

AI-Based Virtual Mock Interviewer for Improving Candidate Performance

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Abstract

The rise of artificial intelligence and the shift toward digital recruitment have transformed traditional hiring practices. However, many candidates still struggle with interview preparation due to limited access to real-time evaluation and expert feedback. To address this issue, we propose a AI Mock Interview Platform that provides users with a simulated interview experience supported by AI. The platform evaluates candidates' responses using Gemini AI, which analyzes the accuracy, clarity, and relevance of each answer. It then generates personalized feedback, performance ratings, and correct responses to help users improve. The system integrates secure authentication through Clerk and efficient database management using Drizzle ORM, ensuring data privacy and scalability. Preliminary testing demonstrates that the platform delivers consistent and meaningful feedback, establishing it as a promising tool for interview preparation and self-assessment.

Keywords- Artificial Intelligence, Mock Interview, Gemini AI, Interview Preparation, Feedback System, Performance rating

1. INTRODUCTION

Artificial Intelligence (AI) is increasingly transforming recruitment and talent-acquisition processes, enabling more efficient candidate screening and assessment than traditional methods [1]. However, many job seekers still face limited access to scalable, real-time interview preparation tools that deliver consistent feedback. To address this gap, we propose a Mock Interview Platform (MIP) that evaluates candidates' responses using an advanced large-language model (LLM), Gemini AI [2], which assigns performance ratings, generates corrective answers, and provides personalized feedback. The platform integrates secure user authentication and robust data management, aligning with modern software-engineering practices. The objectives of this work are to design and implement an AI-driven mock-interview system, automate evaluation and feedback, and demonstrate prototype feasibility through initial testing. By bridging conventional interview preparation with AI-enabled assessment, MIP contributes to the evolving landscape of digital hiring support.

2. LITERATURE REVIEW

Recent research into AI-based mock-interview systems has shown that automated platforms can significantly enhance candidate preparation by providing scalable, consistent feedback. For instance, Dayal et al. report that an AI-driven mock interview system improved candidate performance by over 30% across key metrics such as technical correctness, fluency, and grammar in a large-scale study involving over 6,000 interviews. [3] Meanwhile, Deote et al. developed “AIPrepMate”, a platform using modern web technologies and an LLM-based evaluation engine to offer real-time feedback on technical interview responses. [4] These studies illustrate the growing feasibility of integrating AI, NLP, and web deployment for interview preparation.

Despite these advances, notable gaps persist: many existing systems still focus on a limited domain (e.g., technical questions only), rely on handcrafted features, or lack deployment readiness for broad use. For example, another recent work surveyed AI-enabled mock interview platforms and noted that few offer full web/mobile deployment or integrate automated correct-answer generation and personalized ratings. [5] Our proposed platform seeks to address these shortcomings by offering a full-stack AI Mock Interview Platform that evaluates candidate answers, provides feedback and correct solutions, and supports scalable web access and secure authentication.

3. METHODOLOGY

The proposed AI Mock Interviewer system is designed as a full-stack web application that leverages Gemini AI for realtime question generation, response analysis, and personalized feedback delivery. The system architecture ensures scalability, modularity, and seamless integration of AI services using modern web technologies:

At the architectural level, the framework consists of four major layers: the User Interface Layer, the Application Layer, the Data Layer, and the AI Integration Layer.

The User Interface Layer, developed using Next.js and Tailwind CSS, offers an intuitive and interactive design where users can securely log in, initiate mock interviews, and view detailed performance feedback.

The Application Layer functions as the middleware that connects the frontend interface with backend services and Gemini AI. It manages interview session flow, handles API routing, and ensures secure communication between components.

The Data Layer, implemented using Drizzle ORM, is responsible for maintaining structured storage of user authentication details, interview history, and performance metrics, ensuring data integrity and efficient retrieval.

Finally, the AI Integration Layer connects the system with Gemini AI APIs to facilitate dynamic question generation, semantic response evaluation, and context-based feedback generation, focusing on the technical accuracy, clarity, and relevance of candidate answers.



