AI-POWERED SMART EXAMINATION MALPRACTICE DETECTION SYSTEM

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ABSTRACT- ***This paper presents an AI-Powered Smart Examination Malpractice Detection System designed to improve the security and fairness of online examinations. The main objective of this project is to detect and prevent malpractice automatically by monitoring students during an exam using Artificial Intelligence (AI) and Computer Vision. As online examinations have become more common, it has become difficult for human invigilators to monitor every student continuously. This may lead to cheating and unfair examination practices. To solve this problem, the proposed system uses a webcam to monitor students in real time. It verifies the student's identity using face detection and ensures that only one person is present during the examination. The system also detects suspicious activities such as looking away for a long time, multiple people appearing in front of the camera, the student's face not being visible, and mobile phone usage. These activities are recorded automatically, and alerts are generated whenever malpractice is detected. The system is developed using Python, Flask, OpenCV, and MediaPipe. OpenCV and MediaPipe are used for real-time face detection and activity monitoring, while Flask provides a simple and easy-to-use web interface. The detected violations are stored in the system and can be viewed later by the administrator as examination reports.***

KEYWORDS: ***Artificial Intelligence (AI), Machine Learning (ML), Computer Vision, OpenCV, MediaPipe, Face Detection, Face Recognition, Head Pose Estimation***

INTRODUCTION

Online examinations have become increasingly popular in schools, colleges, universities, and online learning platforms. While they provide flexibility and convenience, they also create challenges in ensuring that examinations are conducted fairly. Traditional online invigilation depends on human supervisors to monitor

students, which can be time-consuming, expensive, and less effective when many students take exams at the same time. This increases the risk of malpractice such as the presence of multiple people, the use of mobile phones, students leaving the camera view, or suspicious head movements.

The AI-Powered Smart Examination Malpractice Detection System is designed to solve these challenges by using Artificial Intelligence (AI) and Computer Vision to monitor students automatically during online examinations. The system uses a webcam to detect and verify the student's face before the examination begins and continuously monitors the student throughout the exam. It identifies suspicious activities such as multiple-person detection, no-face detection abnormal head movements. Whenever a violation is detected, the system records it and generates alerts for the administrator.

RELATED WORK

Several researchers have focused on improving the security of online examinations using Artificial Intelligence (AI), Machine Learning (ML), and Computer Vision techniques. Earlier online examination systems mainly depended on human invigilators to monitor students through webcams. Although effective for small groups, these systems were time-consuming, expensive, and less reliable for large-scale online examinations. To overcome these challenges, researchers introduced AI-based solutions such as face detection, face recognition, head pose estimation and automatically monitor students during examinations. These technologies help identify suspicious activities such as multiple-person presence, absence of the candidate, abnormal head movements, looking away from the screen, and mobile phone usage. Recent studies have shown that combining real-time video analysis with Computer Vision techniques significantly improves the accuracy of malpractice detection while reducing the need for continuous human supervision. The proposed AI-Powered Smart Examination Malpractice Detection System builds on these advancements by integrating OpenCV, MediaPipe, and the Flask framework. The system performs real-time student monitoring, automatically detects and records examination violations, and generates reports for administrators. This approach provides a secure, accurate, and efficient solution for maintaining fairness and academic integrity in online examinations.

LITERATURE SURVEY

The use of Artificial Intelligence (AI) and Computer Vision for online examination monitoring has been widely studied to

improve examination security and reduce malpractice. Turk and Pentland (1991) introduced the Eigenfaces method for face recognition, which became one of the earliest techniques for automatic face identification. Viola and Jones (2001) developed a real-time face detection algorithm that significantly improved the speed and accuracy of detecting human faces in images. With the advancement of deep learning, researchers adopted modern computer vision techniques for online proctoring. Lugaresi et al. (2019) introduced MediaPipe, a framework for real-time face landmark detection and head pose estimation, enabling accurate monitoring of student movements. Bradski (2000) developed OpenCV, an open-source computer vision library that is widely used for image processing, face detection.

