Analysis System Security Door Using The Finger Print Based On Micro Controller

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Abstract. Along with the development of science and technology, Security system is now very needed, One of the security system on the door. the security of the door is very important for the room in question. The purpose of this research is to analyze the door security system using fingerprint sensor. Fingerprint system is by recognizing the pattern of fingerprint. By using this fingerprint pattern has a high level of security, it is proven this system has been widely used in offices, companies, schools, government, hospitals etc. In addition to having a high level of security, fingerprint pattern system is also easier to use. This fingerprint sensor checks whether there is a match between the data obtained from the verification process and the data stored in the database, what data when it matches the door will open. The process of automation on the door is controlled using a microcontroller so it can move the relay and set the automation on the door in accordance with the data obtained.
Keywords: Sensor fingerprint

1. Introduction

1.1 Background

System security is a system that is built with the aim to maintain privacy, information, and key data from instance, of interference parties do not responsible answers. Which will cause harm to the owner of such information and data. As for companies or instance who have a valuable asset that must maintain the confidentiality and security, then they will hire a security guard as the guard that protects the security of those who are not responsible for them. But with the security guard does not ensure a security can be maintained. That requires a *Security System* with high security levels that really will keep your data secure and well informed. With the development of today's technology allows for a developer to build a security system properly. Their technology AI that provides an artificial intelligence system in an electronic device to be able to determine their own decisions without the intervention of a human. These decisions are taken from some input like human fingerprints, the image *(image)*, text documents, and so on, that will send information into an electronic device that had been planted artificial intelligence systems for processing and in conclusions and take appropriate decisions. In a security system required a unique and correct data until responsible parties can not commit fraud. That requires a system that can recognize human fingerprints. *Fingerprint* finger footprint is result reproduction either deliberately taken, stamped with ink, as well as the former left on the body for ever touched skin of the palms or feet. The soles are leather on the palm of the hand from the base of the wrist until all of the fingertips, and the inner skin of the foot from heel to toe which, in the area there is a fine line protruding out of each other, separated by a gap or groove which form a specific structure (David R, 1991). Every human has a different fingerprint so that the fingerprint can be used for authentication and validation of data from the security system.

The combination of conduction AI and *image processing* for protection system can be applied in several fields in a room that can not be accessed by others. The *fingerprint* can be used as the authentication and validation that is good enough where the results *scan* will be sent to device that had been planted intelligent system to be able to determine their own decisions whether *scan finger print* right or wrong results. *Internet of* Things, also known by the acronym IOT, is a concept that aims to extend the benefits of Internet connectivity are connected continuously. Internet of Things is by using an argument programming in which each command argument it generates an interaction between fellow internet-connected machine that became a courier between the machine interaction by (Kevin Ashton, 1999). With the technology of *Internet of Things* the do research analysis on the door security

system using an electronic device planted intelligent systems *(Artificial Intelligent)* based *micro controller.* Validation and authentication as a key that will determine the decision will be taken of the fingerprint *(Finger Print)* human. So that will provide good security. Microcontroller used mainly as a device that will process the results *scan fingerprint* and determine a decision whether the *fingerprint* is sent failed or not. then *microcontroller* The sends a command to a device driver whether the door will open or remain locked. In this study, the device uses a DC motor drive.
Based on the above, this research is expected to help in improving the security at intance which has a sufficient level of confidentiality high. Title research is **"Door Security Systems Analysis use *Fingerprint"*. Microcontroller-Based**

