**AI PROCTORED EXAM SYSTEM WITH BACKGROUND NOISE DETECTION**

**A PROJECT REPORT**

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***In partial fulfilment for the award of the degree***

***of***

**BACHELOR OF TECHNOLOGY**

in

**COMPUTER SCIENCE & ENGINEERING**

of

**FACULTY OF ENGINEERING AND TECHNOLOGY**



**MAY 2023**

**SRM INSTITUTE OF SCIENCE & TECHNOLOGY**

(Under Section 3 of UGC Act, 1956)

**BONAFIDE CERTIFICATE**

Certified that this project report is titled “**AI PROCTORED EXAM SYSTEM WITH BACKGROUND NOISE DETECTION**” is the bonafide work of ‘**ANIKET ANAND [Reg No: RA1911003030349], VAIBHAV PANDEY [Reg No: RA1911003030331] & RAPETI JAYA KALYAN [Reg No: RA1911003030318]**’, who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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**ABSTRACT**

Online remote education has flourished throughout this Covid-19 epidemic. To complete their academic work, all schools and institutions shifted to the online teaching and learning process. But, administering fair online exams has proven to be very difficult. In some universities, the assignment has been changed to one where students can just copy and paste their responses from the internet. Thus, to conduct fair online examination, AI proctored exam software came in demand. The four capabilities of online AI based proctored software are Gaze tracking, Mouth open or close, face detection, and face recognition. It is basically a timed exam which is taken by a student/person while proctoring software monitors the student's/person's computer desktop, its webcam and also audio. Then the data recorded is reviewed to check if there is any type of malpractice or suspicious activities during the whole exam period. There are AI proctored exam software in market but they have few drawbacks. One of the major drawbacks is if there is any type of background noise during exam, then it’s considered as malpractice. But the examinee many times come with excuses that the noise was coming from a ceremony next door or a dog barking in street, etc. and at that time no proper judgement is taken from the examiner software. Here, our main aim is to fill this gap also by using artificial intelligence. Here, we record the voice of examinee and will convert it into text and match it with the question paper, and if it matches more than 80%, then it’s definitely a malpractice. Here, Different libraries like opencv, google speech recognition etc are used. Artificial intelligence is used to train the haar cascade algorithm.

Overall, the whole project is made from scratch using agile methodology of software development life cycle. This project delivers more accurate result using Artificial intelligence (and also without using human intervention) which also helps to reduce false flagging in case of malpractice during online exam. During Covid time, proctored exam came out to be the best way to take exams as physical exams were not possible at that time, it also reduces the requirement of human proctors. But there are still some gaps in the proctoring software system and we have tried to fill that gap by this project.

**ACKNOWLEDGEMENTS**

I would like to express my deepest gratitude to my guide Dr. Anand Pandey Assistant Professor her valuable guidance, consistent encouragement, personal caring, timely help and providing me with an excellent atmosphere for doing research. All through the work, in spite of her busy schedule, she has extended cheerful and cordial support to me for completing this research work.

**-Aniket Anand**

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**CHAPTER 1**

**INTRODUCTION**

* 1. **Introduction**

The field of online education has grown significantly in recent years, especially after the COVID-19. During Covid period, all the schools, colleges and institutions were compelled to switch to an online education format from offline. Due to COVID-19, many schools got closed worldwide. More than 1.2 billion children got out of school.  
As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken on different digital platforms. Many online Massive Open Online Courses (MOOCS) and other online credential programmes of renowned Colleges and institutions are now easily accessible to the students due to the digitalization of education process. Students now have additional possibilities to learn and develop themselves. There was one more challenge, that was to conduct fair exam in the online teaching process. We know that Exams are actually a blessing in disguise in many instances for the students– by flagging weak spots, enabling student to handle pressure, exams present students with several opportunities along the way to actually improve upon specific areas they wouldn’t know they are deficient in. This can’t happen without a structured fair assessment. So, just by conducting exams on Google form or uploading assignments pdf was not able to restrict cheating and malpractice in online exams. So, AI Proctored Exam system came in demand. And up to a lot of extent, AI Based proctored exam system was able to conduct fair online exams. Online supervision solutions have gained immense popularity in the era of online learning. It ensures the integrity and security of online exams, provides more flexibility for students and teachers. For students, no specific hardware or software is required. All you need is a desktop computer or laptop and a stable internet connection. As The COVID-19 Epidemic had also impacted hiring procedures that use written tests to screen candidates for positions and entrance exams, the hiring procedures also shifted to the online AI based proctored exams.

