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AUTOMATED EXAMINATION MISCONDUCT MONITORING USING IMAGE TRAINING AMONG COMPUTER SCIENCE STUDENTS

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Abstract

Examination misconduct is any immoral behaviour before, during or after any examination. It is a disorganized situation that negatively impacts the nation's quality of education and the kind of certificates issued to students at different levels. These facts are current trends that are alarming and very challenging and call for proper management to rid the school system of its consequences. The objective of this research is to automate examination misconduct monitoring using image training that would be able to check examination misconduct for students among Computer Science. The system was implemented using OpenCV and Pyaudio in Python, the browser, fisher linear discriminant algorithm for testing, dataflow, flowchart and MySQL for the database. This research presents proof of examination misconduct based on the monitoring using image training to instigate the Universities to implement this policy. The results showed that examination monitoring using image training could examine and recognize the faces of the students involved in examination misconduct.

Keywords: Automated, examination misconduct, monitoring, image training, students

1. Introduction

Examination misconduct is now affecting our tertiary institutions and thus has become a societal problem. This alarming trend calls for proper management to rid the school system of its consequences. In short, it has become a plague in the nation's education system, which must be promptly given attention without delay. Insufficient concern for students' well-being also increases the high rate of examination misconduct (Brimble& Stevenson-Clarke, 2005). Examination misconduct is any immoral behaviour before, during or after any examination. It is due to students' laziness in attending lectures, low moral standards in schools, candidates' fear of failure, lack of confidence in them, poor preparation for examinations by students and 419 syndromes that have eaten deep into the life of our society. (Otokunefor, 2011) said that

lecturers who directly and indirectly help and assist examination misconduct are those who sorted their way through the system and are not qualified to become lecturers. For this reason, they are morally and professionally unskilled to administer degree examinations. Examination misconduct is a disorganized situation that adversely affects the nation's quality of education and the kind of certificates issued to students at different levels; for this reason, many people can no longer defend their credentials. Examination monitoring is helpful to students because it helps them to be conscious of their examination prospects. Lack of student monitoring and control contributes significantly to examination misconduct. Also, the increasing rate of examination misconduct results from poor lecture attendance.

For students not to be involved in examination misconduct, some mobile technologies enhance their learning activities. Mobile technologies often have functionalities that make them attractive and effective educational instruments (Onyema *et al.,* 2021). With the aid of mobile technologies, many educational institutions were able to make an urgent transition to online education and enable them to be knowledgeable enough. Mobile devices largely facilitated the growth of virtual education; networks and platforms were instrumental in ensuring continued education (Onyema *et al.,* 2020b). Mobile technology has influenced many educators to carry their individual small computers that contain exceptional computing power (Sung *et al.,* 2016). Mobile technologies are widespread among educators and students (Onyema *et al.,* 2019) and they are equipped with features that have become an essential part of the everyday lives of students and educators (Edgar *et al.,* 2015). Mobile technologies enhance digital and distance learning activities (Onyema *et al.,* 2021), facilitating distributed education and enabling teachers and students to schedule lectures and engage in ubiquitous education (Edeh *et al.,* 2021). (Ugorji *et al.,* 2022) add that the use of mobile technologies had statistically significant effects on the educational activities of computer science educators.

Mobile technology devices such as laptops and mobile phones have become a learning tool in classrooms and outdoor learning (Sung *et al.,* 2016). Mobile devices also aid students in their academic work and help them to avoid examination misconduct because they will guide them properly in their assessments or quizzes. Students use mobile devices for formative evaluation or quizzes in the classroom (Agbatogun, 2012) and academic discussions and social interactions (Al-Rahmi,2015). (Edeh *et al.,* 2020) add that there is a need for all educators and learners to adopt technology and upgrade their digital skills to the emerging global trends and realities in education. When students are taught using mobile technologies, they often develop problem-solving, creativity and independent learning skills that help them avoid examination misconduct (Warschauer, 2007). This study uses the Fisher linear discriminant algorithm for efficient face recognition. A dataset with the facial images of the student we wanted to recognize was used in training the image. An ID for each image was set so the algorithm could use this ID to identify an input image and give out an output. This work conducted experiments to test the resemblance of the face with the Fisher linear discriminant algorithm. The testing process is done gradually by showing the workings of the Fisher linear discriminant, examining the similarity of the face and comparing the image in the test so that the percentage similarity of the face is known. The study solves these

identified problems by examining misconduct using image training that automatically captures and monitors the examination process for Computer Science Students.

