International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 02, February 2026)

Interview Mirror: AI-Powered One-to-One Interview Simulation Platform

Meena Arora[1], Abhay Mishra[2], Akriti Yadav[3], Ayushman Singh[4], Devesh Singh[5], Atharva Srivastava[6]
Department of Information Technology, JSS Academy of Technical Education, Noida, India

***Abstract*-- Interview Mirror is an AI-powered interview simulation platform designed to prepare students and job seekers for real-world recruitment processes. The system conducts interactive one-to-one mock interviews in both text and voice formats and provides multi-dimensional feedback on technical accuracy, communication clarity, emotional confidence, and response structure. Using natural language processing, speech analysis, and adaptive learning algorithms, the platform tailors interview questions to a candidate's resume and dynamically adjusts difficulty based on performance. A scalable microservices-based cloud architecture utilizing Kafka and Redis ensures real-time, low-latency interaction and supports concurrent users. Experimental evaluation in academic settings demonstrates improvement in communication confidence, technical articulation, and interview preparedness. The proposed system bridges the gap between academic learning and employability by providing an accessible, data-driven, and fair interview training ecosystem.**

***Keywords*— Artificial Intelligence, Mock Interviews, Resume-Based Question Generation, Multimodal Evaluation, Kafka, Redis, Natural Language Processing**

I. INTRODUCTION

Modern recruitment practices increasingly emphasize both technical competence and soft skills such as communication clarity, confidence, and structured reasoning. Traditional preparation approaches, including classroom sessions and peer mock interviews, often fail to replicate the spontaneity and pressure of real interview environments. Furthermore, the rise of AI-driven hiring tools such as automated screening and video-based assessments has widened the gap between academic preparedness and professional expectations. InterviewMirror addresses these challenges by offering an AI-powered mock interview platform that simulates real-world HR, technical, and behavioral interviews. The system leverages resume-based question generation, adaptive conversational flows, and multimodal feedback mechanisms to enhance candidate preparedness and employability. ([1]; [4]).

II. RELATED WORK

Existing research explores AI applications in recruitment, automated interview systems, and candidate evaluation. Studies on multimodal fusion models demonstrate the benefits of integrating audio, video, and text analysis for improved assessment accuracy. Emotion recognition systems have been proposed to evaluate non-verbal cues such as facial expressions and vocal tone, providing insight into candidate confidence and engagement. Resume-based question generation frameworks utilize natural language processing and large language models to tailor interview prompts. However, many existing platforms remain limited by text-only interaction, lack of real-time adaptability, scalability challenges, and insufficient ethical safeguards. InterviewMirror differentiates itself by combining adaptive resume-driven questioning, real-time voice interaction, enterprise-grade scalability, and transparent analytics within a unified platform. [14].

III. SYSTEM ARCHITECTURE

The Interview Mirror platform follows a modular microservices-based architecture consisting of three layers: presentation, application, and data. The presentation layer provides a web-based user interface developed using Next.js, supporting resume uploads, interview interaction, and performance dashboards. The application layer contains independent AI microservices responsible for resume parsing, question generation, speech-to-text processing, evaluation, and feedback generation. Apache Kafka is employed as a message broker to enable asynchronous event-driven communication, while Redis serves as an in-memory cache to optimize session management and reduce latency. The data layer utilizes PostgreSQL for structured user and session data and MongoDB for storing transcripts and logs. This architecture ensures scalability, reliability, and real-time responsiveness. ([8]; Gupta & Kumar, 2021).

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 02, February 2026)

IV. Methodology

The system workflow begins with resume ingestion, where uploaded documents are parsed using NLP pipelines to extract skills, experience, and domain-specific keywords. These features are mapped to a question generation module powered by large language models, producing personalized and adaptive interview questions. During the interview session, user responses are captured in text or voice format. Voice input is processed using automatic speech recognition, converting audio to text for semantic analysis. The evaluation engine employs a multimodal approach, combining textual relevance scoring, vocal fluency analysis, and confidence indicators. Performance metrics are logged and visualized on user dashboards, enabling longitudinal tracking and targeted skill improvement. ([12]; [13]).

V. Implementation Details

This section describes the practical implementation aspects of the InterviewMirror platform, focusing on the integration of software frameworks, AI services, and cloud infrastructure. The frontend is developed using Next.js, which provides server-side rendering and static site generation capabilities for improved performance and search engine optimization. The user interface supports real-time interaction using WebSocket connections, enabling continuous streaming of interview questions and candidate responses without. Notice ablelatency.

