



# Smart Detector: Anti-Cheating Exam Detection Based on IoT and Biosecurity Management to Make a Cultural Indonesia Towards a Society 5.0 Era

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## ABSTRACT

All the crises that are happening today started with a crisis of values and a crisis of honesty. The current pandemic condition has changed Indonesia's online-based education system. Since the exam is conducted online, it is possible to cheat especially if a third party is disguised by the examinee. Therefore, the need for authentication and security is a must before starting the exam. This study aims to create a model of an IoT-based anti-cheat test detection tool and biosecurity management. The methods used include observation, literature study and experiment. IoT-based Smart Detector and biosecurity management can be used as an effort to overcome cheating committed in online exams. Through this tool, teachers and other related parties who require supervision in online exams will be more helpful in minimizing fraudulent acts that occur in exams.

**Keywords:** Smart Detector, IoT, Biosecurity Management, MATLAB

## 1. INTRODUCTION

The world has been shaken by the outbreak of the Covid-19 virus. The virus affects all sectors of life, including the education sector. The education sector is one sector that is very concerned about the pandemic. The learning process can no longer be done face-to-face. The government's efforts to continue the learning process are also carried out remotely or online learning. This online learning process forces parents to support their children's learning process by providing an internet network to ensure that their children can get education even from home.

In addition, in the current new normal era, the swift currents of globalization have penetrated all corners of the world, even to remote areas, entering homes, bombarding moral and religious defenses. the life of the younger generation. Young Indonesians are currently experiencing a moral and intellectual crisis at a very worrying level. The case of the murder of a female student in Jakarta, which was ironically committed by the victim's ex-girlfriend and her new boyfriend, is a recent example. The motive for the murder turned out to be very trivial, only because of heartache. This case illustrates the mental condition of young Indonesians who are 'sick'. It may be an exaggeration to say that, but it could be that these actions are the result of an attitude of not caring about the environment, loss of manners, being away from religion, and other 'bad' traits that are already very acute. Other facts can be mentioned: brawls, drug abuse, free sex and so on.

The Indonesian people who are rich in culture do not have confidence in their local culture, and even choose to merge with global culture. This causes Indonesia to increasingly lose its identity so that it only becomes a collection of people who no longer have local cultural roots. Whereas Indonesia has local wisdom and distinctive values that can be used as a basis for living as a state. Indonesia with the diversity and greatness of its archipelago is now having difficulty dealing with the upheavals that occur in society. It is as if Indonesia does not have a foundation of local wisdom values to solve various problems. The indicator that can be seen from the description is that today's youth seem to be swayed by the currents of globalization and tend to forget the noble values of the nation's culture, which results in the degradation of character in the younger generation marked by a decreased sense of nationalism.

All of these crises started with a crisis of values and a crisis of honesty. Therefore, all levels of society are required to be aware of being able to model, teach, foster, and build the value of honesty in their respective environments, so that this nation does not experience destruction. Thomas Lickona (2008:29), states that 'one of the signs of the destruction of a nation is the culture of dishonesty'.

The current pandemic condition has changed Indonesia's online-based education system. Starting from the teaching and learning process, discussions, practicum, exams and others. Since the exams are also conducted online, it is possible to cheat especially if a third party is disguised by the examinee. So authentication and security are things that must be done before starting the exam. Based on these problems, the authors are interested in developing a solution to detect cheating that occurs in the implementation of online exams.

## **2. EXPERIMENTAL**

The research methods used in this study are:

### **a. Observation and Literature Study**

Observations were made to investigate cheating committed by students in conducting online exams. The next step is to study literature, look for references through books, local journals and international journals, relating to the tools needed for tool design.

### **b. Experiment**

In this method, the authors conduct direct experiments in the manufacture of tools and test input, process and output, so that the operation of the tool can be carried out normally.

