AI-BASED MOCK INTERVIEW SIMULATION SYSTEM FOR JOB PREPARATION \

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ABSTRACT:

In today's competitive job market, interview readiness is essential, yet many candidates lack access to realistic practice tools. This research presents an AI-powered Mock Interview Simulation System designed to offer personalized and immersive interview experiences using only the user's job title, technical stack, and years of experience as inputs. Based on this data, the system generates relevant, domain-specific interview questions using Google Gemini, a cutting-edge generative AI model.

Developed with modern web technologies like React, TypeScript, Firebase, and Clerk Authentication, the platform provides a seamless and secure user experience. A key innovation in this project is the use of real-time video recording during mock interviews. These recordings are processed by OpenAI's language and vision models to perform sentiment analysis, offering detailed feedback on a candidate's sentiments. This enables a holistic review of both verbal and non-verbal performance—crucial aspects often missed in traditional mock interview setups. Preliminary testing shows that users report improved self-awareness, increased confidence, and better articulation after using the system. By eliminating the need for resume uploads and incorporating advanced AI feedback mechanisms, this solution provides an accessible, cost-effective, and impactful alternative to conventional mock interviews.

This research highlights the potential of integrating generative and multimodal AI in the interview preparation process and opens up opportunities for future advancements in behavioural analytics and adaptive learning.

KEYWORDS:

AI Mock Interview, Sentiment Analysis, Generative AI, Behavioral Feedback, Interview Simulation.

I. INTRODUCTION:

In today's highly competitive job landscape, candidates are expected to perform well not only in written assessments but also during interviews that test communication, confidence, and clarity of thought. However, many individuals—especially students and early-career professionals—struggle to find platforms that provide meaningful, real-time interview practice and actionable feedback. Traditional mock interviews, though helpful, often require scheduling with mentors, lack personalization, and may not capture the behavioural nuances that employers care about.

To help bridge this gap, this research presents an AI-driven Mock Interview Simulation System that offers a realistic and interactive environment for interview preparation. The system uses basic user

information such as job role, relevant technologies, and years of experience to tailor the interview session accordingly. Questions are dynamically generated using Google Gemini, a generative AI model capable of producing domain-specific and context-aware content. This ensures that users receive a unique set of questions aligned with their career goals and skill levels.

One of the key innovations in this system is the integration of video recording during mock interviews. This allows the platform to analyse both spoken responses and visual cues using OpenAI's language and vision models.

As a result, the user receives detailed feedback not just on the correctness or completeness of their answers, but also on aspects like emotional tone, and overall presence—factors that play a critical role in real interviews but are often overlooked.

By combining generative AI with sentiment, the proposed system provides a holistic and accessible solution to interview preparation. It empowers users to practice confidently and improve not only what they say, but how they say it.

II. LITERATURE REVIEW:

Table 1: Literature Review

Sr. No	Ref No.	Paper Title and Publisher	Findings
	[1]	An AI Mock-interview Platform for Interview Performance Analysis, IEEE 2022	The AI-powered system is designed to simulate realistic interviews and evaluate candidates remotely. It leverages machine learning models to provide automated, real-time feedback and assessments, making the interview experience both interactive and insightful.
	[2]	A Comprehensive Study and Implementation of the Mock Interview Simulator with AI and Pose-Based Interaction, IEEE 2024	The system aims to address common challenges faced by candidates during interviews by offering AI-based mock evaluations. It uses deep learning techniques to analyze responses and provide constructive suggestions for improvement.
	[3]	AI-Driven Virtual Mock Interview Development, IEEE 2024	The system highlights the transformative potential of AI in revolutionizing interview preparation, offering personalized, interactive, and data-driven mock interviews that are tailored to each individual's job role and experience.
	[4]	A Survey of AI-Driven Mock Interviews using GenAIand Machine Learning (InterviewX), ICUIS 2024	The system uses advanced techniques like Retrieval-Augmented Generation (RAG) and Quantized Low-Rank Adaptation (QLoRA) to generate tailored interview questions and deliver real-time feedback. By combining fine-tuned language models, live behavioral analysis, and automated scoring, it provides a scalable and cost-effective solution for preparing candidates for interviews.
	[5]	From Practice to Perfection: AI-Driven Mock Interviews for Career Success, ICSCNA 2023	The system combines Natural Language Processing (NLP), facial expression recognition using CNN and the FER dataset, and body posture detection with MediaPipe to offer a well-rounded evaluation of both a candidate's technical abilities and soft skills.

