Real Time Online Exam Proctoring System

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Abstract— Massive open online courses (MOOCs) and other forms E-Learning's continue to increase in popularity and reach. The rapid growth of the e-learning industry has created needs for various supporting technologies. One area that is gaining significance is the virtual proctoring space. The ability to evidently proctor remote online examinations is an important limiting factor to the scalability of this next stage in education. Currently, human proctoring is the most common approach of evaluation, by either requiring the test taker to visit an examination center, or by monitoring them visually during exams via a webcam. However, such methods are labor-intensive and costly. Our project, is a automated analytics system which performs online exam proctoring. The system hardware includes a webcam, for the purpose of monitoring the visual environment of the test location. The system includes _ve basic components which continuously estimate the key behavior cues: user authentication, active window detection, multiple people detection, constant check on who is giving the test and phone detection. By combining the continuous Estimation components, we design a webpage which classify whether the test taker is cheating at any moment during the test. Henceforth, Assessment providers, educational institutions and a MOOC's can become valuable partners by enabling assessments to be administered cheaper and faster. Also this helps test-takers to give exam at convenience of their homes at a suitable time.

Keywords: Online Exam Proctoring (OEP), User Authentication, Active Window Detection, Multiple People Detection, Face Recognition and Phone Detection

I. INTRODUCTION

Massive open online courses (MOOCs) o er the potential to greatly expand the reach of today's educational institutions, both by providing a wider range of educational resources to enrolled students and by making educational re- sources available to persons who cannot access a campus due to location or schedule constraints. Instead of taking courses in a typical classroom on cam- pus, now students can take courses anywhere in the world using a computer, where educators deliver knowledge via various types of multimedia content. It is stated that 70% of higher education institutions believe that online education is a critical component of their long-term strategy. Exams are a critical component of any educational program, and online educational programs are no exception. In any exam, there is a possibility of cheating, and therefore its detection and prevention is important. Educational credentials must react actual learning in order to retain their value to society. But the academic cheating activity is on the rise. When exams are administered in a conventional and proctored classroom environment, the students are monitored by a human proctor throughout the exam. In contract, there is no convenient way to provide human proctors in online exams. As a consequence, there is no reliable way to ensure against cheating. With- out the ability to proctor online exams in a convenient, inexpensive, and reliable manner, it is di cult for MOOC providers to o reasonable assurance that the student has learned the material, which is one of the key outcomes of any educational programs, including online education. The common testing procedure for online learners is that the, Students come to an on-campus or university certified testing center and take an exam under human proctoring. New emerging technologies like Criterion and Proctor allow students to take tests anywhere as long as they have an Inter- net connection. However, they still rely on a person watching the exam-taking. For example, Criterion employs a human proctor watching a test taker through a webcam from a remote location. The proctor is trained to watch and listen for any unusual behaviors of the test taker, such as unusual eye movements, or removing oneself from the old of view. He can alert the test taker or even stop the testing. In this project, we introduce a web based system to perform automatic and continuous online exam proctoring (OEP) . The overall goal of this system is to maintain academic integrity of exams, by providing real-time proctoring to detect the majority of cheating behaviors of the test taker.

II. MOTIVATION

To demonstrate and maintain academic integrity, some institutions require proctor supervision of online exams. However, proctoring can be very expensive. Costs to students can include fees at testing centers, costs to purchase the Remote Proctor, time to and an approved proctor, and e ort required to coordinate a time for the exam. Costs to the institution include salaries of staff to administer a proctoring process, approval of proctors, maintaining testing centers, and potential loss of enrollments and revenue since not all institutions require proctors for online exams.

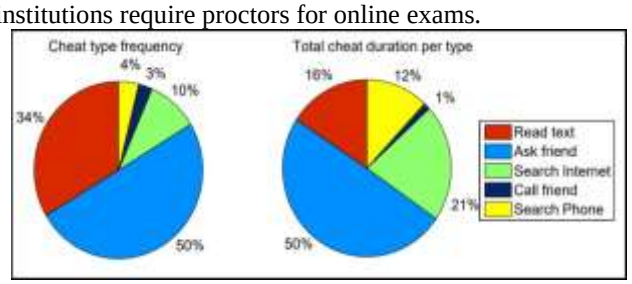

Fig. 1: Statistics of cheating behavior in an OEP

III. LITERATURE SURVEY

Literature review was done for various works which was essential to know how serious the action of cheating is considered and what all work have been done to minimize them. The paper [1] present a conceptually simple, exible, and general framework for object instance segmentation. Our

