock Interview Evaluator: An Emotion and Confidence

Classifier Model Publication Year: 2023

Authors: Rubi Mandal, Pranav Lohar, Dhiraj Patil, Apurva Patil, Suvarna Wagh

The paper "AI-Based Mock Interview Evaluator" reviews various studies on virtual interview systems, emphasizing emotion recognition, sentiment analysis, and confidence evaluation. It highlights the use of machine learning models to analyze non-verbal cues such as facial expressions, eye movements, and head posture. Additionally, EEG-based techniques for tracking emotions are explored. The study also delves into speech recognition and natural language processing, utilizing databases like Ryerson and Sentiment Speech to classify emotions in speech. Personality traits and behavioral characteristics are assessed using human-computer interaction (HCI) systems, enabling candidates to improve their interview performance in realistic scenarios. This research supports the development of an AI system that evaluates both emotional and confidence aspects, delivering a comprehensive mock interview experience.

2) Paper 2: AI-Based Interview Critique

System Publication Year: 2024

Authors: Nirgide Shubhangi Vishal, Sayyed Arsh Aktharali, Patil Paresh Narendra, Raktate Shriraj Vikas, Pathan Md Fazal Mushtaque

The paper "AI-Based Interview Critique System" examines advancements in AI-driven mock interview platforms, focusing on speech emotion recognition, behavioral analysis, and real-time evaluation techniques. Studies discussed include the integration of deep learning models such as EmoConfidNet for speech emotion recognition, enhancing confidence estimation through data preprocessing. The research also emphasizes the importance of mock interview systems in improving candidate performance by assessing non-verbal cues, including facial expressions and posture. Collectively, these studies contribute to the development of a comprehensive AI system that offers personalized feedback, helping candidates refine both technical and behavioral skills.

3) Paper 3: Smart Interviews

Using AI Publication Year: 2022

Authors: Aditi S. More, Samiksha S. Mobarkar, Siddhita S. Salunke, Reshma R. Chaudhari

The paper titled "Smart Interviews Using AI" proposes an AI-based system that evaluates candidates' personality traits through video and speech emotion recognition. The system aims to address the inefficiencies of traditional interview methods by offering an objective, efficient, and unbiased solution. By analyzing facial expressions and speech emotion, the system gauges candidates' emotional states and behavioral traits during interviews. This AI-based approach enhances the recruitment process by saving time and improving accuracy, particularly in online

interviews. The paper reviews various AI models, including Convolutional Neural Networks (CNN) and TensorFlow-based systems, for real-time emotion and personality analysis. Future improvements are suggested, such as incorporating additional parameters to further refine the system's accuracy and effectiveness for AI-driven interviews.

4) Paper 4: AI-Based Behavioral Analyser for

Interviews/Viva Publication Year: 2021

Authors: Dulmini Yashodha Dissanayake, Venuri Amalya, Raveen Dissanayaka, Lahiru Lakshan, Pradeepa Samarasinghe, Madhuka Nadeeshani, Prasad Samarasinghe

The paper "AI-Based Behavioral Analyser for Interviews/Viva" presents a system that enhances the assessment of behavioral cues in online interviews. Using deep learning techniques, the system analyzes non-verbal cues, including emotions, eye movements, head movements, and smile patterns, to evaluate personality traits based on the Big Five model. The proposed system demonstrates high accuracy (over 85%) in detecting behavioral changes, offering a comprehensive analysis that allows for fair comparisons among candidates. This solution addresses the limitations of previous systems that focused primarily on verbal communication by providing a more detailed analysis of non-verbal behavior. The paper highlights the system's applicability in both professional and academic settings, demonstrating significant improvements in accuracy and comprehensiveness.