III. AIM AND OBJECTIVE:

The aim of this project is to develop an AI-driven mock interview simulation system that helps candidates prepare for job interviews by offering personalized, real-time feedback. Unlike traditional tools that focus solely on technical questions, our system takes a more holistic

approach—supporting users not just in showcasing their knowledge, but also in improving communication, confidence, and emotional expression.

A core objective of the system is to customize each interview experience based on the user's job title, technology stack, and level of experience. This ensures that the questions and feedback are relevant and meaningful to each individual.

By combining this text-based sentiment analysis with domain-specific question generation and clear, actionable feedback, the system empowers candidates to improve not only what they say, but how they say it. Ultimately, this project aims to provide an accessible, scalable, and cost-effective tool that helps job seekers practice with confidence and walk into real interviews better prepared—both technically and emotionally.

IV.   EXISTING SYSTEM:

Today, a variety of platforms exist to help candidates prepare for interviews—but many of them still fall short in offering a complete and personalized experience. Most traditional mock interview tools follow a standard format with pre-recorded or generic questions that don't reflect an individual's specific job role or experience level. While some platforms simulate interviews reasonably well, they tend to focus primarily on technical questions and miss out on the soft skills that are just as important—like clear communication, confidence, and the emotional tone behind a candidate's response.

A few tools have started incorporating AI to generate questions based on user input or resumes, which is a step forward. However, they often lack meaningful feedback on how the candidate actually performs during the interview—especially in terms of how they sound, express themselves, or convey confidence.

Even video-based interview platforms typically emphasize recording and reviewing, without going deeper into analyzing the emotional aspects of a candidate's answers. These emotional cues—how confidently someone speaks or how engaged they sound—can make a big difference in a real interview setting.

In short, while existing tools help in certain areas, there's still a need for a more well-rounded solution—one that combines smart question generation with deeper, personalized feedback based on both technical content and emotional expression. That's where our system steps in.

V.   METHODOLOGY:

The methodology behind our AI-based Mock Interview Simulation System is designed with a clear goal: to create an intuitive, personalized, and deeply insightful interview preparation experience for users. Here's how the system works, step by step, from the moment a user lands on the platform to when they receive detailed feedback:

1.   User Registration & Authentication

To get started, users sign up or log in using secure authentication powered by Clerk. This ensures a smooth and safe onboarding process. Whether it's a first-time user or a returning one, the platform remembers their profile, past interviews, and progress—all tied securely to their account.

2.   Interview Setup – Tailored to the User

Once authenticated, users are invited to create a new mock interview session. They're asked to input three simple but crucial details:

- Their job title (e.g., Front-End Developer, Data Scientist)

- The technology stack they specialize in (e.g., React, Python, AWS)

- Their years of experience

These inputs help the system tailor each session uniquely to the user's career path and proficiency level. No resume uploads are needed—making the setup lightweight yet effective.

3.   Personalized Question Generation Using Google Gemini

The core of the system's intelligence lies in Google Gemini, a powerful generative AI model. Once the interview is initiated, Gemini dynamically generates interview questions that are domain-specific, relevant to the user's job title, and aligned with their experience level.

This means a beginner front-end developer and a senior data scientist will receive completely different sets of questions—both equally challenging and appropriate for their roles.

4. Video Recording

To make the mock interview as realistic as possible, video recording is now a mandatory part of the experience. As soon as the interview starts, the user's webcam is activated and the entire session is recorded.

5. Speech-to-Text and AI Validation

As the user responds to each question, their speech is transcribed into text in real-time. This transcription is then analyzed and validated by Google Gemini, which compares it to the ideal answer. This step forms the foundation of the technical evaluation.

6. Sentiment Analysis from Responses:

Now comes the advanced, human-like evaluation. Instead of analyzing facial expressions or body language directly from video, the platform focuses on the transcribed responses generated during the mock interview. These transcriptions are sent to Google Gemini, which analyzes:

- Tone and confidence: Does the candidate sound enthusiastic, uncertain, or assertive?

- Emotional expression: Are the responses calm, tense, or well-composed?

- Clarity of speech: Does the language reflect organized thinking and professionalism?

This text-based sentiment analysis allows the system to assess how candidates express themselves emotionally, offering deep insight into their communication style and overall confidence—crucial elements in real interviews.

