

Centralized AI Process Monitoring System for Academic Integrity

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Abstract- Now a days online education is increasing very fast and many exams are conducted in remote mode. Because of this flexibility, students can give exams from home or any place which is very convenient and useful for them. But along with this advantage, cheating methods are also increasing very fast because of AI tools, internet and different smart devices. Students can easily search answers, use AI tools, open multiple tabs, switch screens or even take help from another person sitting near them without getting noticed properly. This paper presents a smart monitoring system using artificial intelligence to reduce cheating in online exams. The system combine multiple modules like identity verification, behaviour tracking, environment monitoring and content checking. These modules continuously observe student activity and send data to centralized system where all analysis is done together. This makes system more effective and reliable compared to single method systems. The main goal of this system is to create a fair environment for all students. Honest students should not feel disadvantage because of others cheating. But there are some issues like privacy concerns, wrong detection and mental stress on students. Sometimes system can detect normal behaviour as suspicious which is not correct and may create problem for students. So it is very important to use AI system along with human judgement. This paper explain working of system, its advantages, limitations and possible improvements in future in simple and understandable way.

Index Terms—Artificial Intelligence, Online Exam, Academic Integrity, Monitoring System, Cheating Detection.

I. INTRODUCTION

In today's time, digital technology is changing education system very rapidly and continuously. Online classes and online exams are becoming very common in many schools and colleges. Students can attend lectures from home and also give exams without going to physical classroom. This is very helpful for many students who live far from college

or have time related problems. It also help institutions to conduct exams in flexible way.

But along with these benefits, many new problems are also coming. One of the biggest problem is maintaining fairness in exams. In physical classroom, teacher can easily monitor students and control cheating. But in online exams, students are not directly visible all the time, so it becomes difficult to control their activities properly and continuously.

Earlier cheating was simple like copying from notes or asking friend sitting nearby. But now situation is completely

changed. Students are using advanced tools like AI chatbots, Google search, mobile phones, smart watches and even second devices. These tools can give answers instantly which makes cheating very easy and fast. Sometimes students even use hidden devices which are not easily visible.

Because of this reason, traditional monitoring methods like simple webcam recording are not enough. There is need of smart and intelligent system which can observe multiple things at same time like student behaviour, surrounding environment and answer pattern. This system should be able to detect even small suspicious activity.

Additionally, online examinations are now used in competi-tive environments also, so maintaining integrity becomes more critical. If cheating is not controlled, it may reduce trust in digital education systems. Students who are honest may feel unfairly treated, which can affect overall academic quality.

Another important point is that students also feel pressure when they are monitored continuously. Some students feel nervous when camera is always on and they think they are always being watched. This can affect their performance also. So system should be designed carefully so that it does not create too much stress or fear among students.

So in this paper, a smart AI-based monitoring system is proposed which tries to solve this problem by combining different techniques together and giving better monitoring solution.

II. LITERATURE REVIEW

Many researchers have already worked on online exam mon-itoring systems and different methods have been proposed in past few years. Some systems use webcam monitoring where face and eye movement of student is tracked continuously during exam. These systems try to detect if student is

looking away frequently, using phone or talking to someone.

Other systems use machine learning algorithms to analyze behaviour patterns of students. For example, typing speed, mouse movement, time taken to answer questions and switch-ing between tabs are analyzed. If behaviour is very different from normal pattern, it is considered suspicious.

Plagiarism detection tools are also widely used to check copied answers. These tools compare student answers with large database and find similarity. But these tools only check

text similarity and not overall behaviour, so they are not fully reliable for online exams.

Some advanced systems combine multiple technologies like computer vision, audio detection and network monitoring. These systems are more powerful because they observe mul-tiple parameters at same time. But these systems are also complex and costly to implement which is not possible for all institutions.

In some research papers, hybrid systems are also proposed where AI and human monitoring are used together. This approach reduce error but still not perfect. It also highlights that human judgement is still required in final decision.

Another observation is that student acceptance of such systems is mixed. Some students feel safe because cheating is reduced, while others feel their privacy is affected. So system design should consider both technical and social aspects.

Still there are many problems in existing systems:

- Sometimes system mark innocent student as cheating due to wrong detection
- Privacy issue because camera and microphone are always active
- System require good internet connection and proper hard-ware
- Cost of setup and maintenance is high

- So there is still need of improved system which is accurate, affordable and also fair for students. structure and compare with database to find similarity.

III. METHODOLOGY

The proposed system is based on centralized architecture where all data from different modules is collected at one place and processed together. This helps in better understanding of student behaviour and more accurate decision making.

An important aspect of this methodology is integration of multiple modules. Instead of depending on a single detection method, combining different signals improves overall accuracy and reduces chances of error.

A. Identity Verification

This module ensures that correct student is giving exam. It uses face recognition and typing pattern analysis. Before exam start, student face is matched with stored image in database. During exam also continuous checking is done to make sure same student is present.

However, sometimes face recognition may not work prop-erly due to poor lighting, low camera quality or network issue. Typing pattern may also change if student is nervous, stressed or typing in hurry. So system should consider these situations before making decision.

