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AI- BASED ONLINE EXAM PROCTORING APP

Arya Mishra[1], Vedika Patil[2], Prachi Sudra[3], Poonam Jadhav[4]

[1]*Arya Mishra, Co, Viva Institute of Technology, Shirgaon, India*
[2]*Vedika Patil, Viva Institute of Technology, Shirgaon, India*
[3]*Prachi Sudra, Viva Institute of Technology, Shirgaon, India*
[4]*Poonam Jadhav, Viva Institute of Technology, Shirgaon, India*

Abstract *- The expansion of online education has increased the demand for secure and trustworthy examination systems. Conventional proctoring techniques are often ineffective in remote a environment, which leads to concerns about cheating and loss of exam credibility. This paper presents an AI-based online exam proctoring application that automatically supervises students during examinations using computer vision and behavior analysis techniques. The proposed system continuously monitors the candidate through webcam and microphone input to identify suspicious actions such as the presence of multiple faces, candidate absence, irregular head movements, voice detection, camera obstruction, and tab switching. All violations are logged with supporting evidence, and the examination is automatically terminated when predefined limits are exceeded. The application follows a role-based architecture consisting of Admin and Student modules with secure authentication mechanisms. By minimizing human intervention, the system enhances fairness, transparency, and academic integrity in online examinations.*

Key Words: **Online Exam Proctoring, Artificial Intelligence, Computer Vision, Face Detection, Behavior Monitoring, Online Examination Security.**

1. INTRODUCTION

The rapid growth of digital learning platforms and online education has changed how academic assessments are conducted. Institutions increasingly rely on remote examinations to evaluate student performance, especially in distance learning and large online courses. While online examinations offer convenience and flexibility, they also present serious challenges related to exam security, identity verification, and preventing cheating. Traditional in-person supervision methods do not work well in remote settings, making it hard to ensure that exams are fair and controlled. Most existing online examination systems mainly focus on delivering questions and evaluating results, providing limited supervision and monitoring. These systems often struggle to detect suspicious behavior such as impersonation, collaboration, using unauthorized resources,

or candidates being absent during exams. As a result, academic integrity may suffer, lowering the reliability and credibility of online assessments. There is a rising demand for intelligent and automated proctoring solutions that can continuously monitor candidate behavior without depending heavily on human invigilators.

The Exam Proctoring App aims to solve these issues by offering a web-based remote examination monitoring system backed by intelligent observation techniques. The system seeks to ensure disciplined exam conduct by monitoring candidate activity, identifying violations, and enforcing examination rules in real-time. By blending structured exam management with automated monitoring and administrative oversight, the proposed system aims to enhance transparency, fairness, and trust in online examination settings while being user-friendly for both administrators and students.

2. System Overview

The Exam Proctoring App is a web-based remote examination system designed to support secure and monitored online assessments. The system combines exam management with continuous observation of candidate activity to ensure fair conduct during remote exams. It provides structured access for different users and supports administrative supervision throughout the examination process.

2.1 Super Admin

The Super Admin module manages the entire system. It handles user registration, role assignments, and system-level settings. This module ensures that only authorized users can access administrative and examination features.

2.2 Exam Admin

The Exam Admin module takes care of examination-related activities within the system. It allows administrators to create and manage exams, monitor ongoing examinations, review recorded activities, and access examination results for evaluation.

2.3 Student

The student module enables candidates to take part in online examinations through a controlled interface. Students can access assigned exams, attempt questions within the set time limit, and submit their responses while being continuously monitored by the system.

3. Related Literature Review

Several researchers have proposed intelligent online proctoring systems to maintain fairness and integrity in remote examinations. Machine learning–based frameworks such as vProctor automates student monitoring by analyzing visual behaviour patterns and identifying suspicious activities during online assessments. [1]

Modern proctoring solutions integrate image processing and computer vision techniques, including face detection and gaze tracking, to continuously observe candidates and detect irregular movements or actions in real time. [2]

AI-enabled examination applications have also been developed using tools like OpenCV to track facial expressions and automatically log unusual activities for further evaluation by exam administrators. [3]

Advanced AI-driven models combine facial recognition, head pose estimation, and audio monitoring to strengthen online exam security and minimize the risk of examination malpractice. [4]

Furthermore, survey-based studies highlight the importance of multi-modal monitoring techniques and discuss existing challenges such as privacy concerns, accuracy, and system reliability in remote proctoring environments. [5]

4. Proposed System

The proposed system introduces an automated approach to online exam monitoring to address the limitations of traditional remote assessment methods. It focuses on ensuring exam integrity by observing candidate behavior and enforcing examination rules throughout the test. The system lowers reliance on manual supervision while maintaining a controlled examination environment.

