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AI Interview Mocker: Smart Interview Simulator with Expressive Behavioral Analytics

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ABSTRACT: In today's highly competitive job market, prospective employees who have recently graduated and are looking for additional training or career prospects really need to possess great interview skills. When it comes to interview circumstances, however, a significant number of candidates do not adequately prepare themselves during their college years. Researchers want to construct and develop social skills training systems that will give applicants with chances to improve their performance during interviews in order to fill this vacuum in the educational landscape. Interviews for jobs are an important tool for prospective employers to evaluate the eligibility of candidates, and they rely primarily on the social cues that applicants display throughout the interview process. The purpose of this work is to present an enhanced way for simulating job interviews by utilizing a virtual human recruiter in conjunction with signal processing techniques to examine the performance, behavior, and emotions of candidates in real time. This model's objective is to provide applicants, particularly young people who are looking for work, with assistance in developing the social skills that are necessary for successful interviews. The suggested system incorporates a three-dimensional virtual environment, a dialogue/scenario manager, a behavior manager, and real-time social cue detection. Candidates receive significant insights into their performance during mock interviews as a result of the use of feedback systems that monitor facial expressions, head nodding, response time, speaking pace, and loudness. An additional component that evaluates grammatical correctness is a speech-to-text component, and applicants are able to readily trace their progress throughout numerous sessions thanks to graphical representations of performance data. This work makes a contribution to the multidisciplinary research on interview evaluation and highlights the potential of technologies powered by artificial intelligence to improve applicants' potential for success in interviews as well as their social competency.

KEYWORDS: Facial Expression Recognition, Sound Analysis, Interview Evaluation, Artificial Intelligence-Based Application, Real-time Feedback, and Speech-to-Text Technology.

1. INTRODUCTION

The purpose of the AI interview mocker is to assist in overcoming these obstacles by utilizing artificial intelligence to develop a platform for the preparation of interviews that is both interactive and customized [1],[2]. Providing users with the opportunity to practice answering questions that are dynamically created by artificial intelligence, receiving quick feedback, and tracking their progress over time is the primary objective of the platform, which aims to imitate actual interview scenarios. This provides users with the opportunity to consistently enhance their abilities in a low-pressure atmosphere, therefore fostering the confidence that is necessary to be successful in genuine job interviews. The objective is to construct a smart conversational system that incorporates face and voice analysis in order to better understand and analyze the personalities of applicants. This will allow for the resolution of these challenges. A further step toward improving the accuracy and effectiveness of candidate evaluations is the use of sophisticated
Data communication, deep learning models, and data processing techniques. The ultimate objective is to accomplish the goal of revolutionizing the interview process by utilizing AI to provide a system that is more dependable, objective, and

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efficient.
In today's highly competitive and demanding job market, the interview process has become more difficult and time-consuming than it has ever been [3]. In today's competitive job market, when employers are looking to select applicants who not only possess the necessary skills but also have the ability to demonstrate their ability to communicate effectively, solve problems, and adapt to new situations, preparation is essential to achieving success. It is difficult for many people who are looking for work to locate methods that are both accessible and helpful for practicing interviews [4]. Despite the fact that mock interviews are a tried-and-true technique of preparation, they are frequently expensive, time-consuming, and may not give the customized feedback that is essential for growth.

II. METHODOLOGY

The adopted methodology facilitated a comprehensive assessment of the application's performance, particularly its effectiveness in tackling practical challenges in interview preparation and its adaptability to evolving user needs.

1) **User-Centered Design**

The app was developed based on insights from a survey of 500 job seekers across various industries. The findings highlighted key challenges in interview preparation, guiding the inclusion of features like personalized question sets, real-time feedback, and industry-specific scenarios.

2) Real-Time Speech Analysis: The system analyzes candidates' speech in real time, focusing on emotional cues such as tone, pitch, and speech dynamics using MFCC features and advanced signal processing. An LSTM model, validated rigorously for accuracy, captures subtle emotional variations [5]. Combined with CNN outputs, it enables a reliable assessment of candidates' emotional engagement and communication effectiveness.