7. Intelligent Feedback Generation

Once the interview concludes, the platform brings everything together. It generates a comprehensive feedback report broken into three main areas:
- Technical Accuracy: How well the user answered the questions.
- Communication Skills: Clarity, structure, and fluency of speech.
- Emotional Tone Feedback: Insights from sentiment analysis on how confidently and clearly the user communicated.

Each point includes thoughtful, actionable suggestions, making the feedback both personal and practical. This empowers candidates to understand not just what they said, but how effectively they delivered it enhancing their overall interview readiness.

8. Real-Time Scoring System

In addition to the detailed feedback, users receive a scorecard that reflects their overall performance in each category. The scoring system is transparent and updated instantly—helping users track their growth over time.

9. Data Storage and User Dashboard

All interview data—questions, answers, videos, and feedback—is securely stored in Firebase. Users can revisit their dashboard to review past interviews, track progress, and prepare better for upcoming sessions.

10. Accessibility and Scalability

The entire platform is built on modern, cloud-based technologies, making it accessible from any device with a webcam and internet. There's no need for scheduling, coaching, or expensive subscriptions—this system provides a full-featured mock interview lab, right in your browser.

VI. PROPOSED SYSTEM:

The proposed system is designed to closely replicate a real-world interview experience by integrating advanced AI technologies within an accessible web platform. It targets students and job seekers who aim to improve their communication, technical knowledge, and overall presentation through realistic mock interview simulations. The system is structured into three key stages:

A. Input Stage

1) User Registration
Users begin by signing up using a simple email-based registration process. Authentication is handled securely using Clerk Authentication, ensuring safe access to personalized interview sessions. This initial step requires minimal effort while providing access to all the platform's capabilities.

2) Selection of Job Profile
After registration, users select a job profile that aligns with their career goals, such as "Frontend Developer" or "Data Analyst." They also specify their technology stack and years of experience. This input allows the platform to generate tailored interview questions and assessments specific to the user's desired role, ensuring high relevance and engagement.

B. AI-Driven Mock Interview

The core of the platform is an AI-powered interview simulation engine. It uses Google Gemini, a generative AI model, to dynamically create interview questions relevant to the user's selected job profile and skill level. The interview process is structured to simulate a real interview environment with realistic, interactive questioning.

C. Intelligent Evaluation System

Following the mock interview, the user's transcribed answers undergo comprehensive analysis using advanced AI techniques:

Sentiment Recognition:

The system uses Google Gemini to analyze the transcribed text of each response, evaluating the emotional tone embedded in the language. It identifies patterns such as expressions of confidence, hesitation, or clarity of thought and

offers insights that help users understand how their words may be perceived during real interviews.

D. Feedback Generation and Scoring

Based on the sentiment analysis and technical evaluation, the platform generates a detailed feedback report categorized into:

- Technical response accuracy
- Verbal communication effectiveness
- Emotional tone and expressiveness

Each feedback point includes clear and actionable suggestions for improvement. Additionally, users receive a comprehensive performance score reflecting their overall interview readiness. All session data is securely stored in Firebase, and users can revisit their personalized dashboard to review past interviews and track progress over time.
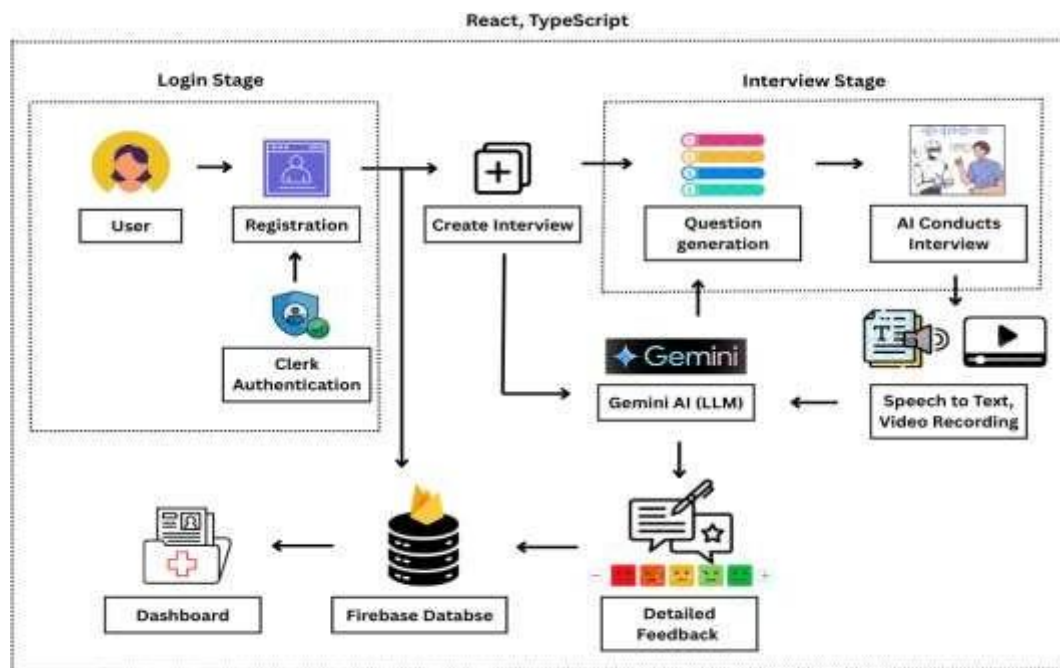
VII. SYSTEM ARCHITECTURE:

Fig 1. System Architecture

VIII. OUTPUTS:

Fig 2. Mock Interview

Fig 3. Overall Feedback

Fig 4. Detailed Feedback

IX. CONCLUSION:

This project introduces a modern and intelligent way to help candidates prepare for job interviews by combining artificial intelligence with real-time feedback. Unlike traditional mock interviews or expensive coaching sessions, our system offers a smart, accessible, and personalized solution that adapts to each user's role and experience level. It generates tailored questions and provides meaningful feedback that helps users not only focus on what they say but also on how they communicate.

By leveraging Natural Language Processing and sentiment analysis on transcribed responses, the system delivers a well-rounded evaluation. It offers insights into both technical accuracy and the emotional tone of the candidate's responses—capturing elements like confidence, clarity, and expression. The feedback is clear, actionable, and immediately available, making it easier for users to improve with every session.

In essence, this platform bridges the gap between solo practice and real-world interviews. It equips users with the tools and self-awareness they need to grow, helping them enter actual interviews with greater confidence, clarity, and readiness.

X. REFERENCES:

[1] Y.-C. Chou, F. R. Wongso, C.-Y. Chao, and H.-Y. Yu, "An AI Mock-interview Platform for Interview Performance Analysis," in Proc. 2022 10th Int. Conf. on Information and Education Technology (ICIET), Matsue, Japan, 2022, pp. 37–41. doi: 10.1109/ICIET55102.2022.9778999.

[2] B. B. Jadhav, A. Sawant, A. Shah, P. Vemula, A. Waikar, and S. Yadav, "A Comprehensive Study and Implementation of the Mock Interview Simulator with AI and Pose-Based Interaction," in Proc. 2024 IEEE Int. Conf. on Computing, Communication and Intelligent Systems (ICCCIS), 2024. doi: 10.1109/ICCCIS.2024.10530717.

[3] P. K. Mishra, A. K. Arulappan, I.-H. Ra, L. T. Mariappan, G. G. Rose, and Y.-S. Lee, "AI-Driven Virtual Mock Interview Development," in Proc. 2024 Joint 13th Int. Conf. on Soft Computing and Intelligent Systems and 25th Int. Symp. on Advanced Intelligent Systems (SCIS&ISIS), 2024, pp. 1–4. doi: 10.1109/SCISISIS61014.2024.10760210.

[4] J. V. Barpute, O. Wattamwar, S. Pakjade, and S. Diwate, "A Survey of AI-Driven Mock Interviews Using GenAI and Machine Learning (InterviewX)," in Proc. 2024 4th Int. Conf. on Ubiquitous Computing and Intelligent Information Systems (ICUIS), Pune, India, 2024. doi: 10.1109/ICUIS64676.2024.1086631.

[5] R. Umbare, A. Budhodkar, S. Suryawanshi, S. Udgirkar, P. Aher, and S. Rangdale, "From Practice to Perfection: AI-Driven Mock Interviews for Career Success," in *Proc. Int. Conf. on Sustainable Communication Networks and Applications (ICSCNA)*, Pune, India, 2024, pp. 1250–1251. doi: 10.1109/ICSCNA63714.2024.10864324.