2. Literature And Theoretical

2.1 Literature

To support this study used several relevant theoretical basis and related to the subject as follows:
2.1.1 According to research Setya Ardhi and Savitri entitled "PLANNING AND DEVELOPMENT SYSTEM WITH HOME SECURITY FINGERPRINT RECOGNITION TECHNOLOGY" the destruction and burglary door by common criminals at the time now, the security system needs to be improved in order to avoid crime. Security using key now is easily once disabled by crime. Using the key in the security system is also less trusted because the key is lost in use, so the system is perceived less practical and less modern for today. In this study, using a fingerprint as a security system is Sensor Fingerprint. This tool checks whether there is a match between the data which is obtained of the verification process and the data stored in the file, if fit then door can be opened. More than a century has passed since Alphonse Bertillon times understad first and then diligently put into practice the idea of using the body size to break crime. When the idea this statrs popular, it becomes things that are far more significant and the discovery of the fingerprint practical person. On 1893, the UK Department of the Ministry said that there are two people have the same fingerprints. Soon after this discovery, many department law enforcement sees potential in identifying the fingerprint. The introduction of biometrics, or simply biometrics refers to the use of distinctive anatomical and behavioral characteristics or identifiers (fingerprint, face, voice, geometry hand) to automatically recognize a person's biometric recognition provide better security, higher efficiency, and improve comfort user. These are the reasons that biometric recognition systems increasingly used in large number of both the government and society. Some technology biometrics have been developed and some of the technology has been successfully disseminated. Fingerprint recognition system can be viewed as a pattern recognition system. Ability to design algorithms of fingerprint stand out and match them with the powerful is a challenging problem. This is particularly so when the user is not cooperative, the surface is dirty fingerprints or injured and quality fingerprint images produced bad. Rather, the problem of pattern recognition on the fingerprint remains challenging and important.
2.1.2 According to research A. Aditya Shankar, et al "Finger Print Based Door Locking System"
Security has replaced a key role in many of our places such as offices, institutions, libraries, laboratory, etc. on secreet to keep our data so that no other unauthorized people can have access at them. At present, at any point in time, we need a security system for valuable even data protection. This paper presents a fingerprint based system bookkeeping doors that provide security can use to many banks, institutions and organizations etc. There are other methods for verify authentic via password, RFID but this method is the most efficient and reliable manufacturer. To give the perfect security to lockers bank to make the job easier, the project is taking help from two different technology. embedded systems biometrics access unauthorized and prohibited by designing a key that stores fingerprint from one or more authorized users. Fingerprint authentication is perceived by sensor and validated. If the fingerprints match, the door will open automatically if not buzzer connected to the audio amplifier will be activated so that people will get a warning near neighborhood. Security is a major concern and in this busy, competitive world, people can not find a way for gives security for goods manual secreet. Instead, he found an alternative and can provide complete security. In the network society everywhere, where people can easily access there information anytime and anywhere, people face the risk of another people can use same information anytime anywhere harps. This cause

risk, technology identification, which can distinguish between a legitimate user who is registered and fraud, is now generating interest. Generally passwords, identification and verification card PIN used but the disadvantage is that password can be hacked and card maybe stolen or lost. Secure is the most recognition system fingerprint for fingerprint finger one ever match with other people. General Biometrics Study including fingerprint, face, iris, voice, signature, and hand recognition geometry and verification. Many other modalities are in various stages of development and which are available boimetric characteristic fingerprint assessment. On a proven finger be one of the best features provide good ratio mismatch, high accurate in terms security and also reliable.

2.1.3 According to Eni Yuliza Research and Toibah entitled "DOOR SAFETY EQUIPMENT BRANKAS JARIDAN PASSOWORD BASED DIGITAL FINGERPRINT SENSOR USING MICROCONTROLLER ATMEGA 16"

Security door safe still using conventional security. Where safety deposit box door was opened by rotating and using the code. Therefore, the necessary measures to facilitate the security door safety deposit box. Aim of this research is to safety deposit box door security system using fingerprint sensor R305 series. Other major equipment includes a microcontroller AT Mega 16 and Visual Basic 6.0. The results showed that the Safe Door Security Tools can be monitored using applications created with *Visual Basic* 6.0 in accordance with the orders given. The test results showed that the response tool to the tool-instruction from command applications run normally. The success of the test results the tool is 100%. In the era of globalization of technological development is very rapid, technology happens to the appliance from manual now be completely automated with the microcontroller, it can be seen from the number of electronic devices in our daily lives are completely automated, from the application of simple or more sophisticated. Microcontroller-based electronic equipment does have a tremendous benefit if developed by experts in the field, it can be seen from the widespread use of automated electronic equipment as a tool in carrying out their daily work people. Such also the case with today's security environment around us, most people overlook a security at a storage place such as cabinets and safes. So that the storage is not properly maintained, although a safe locked with a key that is used but the possibility of such safes can be opened and can be theft. The security system is now urgently needed. One of these security systems on doors and safes prone robbing possibility of very large. In a safe deposit today is very necessary to have a security, in order to anticipate the danger of theft that can occur unexpectedly. The safe door is not everyone can open the door safe because it has a tool that is by fingerprint and *password.* Security doors are still very manual safe, in the sense of security doors safes circulating among people today still use conventional safes security doors. Where is the safe door open by rotating and put the code, which in a sense it is not efficient.

2.1.4 According to research Nasrin Atar et al, entitled "FINGERPRINT BASED SECURITY SYSTEM FOR BANKS"

In this paper we design and implement a high locker security system based on fingerprint, password and GSM technology that can be arranged in banks, offices and homes are protected. In this system the Bank will collect biometric data for each person to put lockers Only the authentic person can be recovered money, documents of lockers. We have implemented security system based on fingerprint lockers, a secret word and GSM technology containing door locking system that can enable, authorize, and validate the user and opens the door in real time to access secure lockers. Fingerprint one of the many forms of biometrics, which is used to identify and verify their identity. This technology can be used to identify, track, sort or detect a wide range of objects.