3) Knowledge Processing Module:

4) Question Categories: Questions are classified into three types—conceptual, specific, and analytical—to guide evaluation. Conceptual questions (e.g., *"Explain a concept"*) require broader understanding, specific questions (e.g., *"Define a term"*) demand precise answers, and analytical questions (e.g., *"Compare and contrast"*) call for deeper analysis**.**

Question-Type Association: Each question is tagged based on its nature (e.g., *explain*, *define*, *compare*), which aligns with its category. These tags assist in applying appropriate evaluation strategies.

Text Preprocessing: Candidate answers are preprocessed by segmenting long responses into meaningful sentences to improve evaluation accuracy and computational efficiency.

Extractive Summarization: For lengthy responses, extractive summarization using the Genism library condenses answers while retaining key information.

Database Storage: Processed data—including questions, answer types, keywords, and scores—are stored in a structured database for efficient retrieval and analysis.

Keyword and Similarity Score: The system checks for the presence of key terms and computes cosine similarity between candidate and expected answers to evaluate relevance and accuracy.

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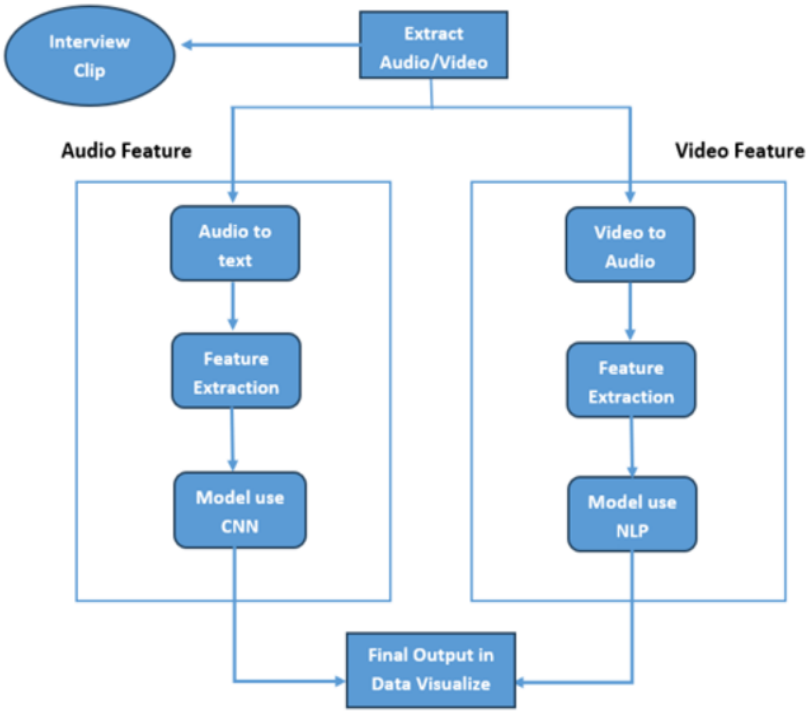

Figure.1: Block Diagram of Proposed Method

Feedback Analysis: The app's AI feedback system was evaluated for accuracy, comprehensiveness, and clarity. User suggestions for improvement were categorized to refine the app's features.

III. SYSTEM DESIGN

AI Interviewer Mocker – System Overview

The application follows a client-server architecture with both frontend and backend powered by **Next.js**. The frontend, built using **React**, offers a responsive and interactive UI. Backend logic is managed through **Next.js API routes**, handling data operations and external API integrations.

Key Components:

- **Frontend:** Built with Next.js and React for a seamless and dynamic user experience.
- **Backend:** Uses Next.js API routes to process requests, interact with the database, and connect to AI services.
- **Database:** PostgreSQL with **Drizzle ORM**, used to store user data, interview sessions, and questions.
- **AI Service:** Integrates with the **Gemini AI API** to generate relevant interview questions based on user inputs.
- **Authentication:** Managed by **Clerk** to handle secure user registration, login, and session control.

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IV. ARCHITECTURE

1. Getting Started: Registration & Login

User Actions:

- Creates an account or logs in using email/password, OAuth (Google, LinkedIn), or biometric login.
- Provides profile info: preferred roles, skills, experience level, and goals.

Backend Process:

- Authenticates credentials via secure services.
- Stores user preferences and profile data in the database.
-

2. Interview Session Setup: Selecting Interview Type

User Actions:

- Selects interview type (technical, behavioral, case study), skill level, and optionally industry/role.