The proposed system supports structured exam delivery with continuous monitoring and centralized supervision. It records examination activities, identifies irregular behavior, and keeps violation records for administrative review. By integrating monitoring methods with exam management, the system enhances reliability and transparency in online examinations.

5. System Architecture

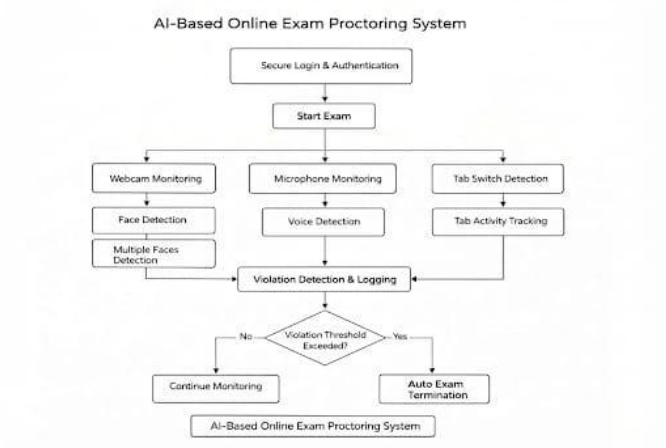

Fig -5.1: System architecture of AI-Based Online Exam Proctoring System

5.2 Description of the System Architecture

The system architecture of the Exam Proctoring App is designed to support secure online exam delivery and continuous monitoring. It follows a structured client-server model, where users interact with the system through a web interface. Examination management and monitoring tasks are handled in the backend.

The architecture allows communication between user modules, examination services, and data storage components. It supports real-time supervision, activity recording, and administrative access to examination data. The modular design of the architecture enables scalability, efficient data management, and reliable system performance for remote examination environments.

6. Implementation

The implementation of the Exam Proctoring App is done using a web-based development approach to ensure accessibility and ease of deployment. The system integrates exam management functions with automated monitoring features within a single platform. User roles are enforced throughout the system to maintain secure access.

The implementation focuses on smooth interaction between the user interface, exam logic, and monitoring components. Examination data, activity records, and results are stored in a centralized database for consistency and administrative review. Cloud-based deployment is used to ensure scalability, availability, and reliable system performance during online exams.

7. Implementation results

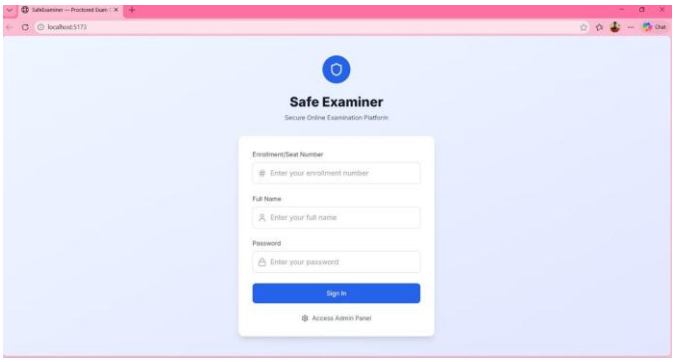

Fig. 7.1 Login Interface

Exam Proctoring App, login page where a student enters enrollment number, name, and password to sign in to the online examination platform. Also, admin access panel for admin to login.

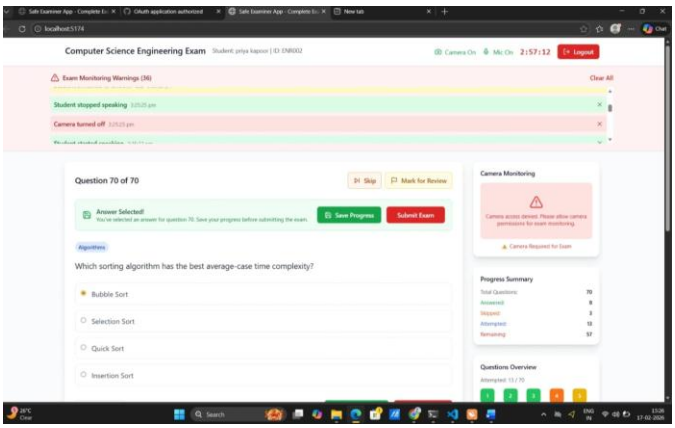

Fig. 7.2 Examination Monitoring Interface

Student exam interface showing Question 70/70 with save progress and submit options, along with camera monitoring warning for denied camera access.

