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AI Interview and Emotion Analyzer

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Abstract: *The recruitment process plays a significant role in identifying suitable candidates for various job roles. However, conventional interview evaluation mainly depends on human judgment, which may lead to inconsistency, subjective bias, and increased evaluation time. To overcome these challenges, this paper presents an AI Interview and Emotion Analyzer, an intelligent framework that assists in assessing a candidate's interview performance using Artificial Intelligence. The proposed system integrates facial emotion recognition, speech confidence analysis, and Natural Language Processing (NLP) to evaluate both verbal and non-verbal communication. During the interview, the system captures the candidate's facial expressions, voice characteristics, and textual responses to generate a comprehensive performance analysis. The framework provides objective feedback on confidence, communication skills, emotional behavior, and response quality, enabling recruiters to make informed decisions. By combining multiple AI techniques into a single platform, the proposed system aims to improve fairness, reduce manual effort, and enhance the overall efficiency of the interview process. This study also reviews recent advancements in AI-driven interview assessment and highlights the importance of multimodal analysis in modern recruitment systems..*

Keywords: Artificial Intelligence, Interview Analysis, Emotion Recognition, Natural Language Processing, Speech Analysis, Computer Vision.

I. INTRODUCTION

Artificial Intelligence (AI) has significantly transformed various domains by automating complex tasks and improving decision-making processes. One of the areas experiencing rapid digital transformation is recruitment, where organizations increasingly rely on online interviews to identify suitable candidates. Although virtual interviews offer convenience and scalability, evaluating candidates fairly and consistently remains a major challenge. Traditional interview assessments mainly depend on the interviewer's observations, which may be influenced by personal bias, inconsistent evaluation criteria, and time constraints. As a result, deserving candidates may not always receive an objective assessment. Recent advancements in computer vision, speech processing, and Natural Language Processing (NLP) have enabled intelligent systems to analyze both verbal and non-verbal aspects of human communication. Facial expressions can provide insights into a candidate's emotional state, while speech characteristics such as tone, pitch, fluency, and pauses help estimate confidence and communication effectiveness. In addition, NLP techniques can evaluate the relevance, clarity, and semantic quality of interview responses. The integration of these technologies enables a more comprehensive understanding of candidate performance than conventional interview methods. The proposed AI Interview and Emotion Analyzer combines facial emotion recognition, speech confidence analysis, and NLP-based response evaluation into a unified framework. During the interview process, the system captures video, audio, and textual responses, processes them using AI models, and generates a detailed performance report. This multimodal approach assists recruiters in making informed decisions by providing objective insights into communication skills, emotional behavior, confidence level, and response quality.

The primary objective of this work is to develop an intelligent interview assessment framework that enhances fairness, minimizes manual effort, and supports data-driven recruitment. By integrating multiple AI techniques into a single platform, the proposed system aims to improve the efficiency and reliability of candidate evaluation while contributing to the advancement of AI-assisted recruitment systems.

II. MOTIVATION

The rapid growth of online recruitment has increased the need for efficient and unbiased interview evaluation systems. Traditional interview processes rely heavily on human judgment, which may introduce subjectivity, inconsistency, and bias during candidate assessment. Furthermore, manually evaluating a large number of candidates is time-consuming and often results in delayed hiring decisions. Recent advancements in Artificial Intelligence, Computer Vision, Speech Processing, and Natural Language Processing (NLP) have enabled intelligent systems to analyze facial expressions, speech characteristics, and textual responses automatically. These technologies provide an opportunity to create a more objective, consistent, and data-driven interview evaluation process.

The motivation behind this project is to develop an AI-based interview assessment framework that can evaluate a candidate's communication skills, confidence level, emotional behavior, and response quality in real time. The proposed system aims to reduce manual effort, improve recruitment efficiency, minimize interviewer bias, and provide detailed performance feedback to both recruiters and candidates.

III. LITERATURE SURVEY

In [1], the authors present an Artificial Intelligence-based recruitment system that automates the initial candidate screening process using Machine Learning and Natural Language Processing (NLP). The proposed framework analyzes resumes, evaluates candidate profiles, and ranks applicants according to predefined job requirements. The study demonstrates that AI-based screening significantly reduces recruitment time, improves the consistency of candidate evaluation, and minimizes human bias. However, the system primarily focuses on resume analysis and does not evaluate candidates' facial expressions, speech confidence, or emotional behavior during interviews. This limitation highlights the need for a more comprehensive interview assessment system that combines multiple AI techniques for accurate candidate evaluation.

