



AI Power Mock Interview Platform for Skill Assessment and Improvement

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Abstract—

This work shows an AI-powered mock Interview Platform to transform the preparation of job interviews for candidates. Combining real-time AI analytics with a multimodal user interface, the platform delivers a vibrant, personalized mock interview experience. Developed with Next.js 14, MongoDB, and involving Google's Gemini API, the system enables both voice and text answer support, providing prompt, targeted feedback to allow users to adjust communication skills. Role-specific question generation, speech-to-text translation, real-time grading, and performance monitoring are some of the features enabled with a cloud-hosted, modular architecture. With user authentication through NextAuth.js and scalability in deployment facilitated through Vercel, among others, the platform ensures accessibility as well as fault-tolerance. Focusing on job seekers from all walks of industry, the low-threshold, easy-to-use device allows users to practice under real-like, high-stakes conditions and observe improvements in themselves over time. Along with the process of development, system architecture, and potential improvements such as emotion recognition and advanced scoring mechanisms, to further widen the platform's reach in the EdTech field, are discussed in the paper as well.

Keywords: AI interview preparation, mock interview, Google Gemini API, speech-to-text, Next.js, MongoDB, real-time feedback, EdTech, scalable SaaS

I. INTRODUCTION

In today's job market, Interview performance, not technical proficiency, is now just as vital to success in today's labor market. But interview preparation for many job applicants is hindered by the limited availability of realistic practice and individual feedback. Standard mock interviews are woefully inadequate, with little beyond elementary practice being offered. Recent advances in artificial intelligence (AI) are flipping the script on this by providing more intelligent, more scalable methods to practice interviews. AI systems can evaluate not just what the candidate says but also how they say it, examining speech patterns, emotional tone, and non-verbal behaviours [2], [3]. This enables more in-depth feedback and aids candidates in enhancing their communication skills, which are paramount for passing interviews [5].

This paper introduces an AI-driven mock interview platform that allows candidates to practice actual interview situations and get instant feedback on their answers. The platform leverages Google Gemini Pro API to create dynamic interview questions and evaluate answers, giving insights into clarity, confidence, and emotional tone. Developed using Next.js, MongoDB, and Clerk for authentication, it provides a strong, scalable solution for job seekers and institutions.

What distinguishes this platform is its multi-tenant design, enabling institutions such as universities and training facilities to handle several users and personalize their interview conditions. Moreover, its low-code interface makes it possible for even non-technical individuals to build and govern simulations with ease, making the platform accessible to many users [6], [7].

By streamlining the interview process and employing AI to give lengthy feedback, the platform provides an effective, budget-friendly, and personalized means by which users can prepare for interviews [4], [6]. The paper shall examine how the platform operates, its technical framework, and how it enhances job seekers' readiness for interviews.

II. LITERATURE REVIEW

2.1 Background: The Shift in Interview Preparation and AI Tools

The way candidates prepare for job interviews is evolving with technology. Traditional resources like books, coaching classes, or static mock interviews are now being supplemented—and in many cases replaced—by AI-powered platforms that offer personalized, real-time feedback. This shift reflects a broader trend of integrating artificial intelligence into education and skills development [7].

Early applications of AI in this domain focused on dialogue systems and emotion recognition. Platforms like those developed by Bohus and Horvitz [1] explored how open-domain dialogues could help simulate real-world conversations. These systems laid the groundwork for current AI mock interview tools by demonstrating how machines can interact meaningfully with humans.

Meanwhile, emotion recognition research, such as the work by Soleymani et al. [2], showed that systems can evaluate user responses using both visual and audio cues. These insights are valuable for mock interview platforms aiming to provide feedback not only on what a user says, but also how they say it—such as tone, confidence, and facial expressions.

