

AI-Powered Video Interview Screener

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Abstract - Traditional recruitment processes are often time-consuming, subjective, and inefficient due to manual shortlisting and synchronous interviews. With the increasing number of applicants for a single role, organizations face challenges in maintaining fairness, consistency, and efficiency during initial screening. This paper presents an AI-powered video interview screener designed to automate and streamline the recruitment process. The proposed system integrates aptitude testing, asynchronous browser-based video interviews and Natural Language Processing (NLP) techniques for transcript generation and response evaluation. Candidates can complete assessments and interviews at their convenience, while recruiters gain access to automatically generated scores, transcripts, and comparative insights through a centralized dashboard. The system is developed using Next.js for the frontend and Supabase for backend services, including authentication, database management, and secure cloud storage of video responses. By minimizing human intervention in early-stage screening, the platform reduces bias, eliminates scheduling conflicts, and improves scalability. The proposed solution enhances recruiter efficiency and candidate experience and engagement, making the recruitment process more transparent, flexible, and data-driven.

Key Words: AI Interview Screener, Recruitment Automation, Video Interview, Natural Language Processing, Cloud Computing, Supabase, Next.js.

1. INTRODUCTION

Recruitment and candidate evaluation are critical processes for organizations and educational institutes, as they directly influence the quality of talent selection. With the rapid growth in the number of applicants for a single role or opportunity, traditional recruitment methods such as manual shortlisting, written tests, and synchronous interviews have become inefficient, time-consuming, and difficult to scale. These methods often depend heavily on human judgment, which may introduce bias and inconsistencies in candidate evaluation.

In recent years, digital recruitment platforms have attempted to address these challenges through online assessments and virtual interviews. However, many existing systems focus on isolated stages of recruitment, such as either aptitude testing or video interviews, without providing an integrated and automated workflow. Additionally, the lack of transparency in evaluation criteria, limited customization for institutes, and scheduling constraints continue to affect both recruiters and candidates.

To overcome these limitations, this paper proposes an AI-powered video interview screener that automates the early stages of the recruitment process. The system is designed to combine an initial quiz-based aptitude assessment with asynchronous video interviews, allowing candidates to participate at their convenience. The quiz section serves as the entry-level evaluation stage, enabling institutes to assess candidates' subject knowledge and reasoning skills in a controlled and structured manner. The interview section further evaluates communication skills and response quality through recorded video answers.

The proposed system leverages modern web and cloud technologies to ensure scalability, accessibility, and security. The frontend is developed using Next.js, enabling a responsive interface, while Supabase is used for authentication, database management, and secure cloud storage. An Artificial Intelligence layer based on Natural Language Processing (NLP) generates transcripts from video responses and performs objective analysis of candidate answers. By reducing manual intervention and introducing standardized evaluation mechanisms, the system aims to minimize bias, eliminate scheduling conflicts, and improve recruitment efficiency.

This work presents a unified recruitment screening platform suitable for both organizations and educational institutes. By integrating quiz-based evaluation, AI-driven interview analysis, and cloud-based infrastructure, the proposed solution provides a fair, flexible, and efficient alternative to traditional recruitment practices.

2. LITERATURE SURVEY

With the advancement of artificial intelligence, recruitment processes have increasingly shifted toward automated and online screening methods. Several platforms have been developed to assist recruiters in evaluating candidates through online assessments and video interviews.

Hire Vue is an AI-based interview platform that uses recorded video responses and automated analysis to support recruiters. While it improves screening efficiency, concerns related to evaluation transparency and high subscription costs limit its adoption by smaller organizations. Spark Hire provides one-way video interview functionality, enabling candidates to record responses asynchronously. However, it lacks integrated aptitude testing and relies heavily on manual review.

Talview combines online assessments, video interviews, and remote proctoring within a single system. Although it supports large-scale recruitment, its complexity and operational cost make it less suitable for academic institutions. Similarly, My Interview focuses on asynchronous video interviews with limited AI-based insights and does not provide standardized scoring mechanisms.

From the study of existing systems, it is observed that most platforms emphasize either aptitude testing or video interviews, but rarely offer both in an integrated manner. Additionally, high costs, limited customization, and lack of transparency remain major challenges. These limitations highlight the need for an affordable and integrated AI-based interview screening system that combines quiz-based evaluation with automated interview analysis.