1.1 Monitoring of the examination process

It is essential to monitor the examination process to enable students to attend lectures regularly, read and enhance their performance. (Ugwuja & Omankwu, 2022) establish a positive influence of students 'attendance on the examination performance. If students attend classes frequently, they will gain more knowledge enabling them to be skillful in their various fields and not cheat in examinations **(**Geetha, 2016). Misconduct monitoring checks in the examination process will help reduce examination misconduct to the minimum. With the examination misconduct monitoring using image training introduced in the universities, students' educational quality will improve because they will sit up to their responsibilities. (Ugwuja & Onu, 2018) Additionally, the process that captures and monitors the examination process helps to check examination misconduct for students.

However, the challenges focus on the causes of examination misconduct, which can be insufficient lecture attendance by lecturers or laziness on the part of the student to attend lectures and read based on the syllabus. In this paper review, it was observed that the following problems were identified and associated with the examination misconduct in the examination hall, like lack of confidence and poor preparation for examinations by students. Implementing strict rules regarding examination misconduct could be a way to ensure that students are being evaluated and that they attend lectures regularly. It could also become difficult for some students with significant responsibilities because they can face the most inconvenience. Parents sometimes spend their hard-earned money in vain because their children neglect their studies; they are busy with their smart phones, chatting with their friends or going to the shopping mall. During the examination, such students go for agitation and cheating because they do not attend lectures and are unprepared for the examination. **(**Geetha, 2016) added that students' overall academic performance may be considerably affected because they are inconsistent in lecture attendance leading them to be involved in examination misconduct.

2.0 Methodology

2.1 Data collection

The design tools used to accomplish automated examination misconduct monitoring using image training among Computer Science Students are a camera – the specification is Ultra

HD (3849 x 2160) resolution; Streaming ability: 30fps in Jpeg format, OpenCV, Pyaudio, browser, the fisher linear discriminant algorithm for testing, dataflow, flowchart and MySQL for the database. This study used the following data collection techniques to gather information about the existing and proposed system, observation, interview, questionnaire, internet, evaluation, and inspection of documents. Object-oriented analysis was used for the system analysis. The design was based on software organization as a collection of objects that incorporated data and behaviour. The system was finally tested in a natural environment for efficiency and effectiveness in application**.**

