



# Automated Online Proctoring System Using AI

<sup>1</sup>Siddhesh Karpe, <sup>2</sup>Akash Mishra, <sup>3</sup>Krishna Oza, <sup>4</sup>Prof.Madhura Phadke

<sup>1</sup>Student, <sup>2</sup>Student, <sup>3</sup>Student, <sup>4</sup>Professor Incharge

<sup>1,2,3,4</sup>Computer Engineering Department,

<sup>1,2,3,4</sup>Datta Meghe College of Engineering, Airoli, Navi Mumbai, India

**Abstract:** Remote examination system is a online examination system where exams are given online. The online education system, which increasingly demands full remote teaching, continues to find its way to the evaluation system. Nowadays, Educational Disruption and Response to COVID-19 crisis, most governments around the world are closing the educational institutions and moving their activity to online and remote modality impacting over 89% of the world's student population. For example, in Spain, nearly all universities have decided to conduct exams in online mode. Thus, online proctoring tools are very pertinent and significant supporting this process. Adopting this technique is not viable on a large scale. With numerous exams being postponed or cancelled due to COVID-19 risk to students, remote proctoring can facilitate them to give exams in the safety of their homes.

With AI-based remote proctoring and invigilation technologies, it can be ensured that students do not get involved in cheating or unfair means during the examination. With AI-based technologies, remote proctoring gives various benefits. While it allows students to take a test from any premises with some technical prerequisites, it also removes the need for physical examination centers.

**Index Terms - Online examination , AI based technology , Remote Proctoring, AI proctoring**

## I. INTRODUCTION

Remote proctoring project is an active research area. It provide digital form of invigilation using monitoring software. It uses use audio, video and various anti-cheating features to maintain the exams integrity, ensure its credibility and authenticity. This OpenCV application that contributes immensely to the advancement of an automation process and can improve the ability of proctor for online Supervision. The objective of Remote Proctoring software is to supervise students while conducting exams. Thus, developing computer algorithms to Identify students cheating. Student camera access is taken then monitor them for unfair practices . Then AI function is involved. And it helps to find candidates to monitor closely. Online proctoring enabling candidates to take exams from any location. The proctored exam software is used during online proctoring to allow students and proctors to take exams at any place. It must be sufficiently reliable and internet connected. Proctoring an online exam is no longer difficult. Monitoring software is employed to monitor the students through audio and video after establishing the exam's credibility and authenticity. A proctored exam is associated with having an individual proctor monitoring an exam and monitoring the students. A proctor completely impacts an exam's integrity with strict invigilation. In case a student violates the rules of conduct, a proctor can dismissed the test and report the matter to the institution conducting the assessment.

## 2. Project Design

Project designing is an early phase of the project where a project's key features, structure, criteria for success, and major deliverables are all planned out. The main point is to develop one or more designs which can be used to achieve the desired project goals.

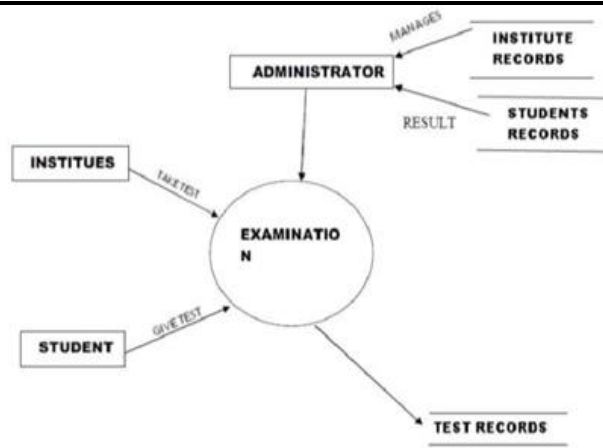


Fig 1: Workflow Diagram

### 3. Methodology

The AI proctored exam which we have developed is similar to traditional exam with improved feature of AI. Normally in online exam there is a proctor interface and proctor examines a limited group of students. But our system will be using Head Pose estimation feature of AI to track the student head movement and alert the proctor.

