DESIGN AND BUILD A SECURITY TOOL BASED ON PIR AND ESP-32CAM WITH TELEGRAM CONTROL AT EMPLOYEE ROOM OF PT YOMART KOPO

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Abstract

The purpose of this research was to designed safety tool in the staff room at Yomart Ltd. To solving problem of losing personal or valuables items where caused by poor secutity at staff room. The writer used case study research method that includes observation and interview with staff. The tool used PIR (Passive Infrared Receiver) as a motion detector which if it detected movement will capture images. ESP-32CAM can capture images without wait the PIR that used Telegram application. The images that was captured by the ESP-32CAM will automaticlly be sent to user's Telegram application.

Keywords: safety tool, PIR, ESP-32CAM and Telegram application.

Introduction

At Yomart Minimarket KOPO there is a room that should be safe or sterile from people other than employees. In this room there are various kinds of valuable objects belonging to employees or company property, for example there are lockers that store valuable objects belonging to employees, there are storage cabinets for operational needs, and many other valuable things that cannot be mentioned.

The obstacles faced by the author and co-authors at Pt. This Kopo Yomart Minimarket is difficult to monitor the room, due to the lack of human resources at this KOPO Yomart Minimarket, to overcome this problem one of the employees is required to stand guard or stand in a position that can see freely the direction of access to the room. It's just that if you do that, other work will be left behind and will disrupt operations at that time. Based on this problem, the authors conducted research on designing a security tool using PIR which functions as a trigger or motion detector and ESP-32CAM which functions as an image capture, then the Telegram application as a device controller and also functions as the output of this tool.

Literature Review

Security is an effort to avoid the emergence or threat of crime that will interfere. IoT is a technology that allows an object to be able to send data over a connection without the help of a computer or human. Iot-based security tools are tools that make it easier for users to control security when they are near or far away, by using the internet or a connection, users can connect to these devices with application media. Less attention to security at Pt. Yomart encourages writers to design IoT-based security tools to help make the work of fellow writers easier.

The PIR sensor is a sensor that can detect movement, in this case the PIR sensor is widely used to determine whether there is human movement in the area that the PIR sensor can reach. This sensor is small, inexpensive, requires little power, and is easy to use. Therefore, this sensor is widely used on a home and business scale. The PIR sensor itself stands for "Passive Infrared Receiver" sensor. And the writer decided to use PIR as a trigger.

ESP32-CAM is a platform equipped with a camera module and also a wifi module.

With the rapid development of technology at this time, the PIR and ESP-32CAM can be connected to the Telegram application using the Telegram bot API and chat id. By using the API bot and chat id, this tool can send output in the form of screenshots or text, and this tool can be controlled through the Telegram application only with commands in the form of messages sent to bots that have been set. The Arduino IDE serves to enter syntax into the ESP-32CAM module and manage the API bot and chat id.

Design Method/ Analysis

To make it easier for the writer to design this tool, complete data is needed to support the correctness of the description material. The methodology used is field research, namely observation where techniques or approaches are used to obtain primary data by observing directly on the object. And also use interviews to get data related to these data sources by communicating directly. The object in completing this research is controlled security in order to create comfort in working, especially in the staff room at Yomart Minimarket Kopo.

After collecting data and knowing the problem, the next step is to design a security tool in the form of a flowchart so that it can be interpreted as a tool.

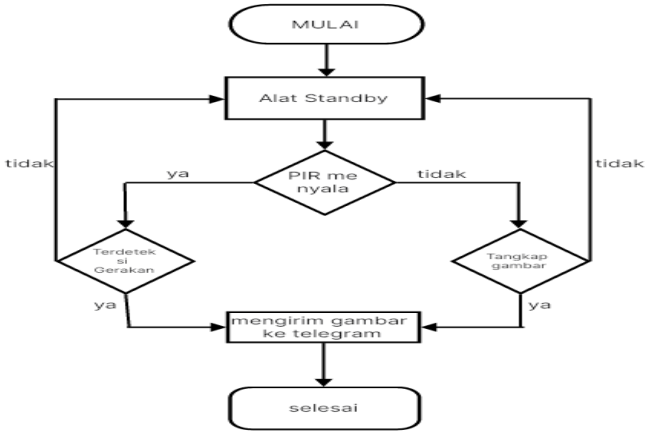

Figure 1. Flowchart

Results and Discussions

To facilitate the design of this tool and to assist in the preparation of this tool, a chart is made that will explain the input and output movements of the tool being designed

