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# AUTOMATING ONLINE PROCTORING SYSTEM

**GUIDE: DR.B.KALAAVATHI[1]**

**Sangeetha M[2], Chowmiya S B[3], Vaishnavi V[4], Pooja Shree K[5]**

*[1]Director and Professor, KSR Institute for Engineering and Technology, Tiruchengode.*

*[2,3,4,5] Department of Computer Science and Engineering,*

*KSR Institute for Engineeringand Technology, Tiruchengode.*

**ABSTRACT**

*In this pandemic situation of Covid-19, online remote has blossomed. All the schools and universities have been shut down and they were switched to online applications to finish their academic activities. However, there has been a great trouble in conducting examinations. Some institutions have moved it to an assignment form where students can just copy and paste their answers from the internet. If it is the way we are living is to be the new norm there needs to be some solution. Allowing students to take exams from home through online where they will be monitored by a proctor for the whole duration of the exam was quite difficult. Further implementing this process at a large scale will not be plausible due to the workforce required. To overcome this problem, we have created an AI in python which can able to monitor the students using their laptop or system webcam and microphone itself and would enable the invigilator to monitor multiple number of students once at a time. Our AI have four vision-based capabilities which are integrated using threading so that they can work together. The four capabilities are Gaze tracking, Mouth open or close, Person counting, and Mobile phone detection. Other than that, the speech from the microphone will be recorded, converted to text, and compared to the text of the question papers of the exam to report the number of common words spoken by the test taking student individually.*

***Keywords***: *Online mode, to avoid cheating, vision-based capabilities, using python webcam monitor*

## I. INTRODUCTION

In this digital world, everything has become digitalized and people were start migrating to the world of automation. All a sudden, the Covid-19 has made a great impact on everybody's life. Especially students were affected lot. They were meant to stay in the home and continue their studies through online mode. For monitoring the students activity every teachers and their school/university managed has gone through lot of approaches and find their own comfortable platforms to educate the students through online.

**Process:**

However, for conducting online exams, they arranged one meeting link via Google meet app, Microsoft teams app etc., by using the link students were able to logged in and the questions were displayed by the admin of the meet, by watching them, students could write the answers. At the time of examination, the invigilators were assigned to every student to monitor their activities to not to be copied answers from books, internet or by asking their friends.

**Problem:**

It was great difficult to monitor students for the entire scheduled timing of the examination. Despite the fact that there are already electronic proctoring tools that seek to guarantee the quality of the evaluation process without requiring the physical presence of the student in a specific place or the union of the students and the examiner in

that place, e-proctoring still continues without widespread use in the institutions.

**Solution:**

To overcome this, we have planned to create an AI using python to monitor the activities named online proctoring system. With this system, we would monitor multiple students once at a time. The system will help in large scale activity. We use vision-based techniques like gaze tracking, mouth detection, person count and mobile phone detection. We use the standard libraries available in python and import modules based on our requirements. This system includes six basic components that estimates the key behavior of the student: verification of the test-taker, text and voice detection, active window and toggle of windows detection, gaze estimation, phone and person identification. By combing them with multithreading components and applying the conditions, we classify the features whether the test-taker is cheating or not at any moment during the exam. We collect multimedia (audio and video) data to evaluate various types of cheating while taking exams.

## II. RELATED WORK:

The benefits of proctored examinations online trough proctoring software are enormous. And several online remote proctoring service providers offer an application to help you supervise your tests in a budget-friendly way.

### Problems to overcome:

- Not a free vision
- Interface could look a bit betters
- Image inclusion process could be improved
- Scope for improvement in proctoring
- Supports limited mobile platform
- Noticeable latency in starting a test
- Does not work well with freelancers
- Might face a few glitches and make users reboot their PCs and laptops
- Cannot build a question library

## III. EXISTING APPROACH:

Online proctoring enabled the examiner to examine the student's activity. Whereas, the test-taker were able to do mal practice in order to show their photos in front of camera to avoid their presence. Placing the webcam at a certain distance, enables other person to answer the questions are some of the drawbacks. The existing system doesn't identify the photos or images, it recognizes the photos has a true person and allows the test-taker to do such activities. It also doesn't analyze the distance between the normal laptop embedded cameras to the person sitting in-front of the camera. It doesn't identify the presence of person in the room other than the test-taker. The eyeball movements aren't captured to find the student vision on the exams.

## IV. PROPOSED SYSTEM:

The proposed system can be used to detect the above mentioned drawbacks in the existing system. In our proposed system, we aim to track the movement of eyeballs of the test-taker and getting the reports like he is looking to the

right, left, or up which he/she might do to have a glance at a notebook or signal to someone. This identification can be done by using python's Dlib's facial keypoint detector and OpenCV for further image processing. Other than this we will need a facial key points detector that can detect eyes in real-time. The first thing to do is to find eyes before we can move on to image processing and to find the eyes we need to find a face. The facial key point detector takes a rectangular object of the dlib module as input which is simply the coordinates of a face. To find faces we can use the inbuilt frontal face detector of dlib. The eyeballs are segmented out and we can utilize them.

Mouth detection is very similar to eye detection. Dlib's facial key points are again used for this task and the test-taker is required to sit straight (as he would in the test) and the distance between the lips key points is noted for 100 frames and averaged. If the user opens his/her mouth the distances between the points increases and if the increase in distance is more than a certain value for at least three outer pairs and two inner pairs then infringement is reported.