B. Environment Monitoring

This module monitors surrounding environment using cam-era and microphone. It tries to detect if student is using mobile phone, talking to someone or if any other person is present in room.

But sometimes normal actions like adjusting sitting position, stretching body, looking around or reacting to noise can also be detected as suspicious which is not correct. So system should be designed carefully to reduce such errors.

C. Content Checking

This module checks answers submitted by student. It uses plagiarism detection and AI detection techniques. It analyze writing style, sentence

But AI detection is not always accurate because sometimes human writing also look similar to AI generated content. So system should not fully depend on this method alone.

D. Behaviour Analysis

This module analyze student behaviour and compare it with past data. If sudden improvement is observed, it may be suspicious. For example, if student performance suddenly increase a lot, system may flag it.

But this is not always correct because student may have prepared well this time. So this module should be used with other modules to avoid wrong judgement.

IV. SYSTEM ARCHITECTURE

The system is divided into multiple layers which help in smooth working and better performance of the system.

This layered architecture also provides flexibility because each layer can be improved independently. It also makes system scalable and easier to maintain.

A. Data Collection Layer

This layer collects data from different sources like webcam, microphone, keyboard and screen activity. It records all actions in real time which helps in detailed analysis of student behaviour during exam.

B. Processing Layer

In this layer, raw data is processed and converted into useful features like face detection, eye movement, typing pattern and screen activity. This step is very important because incorrect processing can affect final decision.

C. Decision Layer

This layer uses AI models to analyze processed data. It decide whether activity is normal or suspicious based on multiple parameters collected from different modules.

D. Reporting Layer

This layer generate report for teacher which includes flagged activities with time and probability score. Teacher can review this report and take final decision which is very important to avoid wrong judgement.

V. RESULTS AND DISCUSSION

The system shows improved performance in detecting cheat-ing activities when multiple monitoring modules are com-bined. It provides better accuracy compared to traditional single-method approaches. However, some limitations such as false positives and environmental factors still affect the performance.

VI. ETHICAL AND SOCIAL ISSUES

Using AI monitoring system can create ethical problems. Students may feel uncomfortable because they are continu-ously monitored which can increase stress and anxiety.

Privacy is also a major concern because personal data like video, audio and behaviour is recorded. If this data is not stored securely, it can be misused. There is also issue of fairness. Some students may get flagged due to system limitations like lighting condition or background. Transparency is very important, students should be aware about how system works and how data is used.

VII. CHALLENGES

There are many challenges in implementing this system:

- High cost of system setup and maintenance which may not be affordable for all institutions.
- Requirement of strong and stable internet connection, otherwise system performance can get affected.
- Different device quality among students which can create unfair detection results.
- Privacy concerns because continuous monitoring collects sensitive data like video and audio.

- False positives where normal student behaviour is de-tected as suspicious which is not correct.
- Scalability issues when large number of students give exam at same time.
- Legal restrictions related to data protection and privacy laws in different countries.
- Difficulty in handling different environmental conditions like lighting, noise and background.
- System maintenance and regular updates are required to keep it effective against new cheating methods.
- Students may find new ways to bypass the system using advanced techniques.
- Training users (students and teachers) to properly use the system can also be a challenge.
- Technical failures during exam like system crash or network issue can create serious problems.

Another challenge is scalability when many students give exam at same time. System should handle high load without failure.

VIII. FUTURE SCOPE

- In future, system can be improved by using better AI models which are more accurate and reliable.
- Privacy can be improved using new techniques like feder-ated learning where data is not stored centrally.
- Blockchain technology can be used for secure storage and transparency.
- System can also be extended to monitor assignments, projects and continuous evaluation of students.
- Future systems may also include adaptive monitoring which adjust based on student behaviour.

IX. CONCLUSION

This paper presents AI-based monitoring system for online exams which helps in reducing cheating and improving fair-ness. The system combine multiple

techniques like identity verification, behaviour tracking and content analysis to give better results. The proposed centralized approach helps in collecting and analyzing data from different sources together, which makes the system more reliable compared to traditional methods. By using multiple modules at the same time, the system can detect different types of cheating activities more effectively. This also helps in reducing dependency on any single method which may fail in some situations.

However, the system also has some limitations such as false detection, privacy concerns and technical challenges. Some-times normal student behaviour may be marked as suspicious which is not correct. So it is important to include human judgement in final decision making process. AI should assist the teacher, not completely replace human decision.

Another important point is that system should be designed in a way that it does not create too much stress for students. Continuous monitoring may affect student performance and confidence. So proper balance between monitoring and com-fort is required.

In future, improvements can be made in accuracy, privacy protection and system efficiency. New technologies like better AI models and secure data handling methods can help in making system more effective. Regular updates and testing are also necessary to handle new cheating methods.

Overall, this system has strong potential to improve trust in online education. If implemented carefully, it can create a fair and secure exam environment where all students get equal opportunity to perform based on their knowledge and skills.

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