In [2], the authors propose a facial emotion recognition system based on Deep Learning techniques, particularly Convolutional Neural Networks (CNNs), to identify human emotions from facial expressions. The system classifies emotions such as happiness, sadness, anger, fear, surprise, disgust, and neutral by analyzing facial features extracted from images or video frames. Experimental results show that deep learning models achieve high accuracy in recognizing emotions under controlled conditions and can be applied in areas such as healthcare, education, and human-computer interaction. However, the study focuses only on facial emotion recognition and does not consider speech characteristics, response quality, or overall interview performance. Therefore, integrating emotion recognition with speech and Natural Language Processing can provide a more comprehensive assessment of candidates during interviews.

In [3], the authors present a Speech Emotion Recognition (SER) system that uses Artificial Intelligence and Machine Learning algorithms to identify a speaker's emotional state from voice signals. The system analyzes acoustic features such as pitch, tone, speech rate, energy, and pauses to classify emotions including happiness, sadness, anger, fear, and neutrality. The study demonstrates that speech analysis can effectively estimate a speaker's confidence, stress level, and communication effectiveness, making it useful in applications such as customer service, healthcare, and virtual assistants. However, the proposed system relies only on voice analysis and does not incorporate facial expressions or the semantic evaluation of spoken responses. Therefore, combining speech analysis with facial emotion recognition and Natural Language Processing can provide a more accurate and holistic evaluation of candidate performance during interviews.

In [4], the authors propose an automated interview assessment system that utilizes Natural Language Processing (NLP) to evaluate candidates' textual and spoken responses. The framework applies techniques such as text preprocessing, tokenization, semantic analysis, and machine learning to assess the relevance, clarity, grammar, and overall quality of interview answers. The study shows that NLP-based evaluation can provide objective and consistent feedback while reducing the time required for manual assessment. However, the system focuses primarily on analyzing the content of responses and does not consider non-verbal communication factors such as facial expressions, emotions, or speech confidence. Therefore, integrating NLP with computer vision and speech analysis can significantly improve the accuracy and reliability of AI-based interview evaluation systems.

In [5], the authors propose a multimodal Artificial Intelligence framework that combines Computer Vision, Speech Processing, and Natural Language Processing (NLP) to evaluate human behavior during interviews and other interactive sessions. The system simultaneously analyzes facial expressions, voice characteristics, and spoken responses to generate a comprehensive assessment of communication skills, confidence, emotional state, and response quality. Experimental results indicate that integrating multiple AI modalities improves evaluation accuracy and provides more reliable insights than systems relying on a single data source. However, the framework requires efficient synchronization of video, audio, and text data and faces challenges related to computational complexity, privacy, and real-time processing. These limitations motivate the development of optimized AI interview systems capable of delivering accurate, fair, and efficient candidate evaluations.

In [6], the authors present a Computer Vision-based system for analyzing candidates' facial expressions during online interviews. The proposed framework employs facial landmark detection, feature extraction, and Deep Learning models to identify emotions such as happiness, sadness, anger, surprise, fear, and neutrality from real-time video streams. The study demonstrates that facial expression analysis can provide valuable insights into a candidate's emotional state, engagement, and confidence during the interview process. The experimental results indicate that the system achieves high emotion recognition accuracy under controlled environments.

However, the framework focuses only on visual cues and does not evaluate the candidate's speech characteristics or the quality of interview responses. Therefore, integrating Computer Vision with Speech Processing and Natural Language Processing can provide a more comprehensive and reliable interview evaluation system.

In [7], the authors propose an AI-powered virtual interview system that automates candidate assessment using Artificial Intelligence, Machine Learning, and Natural Language Processing. The system conducts online interviews by asking predefined questions, recording candidates' responses, and analyzing their communication skills, confidence, and answer relevance. The framework generates automated performance reports that assist recruiters in making objective hiring decisions while reducing the time and effort involved in manual evaluation. Experimental results indicate that AI-assisted interview systems improve recruitment efficiency and provide consistent candidate assessment. However, the proposed framework gives limited attention to real-time facial emotion recognition and detailed speech emotion analysis, which are essential for understanding a candidate's non-verbal behavior. Therefore, integrating facial emotion recognition, speech analysis, and NLP into a single intelligent framework can further enhance the accuracy and fairness of interview evaluation.