In the proposed framework, next we move forward to identify the number of persons in the room where the test-taker taken the test. It is helpful to identify other persons than the actual test-taker to find the student mal practice. Here YOLOv3 pre-trained model can be used to classify 80 objects and is super-fast and nearly as accurate as SSD. By this we can count the number of things present in the room.

**Face spoofing:**

Face spoofing is the concept to detect if the face in front of the camera is a real person or a fake photograph or phone screen. This will help us to know the actual mirror image of the test-taker. We can use face spoofing techniques to find out if the face is a real person or merely a printed photograph or a picture of his on a digital device. It is also known as liveliness detection or replay attack detection.

**Audio Detection Module:**

Audio from the microphone has been recorded and converting it to text using Google's Speech Recognition API. A different thread is used to call the API such that the recording portion is not disturbed a lot, which processes the last one, appends its data to a text file and deletes it. Using NLTK, we remove the stop words from that file. The text format of the question paper is taken whose stop words are also removed and their contents are compared. At last, the common words presented in the text along with its number are presented to the proctor.

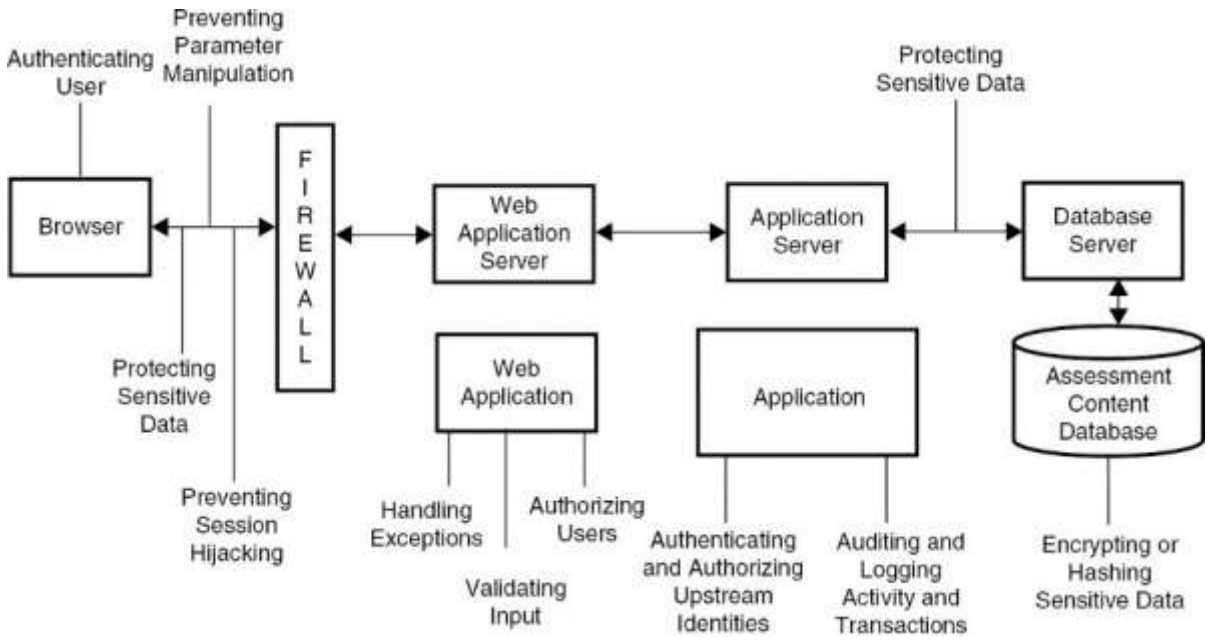
**Real-Time Head Pose Estimation:**

This is user to create a head pose estimator that can tell where the head is facing in degrees. The degrees will ensures the movement of the head position based on the positions the student do. It works great for recording the head moving up and down, right and left. The work is to extract the faces and apply facial landmarks on it to make it ready to train and store them as record files.

**Methodology:**

To achieve all the above mentioned activities we were using python pre-defined modules and packages like tensorflow, opencv, dlib, keras, ntlk, wget, sklearn, pyaudio, speech_recognition, trained models and basic modules.

## V. SYSTEM ARCHITECTURE:




## VI. CONCLUSION:

Our system has been combined with a secure browser to prevent cheating. This project does not eliminate the need for a proctor as he is required to perform certain operations. There are certain ways to cheat like a person sitting behind the laptop communicating with the test-taker by writing. To completely stop cheating we would need external hardware like a spectacle camera to cover the whole field of view of the test-taker and apply computer vision on its feed. We can avoid mal practices by achieving the required conditions through our system. This has become a best suitable method for the examiners to examine the student's activities. In this system, we doesn't use any other languages, other than python. We implementing our system at a great extent this would be much helpful for us. We make an accurate reports and find the fraudulent things. Our system will help to reduce the chances of cheatings by the test-takers. We ensure a clear vision on the online examinations. This semi- automate proctoring based on vision and audio based capabilities are used to prevent cheating in online exams and monitor multiple students at a time. This system is made up of the following factors such as Quality management, available information, external conditioning, trust, perceived compatibility, usefulness, attitude and intention. Thus, in general terms, it can be said that this is intended to change the vision of institutions dedicated to online monitoring regarding e-proctoring and to encourage the use of this system in their places, allowing complete remote monitoring.

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