Backend Process:

- Loads AI models or relevant datasets to generate a targeted question bank.
- Configures session parameters like tone, length, and complexity.
-

3. Mock Interview Begins: Conducting the Interview

User Actions:

- AI asks questions via text or audio/video (TTS).
- User responds through text, or speech/video (if enabled).
- Interview adapts dynamically based on answers.

Backend Process:

- **Question Generation:** NLP models (e.g., GPT) create or select context-relevant questions.
- **ASR (if audio/video):** Converts speech to text.
- **Real-Time Analysis:** Evaluates responses for clarity, relevance, and confidence.
- **(Optional)** Computer vision analyses body language and facial cues during video interviews.

4. Real-Time Feedback (Optional)

User Actions:

- Receives real-time prompts or hints (e.g., “Can you elaborate on that?”).

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Backend Process:

- **Sentiment Analysis:** Detects emotional tone and stress.
- **Dynamic Adjustments:** Alters question difficulty or follows up based on user behavior.
-

5. Post-Interview Evaluation: Generating Feedback

User Actions:

- Gets a performance report including scores, strengths, weaknesses, and personalized suggestions.

Backend Process:

- **Response Analysis:** NLP evaluates content quality and structure.
- **Scoring Algorithms:** Assess communication, problem-solving, confidence, etc.
- **Behavioral Analysis:** (if video) Reviews facial expressions, posture, and eye contact.
- **Feedback Engine:** Summarizes insights and offers tailored improvement tips.
-

6. Results & Insights: Reviewing Performance

User Actions:

- Views session summary, replays video/audio (if any), and downloads/shares feedback.

Backend Process:

- Securely stores all session data and logs feedback for future comparison.
- Tracks user progress over time.

7. Continuous Learning: Future Sessions

User Actions:

- Schedules future interviews or practices specific skills.
- May engage in gamified progress tracking.

Backend Process:

- Leverages session data to personalize future questions.
- Continuously improves AI models based on user feedback and performance trends.

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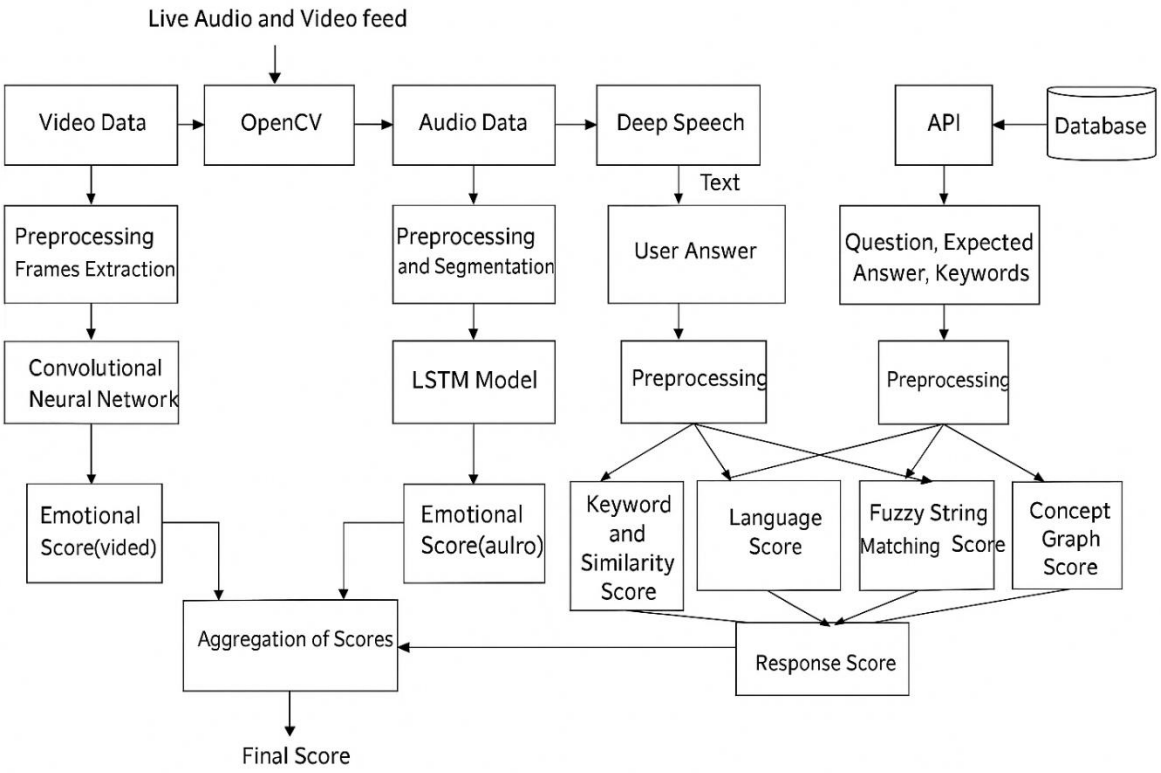