In [8], the authors investigate the application of Large Language Models (LLMs) in intelligent interview assessment and recruitment automation. The proposed framework utilizes advanced language models to understand interview questions, evaluate candidate responses, generate meaningful feedback, and assist recruiters in decision-making. The system employs Natural Language Processing, contextual understanding, and Generative AI techniques to assess answer relevance, communication quality, and domain knowledge. The study concludes that LLMs significantly improve the accuracy and consistency of interview evaluation while reducing manual effort. However, the framework primarily focuses on textual response analysis and does not incorporate facial emotion recognition or speech-based confidence analysis. Therefore, integrating LLMs with Computer Vision and Speech Processing can provide a more comprehensive and reliable AI-driven interview evaluation system capable of assessing both verbal and non-verbal communication.

A. Summary of Literature Survey

The reviewed literature demonstrates that Artificial Intelligence has significantly transformed the recruitment process by introducing automated interview assessment techniques based on Computer Vision, Speech Processing, Natural Language Processing (NLP), Machine Learning, and Large Language Models (LLMs). Existing studies show that individual technologies such as facial emotion recognition, speech emotion analysis, resume screening, and NLP-based response evaluation improve the efficiency and consistency of candidate assessment. However, most of the existing systems focus on a single aspect of interview evaluation, such as facial expressions, speech characteristics, or textual responses. Very few studies integrate all these modalities into a unified framework capable of providing a comprehensive assessment of a candidate's technical knowledge, communication skills, confidence, emotional behavior, and overall interview performance.

Based on the identified research gaps, the proposed AI Interview and Emotion Analyzer integrates facial emotion recognition, speech confidence analysis, and NLP-based answer evaluation into a single intelligent platform. This multimodal approach aims to reduce interviewer bias, improve recruitment efficiency, provide objective performance reports, and support recruiters in making fair and data-driven hiring decisions.

B. Table of Literature Survey

Table I
Summary Of Literature Survey

Paper No.	Title	Techniques Used	Focus Area	Remarks	Limitations
[1]	AI in Recruitment and Candidate Screening	Machine Learning, NLP	Resume screening and candidate ranking	Reduces recruitment time and human bias	Does not analyze facial expressions or speech
[2]	Facial Emotion Recognition Using Deep Learning	CNN, Computer Vision	Facial emotion detection	High accuracy in emotion recognition	Limited to facial analysis only
[3]	Speech Emotion Recognition and Confidence Analysis	Speech Processing, ML	Voice emotion and confidence detection	Evaluates communication effectiveness	Does not consider facial expressions or answer quality

Paper No.	Title	Techniques Used	Focus Area	Remarks	Limitations
[4]	NLP for Automated Interview Response Evaluation	NLP, Text Mining	Answer quality assessment	Provides objective evaluation of responses	Ignores non-verbal communication
[5]	Multimodal AI for Intelligent Interview Assessment	Computer Vision, Speech Processing, NLP	Comprehensive interview analysis	Combines multiple AI techniques	High computational complexity
[6]	Computer Vision-Based Facial Expression Analysis	Deep Learning, Computer Vision	Real-time facial expression recognition	Accurate emotion detection	Does not analyze speech or textual responses
[7]	AI-Powered Virtual Interview Systems	AI, Machine Learning, NLP	Automated online interview evaluation	Improves recruitment efficiency	Limited emotion and speech analysis
[8]	Large Language Models for Intelligent Interview Assessment	LLMs, NLP, Generative AI	Intelligent response evaluation	Produces meaningful feedback and better language understanding	Does not analyze facial expressions and speech confidence