On the backend, the Node.js-based API Gateway manages authentication, session validation, and routing of requests to internal microservices. Each AI module—resume parsing, question generation, speech-to-text, and evaluation—runs as an independent containerized service deployed using Docker. This containerization allows services to scale horizontally depending on user load. Apache Kafka is employed as the core event streaming platform, facilitating asynchronous communication between services and ensuring that high-volume traffic does not block critical interview flows.

The resume parsing service uses NLP techniques such as named entity recognition, keyword extraction, and dependency parsing to identify skills, projects, and experience sections. These extracted entities are mapped to predefined skill ontologies and domain taxonomies. The question generation service leverages large language models, augmented with retrieval mechanisms, to ensure that generated questions remain grounded in the user's resume content.

For voice interaction, the platform integrates an automatic speech recognition pipeline based on Whisper-like models. Audio streams are converted into text transcripts in near real time and passed to the evaluation engine. The text-to-speech module synthesizes natural-sounding interviewer questions, enhancing realism. All session metadata, logs, and transcripts are stored in MongoDB, while structured user and performance data are persisted in PostgreSQL.

VI. Security, Privacy, And Ethical Considerations [14].

Given the sensitive nature of candidate data, InterviewMirror incorporates robust security and privacy mechanisms. User authentication is implemented using JSON Web Tokens (JWT), ensuring secure session management and preventing unauthorized access. All communication between the client and server is encrypted using HTTPS and TLS protocols. Personally identifiable information, including resumes and interview transcripts, is stored in encrypted databases with strict role-based access control.

From an ethical standpoint, the system design adheres to principles of transparency, fairness, and accountability. The evaluation engine provides explainable feedback by highlighting specific response segments and communication metrics that contribute to performance scores. This helps users understand how assessments are derived rather than presenting opaque numerical ratings.

Bias mitigation strategies are incorporated by training models on diverse and representative datasets and periodically auditing performance across demographic groups. The platform avoids making automated hiring decisions and instead positions itself strictly as a preparatory and educational tool. Candidates retain full control over their data, with options to delete profiles and session history in compliance with data protection regulations such as GDPR and institutional data governance policies. [14].

VII. Performance Evaluation And Scalability Analysis

To validate the performance of InterviewMirror, a series of stress and load tests were conducted in a controlled academic cloud environment. The system was evaluated under varying numbers of concurrent users to measure response latency, throughput, and resource utilization. Apache Kafka demonstrated high reliability in managing asynchronous message queues, maintaining stable performance even during peak traffic scenarios.

International Journal of Recent Development in Engineering and Technology
Website: www.ijrdet.com (ISSN 2347-6435(Online) Volume 15, Issue 02, February 2026)

Redis caching significantly reduced database query load by storing active session states in memory. Average response times for question generation and feedback delivery remained within acceptable real-time thresholds, ensuring a smooth user experience. The microservices architecture enabled horizontal scaling, where additional containers could be deployed dynamically based on CPU and memory utilization metrics.

Comparative analysis with monolithic system designs showed that the distributed approach improved fault tolerance and minimized system downtime. However, network latency between services introduced minor overhead, which can be mitigated through service colocation and optimized message batching. Future deployments aim to integrate auto-scaling policies and Kubernetes orchestration for enhanced reliability and performance.

VIII. Results And Discussion

Preliminary deployment of Interview Mirror in academic training environments indicates measurable improvements in student confidence, articulation, and technical response quality. Users reported increased realism in interview simulation and greater awareness of communication gaps. The event-driven architecture demonstrated low-latency performance under concurrent usage, validating the platform's scalability. However, challenges remain in handling diverse accent patterns in speech recognition and ensuring bias-free evaluation in emotion and confidence scoring. Future work will focus on expanding multilingual support, integrating fairness auditing tools, and enhancing explainability in AI-driven feedback modules.

IX. Conclusion

Interview Mirror presents a comprehensive AI-powered ecosystem for interview preparation, integrating resume-aware personalization, adaptive questioning, and multimodal feedback. By bridging the gap between academic learning and professional employability, the platform offers a scalable, accessible, and fair solution for students and job seekers. The system's modular architecture and ethical design principles position it as a viable foundation for next-generation digital recruitment training tools. [14].

