



Application of Passive Infrared Sensor to Improve the Quality of CCTV in Maintaining Home Security

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ABSTRACT

Artificial intelligence, or AI, is a simulation technology that runs through human intelligence demonstrated by machines or tools. Artificial intelligence can overcome and provide a sense of comfort, especially in the application of CCTV devices that use this passive infrared sensor method. This method can detect thieves or people moving in the area of the house where CCTV is installed, by detecting human objects using IR filters. If it detects an object that has the minimum temperature possessed by humans, it will immediately direct the alarm indicator. With the existence of CCTV that applies AI, it is hoped that human life will be safe, and crime will be reduced in an area, especially quiet areas with high crime rates. The application of Passive Infrared Sensor (PIR Sensor) in this anti-theft CCTV tool can detect and be able to work with a high level of accuracy.

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1. INTRODUCTION

Over the years, CCTV devices have been widely used by companies, governments, and housing to monitor the condition of a place [1]. However, its use is still limited. It takes at least an admin or worker to directly monitor the CCTV recordings and the admin concludes the data obtained by himself. The television series, Person of Interest, depicts the development of CCTV technology. In the television series, there is an artificial intelligence machine called The Machine that can automatically determine the number of people caught by CCTV cameras. Even the machine can know the identity of each person recorded by CCTV [2]. That way, it is easier for us to see the results of the report done by the machine from CCTV footage. Therefore, this Anti-Thief CCTV was created to minimize the crime that often occurs, especially in areas with very high crime rates [3]. The development of this technology also has advantages and disadvantages. The advantage is, we can feel safer by monitoring crimes that occur in every area fitted with CCTV. The authorities can more easily catch the perpetrator with the data captured by this Anti-Thief CCTV [4]. However, there are also disadvantages that exist in this CCTV technology, one of which is that our privacy is exchanged for the security obtained, our lives are also monitored by this CCTV.

The purpose of this research is to find out the benefits and disadvantages of this Anti-Burglar CCTV in utilizing AI, and to find out how to use the right application of AI in this Anti-Burglar CCTV. The paper made is expected to be able to provide benefits for readers and writers, including providing knowledge and insight into AI. and Providing information on how to improve security using AI systems.

2. METHOD

This research method uses a qualitative approach, which is a research and understanding process based on methodology that is tasked with investigating a social phenomenon and human problems. In this approach, researchers create a complex picture, examine words, detailed reports from respondents' views, and conduct studies in natural situations[5].

In the application using the Passive Infrared Sensor method can make it easier to track and detect the presence of human objects in even dark situations and also rely on IR filters that can capture long waves from the Passive Infrared Sensor itself [6].

According to Moleong qualitative research is research that aims to understand the phenomena experienced by research subjects [7]. More fitting and suitable for researching matters relating to behavioral research, attitudes, motivations, perceptions and actions of the subject. In other words, this type of research cannot use quantitative methods, the power control mode.