approach evidently detects objects in an image while simultaneously generating a high-quality segmentation mask for each instance. The method, called Mask R-CNN, extends Faster R-CNN by adding a branch for predicting an object mask in parallel with the existing branch for bounding box recognition. Mask R-CNN is simple to train and adds only a small overhead to Faster R-CNN, running at 5 fps. Moreover, Mask R-CNN is easy to generalize to other tasks, e.g., allowing us to estimate human poses in the same framework. We show top results in all three tracks of the COCO suite of challenges, including instance segmentation, bounding-box object detection, and person key point detection. Without bells and whistles, Mask R-CNN outperforms all existing, single- model entries on every task, including the COCO 2016 challenge winners. We hope our simple and active approach will serve as a solid baseline and help ease future research in instance-level recognition.

In overvoltage protection system of 3 phase induction motor, protects the motor from overvoltage, the voltage which is higher than the rated voltage. In circuit diagram of overvoltage protection it consists the comparator which compare two voltages one is supply and another one is drop across the variable resistance. When the voltage drop across the variable résistance is higher than specified value then comparator generates signals. This signal is fed to microcontroller and microcontroller takes the appropriate action.

IV. EXISTING SYSTEM

In old online exam system there is no such feature to track and monitor students activities online. Manual approach to monitoring students via webcam or CCTV but there are no system to automate everything. Projects developed earlier do not include the modules to detect face and online activities on device. Old examination system does not provide any feedback about what students need to be improved and what is his weak topic. Old system are either only online exam system that have only feature to add questions and conduct exams but no extra feature to detect students movements. There is no such option to figure out student if he is doing chatting. On his device

V. PROPOSED MODEL

The utmost main feature that make our model different from the existing ones is that, all the existing proctoring systems are software that need to in- stalled into the local computer to take the exam and these software's usually comes with a specific price tag. While the model we proposed is a web application that has integrated all the main features that a automated proctoring software has, this makes is easier to access and free of cost. Our model is similar to any other webpage on the internet but it has deep learning models integrated into it to take care of the cheating issue.

The model mainly has six features:

1) Username and Password Authentication
2) Face Verification
3) Phone Detection
4) Active Window Detection
5) Multiple People Detection
6) Continuous surveillance on whether or not the test taker is authorized until the end of the exam.

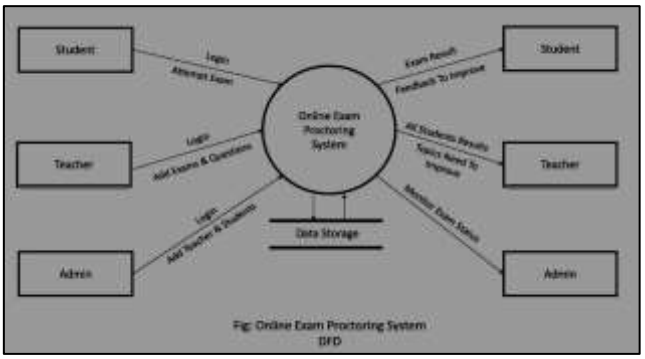

Fig. 2: Real time online Proctoring System

VI. WEB APPLICATION

A web application or dynamic website generates content based on retrieved data (most of the time is a database) that changes based on a user's interac- tion with the site. In a web application, the server is responsible for querying, retrieving, and updating data. This causes web applications to be slower and more di cult to deploy than static websites for simple applications.

A. UI Design

The UI part of the project is a web application designed using HTML, CSS, javascript, MYSQL the web application is majorly divided into 5 pages.

1) Home: Home page provides necessary information of the web application.
2) Register: A new user should get registered rst to access the services of the web application.
3) Login: Only after a successful login the test taker will be redirected to the test page.
4) Guidelines: Provides the test taker with the necessary guidelines, do's and dont's.
5) Test: The test page is where the test taker takes the exam.