EXISTING SYSTEM

The existing online examination monitoring systems mainly rely on manual invigilation or basic webcam monitoring to prevent malpractice. Human invigilators are required to continuously observe students throughout the examination, which is time-consuming, costly, and difficult to manage for large numbers of candidates. Some existing systems use simple face detection or identity verification, but they are unable to detect suspicious activities such as multiple-person presence, abnormal head movements, students leaving the camera view, or mobile phone usage. Although a few online proctoring systems use Artificial Intelligence (AI) and Computer Vision techniques, many of them provide limited monitoring features, require expensive software or hardware, and often generate inaccurate results due to poor detection accuracy. Most traditional systems also lack automatic violation logging and report generation, making it difficult for administrators to review student activities after the examination. Therefore, there is a need for a more accurate, automated, and reliable solution that can monitor students in real time, detect malpractice efficiently, and maintain fairness and academic integrity during online examinations.

PROPOSED SYSTEM

The proposed AI-Powered Smart Examination Malpractice Detection System uses Artificial Intelligence (AI) and Computer Vision to monitor students during online examinations and automatically detect malpractice in real time. The system first verifies the student's identity using face detection through a webcam before the examination begins. During the examination, it continuously monitors the student to identify suspicious activities such as multiple-person presence, no-face detection and abnormal head

movements. The system is developed using Python, Flask, OpenCV, and MediaPipe. OpenCV and MediaPipe are used for real-time video processing, face detection, and head pose estimation, while Flask provides a simple and user-friendly web interface. Whenever a violation is detected, the system automatically records the event, generates alerts, and stores the information for report generation. This approach reduces the need for manual invigilation, improves the accuracy of malpractice detection, and enhances the security of online examinations. It provides a reliable, efficient, and cost-effective solution for schools, colleges, universities, and online learning platforms to conduct fair and secure online examinations.

SYSTEM ARCHITECTURE

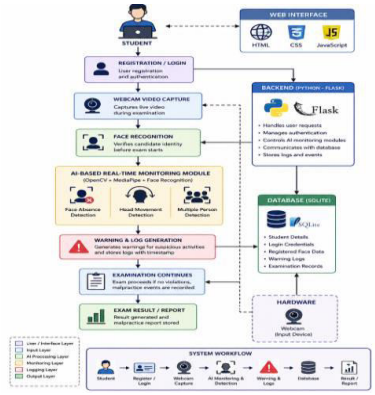

Fig1: System Architecture

MODULE DESCRIPTION

The methodology of the AI-Powered Smart Examination Malpractice Detection System is designed to monitor online examinations and automatically detect malpractice using Artificial Intelligence (AI) and Computer Vision. The system follows a step-by-step process that includes student authentication, real-time monitoring, malpractice detection, violation logging, and report generation. First, the student logs into the system and starts the examination. The webcam is activated, and the system verifies the student's identity using face detection. During the examination, the system continuously monitors the webcam feed to detect suspicious activities such as multiple-person presence, no-face detection and abnormal head movements using OpenCV and MediaPipe. Whenever a violation is detected, the system automatically records the event with the corresponding details. The application is developed using the Flask framework, which provides a simple and user-friendly interface for students and administrators. After the examination, the system generates a detailed report of all detected violations, allowing administrators to review student activities. This methodology provides an accurate, efficient, and reliable solution for secure online examination monitoring while reducing the need for manual invigilation. This methodology minimizes the need for manual invigilation, improves the accuracy of malpractice detection, reduces human errors, and enhances the security, transparency, and fairness.

RESULTS AND DISCUSSION

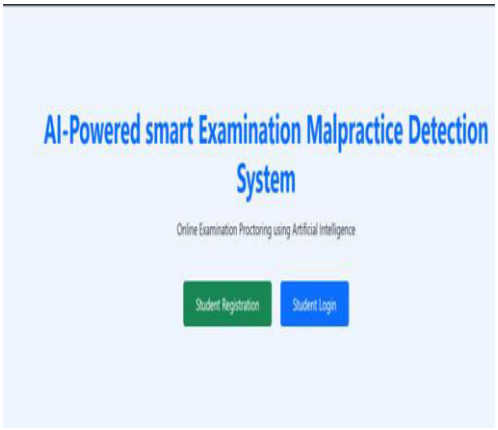

Fig2: Home Page

This is the home page of the AI-Powered Smart Examination Malpractice Detection System. It provides options for Student Registration and Student Login, allowing users to securely access the online examination platform.

