

# Exam Evaluation System Using Eye Tracking, Head Movement and Browser Behaviour

Bhumika Chugh<sup>1</sup>, Dr.Ashima Mehta<sup>2</sup>

<sup>1</sup>M.Tech Research Scholar, Dronacharya College of Engineering, Gurugram, Haryana

<sup>2</sup>Associate Professor, Dronacharya College of Engineering, Gurugram, Haryana

Submitted: 30-09-2021

Revised: 05-10-2021

Accepted: 08-10-2021

**ABSTRACT:** This research paper is about the combination of exam evaluation system and eye tracking, head movement tracking and browser behaviour tracking. The main idea of this combination came from the fact that in recent times, everything is shifting towards online mode. In the field of education, Examination plays a very crucial role. But when it comes to online exams, students are using unauthorized means to complete the exam and score marks. So the proposed system will keep a track on the movement of the student and will generate few warnings. This is done to control the student from cheating.

**KEYWORDS:** Eye tracking, Browser Behaviour tracking, image processing

## I. INTRODUCTION

Eye gaze detection is being studied in past few years as it has variety of applications. It is considered as an interaction method in various fields [1]. Head movement detection is also a method for interaction. Both of these technologies are simple and effective for interface. There applications involve interface with disabled people who are left with no motor skills. Browser behaviour tracking system is used here to keep a check on the tabs opened by the user while attempting any exam.

Exam evaluation system is an online exam portal which enables the students to take online tests and the universities to conduct the online test.

This paper combines the usage of exam evaluation system, eye gaze detecting, head moment and browser behaviour. In recent times, education is shifting towards online mode. But with this, the means of cheating also rise. Students are copying the answers from internet and attempting their exams. It helps them to score good marks [2]. But the main question is what is the use of such marks which is the result of copying and using

unauthorized means. Good marks were the indication of hard work and good education but in online examination, because of cheating, we can't judge the quality of education by student's marks.

Several educational institutions have adopted the format of multiple choice question formats, which might also enables a candidate to search the questions on the internet and score good marks [3].

## II. EYE TRACKING

The mathematical and movement qualities of the eyes are interesting which makes look assessment and following significant for some applications like human attention analysis, human emotional state analysis, interactive user interfaces and human factors.

There are many different approaches for implementing eye detection and tracking systems.

Here we are required to check the number of times the candidate is allowed to check the screen and for how much time in a stretch he is allowed. For example, if the student is looking at the system for a longer time then required, then he will get a warning on the screen that he has been detected with an unauthorized means of completing the exam[4].

After this warning, the admin will know the condition of the candidate and then it will be his decision whether to grade his exam or not.

Moreover we can combine Eye tracking and head movement detection for the purpose that if the student is trying to copy something from sources other than the system screen like other device like mobile phone or any study material present near him, he will be looking in the same direction many times and move his head in that particular direction many times, so this can be detected by the combination of eye tracking and head moment

tracking and again the student will get a warning about this.

In this way admin will be able to check for unauthorized means very easily.

### Computer-Vision-Based Eye Tracking

There are two main field of computer vision based eye tracking. The first is considered as eye detection in the image, also known as eye localization. The second area is eye tracking, which is the process of eye gaze direction estimation. Based on the data obtained from processing and analysing the detected eye region, the direction of eye gaze can be estimated then it is either used directly in the application or tracked over subsequent video frames in the case of real-time eye tracking systems.

### Eye Tracking in Commercial Products

#### Tobii

Tobii eye trackers, along with the Tobii Studio eye tracking software, allow reliable eye tracking results. There are many products provided by Tobii.

Tobii also has an academic program which supports university classrooms and research labs with easy and cost-effective eye tracking. Tobii products are also used by web designers for usability testing where the designers can get direct feedback on their work by analysing what a user is looking at. [5]



Fig 1. Eye Tracking

### III. HEAD MOVEMENT DETECTION

The increased demand and wide range of application, head moment tracking is in studies for past few years. It is used in various mobile applications which use augmented reality for clicking pictures like Snapchat, Facebook, etc.

That same technology can be used to create a mechanism to prevent students from cheating in the exam.

When a candidate is doing the exam, the head moment can track the number of times the head of the candidate is moving in a particular direction. If it is more than the number required, the candidate will get a warning on the screen and admin will also know [6].

This helps the university to conduct the examination smoothly.

### Computer-Vision-Based Head Movement Detection

One approach for head movement detection is computer vision-based. Liu et al. introduced a video-based technique for estimating the head pose and used it in a good image processing application for a real-world problem. Through image processing, we can calculate the X, Y, and Z coordinates of the candidate at the start of the exam. These coordinates should be calculated in fixed interval of time and then compared with the initial coordinates. In this way we can check for the number of times, the head of the candidate is moved and number of times the head of the candidate went in a particular coordinate. With this, we can estimate the total number of times a candidate is allowed to move his head and if it is extended, a warning is to be generated on the exam screen.

Iwata and Ebisawa introduced a good flexible eye mouse interface which is the pupil mouse system combined with head pose detection. The system detects pupil motion in the video frames by finding the difference between the bright and dark pupil images. Head direction is detected by tracing key feature points (nostrils). The nostrils were detected as the darker areas in the bright and dark images. The information obtained is mapped into cursor motion on a display. Using head pose detection to support the pupil mouse is a good idea which improved the overall performance. However, the head pose detection part increases the complexity of the pupil mouse algorithm which causes a need for a lot of optimization techniques, which may not be suitable for real-world applications [7].

