

AI-Driven Platform for Job Interview Preparation Using Gemini API

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Abstract:

This study introduces a smart web-based platform designed to enhance interview preparation using modern Artificial Intelligence techniques. The system combines the MERN stack (MongoDB, Express, React, Node.js) with the Gemini API to conduct adaptive mock interviews and generate intelligent feedback. It simulates real interview scenarios by dynamically producing questions and evaluating responses based on communication skills, subject knowledge, fluency, and professionalism. To ensure efficiency, the platform incorporates caching strategies and optimized API usage, reducing response time and operational cost. A preliminary study involving undergraduate students indicates noticeable improvements in performance, confidence, and interaction speed. The paper outlines the system design, implementation approach, evaluation outcomes, and potential future improvements including multimodal capabilities.

Keywords — Artificial Intelligence, Interview Training, MERN Architecture, Gemini API, Smart Evaluation, Web Systems.

I. INTRODUCTION

Interviews play a crucial role in determining a candidate's suitability during recruitment. Conventional preparation techniques, such as static question lists or peer-based practice sessions, often fail to provide personalized feedback and adaptability. With advancements in Artificial Intelligence, especially Large Language Models (LLMs), it has become possible to create

systems that mimic human-like interaction and evaluation.

In this work, we present an AI-powered interview preparation system built on the MERN stack and integrated with the Gemini API [5]. The platform generates customized interview questions based on selected domains and evaluates candidate responses in real time. It provides structured feedback focusing on clarity,

confidence, and correctness. The primary objective is to develop a scalable, cost-efficient, and interactive solution that helps students prepare effectively for both technical and HR interviews.

II. RELATED WORK

Several existing platforms such as InterviewBuddy and Pramp offer interview practice environments, but they largely depend on predefined scripts or human evaluators. Earlier research in automated evaluation focused on traditional Natural Language Processing (NLP) techniques for analyzing textual responses [1], [2].

With the introduction of transformer-based architectures like GPT and Gemini [3], [4], conversational AI systems have significantly improved in understanding and evaluating human language. Despite these advancements, limited work has been done in integrating such models into complete web-based systems with real-time analytics and feedback mechanisms. This research aims to bridge that gap by combining AI capabilities with a full-stack implementation.

III. SYSTEM ARCHITECTURE

A. Overall Design

The proposed system follows a client-server model. The frontend is developed using React, which manages user interactions and session flow. The backend, built with Node.js and Express, is responsible for authentication, question generation, and communication with the Gemini API. MongoDB is used for storing user data, interview records, and feedback logs, while Redis is employed to cache frequently used prompts and reduce redundant API calls.

B. Module Description

The system has the following modules:

- **User Management:** Handles user registration, login, and authentication using JWT tokens.

- **Interview Engine:** Controls the interview flow, including domain selection and question sequencing.
- **AI Integration Layer:** Acts as a bridge between the backend and Gemini API for generating and evaluating responses.
- **Scoring System:** Combines rule-based and AI-driven techniques to assess answers.
- **Analytics Dashboard:** Monitors user progress and performance across multiple sessions.

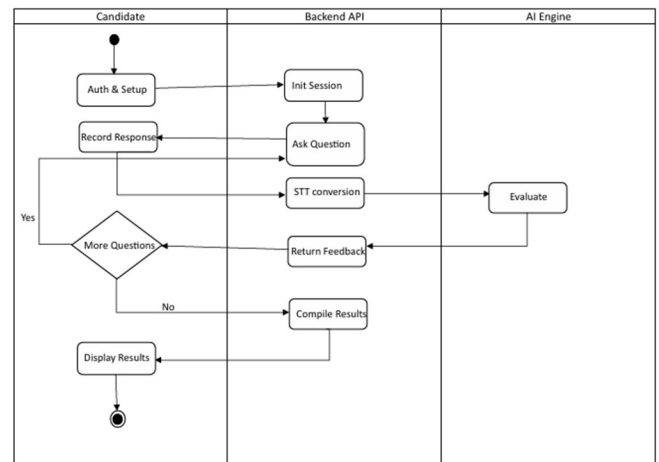


Figure 1 Overall activity diagram of the ai-based interview platform

C. Evaluation Formula

Candidate performance is calculated using a weighted scoring model:

$$S = w_c C + w_k K + w_f F + w_p P, \quad (1)$$

where C is communication, K is knowledge correctness, F is the fluency, and P is the professionalism. Default weights are $w_c = 0.25$, $w_k = 0.40$, $w_f = 0.20$, $w_p = 0.15$

IV. IMPLEMENTATION DETAILS

The backend is implemented using RESTful APIs in Express.js, which handle request processing and interaction with the Gemini API [5]. Techniques such as request batching and caching are applied to reduce latency and API usage costs. MongoDB ensures reliable data

storage, while Redis enhances performance through caching.

On the frontend, React.js combined with Tailwind CSS provides a responsive and user-friendly interface. Real-time communication between the user and the AI system is enabled through WebSockets. Security is maintained using JSON Web Tokens for authenticated API access.

V. EXPERIMENTAL EVALUATION

A. Participants and Methodology

A pilot study was conducted with four undergraduate students specializing in computer science. Each participant completed five mock interview sessions covering both technical and HR topics. Performance was evaluated using pre- and post-assessment surveys.

B. Results and Metrics

TABLE I
PERFORMANCE METRICS BEFORE AND AFTER

Metric	Pre-test	Post-test
Answer Quality	63.2	75.5
Confidence	2.8	4.1
Average Latency (ms)	890	420
API Calls per Session	6.3	4.2

The results show a significant improvement in answer quality along with a reduction in system latency. Users also reported increased confidence after using the platform.

VI. DISCUSSION

The developed system successfully demonstrates the capability of AI in simulating realistic interview environments. The integration of Gemini API enables detailed and context-aware evaluation, which enhances the learning experience. However, certain limitations exist, such as dependency on external APIs, potential inaccuracies in AI-generated feedback, and possible bias in evaluation. Ensuring data security is also essential, and appropriate encryption methods are used to protect user information.

VII. FUTURE ENHANCEMENTS

Future improvements to the system include:

- Adaptive Learning Mechanism:** Adjusting question difficulty dynamically using reinforcement learning techniques.
- Explainable AI Features:** Providing transparent reasoning behind evaluation scores.
- Integration with Educational Systems:** Connecting with Learning Management Systems (LMS) and placement platforms.

VIII. CONCLUSION

This paper presents a comprehensive AI-driven interview preparation system developed using the MERN stack and Gemini API. The platform offers dynamic question generation and automated evaluation, helping users improve their interview skills effectively. Experimental results indicate notable gains in performance and confidence among users. The system has strong potential to serve as a scalable and efficient tool for career preparation.

IX. ACKNOWLEDGMENT

The authors would like to thank the Department of Computer Science and Engineering, Sandip University, Nashik, for their continuous support and guidance. Special appreciation is extended to faculty members for their valuable suggestions and technical insights.

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