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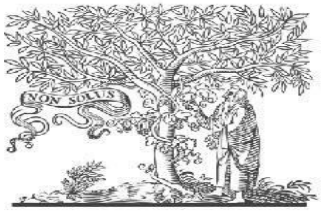

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AI-Based Online Proctoring System

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Abstract
Online education is becoming increasingly popular around the world, including in India. A lot of institutions, colleges, and universities are moving to an online format for lectures and tests. Teachers and students engage electronically during live or online classes. Comparatively speaking, running online classrooms is simpler than running online tests. The standard technique of administering tests is inefficient, and as a result, many malpractices might occur, failing to follow the laws and regulations. During an exam, a participant may attempt to open a new browser or window to seek answers on the internet using the Secure Browser method with Online Proctoring. This compromises the Online Exam's legitimacy. There are relatively few technologies that are embedding the concepts of proctoring and evaluation. During the examination, the secure browser technology restricts he user from accessing any other windows. In this paper, we provide a multimedia analytics system for automatic and continuous online exam proctoring. This system consists of five main components that estimate user verification, audio surveillance, actively identifying windows, eye tracking, and Real-time detection of mobile devices. This project's domain will be connected to online test proctoring, as well as mark evaluation and prediction.

Keywords
Artificial Intelligence, Exams, Online proctoring system, Malpractices, User verification, Face angle estimation, Face recognition, Audio evaluation.

Introduction

The 2019 CORONA virus epidemic has dramatically increased interest in online education, which has been rising for some time. Online instruction and testing have been significantly impacted by the Internet's development. As we are all aware, a new educational system is taking root everywhere, and in order to effectively monitor and evaluate learning, some changes need to be made. Due to a few factors, online education is becoming more and more popular, and when used properly, it can be one of the best forms of education. The tests and assessments that must be administered must be done concurrently with the online form of instruction, materials, and library. To make it happen, the way online tests are administered must be done correctly. Technology is developing very quickly. These online courses frequently include virtual evaluation tasks, which pose a variety of difficulties and obstacles in terms of academic integrity and plagiarism.

Online proctoring is the practice of keeping an eye on student behaviour while taking an exam using virtual technologies.

These technological advancements allow students to take the online exam anywhere while ensuring its dependability and integrity. This involves verifying the

student's identity, safeguarding, and defending the reliability of a test and the way it is given. Online proctoring consists of two primary parts. The webcam on the student's computing device must first be turned on in order to video record the actual learning environment and any activities the student takes throughout the assessment session. The proctor may detect cheating: if a student is talking to someone in the room, using a book, mobile device, or other written material to look up answers. The second choice is to implement a lockdown, which prohibits students from accessing any other computer applications, including the web browser, and user computing methods that might be used to cheat on tests. The proctoring technology also keeps track of every internet activity a student engages in throughout the exam, including any websites they attempt to view. A video recording of the full test is available to teachers or examiners for examination during or after. Due to the ineffectiveness of the standard exam-conducting approach, many unfair acts that violate the law may take place. As a result, there needs to be a specific way of conducting exams. There is a relative handful of technologies that are performing proctoring and evaluation flawlessly in today's world.

Types of Proctoring:
Examination Proctoring Offsite
Remote Proctoring

Examination proctoring offsite: Since ancient times, exams have been given in classroom settings. There are benefits and drawbacks to each strategy. Since they supervise activities and ensure that candidates do not cheat, invigilators are essential to on-site proctoring. When completing an offline review, there will not ever be an internet or power issue. On-site proctoring has a few disadvantages that are worth mentioning. spending on logistics and infrastructure. Examinations cannot be held in the absence of lecture halls and a suitable location with all the amenities required for the students. Proctors must be in the center to administer offline exams, and they are in charge of providing each student with exam papers, answer sheets, and extra papers. Candidates and proctors must go to the testing location in order to take an exam. They must therefore cover the expense of shipping. The prices increase if the test center is in a far-off city.

Remote Proctoring: This is the method adopted to proctor, or watch over, the candidates while they take an online test. Using technology, the supervisors overseeing this procedure can keep an eye on the candidates from any other remote place. The only method that can be implemented to stop cheating or any other malpractice when administering online tests is remote proctoring. Because it was created with the best technology, it enables you to administer online tests without any possibility of cheating. There are three types in online proctoring:

1. Recorded Proctoring
2. Live proctoring
3. Advanced Proctoring

These proctors are trained to assess a candidate's credibility and look for any suspicious eye or facial movements, the use of electronic devices, or other equipment that could indicate suspected cheating. If suspicious circumstances do develop, the proctor has the option of disqualifying the candidate from the exam or alerting the student department in charge of the malpractice. Without any live proctoring, the audio and video feeds from the test takers are recorded during the exam. The equipment can record, but it can also watch the feed in real-time and use advanced audio and visual analytics to hunt for any suspicious activities. It ensures that test-takers are focused on the test screen.

