Problems & Malpractices during Online Exams with possible solutions

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Abstract— With the expansion of Internet and technology over the past decade, E-learning has grown exponentially day by day. Cheating in exams has been a widespread phenomenon all over the world regardless of the levels of development. Therefore, detection of traditional cheating methods may no longer be wholly successful to fully prevent cheating during examinations. Online examination is an integral and vital component of E-learning. This paper explains the various problems faced by the students as well as the proctors during the conduction of such exams. This paper explains many possible ways in which some candidates may try to cheat in these online exams. We also suggest a possible solution that may be adopted to make better proctoring software.

Keywords—MCQ Exam malpractices, Online exam student difficulties, proctoring issues.

I. INTRODUCTION

The advent of technology has steadily digitized all services, taking them to the online platform, and education has been no exception. Online education not only considers delivery for the course but also conducting exams online. May 2021 competitive exams such as PET, TOEFL, GRE, IELTS are also conducted on the online platform. There are many advantages of online examination such as easy and fast evaluation, paperless process, saves time and money to name a few. Since the entire world is affected by the COVID19 virus all major universities had no other option other than online exams as it is the best way to maintain social distancing during exams. Undoubtedly there are many advantages.

At the same time, there are many issues involved in the online examination process. In this paper, we are going to list out various problems or malpractices that may happen during online exams. One such problem is, access to the internet may also tempt students to cheat in exams because there is no one supervising them physically. In this paper we are going to discuss some of the ways how students cheat in online exams, followed by possible high-level solutions to each.

This paper is divided into three main parts, first, we describe various malpractices that may take place during online exams and solutions to some of them. The in the following section we will discuss the other problems that may be faced by the students and proctors during online exams. Finally, we propose two methods that may be used for dealing with a specific type of most commonly found malpractice.

II. PROBLEMS FACED DURING ONLINE EXAMS

A. Problems faced by Students

- **Internet Connectivity**: Internet connectivity is still a huge problem in rural and remote areas. Sometimes students face network issues and get disconnect from the exams. In such a scenario, most of the time submitted answers are not stored and it is expected from the students to complete the exam in the remaining time.

  Proposed Solution: Answers should get auto stored. In the above scenario, though the exam form gets refreshed, the timer should not be adjusted so that the student does not misuse this feature to their advantage.

- **System Crash / Browser Crash**: There may be a system or a browser crash due to some reason. This may result in the loss of the test progress.

  Proposed Solution: For this reason, it is mandatory to store all the progress on the server rather than the local system.

- *Audio / Video Device Failure*: Sometimes there may be a device malfunction. This makes it difficult for the proctor to monitor the candidate. An alternate device must be kept ready to tackle such a situation.

- **Slow Internet**: The Internet is not a stable entity. In India, the speed fluctuates many times and because of which video proctoring may not be possible. *Proposed Solution: Image proctoring must be used in such cases by the supervisor. Candidate images are transmitted at regular intervals to the supervisors. This reduces the bandwidth required.*

- *Mobile Users Data Pack Cost*: Considering the cost of the data pack and the financial conditions of the candidate keeping the video on for the entire exam will be difficult for them. This may be solved by the previous solution.

- *System Update*: In a worst-case scenario the system may undergo an update. Sometimes these updates can run up to few hours. If such an incident happens then an alternate device must be available.

- *Page Timeout*: Sometimes during a bad internet connection/ due to session timeouts the candidates may get a page timeout error. This can be solved by using token-based authentication instead of session-based. This will help the candidate to refresh the page without logging out.

B. Problems faced by Proctors

- *Large Room Size*: Proctors may find it difficult to efficiently do their job if a large number of candidates are assigned to each proctor. So the number of candidates must be ideally limited to 20 to 25 candidates (depends on the proctoring software) per supervisor.

