ARTIFICIAL INTELLIGENCE BASED AUTOMATED EXAM PROCTORING SYSTEM

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Abstract - *There have been giant leaps in the field of education in the past 1–2 years. Schools and colleges are adapting online to provide more resources to their students. Online proctoring services (part of assessment) are also on the rise, and AI-based automated exam proctoring systems (AEPS) have taken the market by storm.. Major issues with AEPS include security and privacy concerns, ethical concerns and to ensure that the level of online examinations is at par with offline examinations in all aspects; be it integrity of marks scored, ensuring candidates do not get involved in wrongdoings etc. The exam proctoring system built uses Face recognition to verify a candidate while conducting an exam on an online exam platform. Images of candidates will be stored in the database. After the candidate logs in, the automated proctor keeps a check on candidate and prevent candidate from using any unfair means while giving the examination.*

Key Words: AI-based AEPS (Artificial Intelligence based Automated Exam Proctoring Systems), Algorithm, Person Detection, Proctoring System, Exam Proctoring, AI.

1. INTRODUCTION

Proctored exams are time based exams that a candidate takes while proctoring software monitors his computer's desktop along with webcam video and audio. So essentially, an online proctored exam is like any other exam but with an online infrastructure to support all the associated activities. And most importantly, invigilation in order to maintain the sanctity of the exam.AI-based AEPS uses an algorithm that monitors the candidates to flag any doubtful case. All the functions are real time based.

2. RESEARCH PROBLEM

The Major concern in the COVID 19 pandemic time is to conduct exams safely maintaining social distance and to maintain the integrity of exams. The best way to do it is develop an artificial intelligence based automated exam proctoring system that

    a. Is completely secure.

    b. Keeps track of a candidate's attendance throughout the examination correctly.

    c. Also ensures that the candidates are not involved in any wrong doings.

3. LITERATURE SURVEY

Due to the COVID-19 Pandemic, it has become the need of the hour to leverage remote proctoring platforms to conduct seamless tests while also ensuring that the candidates do not indulge in malpractices during these online exams. (Remote Proctoring, 2020).

There are numerous benefits to any organization when they conduct any assessment via remote proctoring instead of the traditional pen-and-paper based method. Scheduling exams becomes easier as there is no need to set up specific testing centres to conduct examinations. Communication between the examiner and the examinee is more streamlined, hassle-free and faster. Results of the examination can be generated faster and, in some cases, almost instantly. Online examinations also give the organization the liberty to conduct the exam on a massive scale without worrying about maxing out the capacity of the examination centres. (Arora, 2021).

However, a sincere effort needs to be made for developing proctoring technologies to ensure that the level of online examinations is at par with offline examinations in all aspects; be it integrity of marks scored, ensuring candidates do not get involved in wrongdoings etc.(Pimple, 2021).

Several software aims to analyse students' behaviours in online classes and obtain their unique behavioural characteristics, and then provide this information to proctoring services for better invigilation in online exams. Many such software will be introduced in the future that would aim to help strengthen the numerous pillars of online education. (Slusky, 2020).

A Survey of Automated Proctoring System approach of this paper has different proctoring methods.
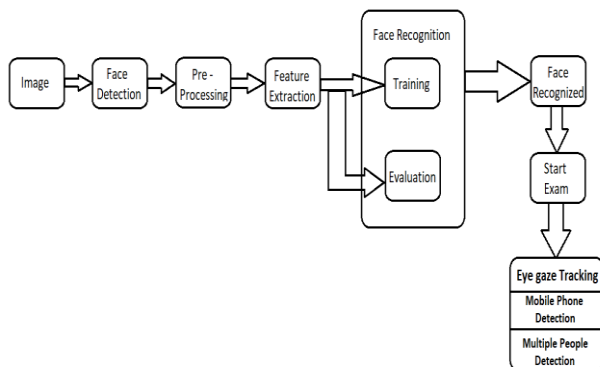
4. METHODOLOGY

Figure 1 : Architecture

4.1 Gaze Tracking

Gaze tracking will also be done to capture the positioning of test taker's eyes. If he is looking left, right to have a glance at some notebook, warning will be displayed on screen. After a fixed number of warnings if the system fails to match an image or the test taker do not stop looking here and there, the test will automatically be closed and submitted and a report of that candidate will be sent to the conducting authority.

4.2 Mobile Phone Detection

Candidates can no longer get away with using their phone. The proctoring system developed will detect the mobile phone or any other secondary device being used by the candidate, thus protecting the academic integrity of examination.

4.3 Multiple People Detection

If any other person comes while the candidate is going under examination, the proctoring system will also detect it and give a limited number of warnings to the candidate before the system automatically submits the exam.

4.4 User Interface and Proctoring System

The technology used to create the user interface will include front-end technologies such as React.js and Bootstrap with basic technologies like HTML5, CSS and JavaScript to create a front-end user interface. This will be facilitated by the back-end which will consist of a server and a database. The back-end technologies include server-side languages such as node.js, python, flask and database management system such as MySQL and phpMyAdmin to connect and manage the database.

