International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 04 Issue: 04 April 2026
Page No: 2468-2473
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2026.0330

AI-Integrated Virtual Interview Platform

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Abstract
The rapid evolution of digital recruitment and remote hiring has transformed traditional interview processes into virtual and technology-driven systems. However, existing interview preparation methods often lack realism, personalization, and structured feedback, making candidates underprepared for real-world interviews. The AI-Integrated Virtual Interview Platform proposes a comprehensive solution that simulates real interview environments using artificial intelligence, resume analytics, and adaptive assessments.The platform integrates automated resume analysis, AI-guided mock interviews, role-based coding challenges, and adaptive aptitude tests to evaluate and enhance candidate skills holistically. Real-time interview simulation using webcam and audio, combined with timed questioning, helps candidates experience authentic interview pressure. Performance analytics and feedback reports assist candidates in identifying strengths and improvement areas.The system is designed using a modular architecture to ensure scalability, security, and ease of maintenance. By emphasizing personalization, real-time evaluation, and analytics-driven feedback, the proposed platform significantly improves interview readiness, confidence, and employability of candidates in modern recruitment ecosystems.

Keywords:

1. Introduction
In the digital era, recruitment processes have increasingly shifted toward online and remote interview platforms. Organizations now rely on virtual interviews, online coding tests, and AI-based screening to evaluate candidates efficiently. Despite this transformation, many students and job seekers continue to depend on conventional preparation methods such as textbook learning, recorded videos, or peer discussions, which fail to replicate real interview scenarios.Traditional interview preparation lacks personalization, real-time interaction, and adaptive feedback. Candidates often struggle with interview anxiety, time management, communication skills, and role-specific technical challenges. Furthermore, existing online platforms typically focus on isolated components such as aptitude tests or coding practice, without integrating them into a unified interview simulation environment.The AI-Integrated Virtual Interview Platform is designed to overcome these limitations by offering a structured and intelligent interview preparation system. The platform analyzes candidate resumes to extract skills, experience, and career objectives, which are then used to generate customized interview questions. Live AI-driven interviews, role-based coding environments, and adaptive aptitude assessments provide a realistic and comprehensive evaluation process.By combining artificial intelligence, analytics, and real-time interaction, the proposed system enhances candidate preparedness and bridges the gap between academic learning and industry expectations.

2. Methodology
2.1.User Interaction
Learners access the Kamaraj MOOC platform through a responsive and interactive web interface. Each course module is designed with intuitive navigation, enabling users to move seamlessly between lessons, assessments, and discussion forums.

2.2.Content Delivery
Learning materials such as video lectures, quizzes, and assignments are hosted on a centralized cloud-based server. Adaptive streaming techniques ensure

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efficient content delivery across different devices and varying internet speeds, thereby providing a smooth learning experience.

2.3.Progress Tracking

The system continuously monitors learner activity using analytics tools. Performance data, quiz scores, and activity logs are automatically recorded to generate personalized feedback and learning recommendations.

2.4.Assessment and Evaluation

Kamaraj MOOC integrates real-time evaluation mechanisms. Quizzes and assignments are auto-graded, allowing students to receive instant results. Instructors can review detailed performance analytics to provide targeted academic guidance.

2.5.Communication and Collaboration

Learners interact through discussion forums and live chat sessions. Collaborative tasks and virtual group projects encourage peer learning, knowledge sharing, and community engagement.

2.6.Security and Data Management

All user data and course materials are protected using encryption protocols. Authentication mechanisms and regular data backups ensure secure and reliable access to system resources.

2.7.Instructor Support and Administration

Faculty members can upload course content, schedule sessions, and monitor learner engagement through an administrative dashboard. Automated notifications alert learners about deadlines and course updates.

2.8.Outcome

This methodology ensures that Kamaraj MOOC delivers a structured, interactive, and personalized online learning experience that promotes continuous learning, skill development, and digital inclusivity.

3. System Architecture

The AI-Integrated Virtual Interview Platform is designed using a three-tier modular architecture that separates user interaction, application logic, and data management. This architectural approach ensures scalability, flexibility, maintainability, and secure processing of interview data. The system supports multiple stakeholders including candidates, administrators, and evaluators, while enabling real-time interview simulation and AI-based assessment. The architecture integrates artificial intelligence components with web technologies to provide a seamless and realistic interview experience.