Online proctoring systems have four major characteristic features:

- Authentication
- Browsing Forbearance
- Remote provision and monitoring
- Record originating

Table 1: Characteristics of Online Proctoring Systems

Characteristic Attributes	Description	Newer Technologies
Authentication	Using the proctoring software to verify and identify the candidate and the proctors is a component of authentication.	In the proctoring system, entities are authenticated using multi- factor factor authentication, OTP, and face recognition.
Browsing Forbearance	This is a limitation on the use of other resources imposed by the proctoring system software.	This is accomplished through log tracking, face and object identification, and log analysis.
Remote provision and monitoring	The proctor is given the authority to manage the proctoring system.	Typically, administrative privileges are granted, and multilayer security approaches are used.
Record Originating	During the exam, the student's report and activity record are created.	This frequently involves the usage of open-source programming languages like Python, ASP.NET,and others.

Problem Statement

Universities and organizations faced significant hurdles in providing an inclusive, equitable, and cheat-free testing environment during a pandemic.

The online remote proctoring technology simplified the work of both organizers and applicants, even when they were in different locations. As a result of the epidemic, various businesses and institutions resorted to a safe and secure online remote proctoring method to complete their duties. Online tests must be performed equitably, with the student being monitored while taking the exam. As a result, schools rely on proctoring platforms to administer tests in a regulated way while still adhering to rules. Online proctoring offered a venue for students to access examinations as well as check, verify, and analyse their grades.

Besides that, the proctoring program should be capable of identifying suspicious behaviour, the presence of electronic devices, the identification of several people other than the applicant, and so on. In such circumstances, the application should warn the candidate and log them out. Software that can monitor the test process is necessary since administering examinations requires the use of certain software. It should give a platform for students to access tests as well as check, verify, and analyse their grades. It should also be able to anticipate or track the marks earned and report the outcome.

Drawbacks in Existing System

- We must rely on a manual proctor sitting at home to supervise students in existing online systems because it is not expensive to have one proctor viewing 10 students at once.
- One exam needs multiple proctors to be administered if we scale the traditional online proctoring solutions. Other students may cheat when the proctor is focused on one student since they must be

able to notice errors. As a result, concurrent proctoring is not possible.

- In a virtual proctoring system, a proctor supervises students using a webcam and directs them through each step of an online exam. Proctors are required to check that there are no unauthorized materials present before the exam starts. They must also request the student's ID card in order to confirm their identity. Throughout the session, students must keep an unbroken audio- visual connection with the proctor.

Because there are roughly 1:30 teachers to pupils, the standard classroom proctoring is less effective. Also, scheduling an exam for a particular student who skipped it requires a lot of resources.

Literature Review

Proctoring System Evaluation:

Systematic evaluation of the literature's goal was to assess the literature that is currently available on online exams and their alternatives.

For many students, online learning environments provided a system that was more supportive of their overall well-being, individual growth, and academic achievement. Researchers have offered numerous approaches for proctoring online tests in the most effective and comfortable manner while maintaining academic standards.

According to the author, adding eight control mechanisms that let instructors make assignments more challenging and hence less likely for students to cheat, as well as a safe web-based exam program and a network layout that is said to minimise fraud, may help to encourage academic honesty. The author provided a method for continuous user verification based on face authentications by constructing an incremental training procedure and employing images taken during learning online lecture sessions as a training data set to boost resistance against posture and illumination variations.

Every time a user completes a lesson, the algorithm gets trained. Article discusses utilizing deep learning for facial recognition along with incremental training. The user's participation in mentoring sessions makes the instructional graphics accessible. The method is expected to maintain the invariant posture and account for minute changes while reducing training schedules and dataset sizes, which can ease the processing load on the server. The authors looked into four different face detectors— MTCNN, yolo-face, Haar-cascade—as well as a Facet model for face recognition in order to retain high efficiency.

Online proctoring, a relatively recent method that mimics in-person proctoring remotely by utilizing technology to produce verified and secure testing settings, has been created to address the limitations of UIT. This study compared the user friendliness, examinee behaviour, and mean scores of administering online exams with and without proctors in a low-stakes testing environment. This research does a comprehensive review of proctoring systems that use and don't use AI. We addressed four main research concerns, focusing on the architecture of AIPS as it currently exists, the parameters to be considered for Apiculture of AIPS, trends, and the issues in AIPS. AIPS security issues are growing and are a legitimate source of concern, according to the analysis of OPS and AIPS.