B. Working

The opening page `Home' provides with the necessary information about the web application then the user needs to register him for the exam this takes in the credentials along with a picture of the user. These credentials pictures will be stored into the database. Only after the user get registered he is considered authorized. Then comes the process of login where the test taker needs to login with authorized credentials once the credentials are con- side red correct by verifying them with the ones in the database, then the webcam automatically takes a snap of the test taker and face verification is done by comparing the picture in the database and the picture clicked this is done by the face recognition algorithm integrated in the backend of the login page. After the login is successful the test taker is redirected to the guidelines page which provides the do's and don'ts during the exam. Once the test taker clicks `START EXAM' a continuous surveillance of the test location begins to take place until the end of the exam this keeps a track of whether the test taker is cheating or not and detects for phone, multiple people or unauthorized user until the end of the exam, if found

any warnings are generated till a specified count if that exceeds the test taker is forcefully logged out of the exam.

VII. FUTURE SCOPE

Remote proctoring tools are going to become the mainstay for online courses. It might soon impact other types of assessments too. The current trends include:

1) Enhancing the test taker's authentication by the use of biometric inputs from devices like smart watches and fitness monitors.
2) Smart watches and fitness monitors may also be employed to detect changes in pulse and temperature and send such data to proctoring software to serve as malpractice cues.
3) Facial recognition with sound and background noise detection is already used by Tale view to avoid impersonation. Keyboard behavior analysis is also in use. In the future, touch screen behavior analysis might be utilized as additional checks.
4) Head movement and position and illumination analysis are already in use by Tale view for cheating. The tone of voice, facial expressions, etc. can be used in future.

VIII. RESULTS

The system once designed is tested on various scenarios to check its efficiency, performance and whether the system was successful to full all the objectives or not. This chapter presents all the results of the implementation of the automated proctoring system in detail by considering a feature analysis, its working and the outputs obtained in every possible case and scenario.

A. User Authentication

During Login Process:

Case 1: If the user logins with correct credentials he/she would be considered for face verification process.

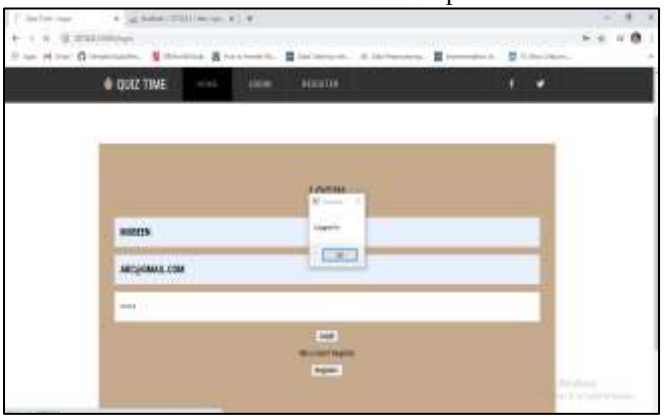

Fig. 3: User Authentication: Case 1 result

Case 2: If the user tries to login with incorrect credentials a warning is generated.

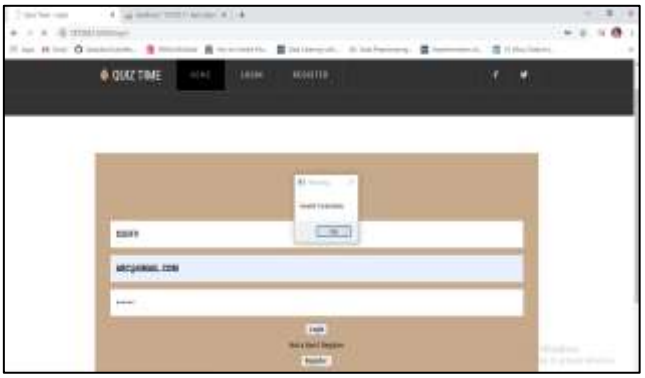

Fig. 4: User Authentication: Case 2 result

B. Face Verification

If the user is authorized he/she would be redirected to Guidelines page.

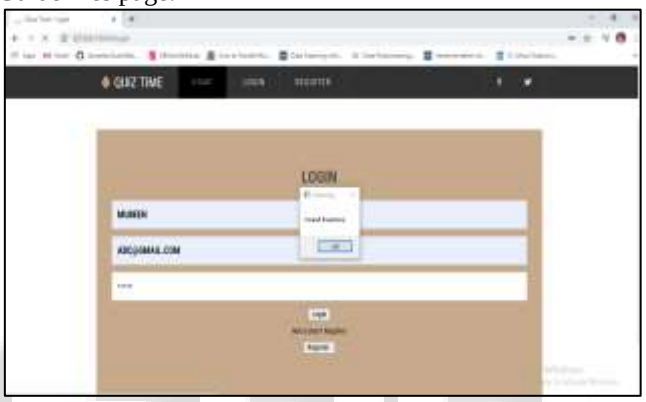

Fig. 5: Face Verification result

C. Phone Detection

If the user tries to use mobile then a warning is generated.