3. PROBLEM STATEMENT AND OBJECTIVES

3.1 Problem Statement

Traditional recruitment and screening processes are time-consuming, inconsistent, and dependent on manual evaluation. Existing online interview platforms often focus either on aptitude testing or video interviews, but fail to integrate both in a cost-effective system. Furthermore, issues such as limited transparency, insufficient customization for institutes, and inadequate proctoring mechanisms reduce the reliability of candidate evaluation. Hence, there is a need for an integrated AI-based interview screening system that ensures fair, efficient, and secure candidate assessment.

3.2 Objectives

The main objectives of the AI Interview Screener are:

- To automate initial candidate screening using quizzes and AI-assisted interviews.
- To support institute-specific quiz creation, management, and evaluation.
- To ensure fairness and integrity through online proctoring mechanisms.
- To generate automated scoring and analytics for effective decision-making.
- To reduce manual effort and improve overall recruitment efficiency.

4. SYSTEM ARCHITECTURE

The AI Interview Screener is designed as a modular web-based system consisting of frontend, backend services, database, AI evaluation, and proctoring modules, as shown in Fig -1.

- **Frontend:** Developed using Next.js with Tailwind CSS, providing a responsive user interface.
- **Backend:** Supabase manages authentication, database operations, and secure storage, while Python-based APIs handle AI evaluation and processing.
- **Database:** PostgreSQL (Supabase) stores candidate data, quiz results, and analytics.
- **AI Evaluation:** NLP-based models generate transcripts and evaluate responses against predefined datasets.
- **Proctoring:** Webcam monitoring and tab-switch detection using MediaPipe and OpenCV help maintain assessment integrity.

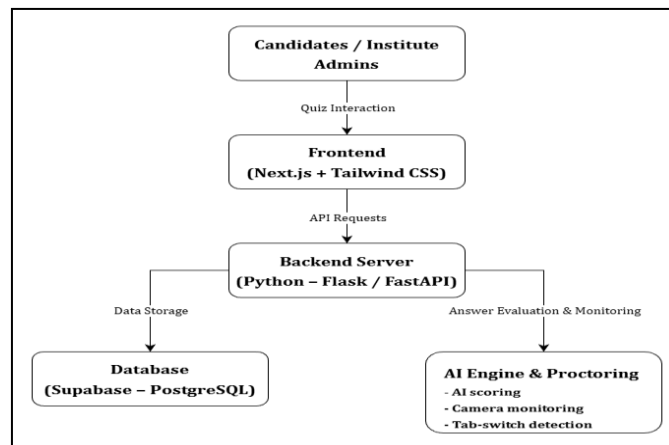


Fig -1: System Architecture of AI Interview Screener

As illustrated in Fig -1, the system follows a modular client-server architecture in which the frontend and backend interact with the database, AI evaluation, and proctoring modules to deliver a unified recruitment screening platform.

4.1 Implementation Methodology

The AI Interview Screener is implemented using a layered and modular approach to ensure scalability, maintainability, and secure data handling. The frontend is built with Next.js and Tailwind CSS, providing a responsive, intuitive user interface for candidates and administrators. Authentication, database management, and file storage are handled by Supabase, ensuring secure access control and reliable cloud storage for resumes and recorded interview videos.

The quiz module is implemented using time-bound MCQ logic with automatic submission and validation. Proctoring mechanisms such as tab-switch detection and webcam monitoring are integrated using browser APIs, Media Pipe, and Open CV, enabling real-time monitoring of candidate behavior during assessments.

For interview evaluation, recorded video responses are processed using Natural Language Processing (NLP) techniques. Speech-to-text models generate transcripts, which are analyzed against predefined datasets and evaluation criteria. Automated scoring is generated based on keyword relevance, response completeness, and contextual similarity. All evaluation results are stored in the PostgreSQL database and visualized through an analytics dashboard for administrative review.

5. MODULE DESCRIPTION

5.1 Candidate Module

The Candidate Module manages candidate registration, authentication, and participation in the recruitment process. Candidates register by submitting personal and professional details such as full name, email, password, phone number, LinkedIn URL, role, resume (PDF), and profile photo (JPG). Google authentication is enabled only for login after registration and verification. Once verified, candidates can access assigned quizzes, attempt them within a time limit, and view results before proceeding to the interview stage.

5.2 Admin Module

The Admin Module allows institutes to manage candidates and recruitment workflows efficiently. Admins can verify candidate registrations; manage candidate lists, and shortlist applicants through collaborative evaluation processes. The module also provides access to detailed candidate profiles, quiz results, and interview-related insights, supporting efficient, transparent, and informed decision-making.