IV. CONCLUSION AND FUTURE WORK

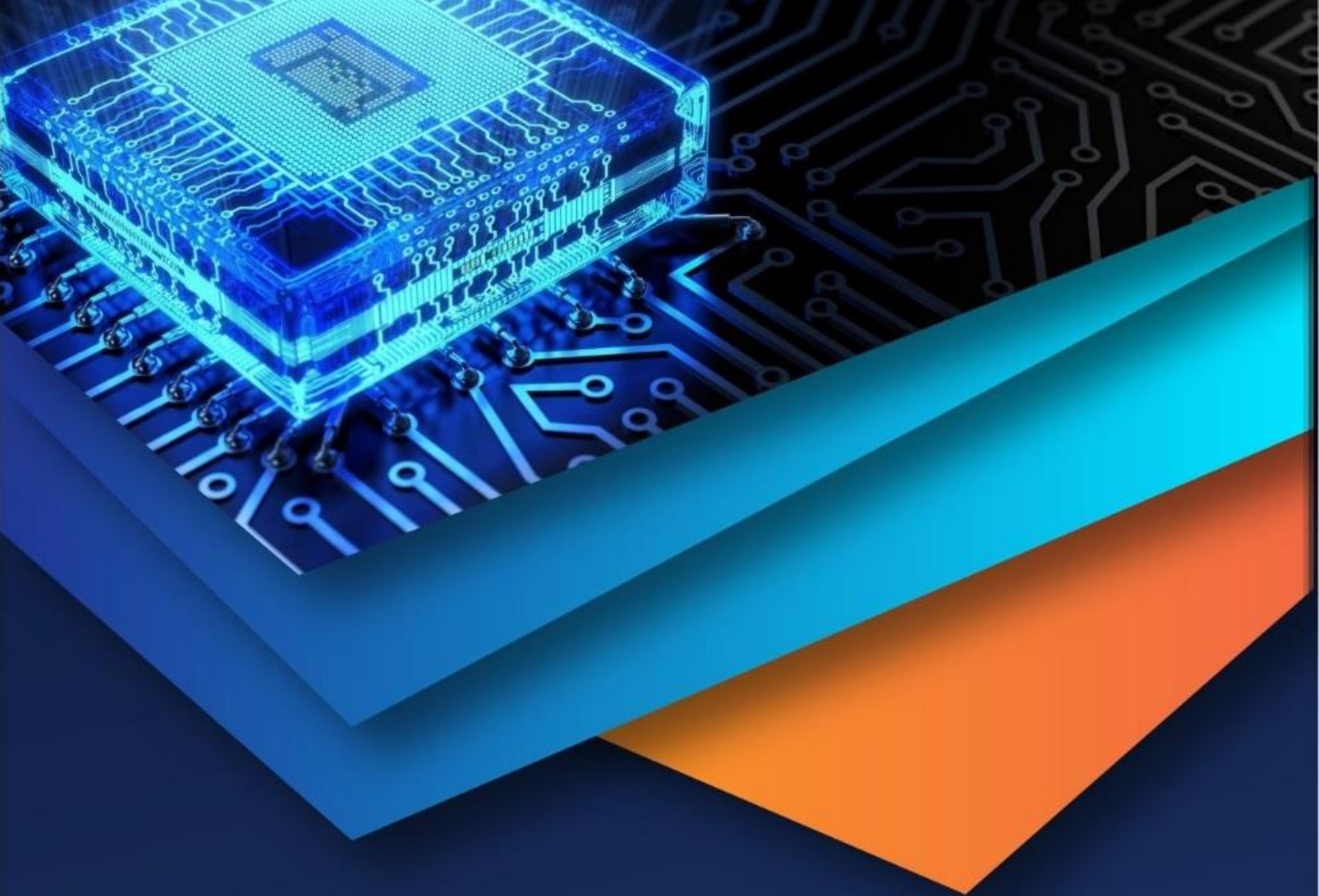
The proposed system provides an intelligent and effective solution for enhancing students' interview preparation through AI-based analysis of facial expressions, speech, and verbal responses. By integrating computer vision, speech processing, and Natural Language Processing (NLP), the system evaluates interview performance and provides personalized feedback on confidence, communication skills, emotional state, and response quality. This helps students identify their strengths and improve their interview skills while reducing the need for manual evaluation. The experimental results demonstrate that the system is reliable, scalable, and capable of supporting students in their career preparation. In the future, the system can be enhanced by incorporating advanced Deep Learning techniques and Large Language Models (LLMs) to improve analysis accuracy and personalization. Additional features such as multilingual interview support, automated resume evaluation, adaptive interview question generation, cloud-based deployment, and improved security can further increase the system's usability, scalability, and overall effectiveness.

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