The detailed methodology of head pose estimation feature of AI is given below:-

#### 3.1 Head Pose estimation using AI:-

Head Pose estimation is a cool feature which we can implement using OpenCV in python. This feature requires various steps for face pose estimation.

They are:-

1. Face detection
2. Face Landmark Recognition
3. Face Pose estimation

##### 3.1.1. Face Detection:-

This is the very first step in head pose estimation technique. We will detect face of users using OpenCV library. We will be using a Caffe model of OpenCV DNN module. We will first capture the user's face and then send it to the OpenCV Caffe model of DNN module for Facial Landmark detection.

##### 3.1.2. Face Landmark recognition:-

For this step we will be using facial landmark detector provided by Yin Guobing in his Github repo. His github repo extracts faces from given image and then applies facial landmarks on it. Then the model will be trained using tensorflow. The tensorflow has the ability to train a model because it contains loss functions which identify the relationship between points as the basis for optimization when minimizing loss. Then the trained model is exported as an API.

The model takes square boxes of size 128x128 which contains faces and return 68 facial landmarks.



Fig 2: Face Landmark recognition

### 3.1.3.Face Pose estimation:-

In this step we will need six points of the face. For the Facial position estimation. They are tip of nose, extreme left and right point of lips and the left and right side corner of eye. We will then take standard 3D coordinates of these facial landmarks and try to estimate the rotational and translational vectors at the nose tip. Now, for the accurate estimate, we also need to intrinsic parameters of the camera like focal length, optical center, and radial distortion of parameters. Here we can estimate the former two and assume the last one is not present to make our work easier. After obtaining the required vector values then we able to project those 3D points on a 2D surface that obtained image.

Now we are able to get angle estimation for our head. We will now set the angle for which Head up, Head down, Head left, Head right will be displayed and proctor will be alerted by sound mechanism.

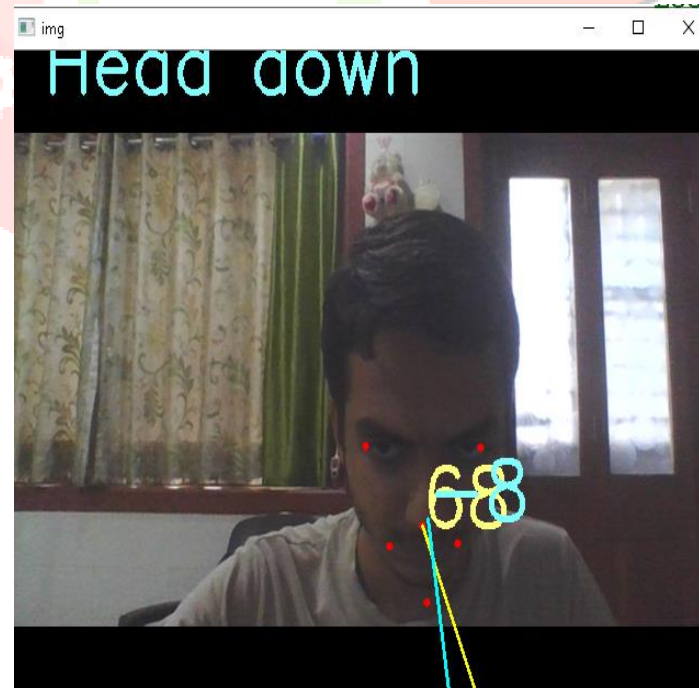


Fig 3: Face Pose estimation

#### 4. Acknowledgment

This world is transforming into a large online learning experiment .online proctoring has become an essential part of e-Learning source. Online Exam Proctoring is a new or current trend in the education system that has opened doors for many possibilities in the online Exam sector. For the education industry, it is good and one needs to adapt the ease of this technology to keep the integrity and consistency of the online exam, which has now become a “new technology” concept since the lockdown.AI improves the quality of the online examination platform giving the best of experience to its users making it interesting software to use. Especially when taking an online exam, AI enhances the process of proctoring and interfaces easy for both candidates as well as teachers and makes better decisions according to it. In the end it is important to take a glance on its future scope in online exam softwares and how it is supposed to improve with time. Technology has got no limitations on its growth and is only moving towards a superior level in terms of rendering perfection.

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