Figure: 2 System Architecture Overview

V. FEATURES

Key Features of the Proposed System

- **Dynamic Question Generation:** Utilizes the **Gemini API** to generate **context-aware and role-specific interview questions**, enhancing the realism and adaptability of practice sessions.
- **Speech-to-Text Conversion:** Leverages **Google Speech-to-Text API** to accurately transcribe spoken responses into text, enabling downstream NLP analysis and automated scoring.
- **Real-Time Feedback Generation**: The system provides **AI-driven, real-time feedback** after each session. Feedback spans multiple dimensions, including content relevance, fluency, emotional tone, and delivery effectiveness.
- **Automated Scoring and Rating** :Evaluates user responses based on predefined parameters such as:
  - Relevance to the question
  - Answer structure and coherence
  - Emotional tone and expression
  - Technical and linguistic accuracy
- **User Convenience and Accessibility**: Fully web-based and device-agnostic, allowing users to access and use the platform **anytime, anywhere** without scheduling or requiring human interviewers [4].
- **Interview Monitoring and Review**: Users can **review past interview sessions**, monitor their progress over time, and analyze recorded performance metrics, including facial expressions and emotional cues.
- **Facial Expression Recognition and Safety Mechanism**: Integrates facial expression recognition to detect signs of stress, distraction, or **potential cheating scenarios**. The system can **issue alerts**, **pause answer recording**,

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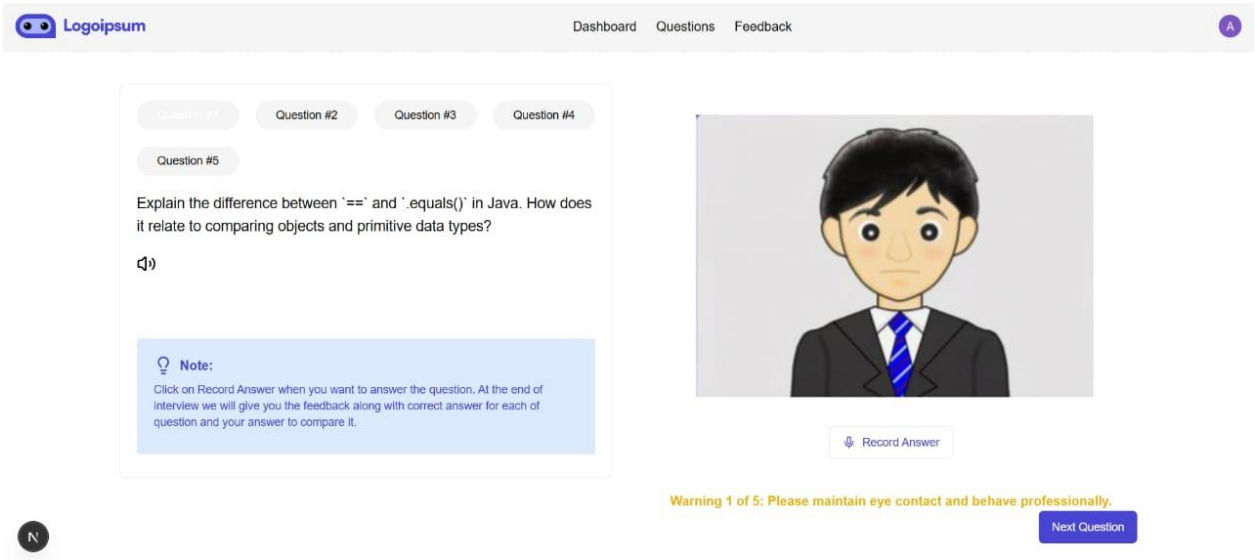
or **flag sessions** automatically if unusual or suspicious behavior is detected, ensuring both user well-being and assessment integrity [6].