3.1.Presentation Layer (User Interface Layer)

The presentation layer provides an interactive and responsive interface for candidates and administrators. It is responsible for handling all user interactions and displaying system outputs in real time.

Key responsibilities:

- User registration and secure login
- Resume upload and profile selection
- Live interview interface with webcam and audio access
- Coding interface with real-time compilation and execution
- Display of aptitude questions and timer controls
- Visualization of performance feedback and reports

The interface is designed to be device-independent, allowing users to access the platform from desktops, laptops, or tablets. Real-time elements such as timers, question prompts, and coding execution outputs enhance realism and engagement.

3.2.Application Layer (Business Logic Layer)

The application layer acts as the core processing unit of the system. It manages AI logic, interview workflows, and assessment evaluation. This layer ensures smooth communication between the user interface and the database.

3.2.1. Resume Analysis Engine

This component uses AI-based text processing techniques to extract skills, education, experience, and keywords from uploaded resumes. The extracted data is structured into a candidate profile, forming the foundation for personalized assessments.

3.2.2. Interview Management Module

This module controls the flow of the virtual interview. It schedules questions, enforces time limits, and manages transitions between interview stages such as HR questions, technical questions, and coding rounds.

3.2.3. Question Generation Engine

Based on the candidate profile and selected job role,

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the system dynamically generates interview, coding, and aptitude questions. Question difficulty is adjusted using performance metrics to ensure adaptive evaluation.

3.2.4. Coding Assessment Engine

This engine manages the in-browser compiler environment. It validates code syntax, executes test cases, and records execution time, accuracy, and efficiency for evaluation.

3.2.5. Aptitude Evaluation Module

The aptitude module conducts logical, quantitative, and verbal assessments. Difficulty levels are adjusted dynamically based on candidate responses to provide accurate skill measurement.

3.2.6. Performance Analytics and Feedback Engine

This component aggregates data from interviews, coding tests, and aptitude assessments. AI-based analytics generate detailed performance reports highlighting strengths, weaknesses, and improvement suggestions.

3.3.Data Layer (Database Layer)

The data layer is responsible for secure storage and management of system data. It ensures data consistency, integrity, and availability.

Stored data includes:

- User authentication details
- Uploaded resumes and extracted skill data
- Interview questions and responses
- Coding submissions and execution results
- Aptitude test scores
- Performance analytics and feedback reports

Role-based access control mechanisms ensure that sensitive data is accessible only to authorized users. Regular backups and encryption techniques enhance data security and reliability.

3.4.Communication and Data Flow

The system follows a structured data flow model:

- The user submits input through the presentation layer
- The application layer processes the request using AI modules
- Relevant data is retrieved or stored in the database layer
- Processed results are returned to the user interface in real time

This structured flow ensures efficient processing and minimal latency during live interviews.

3.5.Security and Privacy Architecture

Security is a critical component of the system architecture.

- Secure authentication and authorization mechanisms
- Encrypted storage of resumes and personal data
- Controlled access to webcam and microphone features
- Secure session management during live interviews
- Protection against unauthorized data access

These measures ensure compliance with data privacy standards and build user trust.

3.6.Scalability and Future Enhancements

The modular architecture allows seamless integration of future enhancements such as:

- Emotion and sentiment analysis during interviews
- AI-based interview scoring models
- Multilingual interview support
- Integration with job portals and recruitment systems

The architecture is designed to handle increasing user loads without performance degradation.

3.7.Architectural Outcome

The proposed system architecture ensures a robust, secure, and intelligent interview preparation platform. By combining AI-driven analytics, real-time interaction, and modular design, the platform effectively simulates real interview environments and enhances candidate employability.

4. Results and Discussion

4.1.Results

The AI-Integrated Virtual Interview Platform provides a realistic and interactive interview preparation environment. Personalized question generation and real-time interviews improve candidate engagement and confidence. Performance analytics help candidates understand their skill gaps and track improvement over time. The integrated system offers a significant advantage over traditional

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https://doi.org/10.47392/IRJAEH.2026.0330

preparation methods.