Methodology

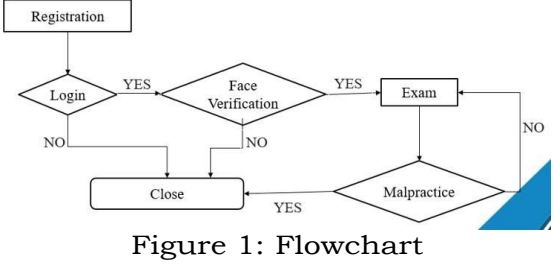

Figure 1: Flowchart

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Proposed System:
This system offers a comprehensive workflow for online test proctoring, starting with registration, login, and test administration while using the proctoring system, and culminating in the generation of the student's report. Our suggested technique is based on both automatic and recorded proctoring. If the student moves their heads or uses any devices throughout the test, it records the audio and takes pictures. By giving the learner three chances, it also alerts them whether they are attempting to copy. The students can exercise caution as a result of these cautions to avoid making the same mistakes again. Three chances are given before the test automatically closes.

Registration:
After opening the link it provides login page where the student can login with their credentials. If the student is not registered then click on the register automatically it will provide registration page as shown in figure 2.

Figure 2: Login Page

The project will provide student registration and an authentication system. Users must register using their username, and mail ID, and capture their face, as shown in Figure 3.

Figure 3: Registration Page

After the registration the student can come back to login page and login with their credentials. During login process an email is sent to the authorizer for OTP verification. After verification the user can login as shown in figure 1.

Exam Platform:

Figure 4: Test Page

After login it will do face verification to know whether the login user is registered author are same or not. If it does not matches it will close. If it matches the student can start the exam. Examinations often feature multiple-choice questions that are objective in nature.

Before examination the student can read all the instructions. The student can start the examination.

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Figure 5: Question format

Proctoring:

In this proposed system, each test obliges the student to grant the proctoring software camera access. Failing to do so will result in dismissal from the test. Every time several faces or unknown faces are shown on a video, a picture is taken and scrutinized for errors. A warning message will be displayed anytime numerous faces or unknown faces are found so that participants do not make the same error again.

Three warnings will result in the automatic termination of the test.

Figure 6: Warning 1

When the test is about to end, a message will remind the student to move quickly so they may complete the exam and turn it in on time.

Figure 7: Warning 2

Results:

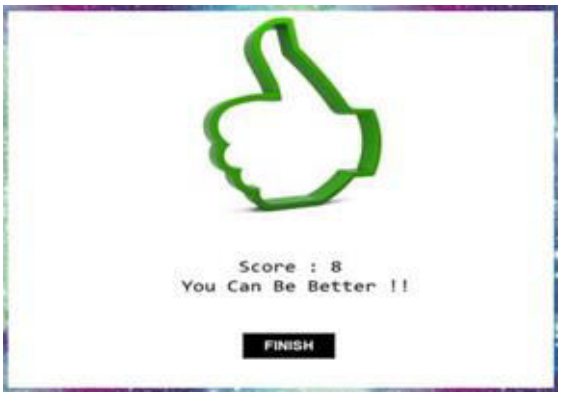

Figure 8: Exam Score

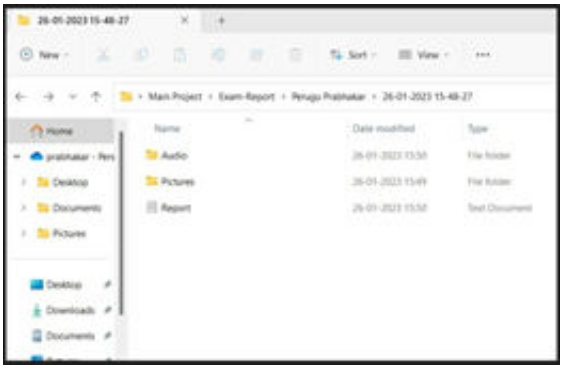

Figure 9: Report

Conclusion

AI-proctored proctored solutions are in high competition because there is such a strong demand for online proctoring these days. It is feasible to develop an accurate AI proctoring system. To handle conflicts, it is crucial to record fraud. From the viewpoint of the text taker, the system is inexpensive and simple to implement because it only calls for two cheap cameras and a microphone. By this study, we

hope to demonstrate that online proctoring is the way of the future and that it can significantly reduce exam cheating.

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