5) Paper 5: Development of an AI-Based Interview System for

Remote Hiring Publication Year: 2021

Authors: B C Lee, B Y Kim

The paper "Development of an AI-Based Interview System for Remote Hiring" introduces a deep-learning-powered solution designed to improve recruitment processes, particularly for remote settings. The AI system, developed using over 400,000 interview image datasets, achieved a high Pearson reliability score of 0.88 and was successfully applied in multiple public enterprises in South Korea, with a satisfaction rate of 85%. The paper highlights the growing global trend of AI adoption in hiring processes, focusing on job fitness evaluations, personality assessments, and applicant screening. By incorporating advanced facial, vocal, and linguistic analysis, the AI system aims to provide objective and unbiased evaluations, streamlining recruitment processes and increasing overall hiring efficiency. The research underscores the potential of deep learning models in enhancing both candidate evaluation and recruitment practices.

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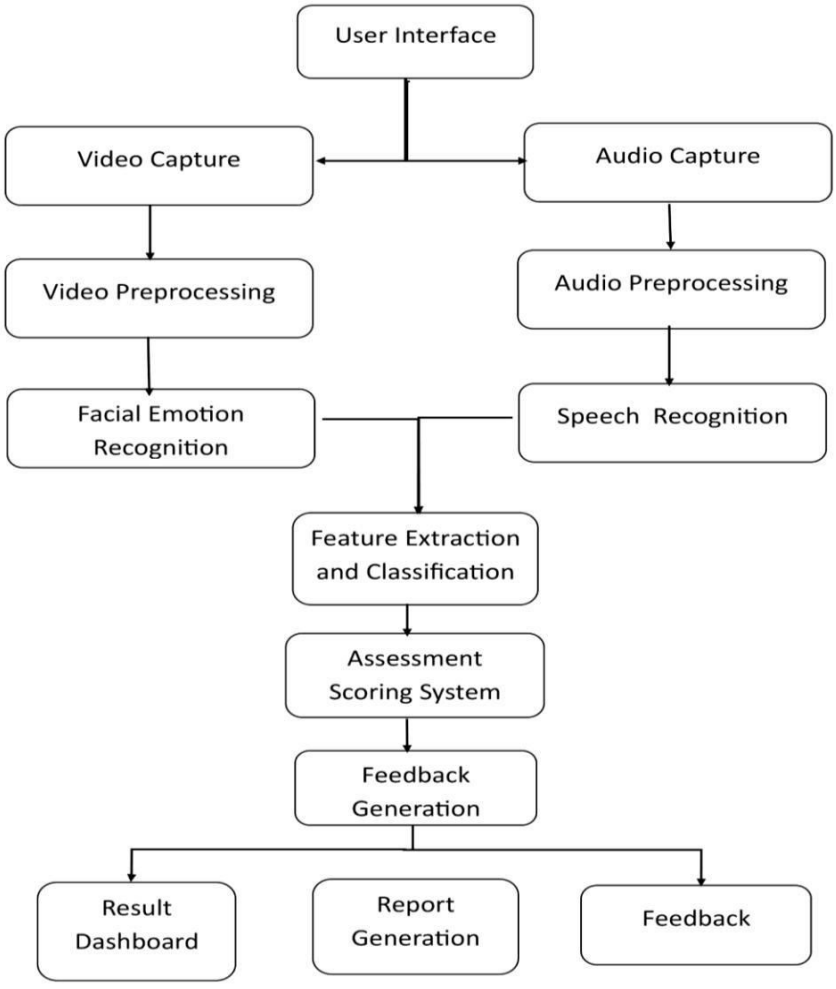
III. PROPOSED MODEL



The proposed model for emotion analysis from video and audio data outlines a comprehensive system that involves several key components and their interactions. Users interact with the system through a user interface, providing video or audio input. The system then captures and processes the input data, including video preprocessing tasks like resizing, frame extraction, and noise reduction, as well as audio preprocessing tasks like noise reduction and feature extraction.

Deep learning models are utilized to analyze the processed data and extract relevant features, such as facial landmarks, audio spectrograms, or other characteristics indicative of emotions. These features are then used by a classification module to predict the emotions present in the data. The system assesses the quality and accuracy of the emotion classification results using metrics like precision, recall, and F1-score, and generates feedback to improve the system's performance over time. Finally, the system presents the final emotion

classification results to the user in a visual format, such as a dashboard or report, and provides feedback to the user or system based on the classification results. The system also stores trained deep learning models, processed data, extracted features, and classification results in a database.

