

A Survey Paper on Online Exam Proctoring Systems

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Abstract: Online courses, online exams and online certificates are conducted by various universities and Information Technology (IT) institutes worldwide. Delivery tools have been created for conducting the exams from any place. Applying this will save time and travelling cost. Nowadays, due to the COVID-19 pandemic, there is a big demand for online courses and exams. This paper introduces a new approach for exam proctoring using a 360-degree security camera. Mainly, online exams' security is a major concern. Thus, a delivery tool must not only ensure the identity of a test-taker but also the overall test integrity. In this paper, the usage of the 360-degree security camera over the traditional webcam was investigated in order to enhance the exam security and to minimize the stressful restrictions. To verify this goal, a case study on a group of volunteer students within the college of computer science and engineering was made. In addition, an automated proctoring model that will eliminate the need for real-time proctoring and remove any scheduling constraints in order to prevent cheating is proposed in this paper. The machine learning algorithms are exploited to enrich the proposed system. A secure framework using the biometric is applied in order to ensure authentication and running the online exam smoothly.

Keywords: Machine learning, face recognition, face detection, exam, Haar Cascade Algorithm.

I. INTRODUCTION

The main domain for the project is Machine Learning. Machine Learning is the sub-category of Artificial Intelligence. AI gives the ability to work on a computer as a human, in this a computer is able to do tasks which are usually done by humans. ML specifically takes data as an input and finds patterns amongst them by using various algorithms. It may include supervised, unsupervised, reinforcement, semi-supervised learning models. The students can make malpractice for choosing answers of questions from assignments or from the online search engines like :Google, Chrome, Windows Explorer etc; for this refer [1]. The Online Proctoring Exam System includes as per [2] Face detection and face recognition online test portal by which the online authentication for particular face have been done for that exact candidate. In the system there is

an absence of a proctor at physical level and the test is assigned to more candidates than that of traditional method hence it is less time consuming and less cost effective as per the paper[9]. We are proposing a system in which there is an object detection algorithm which is used for the faces and real time videos in better way. It includes various models for the candidate's facial movements, body movements like : upper body and lower body detection. This algorithm uses edge detection features proposed by Viola and Jones in their research paper "Rapid Object Detection using a Boosted Cascade of Simple Features" published in 2001. The algorithm is given a lot of positive images consisting of faces, and a lot of negative images not consisting of any face to train on them. Here we are using a new scheme for face naming with HaarCascades Algorithm, which is used to provide greater security for student relevant data and preventing question papers data.

II. INTRODUCTION TO LITERATURE SURVEY

1. Paper Name: Online Examination System with Cheating Prevention Using Question Bank Randomization & Tab Locking.

Author: Samuel S.Chua, Joshuel B. Bondad, Zechariah R. Lumapas, Joven DL. Garcia On 2019.

Abstract: As one of the key contents of Online Examination System with Cheating Prevention Using Question Bank Randomization & Tab Locking is to prevent the cheating using question bank randomization. Because taking answers from others and plagiarizing assignments are continuously used in academics for malpractice, this is the problem that educational institutes want to redeem, which is addressed in this paper[1].

Advantages: Tab locking during exam is resolved.

2. Paper Name: A design of continuous user verification for online exam proctoring on Machine Learning.

Author: Asep Hadian S G, Yoanes Bandung on 2019.

Abstract: In this paper the work proposed by the author will propose a method in which continuous user verification is done on the basis of face recognition modules which is in the form of a prototype which will be used to evaluate a method proposed by measuring the verification accuracy and speed. It gives the best result for automated online exam proctoring[2].

Advantages: Continuous User's Verification.

3. Paper Name: A Novel smart CBT model for detecting impersonators using Machine Learning technique.

Author: ohn-Otumu A. M, Nw Okonkwo O. C, Izu-Okpara I. U., Dokun O. O. ,Konyeha Susan , Oshoiribhor E. O. on 2020.

Abstract: CBT platform is computer-based training that is derived for conducting mass driven examination over computer networks to eliminate the certain challenges during the period of examination. The creation of CBT models is done using KNN ML technique for detecting likely cases of impersonation threats. This proposed smart CBT model is recommended by all the institutions and commercial CBT software production adoption.[3]

Advantages: Human invigilation as it controls mechanisms for cheating and impersonation.

4. Paper Name: Design of face detection and recognition system to monitor students during online examinations using Machine Learning algorithms.

Author: M.Geetha, R.S.Latha, S.K.Nivetha, S.Hariprasath, S.Gowtham, C.S.Deepak

In 2021.