VI. RESULT

The AI-based Mock Interview Behavioral Recognition System offers a smart, unbiased approach to evaluating candidates by analyzing facial expressions, speech patterns, and emotional cues using advanced AI techniques like CNNs and LSTMs [16]. It provides visual feedback and performance metrics, helping users track progress and identify strengths and weaknesses. Trained on large datasets, the system ensures accurate, data-driven evaluations that reduce human bias [15], [16]. The integrated AI Interviewer Mocker app allows users to select roles, answer AI-generated questions via voice, and receive a performance summary. Test users praised its relevance and intuitive design, highlighting its potential to enhance interview preparation and support fairer recruitment processes.

Fig :3 User Interface



[1]

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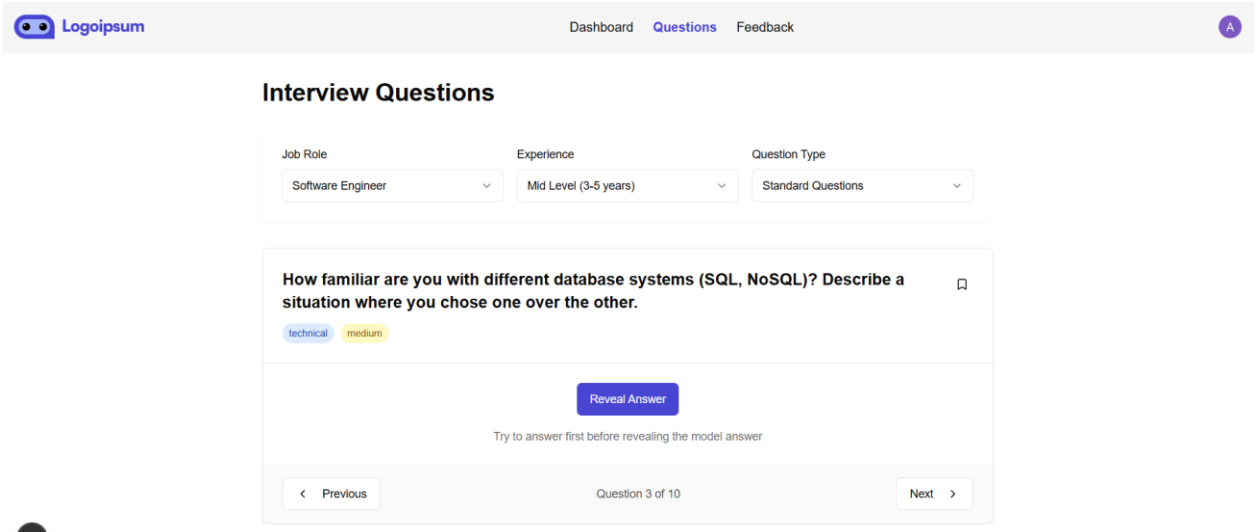

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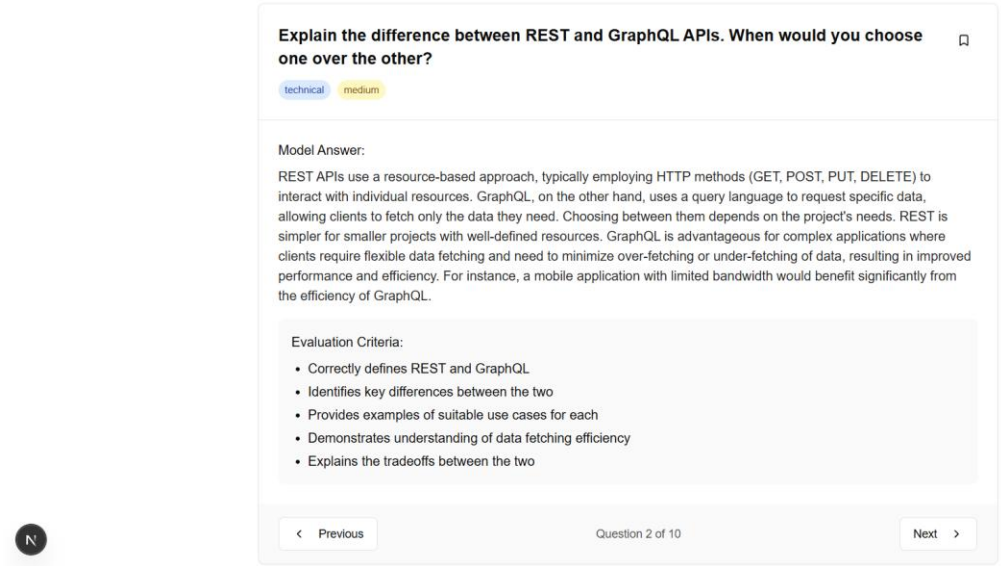