3. Results And Discussion

3.1. The Results Of Analysis Fingerprint

Fingerprints are streaks that are in the skin fingertips. Fingerprints serves to *members* greater frictional force to the fingers can hold objects more closely. A security system using fingerprints already started to be used in the United States by a man named E. Henry in 1902. Henry use fingerprint method for the identification of workers in order to cope with the double remuneration. Henry system using pattern ridge (Ridge = back grooves in the skin, either in the hand or foot), centralized pattern of fingers, toes, especially the index. To obtain a ridge pattern image, done by rolling the finger by ink on

a printed card to produce a ridge patterns that are unique to each individual. Experts proved that no two individuals who have a similar ridge patterns. Ridge pattern is not inherited. Ridge pattern is formed when the embryo, and never change a lifetime. Ridge changes can only occur due to trauma, due to injuries, burns, disease, or other causes. Fingerprint biometrics system is the most widely used system today as it has a degree of accuracy high and easy to apply. From the research, it was found nine kinds of patterns papillary main ridge, among others:

1. Loop: Consists of one or more of the free curve and a delta ridge.
2. Arch: Forming a ridge pattern with a ridge above the other in the form of a general arch.
3. whorl: The pattern consists of one or more free curve ridge and two delta.
4. Tented Arch: This pattern consists of at least a curved ridge above branching into two ridges.
5. Double Loop: This pattern formation to form two arches were then split up, with two-point delta.
6. Central Pocket Loop: Consists of one or more curves and two-point delta ridge.
7. Accidental: This pattern has a two-point delta. One delta will relate to arch upward, and delta else connected with the other arches.
8. Composite: It consists of a combination of two or more different patterns.
9. Lateral Pocket Loop: This pattern consists of two separate arches. There are two colons delta.

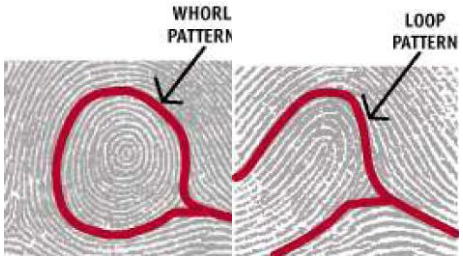
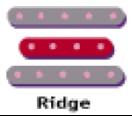
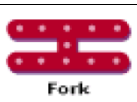


Figure 1 papillary ridge patterns

About 60% of people have a fingerprint pattern Loop. About 30% of people have a whorl pattern, shaped arch around 5%, and 5% were other forms. All of these patterns can be distinguished by the naked eye. Computers can analyze the lines change direction ridge shape, with capabilities such as trained human eye. Picture sizes anatomical characteristics such patterns can be depicted as follows:

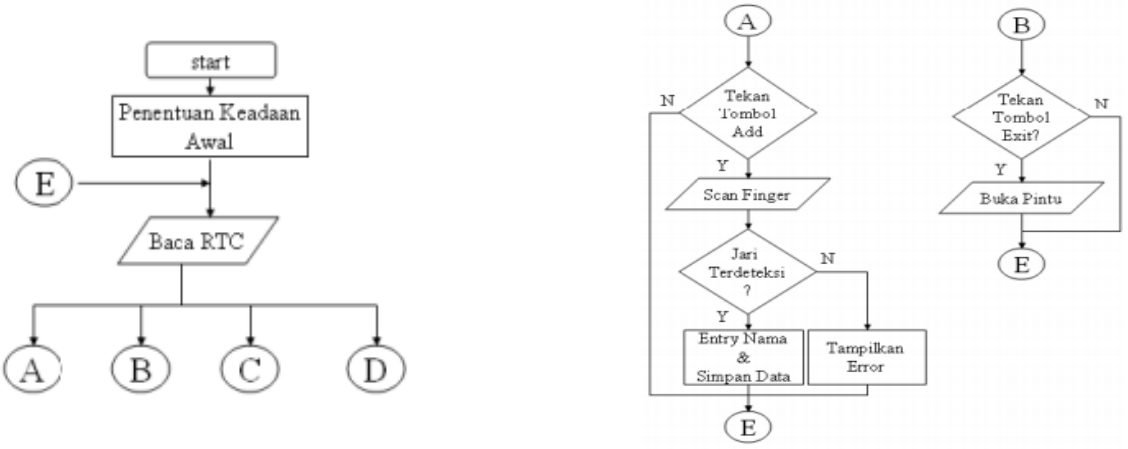
Table 1 Variation Pattern Ridge

NO	Image Pattern	Name Pattern	Description
1		**Ridge**	Having firmness double spacing from starters to-end, as the width of *ridges* from one another
2		**Evading Ends of**	two *ridge* in a different direction running parallel to one another is less than 3mm.
3		**bifurcation**	two *ridge* with a different directions running parallel to one another is less than 3mm.
4		**Hook**	*Ridges* tearing; the *ridges* is not longer than the 3mm
5		**Fork**	Two *ridges* are connected by a trillionth three *ridges* are not longer