### 3. RESULTS AND DISCUSSION

An automation system is needed to deal with problems encountered with student physical examinations that arise before taking the exam. In the proposed system, a cloud-based application that will provide information on prospective examinees such as the original image and fingerprint which will increase the ease of work and reduce the time for report generation. When a student registers for an online exam, the first process is a scan of the student image which can be done using MATLAB (Matrix Laboratory) software. The reason for using MATLAB software is that it does not require dimensioning. In a fraction of the time it will write a program in a scalar without an interactive language like C.

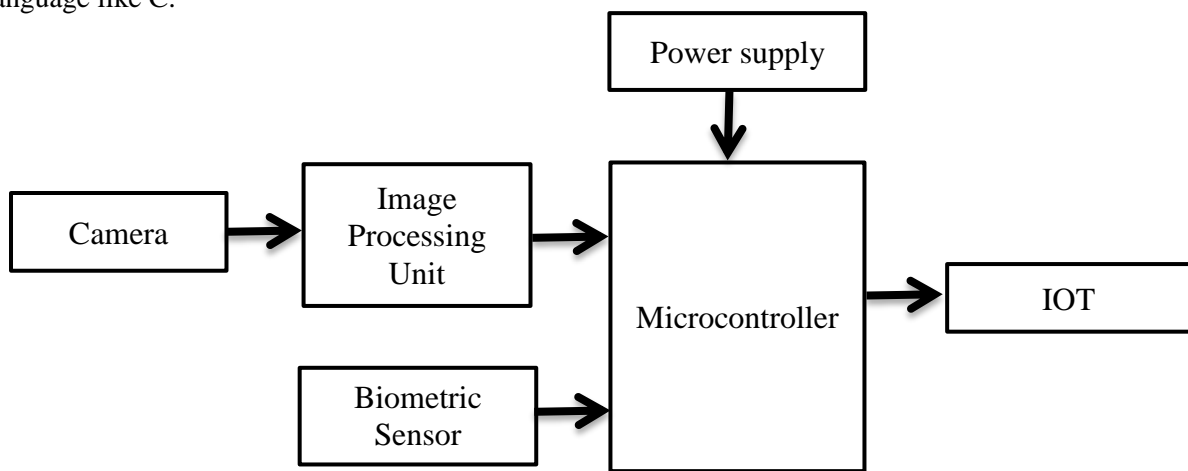


Figure 1. Block Diagram

Figure 1 shows the overall connection of the proposed method. By using the visual cascade object detection method that uses the Viola-Jones algorithm (cascade of scaled images) which takes the nose, eyes, mouth, and upper body of students as characteristics. To track faces in sequential video frames, the easy-to-use MATLAB (Matrix Laboratory) is used. When there is a change in the position of the face, tracking may not be performed. A major disadvantage occurs as the type of eligible regulatory model used may not be suitable for recognition. To solve this problem, computationally concentrated face recognition is performed for each video frame. For people who will come to write exams, this characteristic is very suitable. The step-by-step working process of the proposed methodology is presented in a flow chart as shown in Figure 2.