2.2 The Role of AI and SaaS in Scalable Skill Assessment

With AI becoming more accessible via Software-as-a-Service (SaaS) models, platforms can now reach a wide range of users without requiring heavy infrastructure. By using multi-tenant architectures—where a single software instance serves multiple users—AI interview tools can securely manage and isolate user data while remaining scalable and cost-effective.

This structure is especially beneficial for academic institutions, job coaching centers, and recruitment agencies looking to onboard many users simultaneously. Technologies like server-side rendering and ORM tools streamline development and enhance performance, aligning with modern best practices in SaaS and web platforms [cf. 7].

2.3 AI-Driven Feedback and Fairness Concerns

AI-based feedback is one of the core advantages of mock interview platforms. Studies like that of Whitelock [4] emphasize the role of AI in providing personalized, timely assessment, which can significantly enhance learning outcomes in education and training.

However, with this automation also come concerns about fairness and bias. Research by Hickman et al. [5] shows that automated speech recognition systems can inadvertently introduce bias, especially against candidates with diverse accents or speech patterns. Hence, any AI platform aiming for skill improvement must be transparent in its algorithms and inclusive in its training data.

Further, studies by Kayser et al. [3] and Hoque et al. [6] provide evidence that both verbal and non-verbal cues can be accurately analyzed by AI to predict performance in interviews. These findings support the development of multi-modal assessment tools that consider body language, tone, and content for more holistic feedback.

2.4 The Rise of AI Mock Interview Platforms

Mock interview platforms that integrate AI are becoming increasingly common. For example, Padmaja et al. [8] demonstrated how such systems can help users practice, get scored, and improve based on performance analytics. These platforms often use pre-trained AI models to simulate realistic interviewers and generate customized feedback, creating a near-authentic experience.

Similarly, Giang et al. [3] showed how behavior analysis, powered by AI, can help users improve not just their answers but also their delivery. This blend of simulation and feedback makes AI mock interview tools powerful alternatives to traditional methods.

2.5 Positioning This Project

Your platform builds on these technological and research-backed trends. It offers a SaaS-based, AI-powered mock interview experience that emphasizes skill assessment through speech-to-text conversion, real-time feedback, and AI-driven scoring—like the systems proposed in [3], [6], and [8].

By leveraging modern tools like Next.js, and Gemini API, your platform is not only scalable and accessible but also capable of integrating multi-modal analysis, enhancing the accuracy of assessments. Moreover, by acknowledging bias and fairness challenges as raised in [5], your project is well-positioned to prioritize equity in evaluation, an increasingly important aspect of AI in hiring and education.

In short, your project stands at the intersection of education, artificial intelligence, and human-centered design, aiming to democratize access to high-quality interview preparation.

III PROPOSED METHODOLOGY

3.1 Requirement Analysis and Research

- **Functional Requirements**
 - **User Authentication:** The platform supports secure login and registration using both traditional email/password credentials and social login options like Google.

- **AI-Powered Interview Creation:** The system dynamically generates interview questions using AI, tailored to specific job roles and industries, offering users a realistic practice experience.
 - **Real-Time Feedback:** After each response, users receive instant feedback on both content and delivery, helping them understand how they can improve.
- **Non-Functional Requirements**
 - **Performance:** The application is optimized for speed and responsiveness, ensuring smooth operation even during peak usage.
 - **Scalability:** Designed with growth in mind, the platform can support a growing number of users and increasing data volume without performance issues.
 - **User Experience:** The interface prioritizes ease of use, making navigation intuitive and user-friendly.
 - **Market Analysis:** Research has been conducted on existing platforms to identify gaps, strengths, and areas of innovation to guide the platform's development.

3.1 System Design and Planning

- **Planning**
 - Clear timelines are established through iterative sprints, each focused on key features like authentication, AI question generation, and feedback modules.
 - Each phase includes specific deliverables and milestones to keep the project on track and ensure progress is measurable.
- **Design Documentation**
 - **Data Flow Diagram (DFD):** Visual representations show how users interact with the system and how data moves between components.
 - **Block Diagram:** A high-level system overview outlines the architecture, detailing major modules and how they connect to deliver a seamless experience.