Some believe that an unplanned and rapid transition to online learning (no training, insufficient bandwidth, little training) will result in a degraded user experience that is not conducive to sustainable growth, while others believe that new hybrid education models are emerging. Wang Tao, Vice President of Tencent Cloud and Vice President of Tencent Education, said, "We believe that the integration of information technology in education will accelerate and online education will eventually become an integral part of school education."

* 1. **Objective**

Software for remote proctoring is designed to keep an eye on students as they take tests. Hence, creating computer algorithms to detect student plagiarism. Students are observed using cameras to check for unethical behaviour. A function of AI is then implicated. Finding candidates to closely watch also helps. Candidates can take tests from any location with the help of online proctoring. With online proctoring, the proctored test software is utilised to enable both students and proctors to take exams wherever they choose. It must have internet connectivity and be adequately dependable. Online exam proctoring is no longer challenging. Movement and sound detection should be facilitated by a good remote online proctoring system. It must have internet connectivity and be adequately dependable.

**CHAPTER 2**

**LITERATURE SURVEY**

**2.1 Introduction**

Students and institutions all across the world are using online education to access a wide range of information bases. This type of education and learning is expanding quickly, and the biggest constraint for the scalability of such learning systems is now evaluation and proctoring for online courses. Manual human supervision is a typical method of exam proctoring and evaluation where the examiner must be present or must use a camera to visually and audibly supervise the test taker's testing environment. We show a fully automated exam proctoring method in our suggested system that doesn't entail any human interaction. To process and estimate the wide range of events, behaviours, and patterns commonly connected with cheating, the system integrates all of the inputs.

**2.2 Process**

Several schools demand that online exams be proctored in order to demonstrate and uphold academic integrity. Proctoring, though, can be very expensive. Students may be responsible for paying testing facility fees, Remote Proctor purchasing expenses, time spent looking for a qualified proctor, and the effort necessary to schedule an exam time. The institution must pay staff salaries to oversee the proctoring procedure, approve proctors, maintain testing facilities, and deal with the possibility of losing students and income because not all colleges require proctors for online tests. This essay explores the control concerns surrounding online tests and argues that the overall expense of proctors for online exams (in terms of both students' and the institution's time and money) outweighs any potential advantages.

**2.3 Problem**

As online learning expands, it presents both opportunities and difficulties for both students and teachers. One issue is the impression that the academic integrity of online assessments is jeopardised by undiscovered cheating that results in unnaturally high grades. Proctoring software has been created to address and prevent academic dishonesty in order to allay these worries. This study compared the outcomes of online tests that were proctored and those that were not.

**2.4 Related Work**

Online exams that are proctored using proctoring software have many advantages. And a number of internet remote proctoring service providers give an application to assist you in inexpensively supervising your exams.

Obstacles must be overcome:

* Not an independent vision
* The interface may be improved.
* The insertion of images could be done better.
* Proctoring has room for improvement, and there are just a few mobile platforms it supports.
* Noticeable delay in test start-up
* Does not get along with contractors well
* Potential for a few bugs that force users to restart their laptops and Computers
* Cannot create a question bank

**CHAPTER 3**

**EXISTING PROBLEM AND PROPOSED SOLUTION**

**3.1 Existing Problem**

Current online solutions only have one manual proctor to observe numerous students at once, which is not cost-effective, thus we must rely on a human proctor to watch the kids when they are at home or in school. We will require numerous proctors to administer an exam or exams if we continue with the current standard online proctoring techniques. Other students can cheat when the proctor is concentrating on one student. Hence, proctoring the students concurrently is not an option.