5. RESULT

We considered mtcnn, dnn and dlib for face detection. All three were run simultaneously on 100 images to figure out which of these produces best results in face detection.

MTCNN detected faces correctly in 92 images.

DNN detected faces correctly in 95 images.

DLIB detected faces correctly in 97 images.

We proceeded with DLIB for face detection.

Table 1: Image Detection Percentage

MODEL	CORRECT DETECTION PERCENTAGE
MTCNN	92
DNN	95
DLIB	97

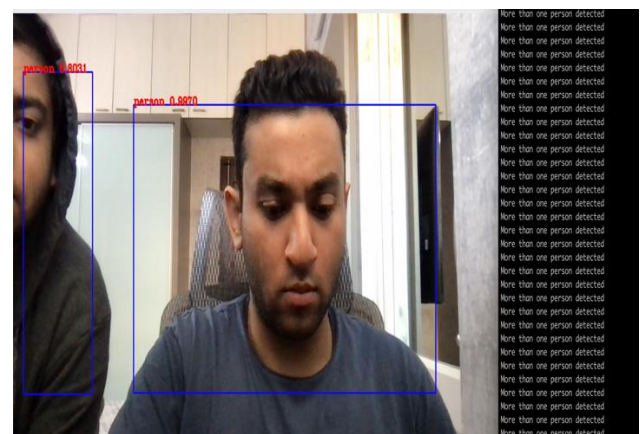Figure 2 : Test Interface

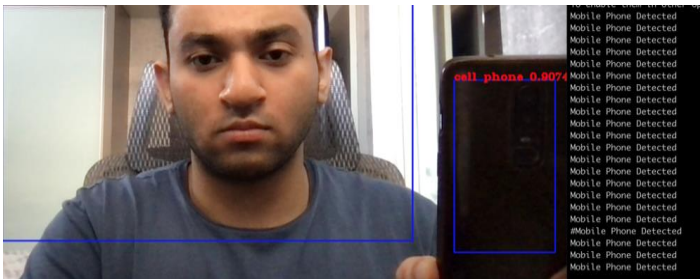Figure 3 : Multiple Person Detection

Figure 4 : Cell Phone Detection
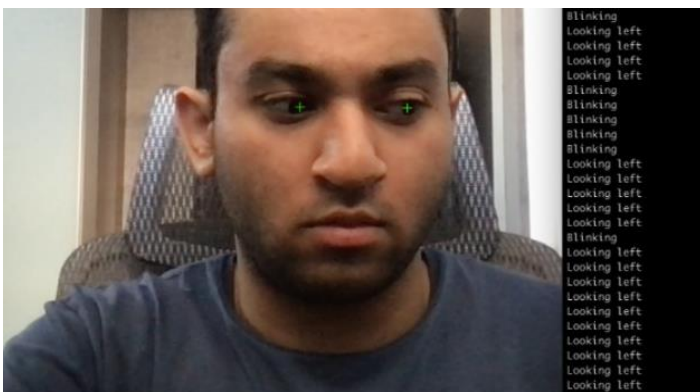

Figure 5 : No Person Detection

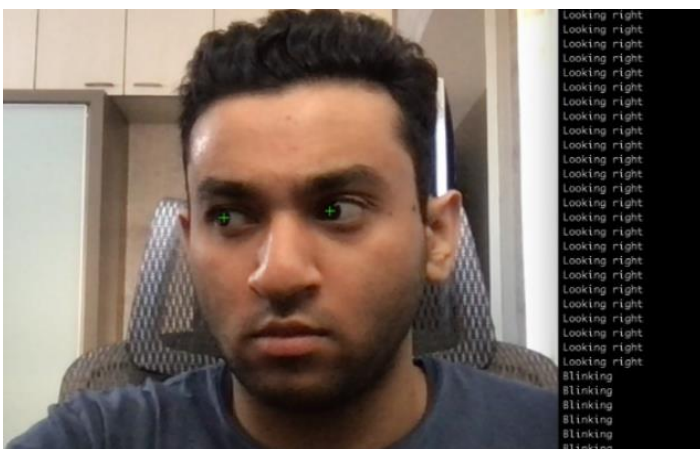Figure 6 : Gaze Tracking (Looking Left)

Figure 7 : Gaze Tracking (Looking Right)

5.1 Hardware Requirements

- Camera Integrated System - Camera that feeds or streams an image or video in real time to or through a computer network**.**

- 4 GB RAM and dual core processor for smooth functioning of the application.

5.2 Software Requirements

- Windows OS, Mac OS.

- Google Chrome, Safari, Windows Edge, Firefox.

6. CONCLUSION

Automated exam proctoring is challenging but very simple and effective .The invigilation by the proctor ensures the safe examination environment within the comfort and safety of your home. Many face recognition algorithms will be released in the future. Some of techniques and methods are being used here and a lot of different techniques, algorithms and methods will be used in future. This is a primary step in exam proctoring to conduct exam securely simultaneously maintaining its integrity.

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