			than the 3mm
6		**Dot**	portions *of ridges* is not more than the ridges adjacent
7		**Eye**	*Ridges* rip and merge again in 3mm
8		**Island**	*Ridges* ripped off and not rejoin , less than 3mm and not more than 6mm. Areas which are attached *Ridge.*
9		**Enclosed Ridge**	*Ridges* are not longer than 6mm between two ridges
10		**Enclosed loops**	are not patterned determine the repeatability between two or more *ridges* parallel
11		**Specialties**	*Rare ridge* formed like a mark Question and cutting plugs

area *papillary ridge* is sometimes known as a *pattern area* in each. Each ridge papillary pattern produces a different form of the pattern area. Center finger image reflect the pattern of the area, known as kernel *core* point. Tangible part of two parallel ridges that different surround patterns core area called *type lines.* The starting point of branching *ridge* called *delta.* The process splits a line into two lines *ridge* is called *bifurcation.* The number of intersection ridge in pola area called a *ridge*count. Use for tormography computer can detect the points are based on the xy coordinate axes. (Eko Nugroho, 2009).

1.1 Draft Flowchart System Security Door Using Fingerprint



Design done before the development in the design of system security door using fingerprint, is as follows:

In the picture above we can see that the first time the program starts, then the program will go to the starting position (home position / check points). After reaching the initial position, the program will read the RTC and wait suppression of one button, the following is an explanation of each keys and of its flowchart. If the add button is pressed, the next process performed is *scanning the* finger. If the fingerprint image is detected, then the user can input name and then save the data. Whereas if the fingerprint is not detection it displays an error. If pressing the exit button, the door will be open outomatically. If the button *verifying* is pressed, and perform the process *scanning finger*. If fingerprint image is detected and valid. The value *counter* is returned to a value of 0, then send the data to a PC and open the door. If the process is repeated up to three times, then the alarm will sound. If the fingerprint is not detected, it displays *an* error.

3.2 Software Testing Results

Process of this equipment is divided into four processes, namely the initialization process time, the process of adding (registration or additional user), the process of verifying (identification), delete process (data deletion) , The explanation will be made clear to the chart that comes with step by step pictures.

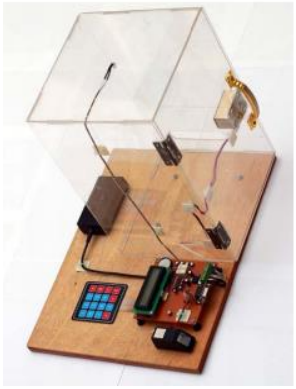


Figure 2. Software Testing

3.3 Experimental Results Fingerprint

In order to strengthen the data then conducted the experiment *Fingerprint Scanner* on a system that has been running, in this case carried out in the halls of the University Rector Bandar Lampung Floor. Using *fingerprint sensor* the model of JM-250-U is used for employee attendance systems are listed as employees of the university this Lampung. Trial done twice, wherein the first experiment conducted by outsiders who are not registered while the subsequent trial was conducted by parties who have been registered in the system, in this case the employee performed UBL (Bandar Lampung University) and obtained from the results is as follows:

1. first experiment
   in the first experiment is done by outsiders (non-employees) who are not registered in the database, so that the fingerprint was not detected on the fingerprint system, then given a warning retry, the following looks:

2. experiment both

in a second experiment was conducted by side who have been registered in the database, so that fingerprints can be detected in the system fingerprint, it will show the writing thank you, the following looks: From the observations above it can be concluded the system *fingerprint* a system that the security level is high enough, so that it can be applied in various fields for example attendance, and can replace the padlock on the door of his security level is still lacking, and now *fingerprint* technology has been widely applied in the security system of one of them is to substitute smart phone security system as a replacement for passwords and patterns.

4 Conclusions And Recommendations

4.1 Conclusions

From the analysis that has been done so in this discussion can be concluded several major ways:

a. Fingerprint Sensor is a suitable module is used to create applications that require the ability to detect fingerprints.
b. Improper finger placement on fingerprint scanning process may lead to errors when shooting. The error occurred because the condition can be a dirty finger prints or putting less pressure and therefore can not take scanning fingerprints well.

4.2 Suggestions

Based on the results of research and discussion in the previous chapter there are some suggestions that can be given to the author for subsequent research:

a. Fingerprint sensors have many uses and can be developed further, and for other applications.
b. Every human being has a fingerprint different from birth that never change and is unique so it is good enough to be the primary key of the security system in a room.

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