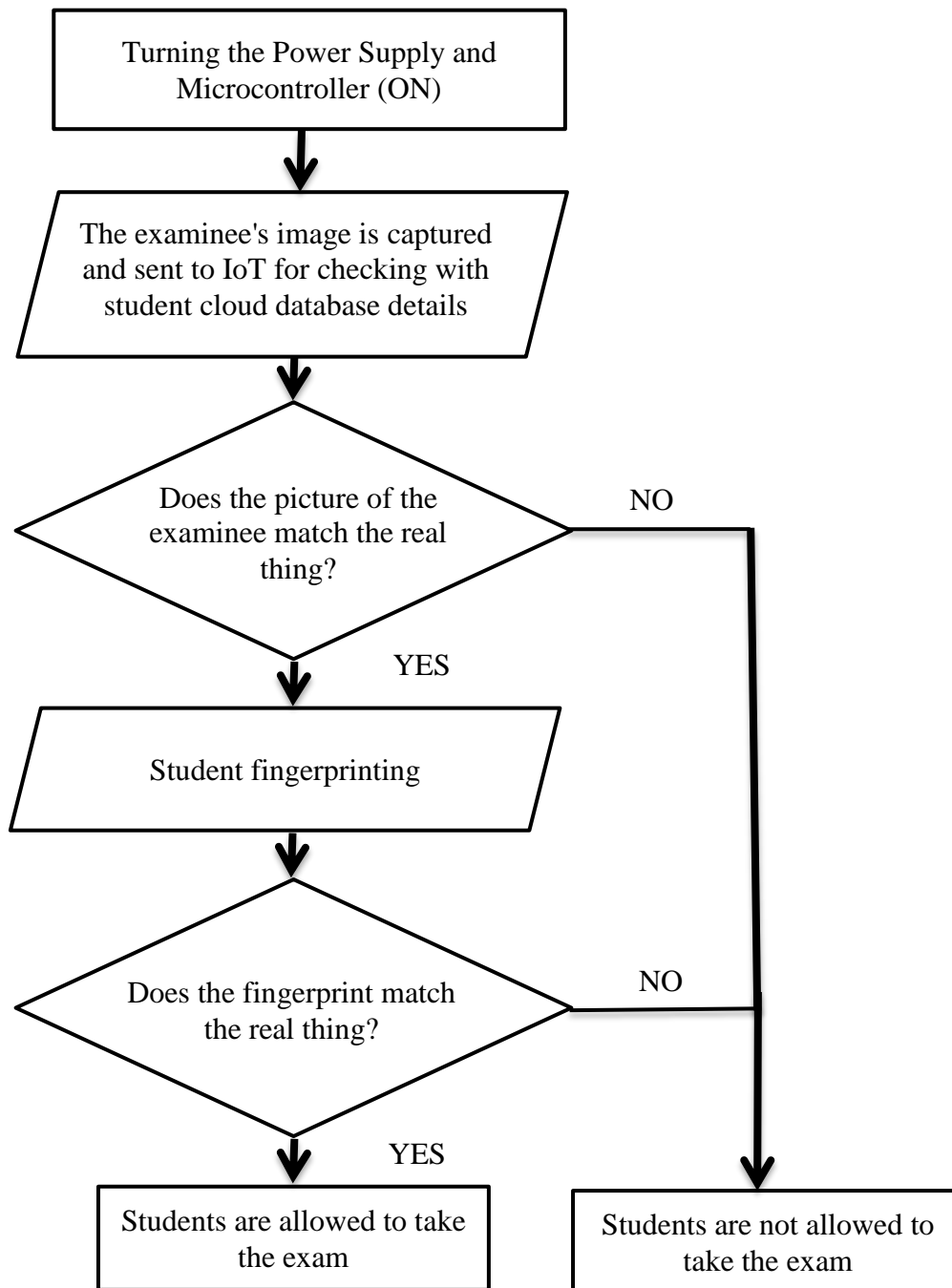


Figure 2. Flow Diagram

Students are allowed to enter the exam center after fingerprint verification using a biometric device. The embedded Embedded C is used to sense the fingerprint and is stored in the database. The main reason for using Embedded C is because it will link the presentation of the differences between the embedded hardware and application architecture and with Standard C. It also, enables this C language with the necessary primitives for DSP (Digital Signal Processing) processors and their applications. The design of data types and address spaces in Embedded C is purely based on DSP-C. The C specification allows to support all processors in the exploit. User-defined address space, direct

access from registers to the processor and some address space functions. This topography is public to the processor, in most consumer applications.

The following are the features presented by embedded C. Among them are hardware I/O addressing, fixed point and saturation arithmetic, segmented memory space. This characteristic enables extensions from a language-based design point of view relatively than processor-based architectures. Then the fingerprint process verification is done at the exam center, if the student is the authorized one and his fingerprint is in the database which is shown as "Found ID". If the two processes match then the student is the authorized person then in the database it shows as the student is allowed to take the exam. If it does not produce results because the student is not allowed to take the exam. This complete process requires a minimum amount of time which reduces the stress of examinees as well as manual examiners. Complete automation of the surveillance system as shown in Figure 3 leads to effective monitoring of the inspection process by the relevant agencies and the possibility of fraud will be reduced.

