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Research Paper**EXAM CHEATING DETECTION USING WEBCAM FEED**¹Degala Venkata Gopi, ²Bachu Venkata Naga Bavana, ³Damarla Karthik, ⁴Dr. M. Ratna Raju^{1,2,3}U. G Student, Dept COMPUTER SCIENCE AND ENGINEERING, St. Ann's College Of Engineering and Technology, Nayunipalli (V), Vetapalem (M), Chirala, Bapatla Dist, Andhra Pradesh– 523187, India⁴Associate professor, COMPUTER SCIENCE AND ENGINEERING, St. Ann's College Of Engineering and Technology, Nayunipalli (V), Vetapalem (M), Chirala, Bapatla Dist, Andhra Pradesh– 523187, India**ABSTRACT**

Academic integrity is now a major concern due to the quick rise of remote exams and online learning. Automated solutions are becoming more popular because traditional proctoring techniques are frequently ineffective, expensive, and inappropriate for large-scale digital exams. A real-time test cheating detection system that uses camera feeds with computer vision and machine learning algorithms is presented in this study. The system uses object detection to find prohibited items like books, smartphones, or other people, gaze and head pose estimation to track candidate attention, and facial recognition to confirm identity.

KEYWORDS Online Examination, Cheating Detection, Webcam Feed, Computer Vision, Machine Learning, Remote Proctoring, Academic Integrity.

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I. INTRODUCTION

The world of education and professional evaluation has seen a revolution in recent years due to the explosive expansion of computer-based and online exams. Digital platforms have replaced conventional pen-and-paper methods for exams, providing applicants and examiners with flexibility, cost-effectiveness, and convenience. But there have also been a lot of difficulties brought about by this change, especially in preserving the fairness and integrity of the testing procedure. Exam cheating is one of the biggest problems as it may seriously. How to Spot Exam Cheating Using a Webcam Feed system is one innovative solution to this issue. This system uses computer vision and machine learning algorithms to analyse a candidate's behaviour in real time utilizing webcam feeds.

II. LITERATURE SURVEY

In Recent Times Online Examinations are During a Some cheating behaviors are Detected there are lot of human invigilators

are required. Here are some limitations occurred I explored some related papers to Exam cheating Detection using webcam. In That first paper AI based Proctoring system (Sharma et al.2021) it uses real time webcam. They not explored more about Suspicious activities and also taken another paper YOLO based Exam cheating detection system (Li and Team 2022) it detects unauthorized objects in the frame. and also taken another paper Exam Authentication facial recognition (Singhal 2023) they focus on the facial expressions and eye gaze, Head movements. These are Some limitations solved by Proposed Method.

III. RELATED WORK

In this Project Exam cheating Detection using webcam for this webcam, it detects an any suspicious activities during the online examinations. By using the Artificial Intelligence and Computer vision. This System identifies find prohibited items like books, smart phones, Laptops, Electronic

Devices or other people Gaze and Head pose estimation to track Candidate Estimation and confirm identity. Computer vision and machine learning algorithms are identifying the candidate behaviours in real time webcam feed. This project has utilized frameworks like OpenCV, Media pipe, and TensorFlow for real-time detection tasks. Deep learning models, including CNNs and YOLO, have been applied to identify objects like mobile phones or notes. Some studies incorporate audio analysis and environmental noise detection for more comprehensive monitoring.

IV. EXISTING METHOD

Exam monitoring has historically mainly relied on human invigilators to watch candidates during exams. In traditional classroom settings, invigilators move between rows, keep an eye on candidate behaviour, and step in when they suspect malpractice. The most popular methods currently in use for online exams are Live Video Proctoring, where a human invigilator watches candidates in real time through a video conferencing platform Recorded Video Review, where the exam session is recorded and subsequently reviewed by invigilators for indications of cheating and Screen Lock Tools, which lock candidate devices to prevent them from switching applications and monitor.

PROPOSED METHOD

In proposed method overcome all the drawbacks it introducing the AI powered Exam monitoring detection using the webcam with real time monitoring and detection capabilities. It captures the real time monitoring using the simple webcam and apply computer algorithms for face detection, identity verification, eye gaze tracking, head movement analysis, and multiple face detection. It uses a object detection modules it identifies the unauthorized materials like smartphones, multiple faces, eye gaze detection, books, earphones, and etc. It requires minimal of human invigilators are required and applicable in a large scale examinations it

contains high detection accuracy.