The workflow of the AI Mock Interview System can be described as follows:

- **User Authentication and Setup:** Users log in or sign up using Clerk authentication. JWT-based tokens ensure secure access and personalized sessions.
- **Dashboard Access:** After authentication, users are redirected to the dashboard, where they can select interview categories such as Technical, HR, or Behavioral.
- **Interview Initialization:** When the user clicks on “Start Interview,” the Gemini AI model generates a set of relevant interview questions dynamically based on the selected category and difficulty level.
- **Answer Recording:** The user’s spoken or typed responses are captured and displayed in real-time. Speech-to-text integration (if enabled) converts voice input into text format for processing.
- **Answer Analysis:** Gemini AI analyzes each answer using NLP-based semantic understanding to evaluate content accuracy, clarity, and relevance — without sentiment analysis.
- **Feedback Generation:** The AI generates structured feedback that includes question-wise evaluations, improvement suggestions, and an overall performance score.
- **Report Generation:** A final report is created summarizing the user’s interview performance, including detailed question-wise analysis and overall score
- **Data Storage and Retrieval:** All interview data, responses, and feedback are securely stored in a Drizzle ORM database. Users can revisit their past interviews and track performance progress over time.

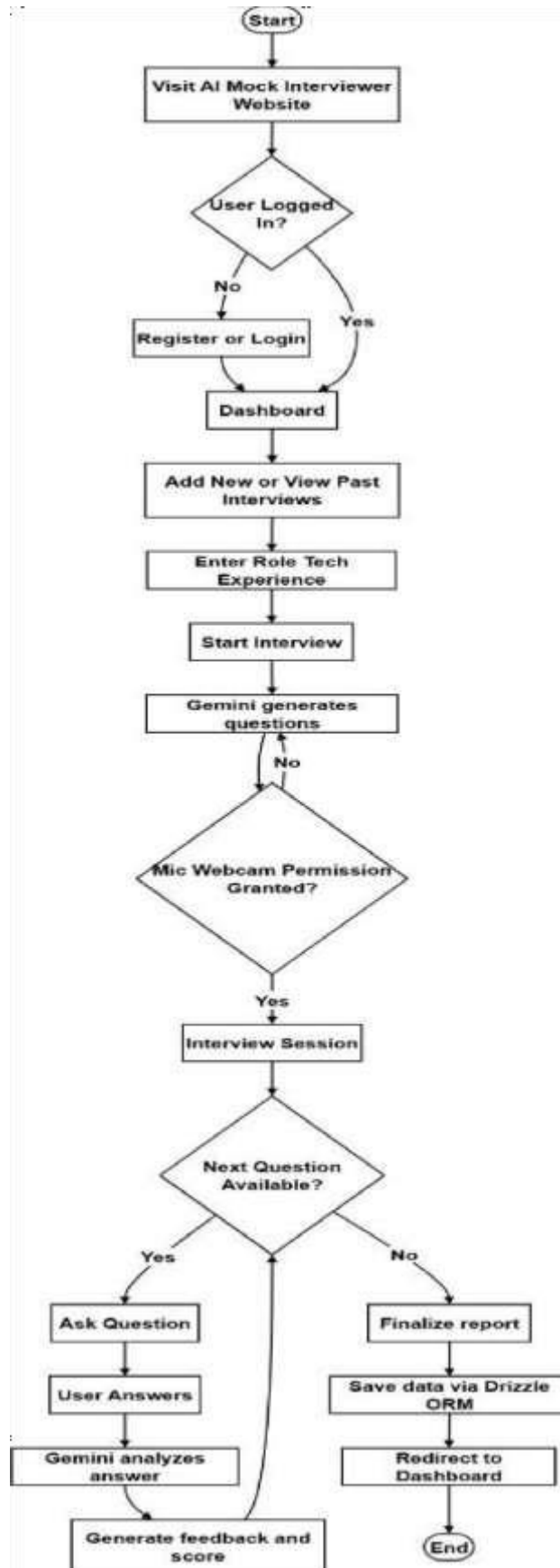


Figure.1: Operational Workflow

The AI pipeline is central to the methodology. User responses and interview data are processed by Gemini AI's fine-tuned language models, which evaluate each answer based on semantic accuracy, contextual understanding, and communication clarity. These evaluations are aligned with predefined job-role parameters to generate a comprehensive assessment of the candidate's performance. Gemini uses prompt-engineered logic to maintain conversational continuity, ensuring that every interaction simulates a realistic interview experience. Reinforcement through response analysis guarantees that the AI maintains an objective and professional evaluation tone consistent with real-world interview standards.