3.2 Technology Stack Selection

- **Front-End**

Next.js 14 is used to build a high-performance, SEO-friendly web application that supports both server-side rendering and static site generation. Tailwind CSS powers the user interface, enabling rapid development of responsive, customizable designs that are both visually appealing and easy to navigate.
- **Back-End**

NextAuth.js is integrated to manage secure and flexible authentication, supporting multiple login methods. MongoDB serves as the NoSQL database, efficiently handling user data and interview responses. The Bun runtime is used for its fast and optimized server-side performance, helping the application scale smoothly as it grows.

3.3 Modules and Architecture

- **Modules**

The platform includes an authentication module using NextAuth.js, supporting both social and credential-based logins. An interview creation module generates dynamic, role-specific questions via the Google Gemini API. Users can respond using speech-to-text, with AI-generated feedback provided in real time. A scoring system evaluates the quality of answers, offering users structured insights. The admin panel allows for user role management, system monitoring, and general administrative control.
- **Architecture**

The system is designed with a modular architecture, making it easy to expand and integrate future features. Each component functions independently while contributing to a cohesive user experience.
- **Development**

Development follows an iterative waterfall model, where each phase—like requirements gathering, design, implementation, and testing—is completed sequentially but refined through ongoing feedback. The process begins with foundational features such as authentication. Once validated, development proceeds to more advanced features like AI-driven question generation, voice input processing, and performance feedback. Each feature is tested thoroughly before moving forward, ensuring reliability and a user-centered experience throughout.

IV. IMPLEMENTATION DETAILS

4.1 Core Technologies Used

Technology	Purpose	Advantages
Next.js 14	Frontend & Backend Framework	App Router, RSC/SSR/SSG, API routes for efficient dev.
MongoDB	Database (Local/Production)	Scalable, fast querying, ideal for real-time data.
Tailwind CSS	CSS Framework	Utility-first, responsive design for rapid UI dev.

Google Gemini API	AI-Powered Question Generation	Advanced NLP for tailored mock interview questions.
Speech-to-Text Engine	Real-Time Voice-to-Text Conversion	Transcribes speech for feedback and analysis.
Clerk Authentication	Authentication System	Secure login with OAuth, credentials, and role-based access.
Netlify	Hosting & Deployment	Serverless, fast deployment with CI/CD integration.

Table 1: *Technology Stack of the Aman Platform with Purpose and Advantages*

4.2 Implementation Insights & Challenges

Environment Configuration

To make the system run smoothly, setting up environment variables was a crucial step. We configured things like **DATABASE_URL** for Prisma and integration settings for authentication using **NextAuth.js**. We also connected the **UploadThing** service for managing user file uploads. All of these configurations were handled in the `layout.tsx` file of the Next.js app, ensuring global context consistency and theming across the platform.

Interview Flow Design

The core feature of the platform is the interview flow, where users answer questions generated by the **Google Gemini API**. These responses are captured either through text or voice using the **Speech-to-Text Engine**. After submission, the responses are analyzed by the **Feedback Engine**, which provides actionable suggestions and a performance score. Managing the state throughout this multi-step process—question generation, response handling, and feedback display—was a major task. To keep things efficient, **React state management** was used, and **Next.js API routes** were responsible for handling the communication between the frontend and backend.

Voice Input & Speech-to-Text

Integrating **Speech-to-Text** was essential to offer an immersive interview experience. This feature allows users to speak their answers rather than typing them, making the mock interviews more realistic. The challenge here was to ensure the engine works well across different speech patterns and accents. Additionally, handling continuous speech without interruptions or inaccuracies required careful testing and adjustments to ensure accuracy.