Abstract: This paper represents the designing of face detection and recognition systems to monitor students during online examinations using Machine Learning algorithms. As previous methodologies have been made progress to improve performance of face detection but there are some issues like human facial appearances such as varying light condition, scale, position, etc; which blocks to reach human level accuracy which have been improved in this model[4].

Advantages: Image processing by support vector Machine.

5. Paper Name: Online Student Authentication and Proctoring System Based on Multimodal Biometrics Technology.

Author: Mikel Labayen, Ricardovea ,Julian Florez , Na-iaraaginako, Basilio Sierra in 2021.

Abstract: The key component for the system is that biometric authentication identity service of online students consistently. It uses cloud computing by which storage of data becomes very convenient and biometric traits cannot be stolen or recreated for any misuses by any unauthorized person. It provides data security because students are interested in better and more reliable academic credit for e-learning courses instead of using traditional classroom methodology for examination purposes[5].

Advantages: Computer vision and biometric authentication.

6. Paper Name: Video summarization for remote invigilation of online exam.

Author: Melissa Cote, Frederic Jean, Alexandra Branzan Albu, David Capson in 2021.

Abstract: In the paper named Video summarization for remote invigilation of online exam describes the proposed approach towards video summarization of abnormal or unethical behaviour during exam period which were conducted on online mode due to pandemic situation in last few years, because of it there is no transparency in examination system that so to overcome the malpractice from candidate the current system presents an automatic approach to video summarization for online exam[6].

Advantages: Behavioral modelling and detection.

7. Paper Name: An Incremental Training on Deep Learning Face Recognition for M-Learning Online Exam Proctoring

Author: Asep Hadian Sudrajat Ganidisastra, Yoanes Ban-dung on 2021.

Abstract: The key component of the papers are incrementation of the training process of face reorganization training modules. As we have an idea that if we add a face recognition process in the system the cost requirement is very costly. That problem is overcome by the existing system and the better version of face recognition has been made with cost reduction by using various algorithms[7].

Advantages: Greater accuracy for face recognition and good performance of memory usage.

8. Paper Name: Students Online Exam Proctoring: A Case Study Using 360 Degree Security Cameras.

Author: Aiman A Turani, Jawad H Alkhateeb, AbdulRahman A. Alsewari on 2021.

Abstract: This paper introduces a new approach for exam proctoring using a 360-degree security camera. Mainly, online exams' security is a major concern. Thus, a delivery tool must not only ensure the identity of a test-taker but also the overall test integrity. In this paper, the usage of the 360-degree security camera over the traditional webcam was investigated in order to enhance the exam security and to minimize the stressful restrictions. An automated proctoring model that will eliminate the need for real-time proctoring and remove any scheduling constraints in order to prevent cheating is proposed in this paper [8].

Advantages: Ensure authentication and running the online exam smoothly.

9. Paper Name: Smart Artificial Intelligence Based Online Proctoring System.**Author:** Neil Malhotra, Ram Suri, Puru Verma, Rajesh Kumar on 2022.**Abstract:** In this project, we describe a strategy for avoiding the physical presence of a proctor during the test by developing a multi-modal system. We captured video using a webcam along with active window capture. The face of the test taker is identified and analyzed to forecast his emotions. To identify his head pose, his feature points are identified. Furthermore, aspects including a phone, a book, or the presence of another person are detected. This combination of models creates an intelligent rule-based inference system which is capable of determining if any malpractice took place during the examination[9].**Advantages:** Creates an intelligent rule-based inference system.**10. Paper Name:** Online face and displacement authentication system.**Author:** Ayushi Jain, G. Bhoomika, Jasneet Kaur on 2022.**Abstract:** The main feature of the system is that it will overcome the various previous systems issues like: accuracy, robustness and efficiency of online exam proctoring system. In the system face reorganization, activity detection and other human behaviours has been overcome which was beneficial to make more transparency in examination to avoid mass cheating[10].**Advantages:** Various human activity detection.

5 LIMITATIONS OF EXISTING WORK

By the comparative study of the proposed system, we have been recognized following limitations of the system as:

- AI is not as smart as to track all human expressions .
- System is unable to track all the noise from the surroundings.
- Less instruction hence students are suffering from logging problems.
- Challenges of technology.

6 CONCLUSIONS

The two main concerns were test integrity and student performance. Avoiding frauds and cheating attempts within online proctoring sessions without affecting test-taker's performance is considered to be very challenging. We suggested using the 360-degree security camera over the webcam for improving the proctoring process.

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