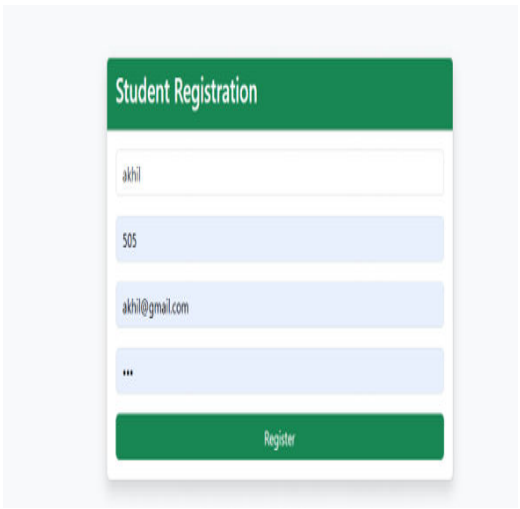

Fig3: Register page

This page allows new students to create an account by entering their name, roll number, email, and password. After successful registration, they can log in and access the online examination system

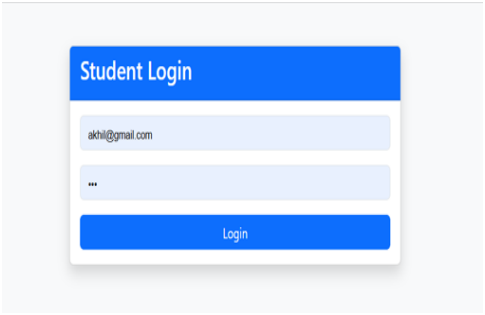

Fig4: Login page

This page allows registered students to securely log in using their email and password. After successful authentication, they can access the online examination dashboard.

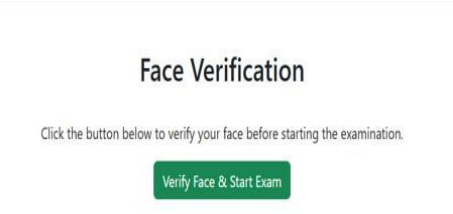

Fig5: Face Verification page

This page verifies the student's identify using facial recognition before allowing access to the examination.

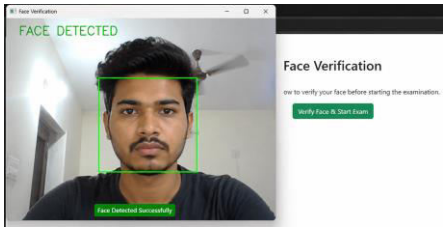

Fig6: Face Detection page

This page is used to verify the student's identity before the online examination begins. When the Verify Face & Start Exam button is clicked, the webcam is activated, and the system performs real-time face detection.

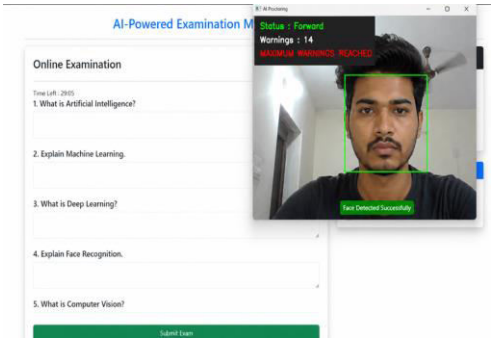

Fig7: Head Pose Detection

This page allows students to take the online examination while the AI-powered proctoring system continuously monitors their activities, detects suspicious behavior, and records violations in real time.

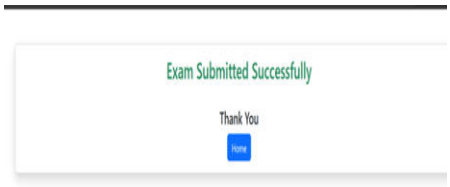

Fig8: Exam Submit page

This page confirms that the examination has been successfully submitted and completed by the student.

CONCLUSION

The AI-Powered Smart Examination Malpractice Detection System provides an effective and intelligent solution for maintaining the integrity of online examinations. By using artificial intelligence, computer vision, face recognition, and real-time webcam monitoring, the system accurately verifies student identity and detects suspicious activities such as face absence, multiple person detection, and abnormal head movements.

FUTURE SCOPE

The proposed AI-Powered Smart Examination Malpractice Detection System can be enhanced by integrating advanced AI and deep learning techniques to improve the accuracy of face recognition and malpractice detection. Future versions can include eye gaze tracking, mobile phone detection, speech detection, and emotion analysis to identify a wider range of suspicious activities.

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