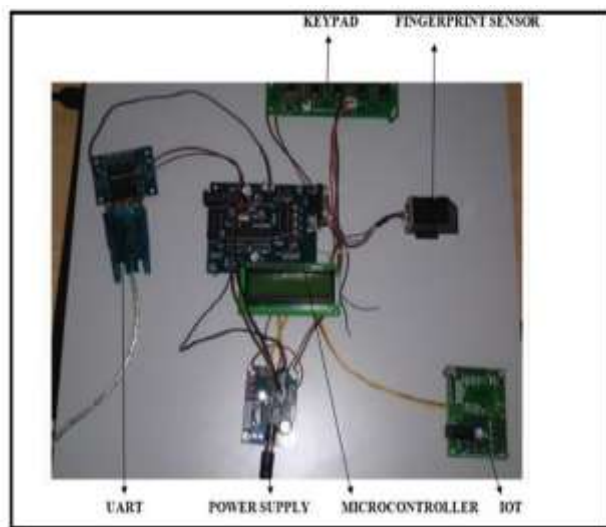


Figure 3. Circuit Connection

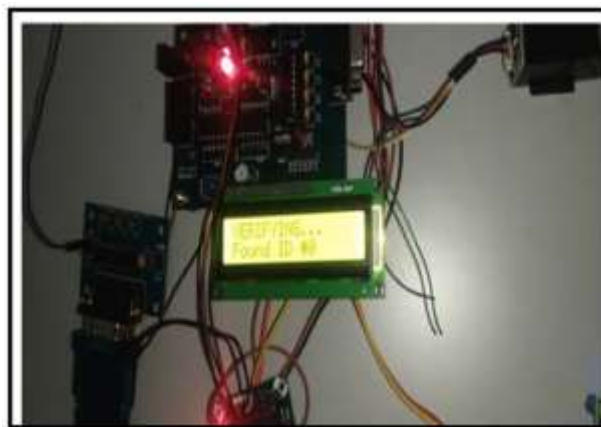


Figure 4. Fingerprint Verification Process

Figure 4 shows the process of verifying fingerprints and images that have been stored in the database and then generating results whether the person is allowed for examination or not. The fingerprint of the first "Person 1" is taken and stored in the database as person 1 i.e. the registration process is complete. Then the image of the examinee i.e., the image of "Person 1" is taken and stored in the database folder. To save in the database, the picture of the examinees i.e., "Person 1" picture is taken and stored. For this at least 3 pictures or 5 pictures are taken based on the count used in the MATLAB code. Then in the test center the fingerprints of the examinees are checked whether they are stored in the database. If a fingerprint is found it will be displayed as "Found ID" as shown in Figure 4.

If this process is successful then the image checking process is complete. Now the picture of the examinee "Person 1" is taken in the main menu of the exam. If the image is already saved in the database, then it shows as "Authenticate with Database Person 1". If the image does not match then it is displayed as "Not Managed by Database". Thus, the image and fingerprint checking process is carried out and produces the result as "Persons Allowed to Open Exam Menu". If it fails then it produces result as "People Not Allowed to Test Menu".

#### 4. CONCLUSION

Based on the explanation above, it can be concluded that IoT-based Smart Detector and biosecurity management can be used as an effort to overcome cheating committed in online exams. With the Smart Detector, teachers and other related parties who require supervision in online exams will be more helpful in minimizing acts of cheating in exams. The contribution of Smart Detector in the field of science and technology is as an IoT-based technology and biosecurity management so that it is able to answer the challenges of education in order to realize a cultured Indonesia towards the era of society 5.0. In addition, with the presence of this innovation, it is hoped that Indonesia can become one of the countries that prioritizes innovation in the education system.

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