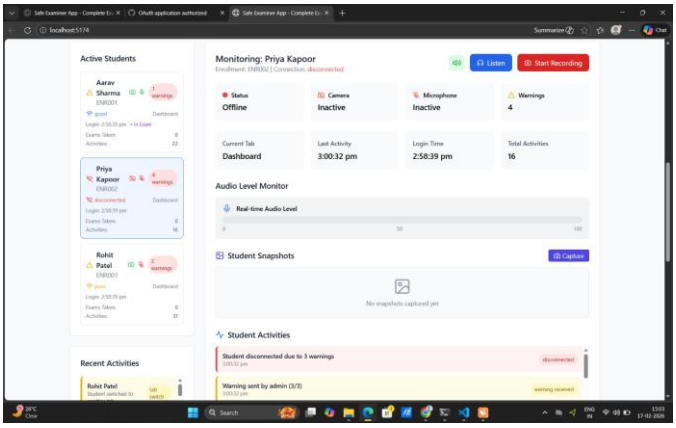

Fig. 7.3 Administrator Monitoring Dashboard

Admin monitoring dashboard showing student "Priya Kapoor" with status offline, camera/mic inactive, 4 warnings, and activity details including audio level and snapshots.

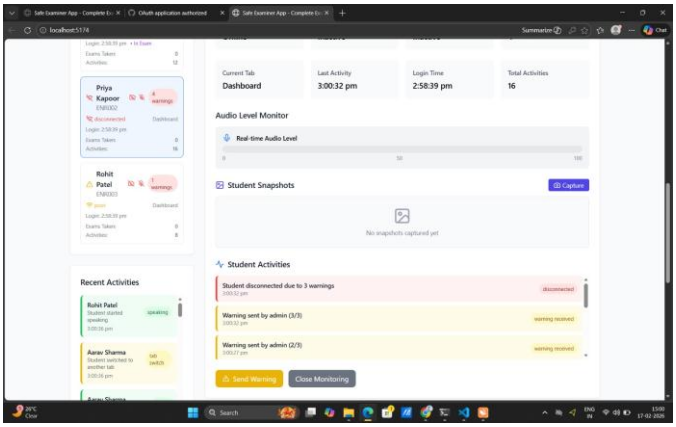

Fig. 7.4 Student Activity & Monitoring Panel

Detailed student activity panel displaying warning logs, disconnection due to 3 warnings, and options to send warning or close monitoring.

8. Conclusion

This paper presented an AI-powered Exam Proctoring App designed to support secure and reliable online examinations. The system combines exam management with automated monitoring to reduce cheating and maintain academic integrity in remote assessment settings.

The proposed solution offers structured administrative control, continuous supervision, and effective examination handling. By providing a scalable and web-based approach, the system enhances trust, transparency, and effectiveness in conducting online examinations, making it suitable for modern educational institutions**.**

9. Future Scope

1] Integration of advanced gaze tracking techniques to improve eye-movement monitoring and detect unauthorized material usage more accurately.

2] Incorporation of facial expression and emotion analysis to better understand candidate behavior during examinations.

3] Implementation of adaptive machine learning models that learn from past exam data to reduce false positives and improve detection accuracy.

4] Addition of biometric authentication methods such as fingerprint or iris recognition to strengthen candidate identity verification.

5] Deployment using cloud and edge computing technologies to enhance scalability, real-time performance, and reliability for large-scale online examinations.

10. REFERENCES

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Presents an automated online proctoring framework using machine learning techniques to detect suspicious behaviour during remote examinations.

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Proposes an AI-based exam monitoring system using OpenCV and MediaPipe for real-time face tracking and suspicious activity detection.

[4] "Proctoring Using AI," International Journal for Research in Applied Science & Engineering Technology (IJRASET), 2025:
https://www.ijraset.com/research-paper/proctoring-using-ai

Describes an AI-powered proctoring model integrating facial recognition, head pose estimation, and voice detection to identify cheating activities.

[5] "A Survey Paper on Online Exam Proctoring Systems," IJSREM, 2023: https://ijsrem.com/download/a-survey-paper-on-online-exam-proctoring-systems/

Provides a comprehensive review of existing online proctoring technologies, challenges, and AI-based monitoring techniques used in remote examinations.