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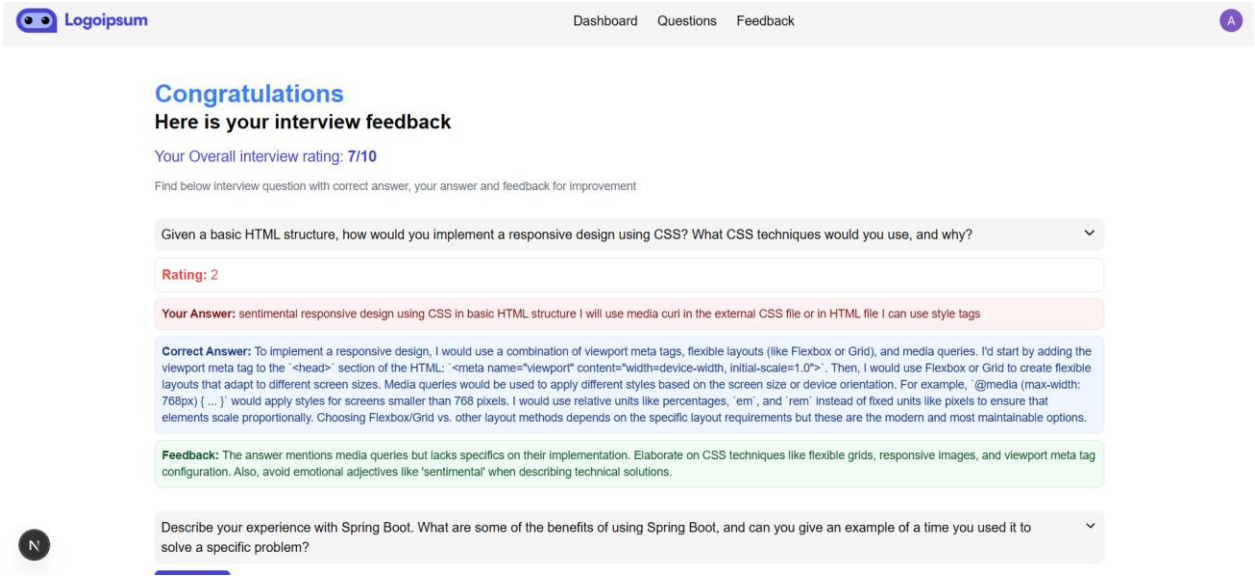

[4]

VII.DISCUSSION

The AI-powered mock interview system provides a major advantage over traditional methods by generating a wide variety of questions tailored to the user's field and experience level. This enhances interview readiness and ensures more realistic practice. However, the system currently lacks a strong feedback mechanism. While it can evaluate responses, it doesn't yet provide in-depth, constructive feedback [7], [8]. Future versions should include AI models that can assess answers in detail and offer improvement tips. Adding voice-based interaction could also make the simulation more lifelike. This would involve integrating speech recognition and text-to-speech capabilities for a conversational experience. The system performs well in converting speech to text using tools like Google Speech-to-Text, even with different accents [13],[14]. Still, it may struggle with heavier or non-standard accents, causing occasional errors [9]. Real-time feedback is a key feature, offering instant analysis on clarity, tone, and relevance. The facial recognition module tracks expressions and posture, giving users insights into their non-verbal communication. That said, the AI feedback can sometimes be too harsh. Future improvements should focus on using emotionally aware language to encourage and guide users constructively.

VIII. CONCLUSION

The AI Interview Mocker is an innovative tool that uses machine learning and speech processing to help users prepare for job interviews [11]. It offers real-time, unbiased feedback by analyzing both audio and video inputs, making interview practice more realistic and effective. While it currently focuses on question generation, future updates aim to include better emotional analysis and more human-like interaction [12]. This system is a practical and accessible solution for students, job seekers,

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