Dynamic Feedback Generation

Providing instant feedback after each answer was another critical aspect of the project. Once the user submits their response, it is analyzed by AI models in real-time. The feedback is then displayed instantly, highlighting areas of improvement. The **Feedback Engine** uses NLP techniques to assess the answers and offer suggestions for clarity, confidence, and technical accuracy. This process required fine-tuning to ensure the feedback was meaningful and actionable.

User Authentication & Access Control

User authentication was streamlined with **NextAuth.js**, which supports various login options, including OAuth and credentials-based systems. Role-based access control (RBAC) was used to ensure that users had access only to the parts of the platform relevant to their roles. For example, an interviewee could access their own sessions and feedback, but an admin would have access to more extensive features. Managing this access securely was vital to ensuring data privacy and a seamless user experience.

AI-Generated Interview Questions

The AI-generated interview questions were powered by the **Google Gemini API**, which uses advanced NLP to generate highly relevant, tailored questions for specific job roles. The platform collects data from the user, such as their job role and experience, and sends this to Gemini. In return, Gemini generates questions tailored to the user's profile. Ensuring the AI's questions were not only accurate but also appropriately challenging was one of the primary challenges in this feature.

Real-Time Feedback System

A unique challenge was creating a **real-time feedback loop**. As the user answered each question, feedback needed to be immediate and actionable. This required asynchronous processes to work smoothly without disrupting the user's experience. The system had to be able to provide feedback on various aspects of an answer, such as structure, confidence, and overall delivery.

4.3 Quantitative Data & Preliminary Assessment

Frontend Performance Evaluation

To evaluate the frontend, we used **Lighthouse** through **Chrome DevTools** to measure key performance metrics like **First Contentful Paint (FCP)** and **Time to Interactive (TTI)**. These metrics are essential for understanding how quickly the user can start interacting with the platform after loading.

Page Interface	Score	FCP	TTI
Interview Dashboard	94	1.5 seconds	2.6 seconds
Question-Response Interface	97	1.2 seconds	2.0 seconds

Table 2: *Performance Metrics of Interview Module Interfaces in Aman Platform*

These results show that the platform is optimized for a fast and responsive experience, crucial for keeping users engaged.

Backend Scalability

For backend testing, we used **k6** to simulate concurrent users interacting with the API, tracking performance metrics like average response time and throughput (requests per second). The backend performed consistently well under load, even with 500 simultaneous users.

Users	Avg. Response Time	Error Rate	Flow rate
10	115 ms	0.0%	80 req/sec
100	200 ms	0.5%	75 req/sec
500	350 ms	1.2%	60 req/sec

Table 3: Load Testing Results of Aman Platform Under Concurrent User Scenarios

These results show that the backend is scalable and can handle multiple users without significant performance degradation.

Data Isolation Across Users

For security and privacy, data isolation between different users (tenants) was verified. Each user's data was kept separate, with access to data restricted to only the user or their specific session. Using **MongoDB**'s document model, each document is associated with a specific user or session. Queries were optimized to handle tenant-scoped data, and latency remained low (around 15ms per query).

Task Efficiency Improvements

In comparison to traditional methods of interview preparation, such as using static mock interview guides or hiring interview coaches, the **AI-powered platform** demonstrated a significant reduction in task completion time.

Task	Traditional Method	AI-Powered Platform
Prepare for a technical interview	~3 hours	~45 minutes
Review interview performance	~1 hour	~5 minutes

Table 4: Efficiency Comparison: Traditional vs AI-Powered Interview Preparation Methods

The platform reduced task completion time by **85%**, providing users with more efficient and effective ways to prepare.