Security and privacy considerations are integral to the methodology. Sensitive user data, including interview answers and credentials, are protected using bcrypt hashing, HTTPS communication protocols, and Helmet.js for secure HTTP headers. Authentication and authorization are managed by Clerk, ensuring reliable user identity verification. Ethical design principles are implemented through transparent communication, clarifying that the system acts as a support and training platform rather than a substitute for human-led interviews.

The project follows an Agile development methodology to enable iterative progress and feature enhancement. Weekly sprints are structured around modular tasks such as frontend development, database design, AI model integration, and system deployment. Each sprint undergoes rigorous testing phases:

- **Unit Testing:** For individual frontend and backend modules.
- **Integration Testing:** For communication between Gemini AI, backend APIs, and database layers.
- **Performance Testing:** To ensure scalability of response analysis under concurrent interview sessions.
- **Validation Testing:** To verify the consistency and fairness of AI-generated evaluations. In conclusion, the methodology integrates modern full-stack web technologies, AI-driven question generation and evaluation, secure authentication mechanisms, and Agile development practices. This hybrid framework ensures that the AI Mock Interview System remains technically robust, scalable, and user-focused, effectively enhancing user readiness for real-world interviews through intelligent automation.

4. IMPLEMENTATION AND RESULTS

The proposed AI Mock Interviewer System was implemented as a full-stack web application using Next.js for both the frontend and backend integration. The system interfaces with Gemini AI through RESTful APIs for dynamic question generation, response evaluation, and feedback synthesis.

The frontend, built using React components within Next.js, ensures responsive interaction and real-time feedback visualization. Backend API routes handle communication between the user interface, Gemini API, and the Drizzle ORM database, which stores generated questions, user responses, and feedback reports. User authentication and data security are managed using Clerk.

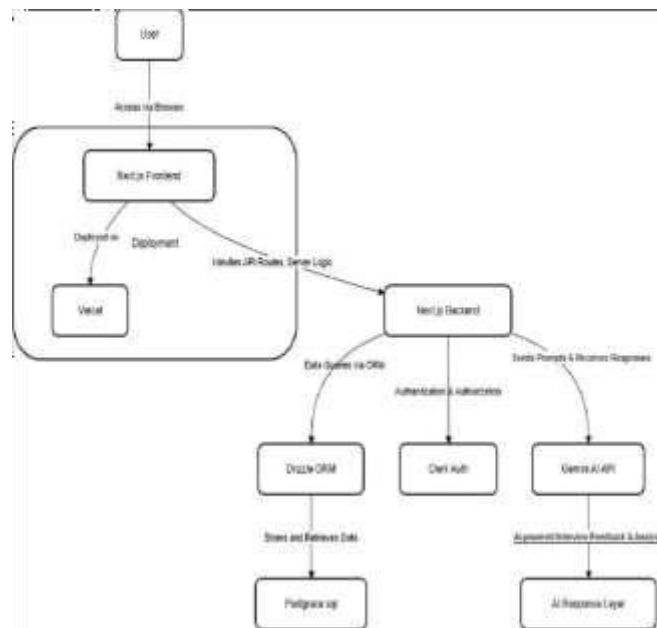


Figure.2: Software Architecture

The application was tested on a standard development environment equipped with an Intel i5 processor and 8 GB RAM, sufficient for efficient web-based execution. The system dynamically generated questions based on user-defined parameters such as job role and experience level.

Testing was conducted on a system with an Intel i5 processor and 8 GB RAM, providing adequate performance for web-based operations. The system dynamically generated questions based on user input such as job role and experience. During evaluation, simulated interviews confirmed that the system effectively:

Generated context-aware technical and behavioral questions. Collected and analyzed responses through Gemini AI.