IV. ALGORITHMS

Convolutional Neural Networks (CNNs) for Facial Recognition

CNNs are a type of deep learning architecture specifically designed for processing and analyzing image data. They have been particularly successful in tasks like image classification, object detection, and facial recognition. CNNs work by applying filters to the input image, extracting features like edges, corners, and textures. These features are then combined to form a representation of the image, which is used to classify it into different categories or classes. CNNs are well-suited for facial recognition due to their ability to learn hierarchical representations of facial features and their invariance to small variations in the input image. They have found applications in various fields, including access control, biometric authentication, law enforcement, and social media.

Natural Language Processing (NLP) for Speech Recognition

Natural Language Processing (NLP) is a field of artificial intelligence that focuses on the interaction between computers and human language. In the context of speech recognition, NLP techniques are used to transform spoken language into text. NLP plays a crucial role in speech recognition by providing the language context and understanding necessary for accurate transcription. By leveraging the power of NLP, speech recognition systems can improve their accuracy, robustness, and adaptability to different speaking styles and dialects.

LSTM (Long Short Term Memory)

LSTM (Long Short-Term Memory) models plays a crucial role in enhancing the system's ability to accurately process and recognize speech. Speech data is inherently sequential, where each word or sound depends on previous words to convey meaning. LSTM, being a specialized type of recurrent neural network (RNN), excels in handling such sequential data by learning long-term dependencies. The key feature of LSTM is its memory cell structure, which allows it to retain important information over time while discarding irrelevant data through its input, forget, and output gates. This mechanism enables LSTM to handle the temporal nature of speech effectively, ensuring that past information is taken into account when processing current input.

Additionally, speech input often varies in length, and LSTM is well-suited for such variable-length sequences, as it can manage input that does not have a fixed size. By leveraging its ability to remember context over long sequences, LSTM helps to improve the recognition of complex speech patterns and longer sentences. This leads to higher accuracy in the overall system compared to traditional models, which may struggle with maintaining context in longer sequences. Therefore, incorporating LSTM into your speech recognition model significantly enhances its performance, making it better equipped to interpret and recognize speech in real-world scenarios.

V. RESULTS

The AI-based mock interview system presented in this paper demonstrates a highly efficient and unbiased approach to evaluating candidates through the use of advanced artificial intelligence techniques. The system integrates convolutional neural networks (CNNs) for facial recognition and long short-term memory (LSTM) models for speech recognition to evaluate candidates' performance across a variety of parameters, including emotional and behavioral cues. Through real-time analysis of video and audio inputs, the system effectively captures non-verbal cues such as facial expressions, eye contact, and speech patterns. The project's results indicate that AI

models can outperform traditional interview processes by providing objective, data-driven feedback, which reduces human bias and subjectivity.

Moreover, the system has been trained using large datasets of candidate behavior, improving its accuracy in evaluating both technical and emotional aspects of a candidate's performance. By incorporating machine learning, natural language processing (NLP), and emotion recognition technologies, the AI-based interview system can handle both video and audio inputs seamlessly, providing a comprehensive evaluation based on key factors such as confidence, emotional stability, and technical knowledge. The system's precision, recall, and F1-score metrics indicate high performance in accurately identifying emotions and providing detailed feedback for both recruiters and candidates. This suggests that AI-driven interview systems could significantly improve the efficiency and fairness of the recruitment process, leading to better hiring decisions.

VI. CONCLUSION

The AI-based mock interview system is a significant step forward in the automation of candidate evaluations. By leveraging machine learning and AI technologies such as CNNs for facial emotion recognition and LSTM for speech recognition, the system provides a robust platform for objective and comprehensive assessment. The findings from the project suggest that AI systems can offer a more accurate and reliable way to assess candidates' emotional and intellectual capabilities compared to traditional methods, which are prone to bias and subjectivity. Additionally, the system's ability to process both video and audio data in real-time makes it a versatile tool for modern recruitment, especially in remote or large-scale hiring scenarios. As AI technology continues to advance, integrating such systems into recruitment processes will likely become a standard practice, enhancing both the fairness and efficiency of hiring across industries.

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