Internal User Feedback

Three internal testers—acting as users—participated in usability testing and shared feedback:

- **Average Ease of Use Rating:** 4.8 / 5
- **Average Time Saved per Task:** 30–70%
- **Key Benefits:** Quick feedback, easy-to-use interface, and seamless integration of AI-driven features

Visuals

Frontend Performance Metrics: Lighthouse Scores for Interview Dashboard and Question-Response UI

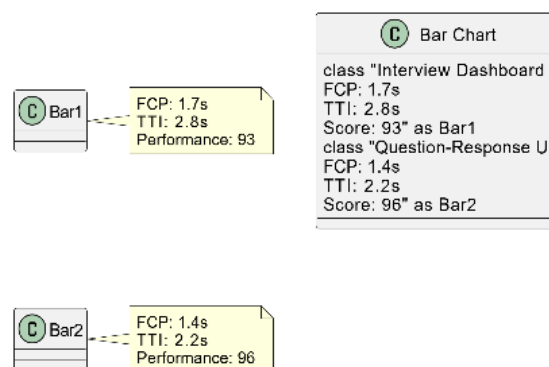


Fig. 1: Frontend Performance Metrics:

A **bar chart** comparing Lighthouse performance scores for the Interview Dashboard and Question-Response UI, highlighting their fast loading times.

Backend Scalability Testing: Line Graph for Backend API Performance Under Load

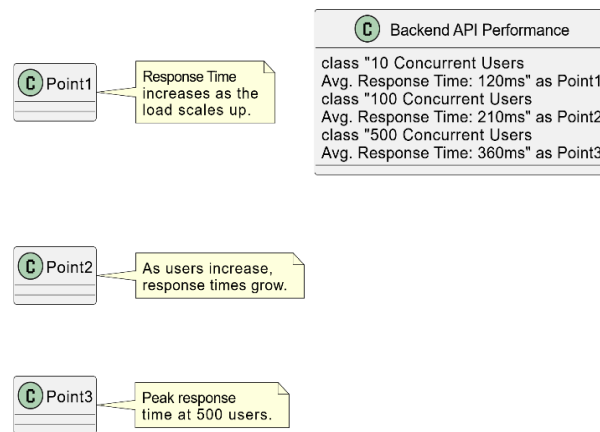


Fig. 2: Backend Scalability Testing:

A **line graph** illustrating the performance of the backend API under simulated load, showing its ability to maintain stability and responsiveness.

V. DISCUSSION

5.1 Strengths

- **Unified Interview Experience:** The platform streamlines the mock interview process by combining AI-generated questions, real-time speech-to-text transcription, and instant feedback, eliminating the need for multiple tools. This all-in-one approach provides a more realistic and efficient experience for users.
- **AI-Driven Customization:** Leveraging the powerful Google Gemini API, the platform creates personalized interview questions tailored to specific job roles. This dynamic question generation ensures that each interview feels relevant and up-to-date.
- **Instant Feedback & Progress Tracking:** Users get immediate feedback on their performance, helping them identify strengths and areas for improvement. The platform also tracks progress over time, offering a clear overview of their development.
- **Flexible for All Users:** Whether you're a job seeker or an admin, the platform supports multiple roles and provides customizable settings to suit different needs. Admins can easily manage interviews and users, while job seekers can tailor their experience.
- **Voice Interaction:** Unlike traditional platforms, this one incorporates voice-based interaction. Job seekers can respond to interview questions naturally, and the platform transcribes their answers, enhancing the realism of the experience.
- **Scalable & Reliable:** Built on a cloud-first architecture, the platform is hosted on Vercel, ensuring fast performance and scalability. It handles traffic spikes effortlessly, providing a smooth experience for all users.
- **Secure & Private:** With NextAuth.js managing authentication, the platform ensures secure logins and role-based access control, so sensitive data is always protected.
- **User-Friendly Interface:** Designed with simplicity in mind, the platform's UI, powered by Tailwind CSS and ShadCN UI, is intuitive, responsive, and easy to navigate on any device.

5.2 Applications

- **Interview Preparation:** AI-generated mock interviews help job seekers practice and prepare for real interviews.
- **Skill Assessment:** AI evaluates user performance, providing insights into strengths and areas for improvement.
- **Role-Specific Practice:** Tailored mock interviews focus on specific job roles for targeted practice.
- **Instant Feedback:** Real-time feedback allows users to adjust and improve immediately.
- **AI-Driven Learning:** The system adapts and personalizes the experience for different roles and industries.