2.2 Dataflowof the System

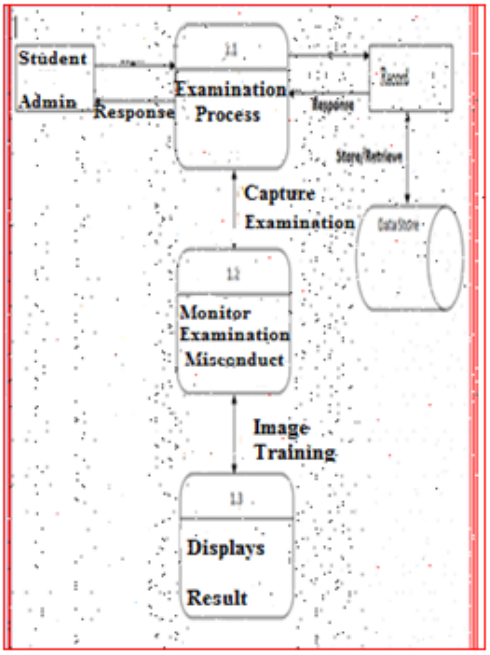


Figure 1: Dataflowof the System

2.3 Flowchart of the Proposed System

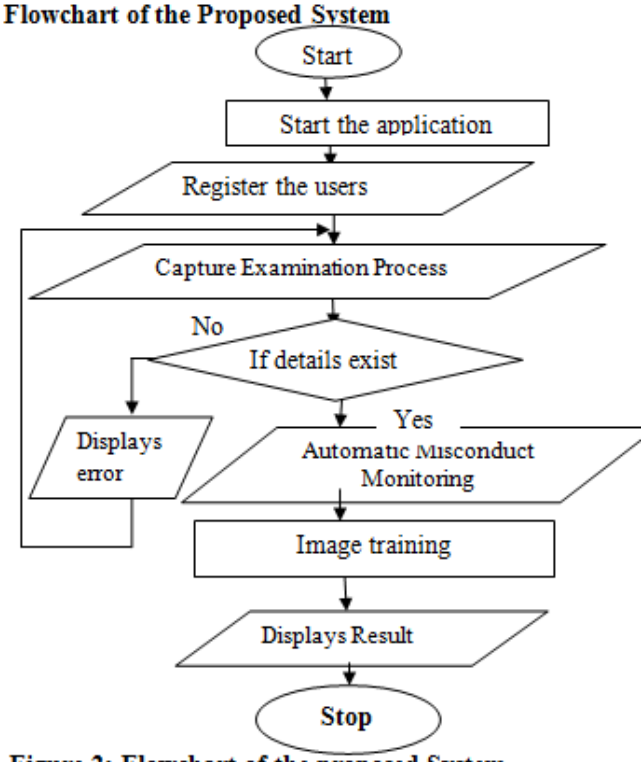


Figure 2: Flowchart of the proposed System

2.4 Monitoring system using the photo capture

Monitoring means monitoring actions, activities or other altering information to influence, manage, direct or protect people (Minsky*et al.*, 2013). Monitoring is increasingly a topic of academic study, including through research centres, books and peer-reviewed academic journals. In the future, intelligence services might use the internet of things for recognition, monitoring, location tracking and gaining access to networks or user credentials. Governments use monitoring for intelligence gathering of information, crime prevention and protection of a process, person, group or object or crime investigation. Monitoring can be viewed as a breach or abuse of privacy and is often opposed by various civil liberties groups and activists (Marx. & Wright, 2015).

This platform enables the administrator to capture the photo of the student with a camera and store the picture in the image directory while the details of the student will be saved in the database. The student's picture taken is a red, green, and blue (RGB) image. The platform uses a Python flask framework and Fisher linear discriminant algorithm to monitor the examination process and activities automatically. The student's photo used as the sample is shown in Figure 3 below.

Figure 3: A Student1 Picture Monitoring

2.5 The automatic examination misconduct monitoring

The automatic monitoring system will be installed in the examination hall. Student examinations could be supervised via live streaming or recorded video files. The system will also be mounted in the administrator's office and shared with the supervisors in their respective offices via wireless hotspot where he/she can monitor any student cheating in the examination hall via live streaming or recorded video and audio. This platform is a design interface that automatically captures the video of the examination process using a camera. It uses OpenCV and PyaudioLibrary in Python to capture and record examinations process to help monitor examinations activities automatically based on real-time live streaming or recorded video and audio. The Opencv library in Python is used for real-time video capturing and recording. While the audio library, which is Pyaudio, is used for audio or voice recording and can live stream through browsers.

The testing process of face images is done by using fisher linear discriminant algorithm. The Fisher algorithm helps to prepare the student's Red, Green, and Blue (RGB) image to greyscale and then turns into a black-and-white image known as the threshold during recognition. The threshold helps to analyze the photo used to identify student cheating in the examination hall via live streaming or recorded video and audio. During an examination, if any student is involved in examination misconduct, openCV and PyaudioLibrary in Python captures that process and help monitor examination activities automatically. The system only

requires the face of the student to be trained for examination misconduct monitoring. If the student's photo matches the picture in the image directory, the system gets the filename and queries the database for the students involved in examination misconduct automatically. Any student found cheating will be captured based on real-time live-streaming video and audio. Figure 4 shows the live streaming of the examination process while Figures 5 and 6 shows the examination process and misconduct 1 and 2 respectively.