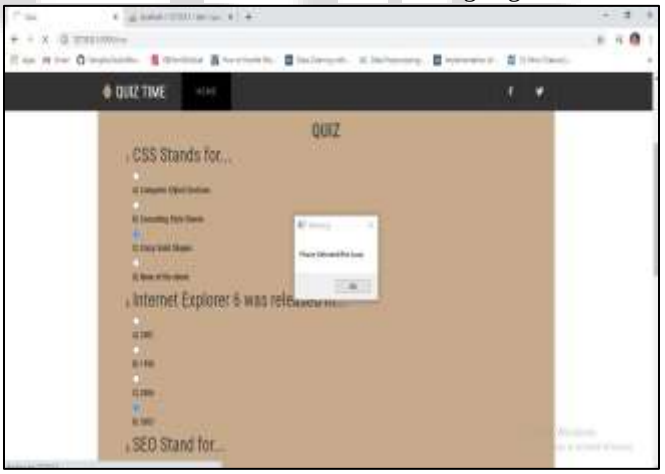

Fig. 6: Phone Detection result

D. Multiple People Detection

If the test location consists of any other rather than the test taker a warning is generated.

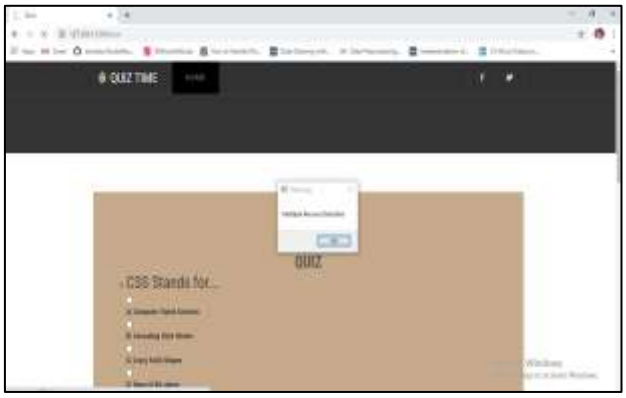

Fig. 7: Multiple People Detection result

E. Unauthorized Examinee Detection

If the user tries to swap his place or makes some other take the test at any instance then a warning is generated.

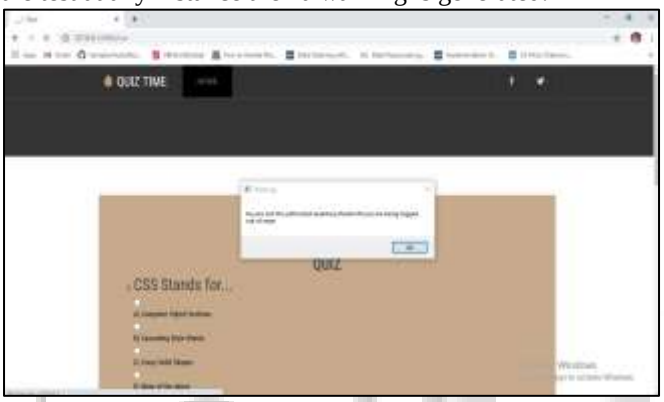

Fig. 8: Unauthorized Examinee Detection result

Henceforth these are the results or outputs obtained during all possible scenarios.

IX. CONCLUSION

This project presents a automated analytics system for online exam proctoring, which aims to maintain academic integrity in e-learning. The system is adorable and convenient to use from the text taker's perspective, since it only requires having a web camera. With the captured videos, we extract low-level features from six basic components: user verification, phone detection, active window detection, multiple people detection, unauthorized test taker detection. These features are then processed in a temporal window to acquire high level features, and then are used for cheat detection. Finally, with the features integrated the common methods of cheating are prevented up to a high level this makes the automated online proctoring client and being a web application it is free of cost. These promising results warrant further research on this important behavior recognition problem and its educational application.

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