Produced constructive feedback highlighting strengths and areas for improvement.

Overall, the system exhibited high responsiveness, accurate contextual understanding, and reliable feedback generation across multiple test sessions.

5. Discussion

The findings of the AI Mock Interviewer system provide significant insights into the application of artificial intelligence in enhancing interview preparation. The integration of Gemini AI as a virtual interviewer yielded highly adaptive and context-aware interactions, enabling dynamic question generation based on user-specific inputs such as job role, technical stack, and experience level. This demonstrates that AI-driven simulations can effectively replicate realistic interview scenarios, fostering confidence and analytical readiness among candidates.

User interaction during testing confirmed that the platform enhances learning engagement and provides a structured approach to self-assessment. The intuitive use of JWT-based authentication and HTTPS communication reinforces data security, an essential component when handling user responses and performance data.

However, the system is not without limitations. Performance may vary due to API response latency, network connectivity, and Gemini's limitations in handling highly domain-specific technical questions. The current version also relies solely on text-based input, limiting the realism of human-like interviews. Future improvements include integrating voice-based interactions, video monitoring for body language analysis, and domain-specific fine-tuning to further enhance accuracy and naturalness. In terms of practical implementation, the AI Mock Interviewer demonstrates strong potential in academic institutions, career guidance centers, and recruitment platforms. It serves as an accessible, cost-effective training tool that empowers users to prepare for interviews in a structured and intelligent manner. Overall, the discussion highlights that while the system does not replace human evaluators, it effectively bridges the gap between traditional preparation and intelligent AI-driven assessment, marking a meaningful advancement in digital learning and career readiness.

6. CONCLUSION AND FUTURE WORK

The present study introduced the AI Mock Interviewer, an intelligent platform designed to bridge the gap between traditional interview preparation and real-world evaluation through artificial intelligence. By integrating modern web technologies such as Next.js, Drizzle ORM, and Clerk authentication with Gemini AI, the system successfully demonstrated its ability to deliver adaptive, context-aware, and interactive mock interviews. The AI dynamically generates both technical and behavioral questions, analyzes user responses in real time, and provides structured feedback based on accuracy, clarity, and contextual relevance. The results from implementation and testing confirm that the system enhances learning engagement and self-assessment, offering users a realistic and data-driven interview experience.

The contributions of this work lie in three major aspects. First, it presents a comprehensive digital interview ecosystem, where users can log in, select roles, participate in AI-driven interviews, and receive performance-based feedback — all within a unified platform. Second, it ensures secure and seamless integration through token-based authentication, encrypted data storage, and efficient ORM-based database operations. Third, it promotes personalized learning, where candidates can analyze their past performances, identify weak areas, and iteratively improve with AI-guided insights. Together, these elements demonstrate that AI-powered simulators can complement human-led interview preparation by making practice sessions more interactive, accessible, and insightful. Despite its promising outcomes, certain limitations must be acknowledged. While the system supports both text-based and speech-based interactions, it currently lacks non-verbal communication analysis such as facial expression or body language tracking. Additionally, response evaluation depends on Gemini's general domain understanding, which may not always align perfectly with specialized technical contexts. External dependencies, such as API latency and connectivity issues, may also impact real-time performance. Addressing these limitations is crucial for improving both scalability and user experience.

For future work, several directions are envisioned. Integrating video-based feedback could further enhance the authenticity of mock interviews by allowing evaluation of confidence and communication style. Implementing domain-specific fine-tuning for Gemini AI would improve the precision of question generation and response evaluation. Further enhancements, such as progress analytics, difficulty level customization, and recruiter-mode evaluation, could expand the platform's applicability for both learners and institutions. Moreover, developing mobile accessibility and offline practice modes would increase user reach and usability. In conclusion, the AI Mock Interviewer represents a significant step forward in leveraging artificial intelligence for skill assessment and interview readiness. While it does not replace human evaluators, it provides a scalable, personalized, and intelligent practice environment that encourages self-improvement and confidence building. With continued advancements in multimodal AI and personalization, platforms like this have the potential to redefine interview preparation and skill evaluation across educational and professional domains.

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