The examiner was able to review the student's activity thanks to online proctoring. The test-takers, however, were able to misbehave by showing their images in front of the camera in order to hide their presence. Some of the disadvantages include the fact that other people can respond to queries when the camera is positioned at a specific distance. The current technology identifies that the photos contain a real person and permits the test-taker to perform these tasks, rather than identifying the photos or images. Moreover, it does not measure the distance between the subject in front of the standard laptop cameras and the camera itself. It doesn't indicate whether anyone else is present in the room besides the test-taker. For exams, the pupil movements are not recorded in order to assess the students' vision.

Also, a big concern is background noise coming from the examinee, where the existing proctored exam software consider it as malpractice without checking that the background noise is of a dog barking outside, or of a construction work happening outside, or it’s actually someone whispering the answers and involved in malpractice.

**3.2 Proposed Solution**

The shortcomings of the current system indicated above can be found using the proposed system. The test-eye taker's movement will be monitored in our suggested system to determine whether he or she is looking up, to the right, or to the left, which is something they may do to glance at a notebook or signal someone. The face keypoint detector from Dlib in Python and additional image processing from OpenCV can be used for this identification. In addition, a facial key points detector that can instantly identify eyes is required. Before beginning image processing, we must first locate the eyes, and in order to locate the eyes, we must locate a face.

The coordinates of a face are input into the facial key point detector as a rectangle object of the dlib module. The frontal face detector built into dlib can be used to find faces. We can use the segmented eyeballs because they are separated. Eye detection and mouth detection are extremely similar. This job makes use of Dlib's facial key points once more, and the test-taker is asked to sit upright (just as he would throughout the test). The distance between the lips key points is recorded for 100 frames, and the average value is calculated.

The distances between the points rise when the user opens his or her mouth, and infringement is considered to have occurred if the distance increase exceeds a predetermined value for at least three outside pairs and two inner pairs. The next step in the suggested framework is to determine how many people were present in the room where the test was administered. Finding the student who is practising poorly can be found by identifying individuals other than the test-taker. Here, the YOLOv3 pre-trained model, which is incredibly quick and almost as accurate as SSD, can be used to categorise 80 objects. By doing so, we can determine how many items are in the space.

**3.2.1** **Face Spoofing**

The idea behind face spoofing is to tell if the face in front of the camera belongs to a genuine person or to a phoney photo or phone screen. This will enable us to identify the test-true taker's mirror image. To determine whether a face is a genuine person or simply a printed photo or an image of him on a digital device, we can utilise face spoofing techniques. It is also known as replay attack detection or liveliness detection.

**3.2.2** **Audio Detection Module**

The microphone's audio has been recorded, and Google's Voice Recognition API has been used to convert it to text. In order to minimise disruption to the recording process, a distinct thread is utilised to access the API, process the most recent request, add its results to a text file, and then delete it. We eliminate the stop words from that file using NLTK. The question paper's text format, with the stop words deleted, is used to compare the contents of the two papers. Next, the proctor is given a list of the most frequent words used in the text along with their frequency.

**3.2.3 Real-Time Head Pose Examination**

This user will develop a head position estimator that can calculate the head's angle of rotation. Depending on the positions taken by the student, the degrees will guarantee that the head position will move. It is excellent for capturing the head's up-and-down, right-and-left movements. In order to prepare it for training and to keep them as record files, the procedure entails extracting the faces and applying facial landmarks to them.

**3.2.4 Methodology**

We used pre-defined Python modules and packages including tensorflow, opencv, dlib, keras, ntlk, wget, sklearn, pyaudio, speech recognition, trained models, and basic modules to complete all the aforementioned tasks.

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