5.3 Quiz Management Module

The Quiz Management Module is responsible for the creation, scheduling, and execution of quizzes across the platform. It manages question sets, quiz duration, navigation controls, and secures submission processes. Candidate responses are evaluated using AI-based validation models, and scores are generated automatically and stored for reporting, review, and further analysis.

5.4 Proctoring Module

The Proctoring Module maintains assessment integrity by employing webcam-based face tracking and real-time tab-switch detection. Candidate behavior is continuously monitored, and any suspicious activity exceeding predefined thresholds results in automatic termination of the assessment session. All such incidents are recorded and made available for administrative analysis.

5.5 Evaluation and Analytics Module

The Evaluation and Analytics Module analyzes quiz results along with proctoring data to generate comprehensive performance reports. It evaluates candidate scores, behavior logs, and overall performance trends. These insights are presented through dashboards and visual summaries that help institutes assess candidates efficiently, consistently, and objectively.

6. WORKFLOW DIAGRAMS

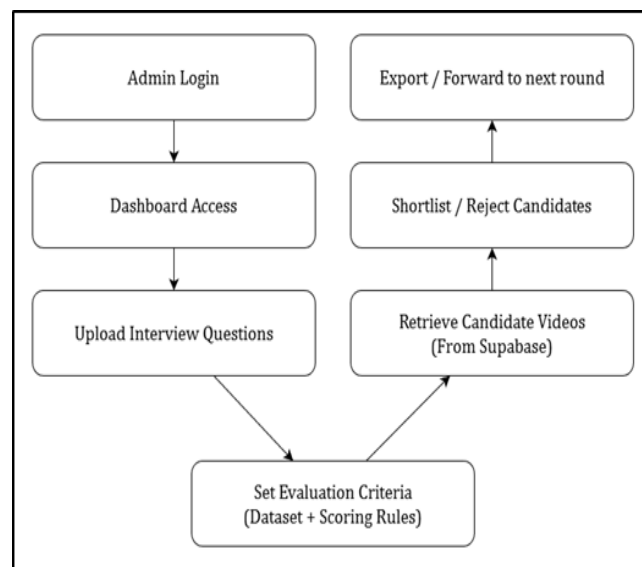


Fig -2: Admin workflow for AI Interview Screener

6.1 Admin Workflow

The admin workflow outlines the steps followed by organizational administrators to manage the interview process, as shown in Fig -2. The workflow starts with admin login and dashboard access. Admins upload interview questions and define evaluation criteria, including datasets and scoring rules. Candidate interview videos and transcripts are retrieved from the database for review. Based on AI-generated scores and evaluation criteria, admins shortlist or reject candidates and export results or forward selected candidates to the next recruitment round.

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6.2 Candidate Workflow

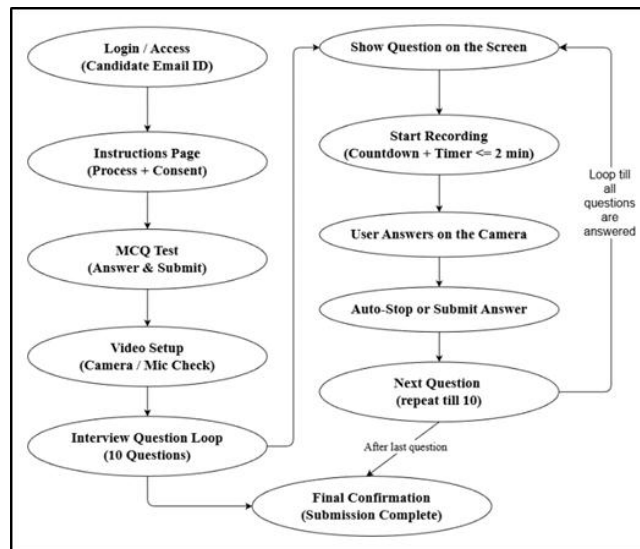


Fig -3: Candidate workflow for AI Interview Screener

The candidate workflow illustrates the complete interview process from the candidate’s perspective, as shown in Fig -3. The workflow begins with candidate login or access through a unique ID or link, followed by instructions and a consent page. Candidates first attempt the MCQ-based quiz and submit their responses. After successful quiz completion, the camera and microphone setup is performed. The system then conducts an AI-based interview consisting of multiple questions, where each response is recorded within a fixed time limit. After answering all questions, the process ends with final submission confirmation.