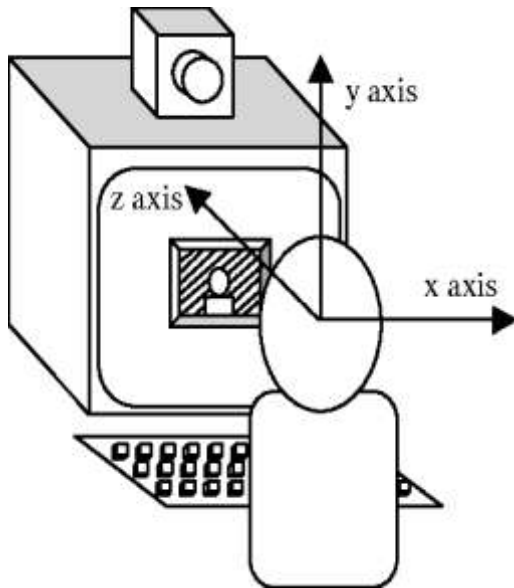


Fig 2. Head Movement Detection

#### IV. BROWSER BEHAVIOUR

The main source of cheating in the online exams can be by switching tabs while attempting questions.

AI-based algorithms keep users from opening other tabs on their screen. In case of multiple such attempts, the examiner is suspended from appearing for exam in most cases. The algorithms also keep a record of the number of times students opened other windows.

By keeping a track on browser behaviour, the candidate as well as the admin will get notified. This may lead to the suspension of the exam. With this mechanism, we can keep a check on generosity of the student while giving the exam.

Proctoring software within the Respondus Browser gives this special web browser an overriding capability that enables it to control most of the important foreground and background functions of the candidate's computer.

Such functions include the opening of new tabs or switching tabs. It is important to note that when a candidate is accessing the exam questions using the special browser, they will have opened a single tab. The browser automatically takes note of the tab.

In addition, if the student attempts to switch tabs, the browser will perceive this as an attempt to cheat. This is the reason why online tests need to tell if you switch tabs. The proctoring software may restrict the action or flag the action.[8]

Proctoring software can also activate surveillance devices such as microphones and webcams to monitor the actions of the candidate while taking their online tests.[9]

Therefore, through proctoring software, online tests can detect cheating. For example, if the candidate opens a new tab to access answers, the proctoring software will forbid the action or notify the instructor.

#### V. EXAM EVALUATION SYSTEM

Online Exams is being dispatched on the grounds that a requirement for an objective that is advantageous for both, Institutes and Students. With this, Institutes can enroll and have online tests. Understudies can give tests and view their outcomes. This site is an endeavor to eliminate the current imperfections in the manual arrangement of directing tests.

Exam Evaluation System satisfies the necessities of the foundations to lead the tests on the web. They don't need to go to any product designer to make a different website for having the option to lead tests on the web. They simply need to enlist on the site and enter the test subtleties and the arrangements of the understudies which can show up in the test. Understudies can give test without the need of going to any actual destination [10]. They can see the outcome simultaneously. Consequently the reason for the site is to give a framework that saves the endeavors and season of both the Institutes and the understudies.

**Exam Evaluation System** gives the stage yet doesn't straightforwardly take part in, nor is it associated with any tests directed. Questions are posted not by the site, but rather clients of the site. The site requires a foundation to enlist prior to posting the inquiries. The site has a head who watches out for the general working of the framework. The site gets income by charging the foundations each time they need to lead the test. The framework named "Online Exams System" is application programming, which targets offering types of assistance to the foundations and voiding them with.

#### VI. CONCLUSION

By combining all these models and technologies, a system can be made to conduct examination online so that they are authentic and the grades are also correct. At the end of the education, what matters the most is the marks obtained by students. Due to online examinations, the quality of education is declining. But to preserve it till some extent, this mechanism can be used to conduct online exams and result declarations.

### REFERENCES

- [1]. Ohno T., “One-point calibration gaze tracking method,” in Proc. Symp. Eye Track. Res. Appl., 2006, pp. 34–34. [Google Scholar]
- [2]. Hansen D. W. and Ji Q., “In the eye of the beholder: A survey of models for eyes and gaze,” IEEE Trans. Pattern Anal. Mach. Intell., vol. 32, no. 3, pp. 478–500, Mar. 2010. [PubMed] [Google Scholar]
- [3]. Indian Express Article “Explained: How proctoring keeps a tab on candidates taking online exams” <https://indianexpress.com/article/explained/how-proctoring-keeps-a-tab-on-candidates-taking-online-exams-6718955/>
- [4]. Amer Al-Rahayfeh and MiadFaezipour, “Eye Tracking and Head Movement Detection: A State-of-Art Survey”,IEEE J TranslEng Health Med. 2013
- [5]. Eye Tracking Products, Danderyd, Sweden: Tobii Technology, Jul. 20 2013, [Online]. Available: <http://www.tobii.com/en/eye-tracking-research/global/products/>. [Google Scholar]
- [6]. Martin LabajMáriaBieliková, “Conducting a Web Browsing Behaviour Study – An Educational Scenario” ,International Conference on Current Trends in Theory and Practice of Informatics, 2015
- [7]. Iwata M. and Ebisawa Y., “PupilMouse supported by head pose detection,” in Proc. IEEE Conf. Virtual Environ., Human-Comput. Inter. Meas. Syst., Jul. 2008, pp. 178–183. [Google Scholar]
- [8]. Faten F Kharbat,Ajayeb S Abu Daabes, “E-proctored exams during the COVID-19 pandemic: A close understanding “, <https://pubmed.ncbi.nlm.nih.gov/33613081/>
- [9]. “Remote Proctoring Checklists During COVID-19”, <https://paeaonline.org/assessment/proctor-resources/remote-proctoring-checklists-during-covid-19>
- [10]. Raghu Raman, Sairam B, Veena G, HardikVachharajani&PremaNedungadi, “Adoption of online proctored examinations by university students during COVID-19: Innovation diffusion study” <https://link.springer.com/article/10.1007/s10639-021-10581-5>