International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 12 | Dec - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

Smart Student Monitoring System

Sasikala P[1], Sanjay R[2], Shivani B[3], Shobhana S[4] and Swetha M[5]

[1]Sasikala P– CSE – Sri Shakthi Institute of Engineering and Technology

[2]Sanjay R– CSE – Sri Shakthi Institute of Engineering and Technology

[3]Shivani B– CSE – Sri Shakthi Institute of Engineering and Technology

[4]Shobhana S– CSE – Sri Shakthi Institute of Engineering and Technology

[5]Swetha M– CSE – Sri Shakthi Institute of Engineering and Technology

---

Abstract - The rapid growth of online education has made it increasingly difficult to ensure academic integrity during remote examinations. To overcome the limitations of traditional manual and webcam-based proctoring, this project presents an AI-Based Smart Student Proctoring System that uses computer vision, behavioral analysis, and real-time activity tracking to automatically monitor students during exams. The system detects suspicious activities such as face absence, multiple persons, gaze deviation, tab switching, and abnormal environmental behavior, generating real-time alerts and detailed violation reports for teachers. By using lightweight, browser-based AI models, the system ensures privacy-preserving and scalable monitoring without requiring additional software installations. The proposed solution provides a secure, efficient, and reliable framework for conducting fair online examinations in modern digital learning environments.

Key Words: AI-based Proctoring, Online Examination System, Computer Vision, Malpractice Detection, Real-Time Proctoring, Exam Integrity.

1. INTRODUCTION

With the increasing adoption of online learning platforms, educational institutions are conducting examinations remotely at an unprecedented scale. While online examinations offer flexibility and accessibility, they also introduce challenges related to cheating, impersonation, and lack of effective supervision. Conventional invigilation methods, such as live video monitoring by human proctors, are labor-intensive, inconsistent, and impractical for large student populations. Moreover, basic online exam platforms lack intelligent mechanisms to detect subtle forms of malpractice. **The AI-Based Smart Student Monitoring System** aims to provide an intelligent, automated, and scalable approach to online exam supervision.

2. SYSTEM ARCHITECTURE

The architecture of Smart Student Monitoring System is divided into five core modules:

Module Name	Responsibilities
User Authentication	Manages secure login for teachers and students with role-based access control.
Exam Management	Enables teachers to create exams, add questions, and assign tests to students.
AI Proctoring	Monitors students in real time using face detection, multiple face detection, and behavior analysis.
Malpractice Detection & Logging	Identifies suspicious activities such as tab switching and device usage and stores detailed violation records.
Reporting & Control	Allows teachers to view malpractice reports, track student behavior, and block students when necessary.

3. METHODOLOGY

3.1 User Authentication and Role Management

- Provides secure login for teachers and students using role-based access control.
- Ensures only authorized users can access specific system functionalities.

3.2 Exam Creation and Assignment

- Enables teachers to create exams, add questions, and set time limits.
- Assigns exams to specific students for controlled and secure access.

3.3 AI-Based Proctoring and Monitoring

- Captures real-time webcam video and screen activity during exams.
- Detects face presence, multiple faces, gaze deviation, and abnormal behavior using AI models.

3.4 Malpractice Detection and Logging

- Analyzes suspicious actions such as tab switching, device usage, and absence from the screen.
- Stores time-stamped violation records in the database for further review.

3.5 Reporting and Teacher Control

- Displays detailed malpractice reports and activity summaries to teachers.
- Allows teachers to block students who repeatedly violate examination rules.