7. RESULTS AND DISCUSSION

The AI Interview Screener was successfully implemented and evaluated to assess its effectiveness in automating the initial stages of the recruitment process. The system integrates candidate registration, online assessment, proctoring, AI-based evaluation, and analytics into a single unified platform. Functional testing and observational analysis were conducted to examine system behavior, workflow accuracy, and usability. This section discusses the observed results and system outputs with reference to key user interface screens, highlighting how automation and AI assistance improve consistency, efficiency, and usability in candidate screening.

7.1 Candidate Registration Page

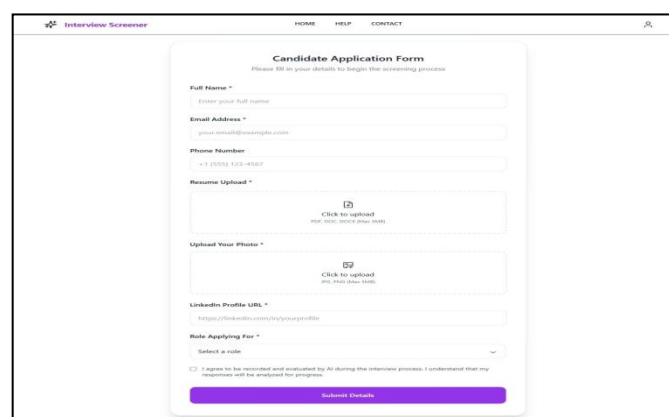


Fig -4: Candidate Registration Page

The candidate registration module enables structured and secure onboarding by collecting essential personal, academic, and professional information, as shown in Fig -4. Details such as full name, email address, phone number, resume, profile photograph, LinkedIn URL, and role applied for are collected. Mandatory field validation ensures data completeness and reduces incorrect submissions. Google authentication is used exclusively for login, while registration is performed manually to maintain verification integrity and control over candidate data.

7.2 Quiz Interface

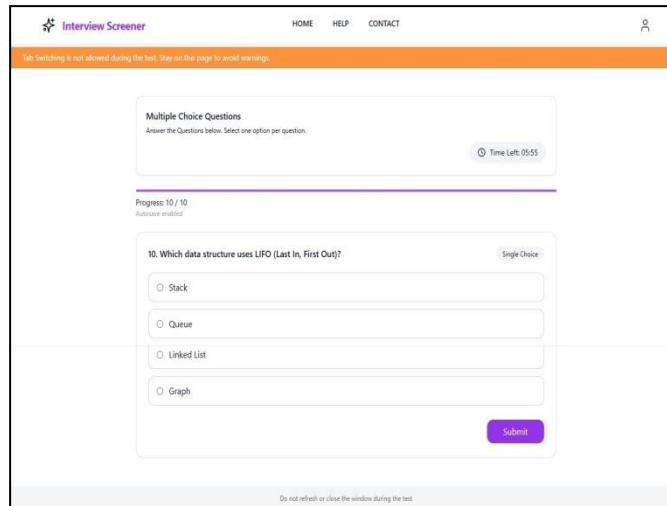


Fig -5: Online Quiz Interface

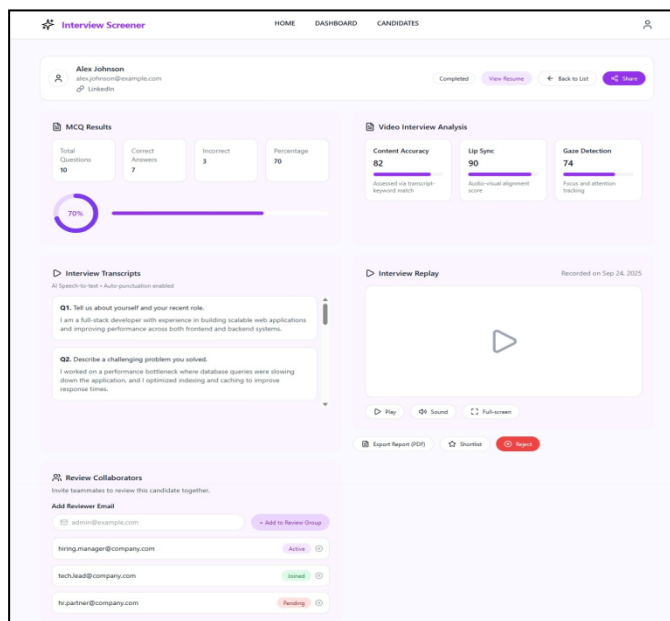


Fig -6: Admin Dashboard Interface

The quiz interface demonstrates the system’s capability to conduct time-bound online assessments with integrated proctoring mechanisms, as shown in Fig -5. Candidates attempt multiple-choice questions within a predefined duration, supported by a visible countdown timer and progress tracker. Candidate behavior is continuously monitored using tab-switch detection and gaze tracking. Any activity exceeding predefined thresholds results in automatic termination of the assessment session, and the incident is logged for administrative review, ensuring fairness and integrity.