Figure 4: Live Streaming for Examination Process

Figure 5: Examination Process and Misconduct1

Figure 6: Examination Process and Misconduct2

3.0 Result and Discussion

3.1 Analysis of the image training for automatic examination monitoring

The result was obtained by training the face image used for automatic examination. The system only requires the face of the student to be trained for automatic monitoring for examination misconduct. The face image was prepared using the Fisher algorithm. The Fisher algorithm helps prepare the student's Red, Green, and Blue (RGB) image for the greyscale. The output image of the student caught cheating is trained to be 30 greyscales of face image in the dataset and the system picks the best one out of the 30 greyscales. The output image of the student is manipulated using the Python library, which will be in the dataset. The dataset will be greyscale-controlled using a Python library called PIL/PILLOW (PIL is a Python library used for image processing).

i. The dataset image training for students1

The Fisher algorithm helps to train the student's 1 Red, Green, and Blue (RGB) images to 30 greyscale image. The face image is changed from an RGB shape into a greyscale form. A photograph of student1 is used for this training in Figure 7.

Figure 7: 30 Dataset for the Students1

ii. The dataset image training for Student 2

The Fisher algorithm helps train the students'2 Red, Green, and Blue (RGB) images to 30 greyscale image. The face image is changed from an RGB shape into a greyscale form. A photo of student 2 is used for the monitoring in Figure 8.

Figure 8: 30 Dataset for Students 2

iii. The image training process of the three different datasets of students

Three sample face images are tested using fisher linear discriminant algorithm with student 1, student 2, and student 3 respectively. The result is in Figure 9.

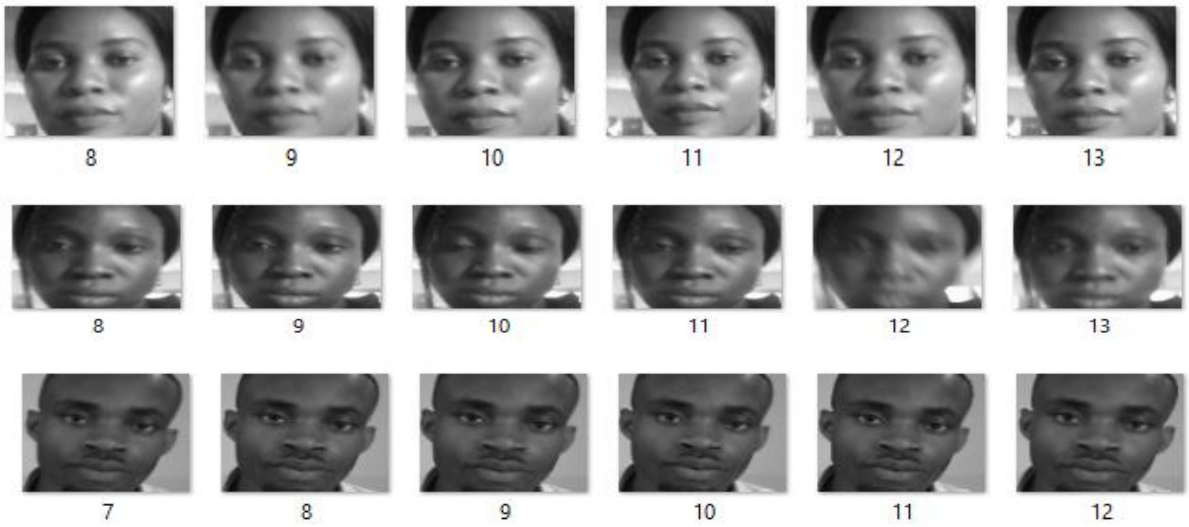
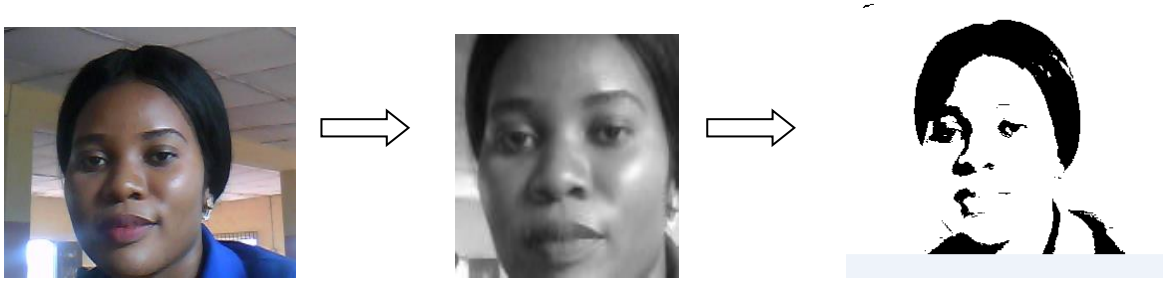