4. FEATURES

1. Role-Based Login for Teachers and Students
2. Secure Online Exam Creation and Assignment
3. AI-Based Real-Time Student Monitoring
4. Face Detection and Multiple Face Identification
5. Tab Switching and Screen Activity Tracking
6. External Device and Object Detection
7. Automated Malpractice Logging and Reporting
8. Teacher-Controlled Student Blocking System
9. Detailed Exam Logs and Violation Analytics

Fig -1: Secure Login – Teacher and Student

Fig-2: Student Dashboard

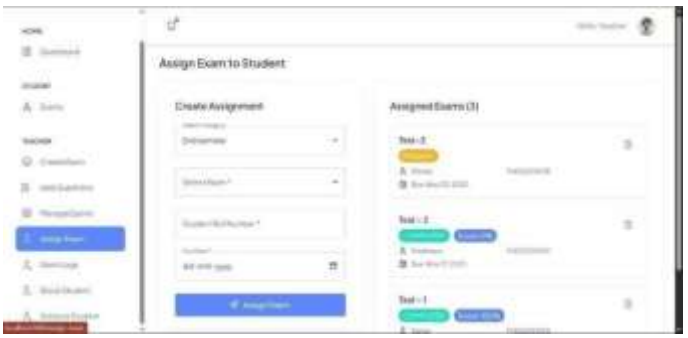

Fig-3: Teacher Dashboard

Fig-4: Reports & Control

5. CONCLUSIONS

This work presented an AI-based Smart Student Proctoring System designed to ensure integrity, fairness, and reliability in online examinations. By integrating computer vision, behavioral analysis, and real-time activity monitoring within a scalable MERN-based architecture, the system automates exam supervision and significantly reduces dependence on manual invigilation. The proposed approach effectively detects key forms of malpractice such as face absence, multiple person presence, gaze deviation, and tab switching, while minimizing false positives through adaptive behavior analysis. Experimental usage demonstrates that the system provides consistent performance across diverse environments and supports large-scale remote assessments. Overall, the proposed solution offers a secure, efficient, and practical framework for conducting trustworthy online examinations in modern digital learning platforms.

ACKNOWLEDGEMENT

The authors sincerely thank the project mentors and faculty members for their guidance and support. Gratitude is also extended to the open-source and AI development communities for the tools and resources that made this project possible. Their contributions played a key role in the successful development of this system.

REFERENCES

1. Alghamdi, A., & Panda, S. K. A Survey on Secure Online Examination Systems, Education and Information Technologies, 26(6), 7895–7924, 2021.

2. Alsharif, A., & Alosaimi, W. A Blockchain-Based Secure Monitoring System for Online Examinations, Sensors, 23(2), 812, 2023.

3. Ashok, V., & Chatterjee, S. AI-Powered Remote Proctoring for Online Assessments Using Facial and Gesture Recognition, Journal of Intelligent & Fuzzy Systems, 45(2), 1781–1793, 2023.

4. Bhatia, S., & Goyal, A. E-Learning Security and Monitoring Systems (Ch. 5 – Secure Assessment Tools; Ch. 7 – Monitoring and Logging Mechanisms), CRC Press, 2021.

5. Bontrager, P., Togelius, J., & Mikkelsen, M. Secure Online Proctoring: Technologies and Challenges, Journal of Educational Technology Systems, 50(1), 45–63, 2021.

6. Cheng, L., Wang, X., & Sharma, S. Deep Learning Approaches for Student Activity Monitoring During Online Exams, IEEE Access, 11, 36092–36105, 2023.

7. Gupta, P., & Arora, N. Proctoring System Using Eye-Gaze Tracking and Audio Analysis, Proceedings of the International Conference on Intelligent Systems, Metaheuristics & Swarm Intelligence, Springer, pp. 241–248, 2022.

8. Khan, R., & Shad, M. Real-Time Proctoring and Activity Restriction in Online Examinations, *International Journal of Computer Applications*, 183(14), 25–32, 2021.

9. Mishra, P., & Mohanty, S. A Comprehensive Framework for Cheating Prevention in E-Learning Environments, *Education and Information Technologies*, 27, 15589–15610, 2022.

10. Mohammed, A. A., & Irfan, M. Browser Lockdown Techniques for Preventing Academic Dishonesty in E-Learning Platforms, *Computers & Security*, 114, 102580, 2022.