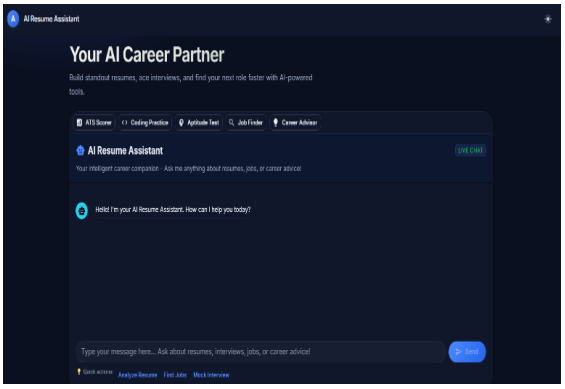

Figure 1 User Login Interface of AI-Integrated Virtual Interview Platform

This figure shows the initial login interface of the AI-Integrated Virtual Interview Platform. The interface provides secure login and registration options for users. It ensures role-based access control, allowing candidates to enter the system using authenticated credentials. This page serves as the entry point to the platform and ensures secure user authentication before accessing interview and assessment features.

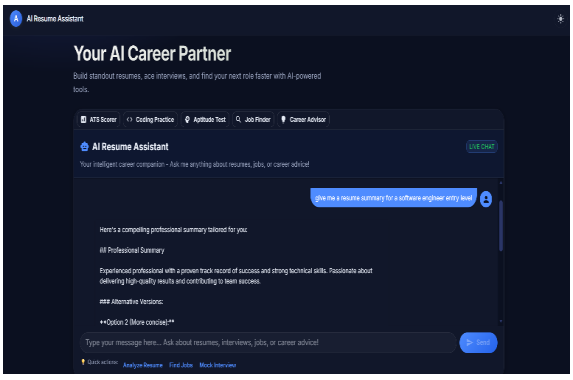

Figure 2 User Registration Page

This figure illustrates the registration interface where new users can create an account by providing basic personal and academic details. The registration module validates user inputs and securely stores user credentials. This process ensures that only authorized users can access interview simulations and personalized assessments.

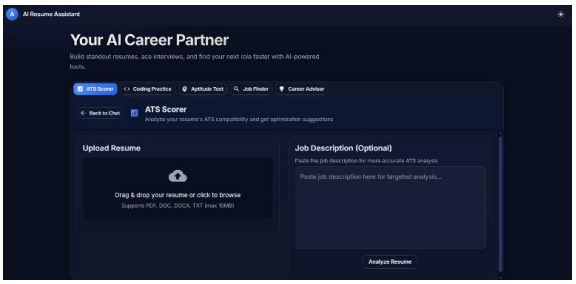

Figure 3 Resume Upload and Profile Creation Interface

This figure presents the resume upload module of the platform. Candidates upload their resumes in supported formats, which are then processed by the AI-based resume analysis engine. Extracted skills, experience, and qualifications are used to build a personalized candidate profile for interview preparation**.**

Figure 4 Candidate Dashboard Home Page

This figure shows the candidate dashboard after successful login. The dashboard provides navigation options to access virtual interviews, coding assessments, aptitude tests, and performance reports. It acts as a centralized control panel for candidates to manage their interview preparation activities efficiently.

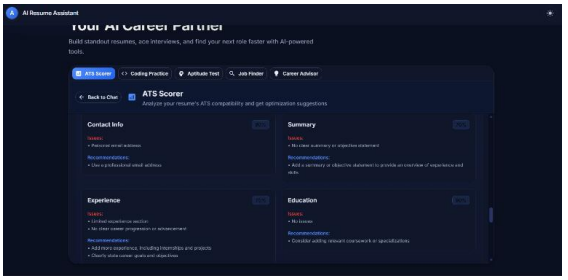

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Figure 5 AI-Guided Interview Question Interface

This figure illustrates the AI-guided interview module where candidates receive interview questions in real time. Each question is time-bound to simulate real interview pressure. The system dynamically presents questions based on the candidate's resume and selected job role.

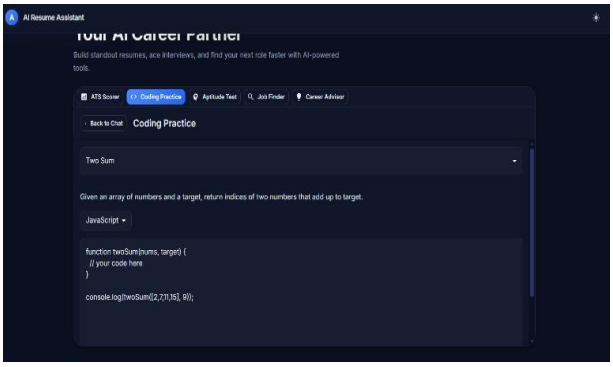

Figure 6 Live Virtual Interview Environment

This figure shows the live virtual interview interface with webcam and audio integration. Candidates respond to AI-generated questions under real-time conditions. This module closely replicates actual interview scenarios, improving communication skills and confidence.