Figure 9: The Three Different Datasets of students

3.2 Analysis of the RGB Image change to greyscale and threshold for automation

The system only requires the face of the student in the examination hall for the automation. The face image of all the students called RGB was captured using camera and stored in the image directory while the details of the students was saved in the database. The face of the student, once directly facing the camera in the examination hall, will be captured as a frame.

During recognition process, the face image is changed from RGB shape into the greyscale form. The dataset image is trained in the greyscale form and then turns into a black and white image which is 2dimensional known as the threshold for easy analysis with the help of fisher linear discriminant algorithm. The threshold helps to analyze the photo used to identify student cheating in the examination hall via live streaming or recorded videos and audio. The threshold is a virtual process and once the training image is formed in the threshold, the images can be obtained. The student cheating in the examination will be captured and tested against any face in the image directory; once it matches any look in the image directory, it will get the file name and query the database for that student, then store it back per student. The result is in Figures 10 and 11.



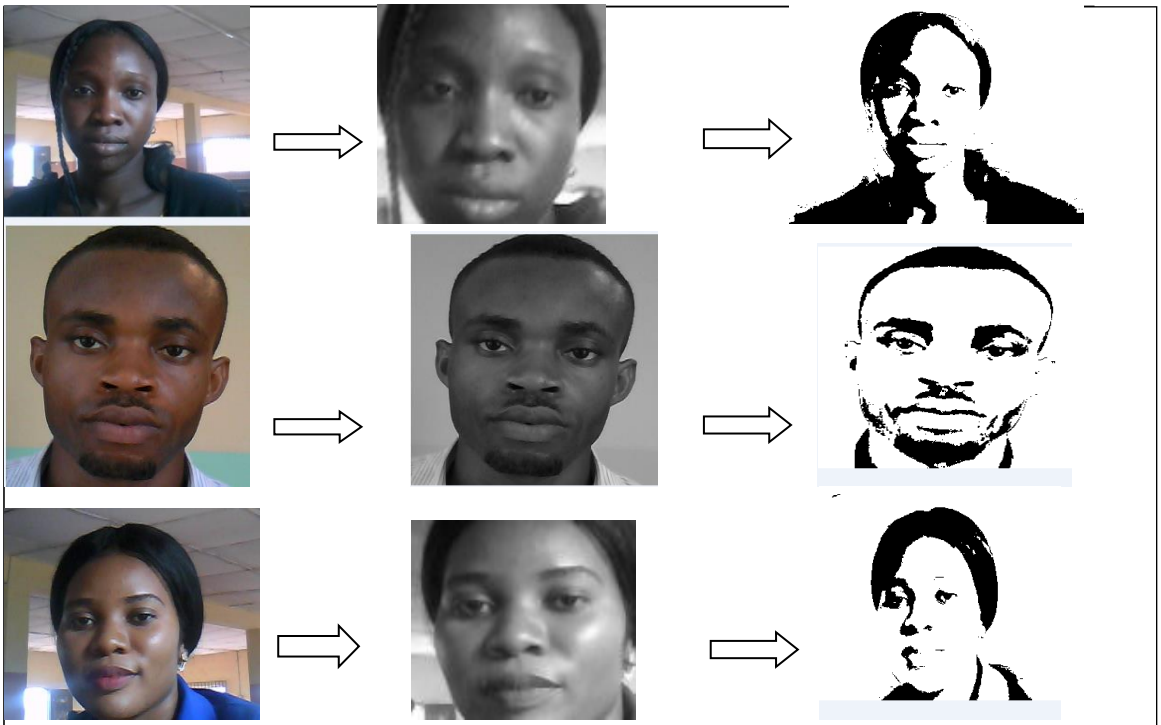


Figure 11: RGB Image for Students Change to Greyscale and Threshold

Figure 10: RGB Image for Students 1 Change to Greyscale and Threshold

3.3 Analysis of the threshold image training

The threshold is also known as 2Dimensional. In 2Dimensional, we only have the X and Y-axis. X is the object, and Y is the background, which involves only black and white. We take the picture to 2Dimensional for easy and proper analysis. The threshold is a virtual process and once the training image is formed in the threshold, these three images can be obtained with a size of 3 x 3 pixels. When the image is in the threshold, it helps to identify, capture, recorded and monitor misconduct automatically. The face image of the student on the threshold is used to identify that student when he/she is cheating in the examination hall via the live streaming or recorded video and audio. This process is shown in Figure 12.

Figure 12: Threshold Image for Students

3.4 Performance evaluation