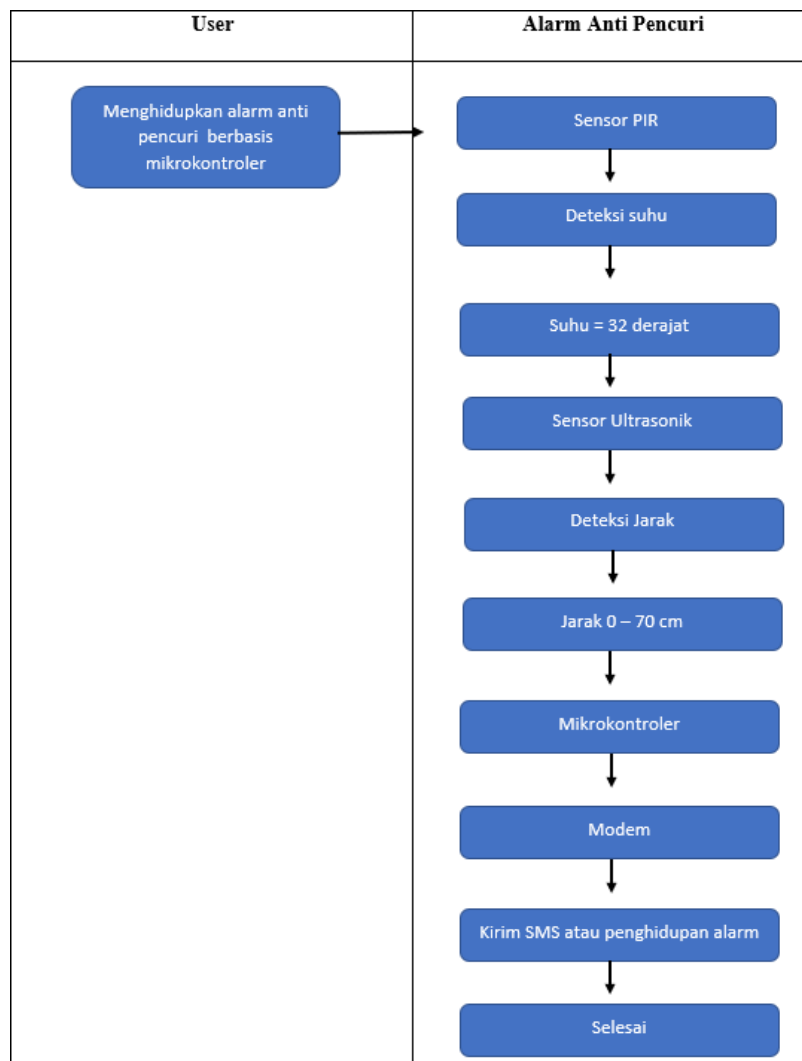


Figure 1. Flowchart

As in Figure 1, where we display the flowchart of the system we designed and With the conduct of this research based on the participants studied, it has several objectives, including increasing security both in public environments such as malls, shops, offices, markets, as well as in private areas such as residential homes, and can be used as evidence in the event of unwanted things, such as crime.

3. RESULTS AND DISCUSSIONS

Manuscripts CCTV is an abbreviation of the word (Closed Circuit Television), which means using signals that are closed or secret. CCTV is generally used to complement security systems and is also widely used in various locations such as airports, military, offices, factories, and stores, CCTV can also be used in private residences such as homes, villas, etc [8].

The way this Anti Thief CCTV works is by detecting the temperature of objects in the area being monitored by the CCTV. If the CCTV detects an object that has a minimum temperature temperature that humans have, the CCTV will immediately turn on the alarm indicator. The way this alarm is detected is by using a device called a Passive Infrared Sensor (PIR Sensor), which is an electronic sensor device that regulates infrared light emanating from objects in the field of view.

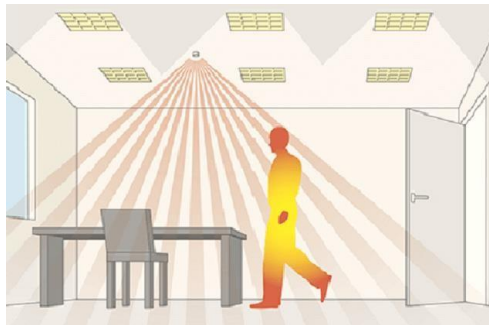


Figure 2. Sketch of PIR system

The way the PIR sensor works as shown in Figure 2 is that infrared light enters through the Fresnel lens and hits the pyroelectric sensor, because infrared light contains heat energy, the pyroelectric sensor will produce an electric current. Pyroelectric sensors are made of gallium nitride (GaN), cesium nitrate (CsNo3), and lithium tantalate (LiTaO3). This electric current will cause a voltage and is read analogically by the sensor. Then this signal will be amplified by an amplifier and compared by a comparator with a certain reference voltage. So the PIR sensor will only issue logic 0 and 1, 0 when the sensor does not detect infrared emission and 1 when the sensor detects infrared. PIR sensors are designed and designed only to detect infrared emission with a wavelength of 8 - 14 micrometers. Beyond that wavelength the sensor will not detect it. For humans themselves have a body temperature that can produce infrared emission with a wavelength of 9 - 10 micrometers, the wavelength can be detected by the PIR sensor [9].

4. CONCLUSION

Based on the discussion above, it can be concluded that the application of Artificial Intelligence (AI) in this Anti-theft CCTV can be very useful, especially in this era of industrial revolution 4.0 we really need human-brained machines like this CCTV that can detect any suspicious movements recorded by this CCTV. This Anti-thief CCTV uses Passive Infrared Sensor (PIR Sensor). The utilization and advantages of the features in anti-thief CCTV are expected to be utilized properly to create a safe and peaceful atmosphere, especially in areas with high crime rates.

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