5.3 Advantages

- **24/7 Access:** Users can practice anytime without needing a human interviewer.
- **Cost-Effective:** Reduces the need for expensive coaching, making it more accessible.
- **Customizable:** Interviews can be tailored to specific roles or industries for more focused preparation.
- **Efficient Learning:** Real-time feedback accelerates learning and adaptation to various interview styles.
- **Scalability:** Supports a large number of users simultaneously, making it scalable for high-demand periods.

5.4 Limitations

- **Limited Human Interaction:** AI cannot replicate human behavior and emotional responses during interviews.
- **AI Dependence:** The quality of questions and feedback depends on the AI model, which may not always reflect the latest standards.
- **Non-Verbal Feedback Missing:** The platform cannot assess body language, which is important in real-world interviews.
- **Platform Issues:** Technical bugs or connectivity issues can impact the user experience.
- **Learning Curve:** Some users may need time to adjust to the platform, especially if not familiar with technology.

VI. CONCLUSION

The **AI-Powered Mock Interview Platform** is a web application built to help users practice and improve their interview skills using AI-generated questions and personalized feedback. Designed with modern technologies like Next.js, MongoDB, Tailwind CSS, and hosted on Vercel, the platform ensures a smooth, scalable, and responsive experience for users. Authentication is handled securely using Next Auth, supporting Clerk-based login methods.

Users can select job roles, define skill areas, and then participate in mock interviews through text or voice input. Powered by the Google Gemini API, the system generates relevant interview questions in real time, simulating realistic interview conditions. At the end of each session, users receive feedback focused on the clarity, structure, and effectiveness of their responses.

What sets this platform apart is its focus on continuous improvement and accessibility. Features like speech-to-text input, customizable interview sessions, and AI-driven evaluation help users gain confidence and prepare more effectively. It also opens doors for future enhancements like sentiment analysis, role-specific feedback, and video-based simulations.

Overall, the project demonstrates the potential of combining AI with modern web development to create a meaningful and practical tool for career readiness and skill development.

VII. FUTURE WORK

The AI-Powered Mock Interview Platform has exciting potential to grow into an even smarter, more helpful companion for anyone preparing for job interviews.

One promising direction is improving the depth of feedback. Right now, the app gives thoughtful suggestions based on clarity, structure, and relevance—but future versions could go further. By using advanced Natural Language Processing, it could start to pick up on how confident or engaged someone sounds. Imagine getting tips not just on what you said, but how you said it—whether your tone showed confidence, empathy, or perhaps a bit of nervousness. That kind of feedback can be a game-changer for improving communication.

The platform could also become more inclusive by supporting multiple languages. Many job seekers feel more confident practicing in their native language or need to prepare for interviews in a different country. By using tools like Google Cloud Translation and expanding Gemini's language support, the app could help users practice in the language they're most comfortable with—making it more accessible to people all around the world.

Another natural next step is offering feedback tailored to specific job roles. For example, someone preparing for a technical interview might get feedback not just on how they explain their answers, but also on the accuracy and efficiency of their problem-solving. On the other hand, someone preparing for a behavioural or HR interview could get suggestions focused on soft skills like teamwork, adaptability, and leadership. By staying up-to-date with job market trends, the app could adjust questions and feedback based on what employers are currently looking for.

Finally, integrating the platform with job sites like LinkedIn, Indeed, or Glassdoor would make the journey from practice to real-world application even smoother. Users could explore job openings, pull in job descriptions, and instantly get mock questions based on those roles—without ever leaving the app.

All of these enhancements point to one clear direction: turning the platform into a complete, intelligent space where users can prepare, improve, and step confidently into their next opportunity.

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