- *No Penalizing System*: Usually in physical exams the supervisors have the means to penalize the students for any wrongdoing. But in online exams even though the proctor may communicate the instruction to the student, the student may opt to ignore them. Eg: maybe a student has not positioned the camera properly. A simple solution would be to give the proctor an option to pause the selected candidate's exam and only allow them to continue if they follow necessary orders.

- *Internet Connection Loss*: Like the students, the proctor may also face internet issues. This may result in a disconnect. During this time there will be no supervisor in that room. To tackle this the proctoring software should automatically divide the students into the various available proctors temporarily till the original proctor reconnects.

III. MALPRACTICES DURING ONLINE EXAMS

The objective of the examination is to evaluate the student's ability fairly and effectively. If there are faults present in the exam conduction or evaluation process, then the results would be inaccurate in reflecting students' actual ability. During an online examination, cheating is one of the issues that we need to consider.

In this section, we discuss different methods that may be adopted by a candidate to cheat in online examination and followed by appropriate solutions for it.

A. Screen Sharing/Reflection

In the case of online examination, candidates can use applications to share screens or can give remote access to another expert person to cheat in the exams. Software like AnyDesk, TeamViewer, etc. is some of the tools used for this. Candidates can also use multiple monitors to approach a friend's exam question simultaneously and provide answers.

Proposed Solution: It is difficult to detect screen shares in a web app. So the exam must be conducted using software that can be installed and that can be executed as an administrator. The simple way to stop this type of malpractice is by blocking the incoming and outgoing ports used by the screen share software. If the software is a web app then specialized browser extensions need to be developed.

B. Impersonation

For the exams especially those that are not proctored or supervised, the chances of a candidate using an impersonator is likely[1].

Proposed Solution: All online exams must be proctored/supervised using appropriate audio and visual aids.

C. Faking identities to get third-party assistance

An exam proctor can authenticate the students during in-person exams. Even in such cases where there is a proctor monitoring via webcam, students can have other individuals impersonating them by showing the rigged identifications such as fake driver's license or school identification card which may not be as easy to authenticate visually[1].

Proposed Solution: The proctoring software should have a valid photo id uploaded in the system which is to be uploaded during candidate registration. This photo id should be visible during the proctoring to check the candidate's identity. The validation of a candidate id through a webcam is obsolete and should not be used as there are chances of fake identifications that can be produced by the candidate. Face recognition is also one of the better solutions for automated candidate validation.

D. Sending Screenshots

This is one of the problems with online exams, students may share screenshots/pictures of questions and options with their friends or other experts to get the answers.

Proposed Solution: Window / Tab Locking, Option blurring and proper penalizing methods may be adopted.

E. Sharing login credentials

In some situations, student shares login information to have others log in and do their exams for them. Careless students might opt for such a risky way.

Proposed Solutions: This type of malpractice may be tackled with the help of implementing two methods. We can have an OTP (One time password) sent to their mobile devices which will be used to authenticate the user and block their IP addresses. Any new device trying to log in with the same credentials will be denied access as their IP addresses will not match. Only after the proctor approves such a change in the IP address will the login be allowed.

F. Cheating with Technological Devices

In recent times, devices like Smartphones have enabled students to cheat during online exams. Some students may use tiny and undetectable Bluetooth devices during online exams.

Also, programmable scientific calculators are available where students can store data and formulas and use them during online exams to help them score.

On the other hand, some students may opt to use the more traditional methods such as writing formulae on sheets and keeping them accessible during the exam.

Proposed Solution: This type of malpractice is very difficult to prevent. Proper active proctoring and banning of such devices are the only option. We can provide calculator apps inside the test environment itself.

G. Use of Social networking site

If students can access multiple tab or window during the exam, then they take the help of social networking sites (eg: WhatsApp) to share the answer key.

The student also attempts to search for the answers on google. During the exam, they tend to log in to unauthorized websites, paste questions into the URL, and find the best solution they can steal[1].