7.3 Admin Dashboard

The admin dashboard provides real-time visibility into recruitment activities and system performance, as illustrated in Fig -6. It displays key metrics such as total registered candidates, completed assessments, shortlisted applicants, and average performance scores. Graphical visualizations help administrators identify performance trends efficiently, reducing manual tracking efforts and enabling faster, informed decision-making.

7.4 Candidate Result and Analytics Interface

The candidate results and analytics interface presents comprehensive evaluation data in an organized manner, as shown in Fig -7. It includes quiz scores, AI-generated interview metrics, behavioral logs, and summarized response insights. Recruiters can review interview recordings, transcripts, and compare candidate performance. Collaborative shortlisting features promote transparency, consistency, and objectivity in evaluation.

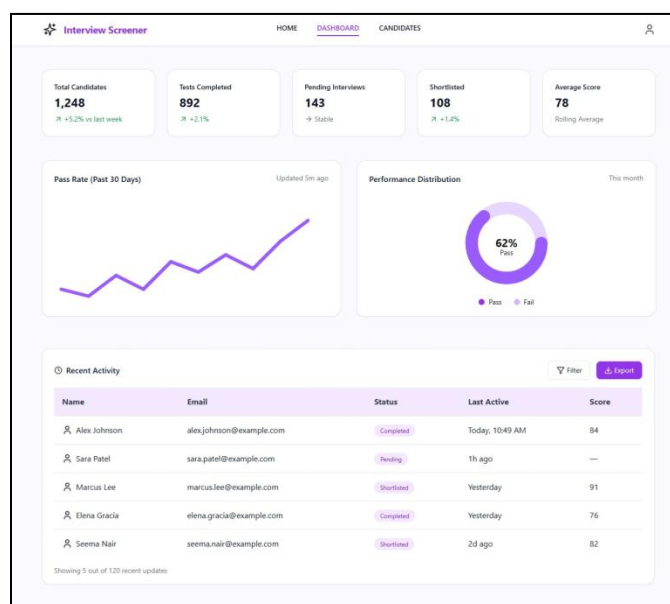


Fig -7: Candidate Result and Analytics Page

Overall, the observed results indicate that the proposed AI Interview Screener effectively reduces manual intervention during early-stage recruitment. The integration of automated assessments, AI-assisted evaluation, and analytics improves consistency and scalability while enhancing candidate experience through asynchronous participation. The system shows strong potential for adoption in both organizational and academic recruitment environments.

8. CONCLUSION

This paper presented an AI-Powered Video Interview Screener designed to automate and enhance the early stages of the recruitment process. By integrating quiz-based aptitude assessment, asynchronous video interviews, AI-driven response evaluation, and online proctoring mechanisms, the proposed system addresses key limitations of traditional recruitment methods, including manual effort, bias, and scheduling constraints.

The system leverages modern web technologies and cloud-based infrastructure to provide a scalable, secure, and user-friendly platform for both candidates and institutes. Automated evaluation and analytics enable consistent and objective assessment, while asynchronous participation improves flexibility and accessibility. Experimental observations indicate that the proposed solution reduces recruiter workload and improves screening efficiency without compromising fairness or transparency.

Overall, the AI Interview Screener demonstrates strong potential as an effective and practical alternative to conventional recruitment practices, particularly for organizations and educational institutions handling large applicant volumes.

9. FUTURE ENHANCEMENTS

Although the proposed system achieves effective automation of early-stage recruitment, several enhancements can further improve its capabilities:

- Integration of advanced AI models for deeper interview analysis, including sentiment, emotion, and confidence detection from video responses.
- Implementation of adaptive question generation, where quiz and interview questions dynamically adjust based on candidate performance.
- Support for multilingual interviews and assessments to improve accessibility for candidates from diverse linguistic backgrounds.
- Integration of predictive analytics to support recruiters in identifying potential candidate performance and long-term suitability based on historical data.

These improvements would enhance the system's reliability, scalability, and effectiveness in supporting data-driven recruitment decisions.

10. ACKNOWLEDGEMENT

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