The test parameter used is the image and examination. The performance evaluation is from photo capturing, where the picture of students is captured first, followed by dataset image training and recognition. The accuracy of the system performance evaluation started with the Fisher linear discriminant algorithm. In this study, face recognition applications with the Fisher linear discriminant method can recognize faces with various expressions. Based on the evaluations that have been done on facial recognition applications using the Fisher linear discriminant method, it is concluded that the application of the Fisher linear discriminant method in face recognition has high accuracy because this method divides class specifically. The application accuracy and count increment are very accurate because the Fisher linear discriminant algorithm recognizes the user's face with an accuracy of about 98.3%. During the examination process, the algorithm was trained using a dataset with the facial images of the students we wanted to monitor in examination hall. Subsequently, the algorithm uses this information to recognize an input image and give out an output. The evaluation results show that openCV and pyaudioLibrary could capture the examination process and with the help of the Fisher linear discriminant algorithm, monitor examination misconduct using image training. By this new approach, monitoring and evaluation will be achieved by the Chief Executive or any Superior, Dean, or Head of the department directly from the office so long as he/she is connected

4.0 Conclusion

In conclusion, this paper solved the identified problems by examining the examination misconduct process using image training. The Fisher algorithm was used to train the student's red, green, and blue (RGB) image to 30 greyscales, and the system picks the best one out of it to identify student cheating in the examination hall via live streaming or recorded videos and

audio. The system also provided an openCV and pyaudioLibrary in Python to capture examinations process to help monitor examinations activities based on real-time live streaming or recorded video and audio. The scope of this work is the examination misconduct monitoring using image training for Computer Science students. Undoubtedly, the proposed system is more convenient for school management than the existing one. In general, the study addresses the identified problems by providing and identifying an examination misconduct monitoring platform using image training that automatically captures and monitors the examination process.

5.0 Future Work

This work deserves further attention, and the research area that may be recommended for further improvement is that the researchers need more research to enable the installation of an online and offline application that will be available 24 hours a day. This area will allow the administrator at school and home to conveniently access automatic examination misconduct monitoring system.

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