SYSTEM ARCHITECTURE

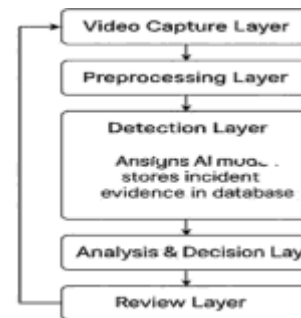


Fig 1: System Architecture

METHODOLOGY DESCRIPTION

The system designed by real time online exam cheating detection using the webcam feed. It Detects the cheating during the online examinations.

Video Capture Layer: This layer is responsible for continuously collecting a live video feed from the candidate's webcam throughout the examination or interview session.

Preprocessing Layer: The goal of this layer is to enhance the clarity and reliability of the data fed into AI models, ensuring accurate detection results under varying camera and lighting conditions.

Detection Layer: This is the core intelligence layer where multiple AI-based models operate simultaneously to extract and interpret relevant information from the video feed.

Analysis & Decision Layer: The system uses predefined rules or machine learning models to weigh various risk factors (e.g., gaze deviation, object presence, or multiple faces). Based on this score, it can automatically categorize events as normal, suspicious, or high risk, supporting real-time decision-making and post-session analytics.

Alert & Logging Layer: At the same time, it securely logs all incidents, along with video clips, timestamps, and detection metadata, into a central database.

Review Layer: The interface allows for manual validation of AI-generated alerts,

adjustment of detection thresholds, and annotation of specific events. This human-in-the-loop mechanism enhances accuracy and fairness, combining automation with expert judgment for final decisions.

V. RESULTS AND DISCUSSION

The result after execution the project it detects and generate the correct output. it identifies the single faces, multiple faces, and any objects in the frame contains.



Fig 2: Single Face Detection

The system successfully detects a single face from the webcam feed and highlights it with a bounding box along with confidence score (Face: 0.98). The output window displays detailed monitoring parameters such as head pose (looking down), eye status (eyes open), gaze direction (looking away), blink detection, and duration of eyes being off screen.

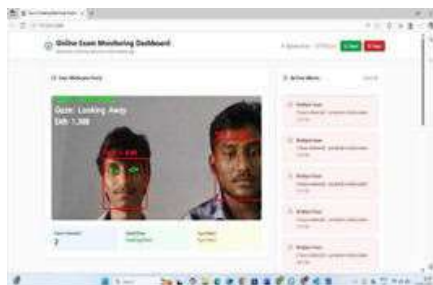


Fig 3: Multiple Faces Detected

Execution and Logs When the application starts and detects more than one face in the webcam feed, it immediately highlights all detected faces bounding boxes and raises an alert message “MULTIPLE FACES DETECTED.” This indicates a clear violation since only one candidate should be present during the exam.

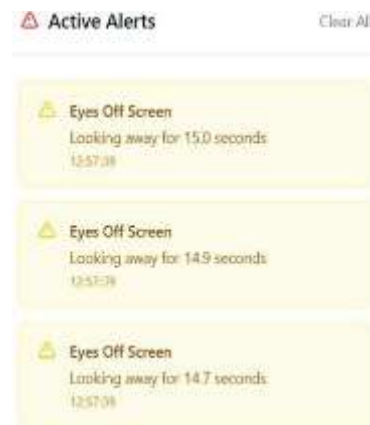


Fig 4: Activity log Multiple faces detected

VI. CONCLUSION

The Exam Cheating Detection Using Webcam Feed system effectively utilizes computer vision and machine learning to uphold integrity in online assessments. By monitoring real-time video streams, it identifies suspicious behaviours such as gaze shifts, multiple faces, and unauthorized activities. This innovation ensures fairness and reliability in remote examination environments.

FUTURE SCOPE

Future enhancements can focus on integrating multi-camera support for 360° surveillance and adding audio-based monitoring for speech and background sounds. Additionally, AI-driven behavioural profiling can personalize detection by learning individual exam patterns. These advancements will make the system more robust, adaptive, and accurate in detecting sophisticated cheating attempts.

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