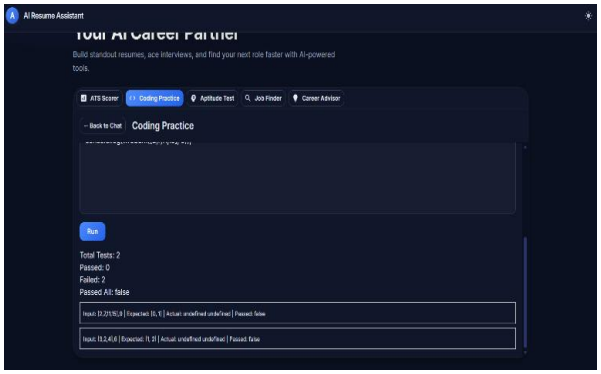

Figure 7 Role-Based Coding Assessment Interface

This figure displays the in-browser coding environment provided to candidates. It allows users to write, compile, and execute code within a fixed time limit. The coding problems are generated based on the candidate's target role and skill set, simulating real technical interview rounds.

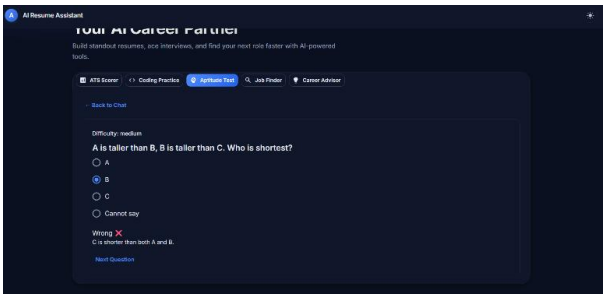

Figure 8 Aptitude Assessment Module

This figure illustrates the aptitude testing interface covering logical, quantitative, and verbal reasoning questions. The system dynamically adjusts question difficulty based on candidate performance, ensuring accurate assessment of aptitude skills.

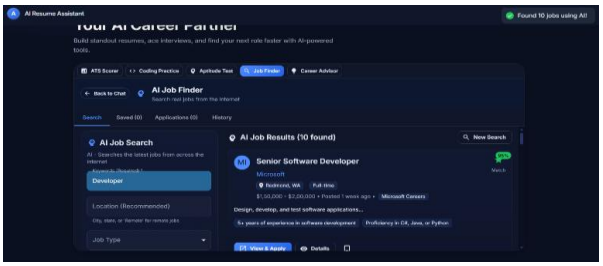

Figure 9 Performance Evaluation and Feedback Report

Figure 10 Administrator Dashboard

This figure shows the administrator dashboard of the platform. Administrators can manage users, monitor interview sessions, analyze platform usage, and generate overall performance analytics. This module ensures effective system monitoring and maintenance.

4.2.Discussion

The screenshots demonstrate that the AI-Integrated Virtual Interview Platform provides a structured and interactive interview preparation environment. The integration of resume analysis, live interview

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simulation, role-based coding, and adaptive aptitude testing offers a comprehensive assessment experience. Real-time feedback and performance analytics enhance candidate learning outcomes and confidence. The modular design ensures scalability and future enhancements, making the system suitable for modern recruitment preparation.

Conclusion

The proposed AI-Integrated Virtual Interview Platform demonstrates an effective approach to modern interview preparation. By combining resume analysis, live interview simulation, coding assessments, and adaptive aptitude testing, the system offers a holistic and personalized preparation experience. The modular and scalable design enables future enhancements such as emotion analysis, multilingual support, and industry-specific interview models, making the platform highly adaptable and future-ready.

Acknowledgment

I would like to express my sincere gratitude to my faculty mentors and the Department of Information Technology at Kamaraj College of Engineering and Technology for their guidance, encouragement, and support throughout the development of the AI-Integrated Virtual Interview Platform project. I also acknowledge the help of online communities and open-source contributors for providing valuable resources and tools. No external financial support was received for this work.

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