Proposed Solution: There are three ways to tackle this problem. First, don't allow the candidates to take screenshots. Common screenshot keys may be blocked. Even if somehow the student takes a screenshot then the methods proposed in this paper may be used to tackle this malpractice. The third option is straightforward, to stop the change of window during active exams. If any student tries to change the window or tab then an appropriate penalty must be applied. But this may give rise to another problem as many candidates may be appearing on the exam from a mobile device, and it is possible that they may receive a call during the exam and this may lead to the system penalizing the student incorrectly. This can be avoided by setting a threshold of few seconds before the system penalizes.

H. Use of Virtual video and audio

In proctored exams, students may cheat very intelligently by making use of virtual video and audio. So in the case of video and audio proctoring also it is difficult for proctors, to differentiate such students.

Proposed Solution: This is very difficult to tackle this problem as detecting virtual camera input is difficult. It will be difficult for the proctor to identify if any candidate is trying to use a VCAM with his bare eyes. One solution is to have a video/audio loop detector software running on the proctoring system which can red flag a candidate and then the proctor can ask for visual feedback from the candidate to check if any VCAM is being used.

I. Use of External Devices

In online exams, some candidates may use hard drives, USBs, micro SDs, and other external smart devices that are easy to hide and challenging to detect. Before or after the test, students insert them to make a copy of online exams so they can sell it to other students post-exam or share it online.

Proposed Solution: A simple solution where printing and taking screenshots may be blocked.

J. Copy-pasting and other keyboard shortcuts

Copy-pasting is one of the most common types of cheating in online exams. In this type of cheating, the student keeps their notes and answers ready in document format in a separate tab and during exam paste it from the document into the exam paper. This is a simple way to trick some remote proctoring software that has no information about what is happening on the screen.

Proposed Solution: This may be avoided by blocking common keyboard shortcuts and not allowing change of windows during exams.

IV. IDEAL PROCTORING AND EXAM SOFTWARE FEATURES SUMMARY

- Making a quiz by randomly selecting a question from a question bank so that each candidate gets a different set of questions (if possible) of the same levels [2].
- Shuffling of question and options order.
- No questions must be numbered as this makes it easy to find the question.
- email verification / OTP as an extra layer of security to ensure authentication.
- Disabling/ penalizing use of other tabs/windows [2].
- Displaying a single question at a time will make it difficult for the student to search the question from the list.
- Inserting time limit to solve each question or to solve section.
- Prevent unauthorized access and distribution of the exam question. Restricted screenshot and printing capabilities.
- Identify suspicious third-party assistance with tracking logs that reveal the location and IP address of the user.
- Video Proctoring: This is the most suitable type of proctoring for very high stake exams where remote proctoring continuously monitors remote candidates using continuous video streaming activity[3].
- Image Proctoring: This type of proctoring is most suitable where internet connectivity is low.
- Audio Proctoring: Capture Audio of the candidate during online exam activity to detect any third-party assistance of any form[3].
- Auto progress must be synced with the server at regular intervals.
- Machine learning-based facial expression & eyeball tracking may be used to detect any fraudulent activity [4].
- Video & Audio loop detection must be present to detect the use of Virtual cameras.
- The proper facility of documenting and recording the malpractices must be present.
- Proper means of penalizing the students must be present.
- Option to upload the ID proofs during candidate registration must be present.

Thus, we conclude that even though a very small fraction of the students may indulge in such malpractices we have to implement a strict method to detect such activities. We have tried to discuss many of the common problems and malpractices that may be thought off before building better software.

V. CONCLUSION

One of the most effective methods that can be used to combat cheating during online tests using technological devices is applying auto proctoring together with heuristics-based live proctoring.

This helps prevent candidates from cheating during online tests because proctoring technologies record test-takers' head movement, keystrokes, and eye movements while they are taking their exams online.

It is also possible for proctoring technologies to record audio during online exams. It is possible to differentiate between the voice of the test taker and other emerging voices that can help the student cheat during online tests.

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