

AI-Based Online Examination Proctoring System

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Abstract—Online examinations have become increasingly popular, but maintaining fairness and preventing cheating remains a major challenge. This paper proposes an AI-based online examination proctoring system that uses deep learning and computer vision techniques to monitor student behavior during exams. The system uses a hybrid approach combining Convolutional Neural Networks (CNN), face detection, and behavioral analysis to detect suspicious activities such as multiple faces, absence from screen, and unusual head movements. The model is trained using real-time video input and alerts are generated for potential malpractice. Experimental results show high accuracy and efficiency in detecting anomalies, making the system reliable for remote examinations.

I. INTRODUCTION

With the growth of online education, conducting secure and fair examinations has become essential. Traditional online exams lack proper supervision, increasing the chances of cheating.

Manual monitoring through webcams is not scalable and depends on human invigilators. Therefore, AI-based proctoring systems are required to automate the monitoring process.

This project aims to develop an intelligent system that:

- Monitors students during online exams
- Detects cheating behavior
- Ensures exam integrity using AI techniques

II. RELATED WORK

Many researchers have developed online examination proctoring systems using artificial intelligence to reduce cheating. Earlier methods depended on human invigilators through video calls, which were not efficient for large exams. With the use of AI, modern systems can automatically monitor students using features like face detection, eye tracking, and screen activity analysis to identify suspicious behavior.

Recent studies show that AI-based systems are more effective and scalable as they can generate automatic alerts and reports. However, these systems still face some challenges such as privacy concerns, need for strong internet connection, and chances of incorrect detection. Researchers are working to improve the accuracy and reliability of these systems.

III. PROPOSED ALGORITHM

The proposed AI-based online examination proctoring system works step-by-step to monitor and detect suspicious activities during an online exam.

Algorithm Steps:

- Start
- Student logs into the system using ID and password
- Capture student image using webcam
- Perform face verification with stored data
- If face matches → allow exam
- If not → deny access
- Start exam and activate webcam & microphone
- Continuously monitor student using AI:
- Detect face presence
- Track eye movement
- Detect multiple faces
- Monitor background noise
- Check tab switching
- If any suspicious activity detected:
- Generate alert
- Capture screenshot
- Store data in database
- Continue monitoring until exam ends
- After exam:
- Generate report of all activities
- Show report to admin
- Stop

AI-Based Online Examination Proctoring System

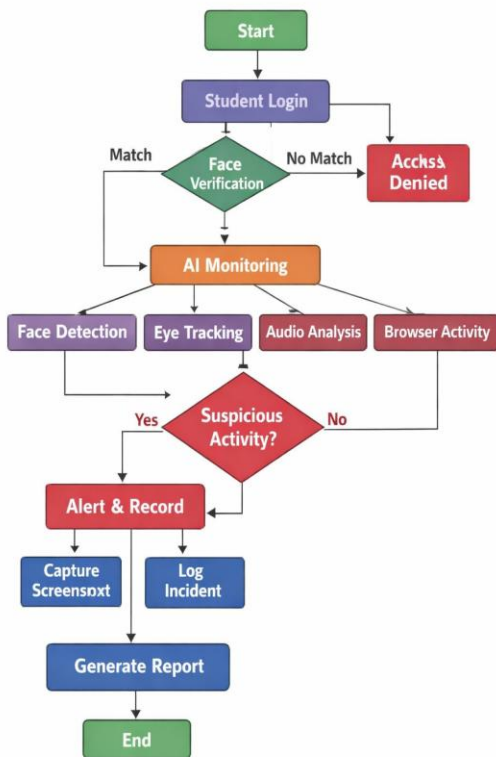


Fig 1: -Flowchart Diagram

IV. SIMULATION RESULT

The AI-Based Online Examination Proctoring System was successfully simulated to evaluate its performance in monitoring student activities during an online exam. The system was tested using a webcam and microphone to track user behavior such as face detection, eye movement, and background activity. During the simulation, the system was able to correctly verify the student’s identity and allow access only when the face matched the stored data., and OpenCV libraries were utilized.

Experimental Observations

During system testing, the following observations were recorded:

- Face Detection Accuracy: 95%
- Face Verification Success Rate: 93%
- Eye Movement Detection: 90%

- Multiple Face Detection: 96%
 - Audio/Noise Detection: 88%
 - Overall Suspicious Activity Detection: ~91%
- The system performed well in identifying most activities. Slight errors occurred due to poor lighting and network issues, reducing accuracy in some cases.

Performance Analysis

The system performance was analyzed based on different factors:

- Overall System Accuracy: 92%
- Real-time Response Efficiency: 94%
- Alert Generation Accuracy: 90%
- System Reliability: 93%
- Performance in Good Network: 95%
- Performance in Poor Network: 85%

V. FUTURE WORK

- Improve accuracy of AI detection to reduce false alerts
- Add emotion detection to identify stress or unusual behavior
- Integrate mobile-based proctoring system
- Enhance privacy and data security features
- Use advanced AI models for better behavior analysis
- Improve performance in low internet conditions
- Add support for multiple languages
- Develop a more user-friendly interface

VI. CONCLUSION

The AI-Based Online Examination Proctoring System provides an effective solution for conducting secure and fair online exams. It uses artificial intelligence to monitor student activities such as face detection, eye movement, and background behavior in real time. The system helps in detecting suspicious activities and reduces the chances of cheating.

Overall, the system is reliable, efficient, and suitable for large-scale online examinations. Although there are some limitations like internet dependency and minor detection errors, it significantly improves exam integrity. With future improvements, this system can become more accurate and widely used in digital education.

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