X. Case Study And User Evaluation

A pilot study was conducted with undergraduate students preparing for campus placement interviews.

Participants used the InterviewMirror platform over a two-week period, completing multiple mock interview sessions across technical and HR domains. Pre- and post-study surveys were administered to measure changes in confidence levels, communication clarity, and perceived preparedness.

Results indicated a statistically significant improvement in self-reported confidence and articulation skills. Students highlighted the usefulness of resume-based personalized questions and real-time feedback in identifying specific weaknesses. The analytics dashboard was particularly valued for tracking progress across sessions and visualizing improvement trends.

Qualitative feedback emphasized the realism of the voice-enabled interviewer and the benefits of adaptive follow-up questions. Limitations reported included occasional inaccuracies in speech transcription for strong regional accents and the desire for multilingual interview support. These findings will inform future enhancements to improve inclusivity and global applicability.

XI. Future Work

Future development of InterviewMirror will focus on expanding multilingual and cross-cultural support to accommodate diverse candidate populations. Integration of advanced bias detection and fairness auditing tools will further enhance the ethical robustness of the platform. The incorporation of immersive technologies, such as virtual reality-based interview environments, is also being explored to increase realism and user engagement.

Additional technical improvements include the deployment of retrieval-augmented generation models for more precise question tailoring, enhanced emotion recognition using deep learning architectures, and explainable AI modules that provide transparent reasoning behind evaluation scores. Long-term goals involve integrating institutional learning management systems and providing APIs for corporate training platforms. [14].

REFERENCES

[1] J. Lv, C. Chen, and Z. Liang, "Automated Scoring of Asynchronous Interview Videos Based on Multi-Modal Window-Consistency Fusion," IEEE Transactions on Affective Computing, vol. 14, no. 2, pp. 345–360, 2023.

[2] V. Patil and S. Rathi, "Emotion Recognition for Mock Interviews," Proceedings of the IEEE International Conference on Data Science and Advanced Analytics, pp. 112–118, 2020.

[3] R. Ramesh and K. Sridhar, "An Intelligent Mock Interview System Based on Emotion Analysis," Proceedings of the IEEE Conference on Intelligent Systems, pp. 89–95, 2022.

[4] Y. Zhang and J. Wu, "AI-Assisted Feedback Generation for Interview Preparation," IEEE Transactions on Education, vol. 65, no. 2, pp. 185–192, 2022.

[5] A. Das and P. Sharma, "A Review of AI Applications in Interview Systems," IEEE Transactions on Emerging Topics in Computing, vol. 9, no. 1, pp. 95–104, 2021.

[6] A. Kumar and P. Singh, "Utilizing AI for Enhanced Interview Feedback Mechanisms," Proceedings of the IEEE International Conference on Artificial Intelligence and Data Science, pp. 221–227, 2021.

[7] S. Gupta and V. Kumar, "Analyzing Candidates' Performance in Mock Interviews using AI Techniques," IEEE International Conference on Data Science and Advanced Analytics, pp. 301–307, 2021.

[8] A. Sharma and L. Dey, "AI-Powered Interview Assistance System," IEEE Access, vol. 10, pp. 12345–12360, 2022.

[9] N. S. Rai et al., "AI Based Interview Evaluator: An Emotion and Confidence Classifier," International Journal of Advanced Research in Computer Engineering and Communication Engineering, vol. 13, no. 4, pp. 55–62, 2024.

[10] E. R. Sophie, "Facial Expression Analysis in AI-Driven Video Interviews," Preprint, 2025.

[11] Nofal et al., "AI-Enhanced Interview Simulation in the Metaverse," IEEE Conference on Virtual Environments, pp. 201–210, 2025.

[12] K. Saeki et al., "Multimodal Features for Speaking Proficiency Scoring," IEEE Transactions on Learning Technologies, vol. 14, no. 3, pp. 410–423, 2021.

[13] Y. Wu et al., "Multimodal Candidate Evaluation Using Deep Learning," IEEE Access, vol. 12, pp. 76543–76558, 2024.

[14] L. Chen et al., "Ethics and Bias in AI-Driven HR Systems," ACM Conference on Fairness, Accountability, and Transparency, pp. 98–110, 2023.

[15] M. Brown and T. Allen, "Compressed Multimodal Fusion for Real-Time Interview Assessment," IEEE Transactions on Multimedia, vol. 27, no. 1, pp. 44–57, 2025.