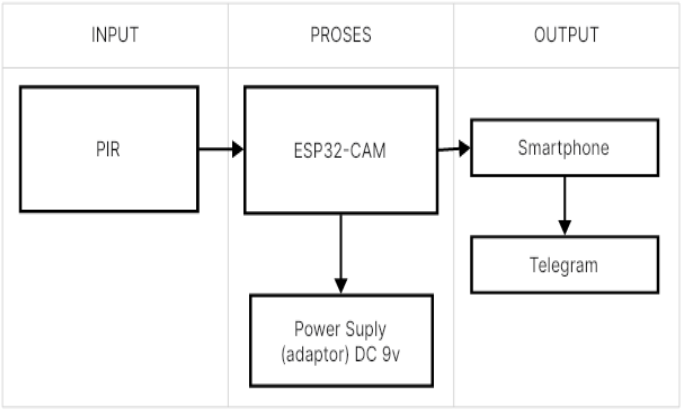

Figure 2. Tool Block Diagram

The block diagram in the picture above explains the process, input and output of the device where the input of the device is a PIR sensor which is used as a reader or motion detector and will be processed by the esp-32cam. The

results of this method will produce an image capture output by esp-32cam and continue by sending the captured image to the telegram application. The input, output and output block diagrams are:

1. Input Block
   In the process block diagram, the esp-32cam acts as a microcontroller that will work on the input from the PIR sensor which will be triggered if there is movement in the form of data, and the esp-32cam waits for the command to be given by telegram. The data that has been processed will be sent and will continue to be output.

2. Blok Process
   In the process block diagram, there is the esp-32cam as a microcontroller that will work on the input from the PIR sensor which will be triggered if there is movement in the from of data, and the esp-32 cam waits for the command to be given by telegram. The data that has been processed will be sent and will continue to be output.

3. Output Block
   In the output block, namely the telegram application that is used as a media for receiving images that have been captured by the ESP-32Cam.

System Circuit Design

The arrangement of the system circuit arrangement is made in order to better identify the tools that will be used and what is needed to make this tool so that it can be implemented.

Tool Design

The arrangement of the tools is designed in advance so that the shape of the electronic arrangement can be recognized. In preparing this tool, some of the arrangements will be broken down to form a total tool, including the following:

1. Power Supply Circuit

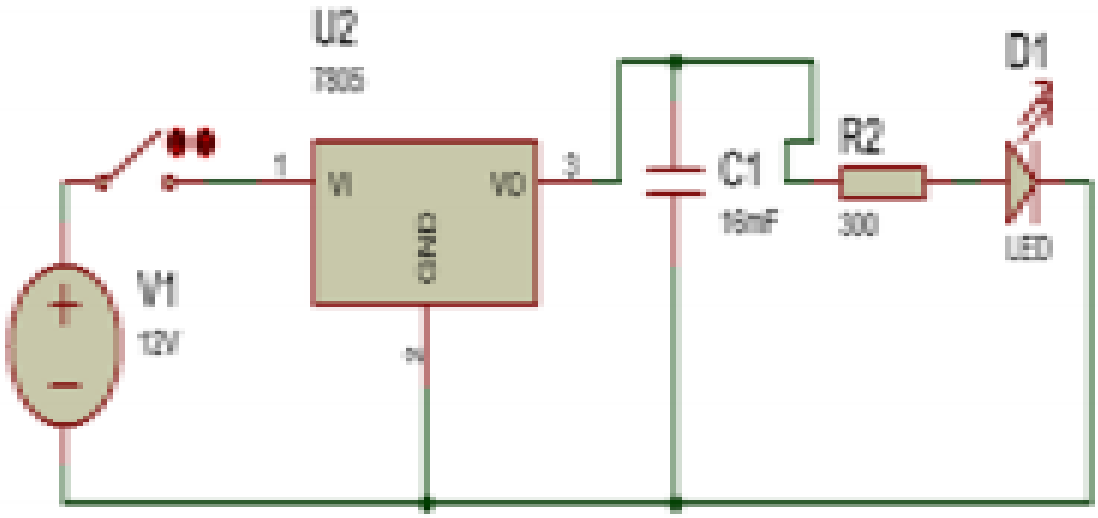

FIGURE 3.Power Supply Circuit

2. Pear String FIGURE

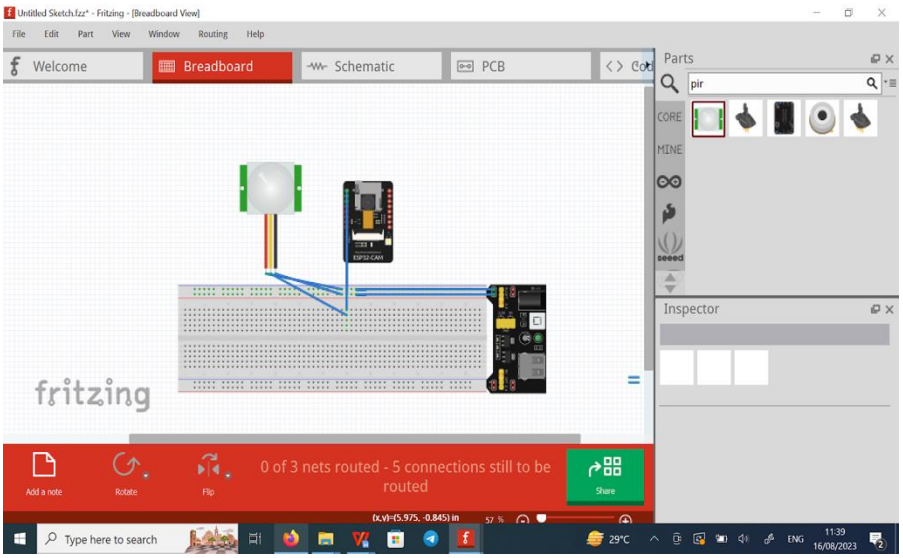

FIGURE 4.PIR & ESP32-CAM circuit

The image above describes the PIR sensor. The PIR sensor is connected to pin 12 as input data from the sensor to the micro controller or esp-32cam. VCC and GND are connected to the Power Supply or power supply so that the sensor can work with electricity.

3. Overal Series FIGURE

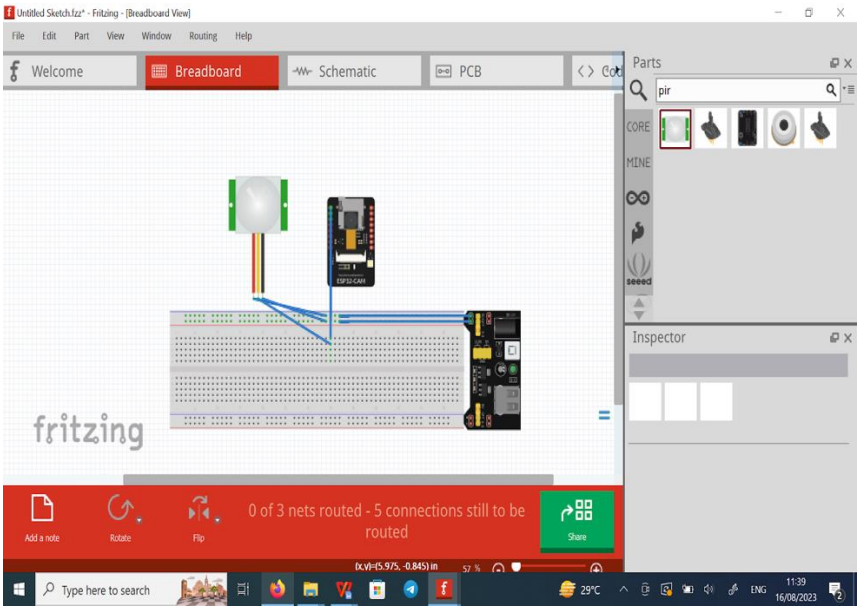

FIGURE 5.Structure Picture of the whole network

It is a series that will be adjusted to achieve the objectives of this study. The sequence in the image above was designed using the fritzing application.

Simulation Design

Pada perancangan alat ini dirancang dengan konsep In the design of this tool is designed with a minimal concept and easy to implement. This simulation design uses a bread board and jumper cables as tools. To make it easier for readers who want to see a simulation of this tool that uses PIR and Esp-32cam as the control IC of the tool. The physical design of the tool made using the simulation can be seen in the following figure:

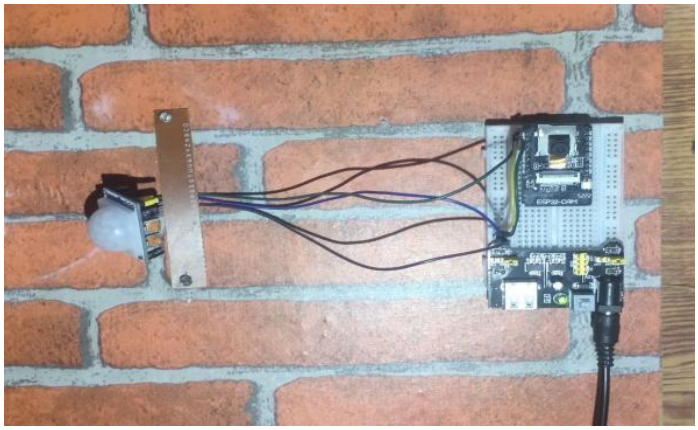

FIGURE 6.Simulasi Rangkaian

In the picture above is a simulation of a security device in a room using a PIR sensor as a motion detector if someone enters or motion is detected and the esp-32cam as a microcontroller and also a camera as an image capturer, and then it will be processed to be sent to Telegram.

The following is the simulation result of the security device:

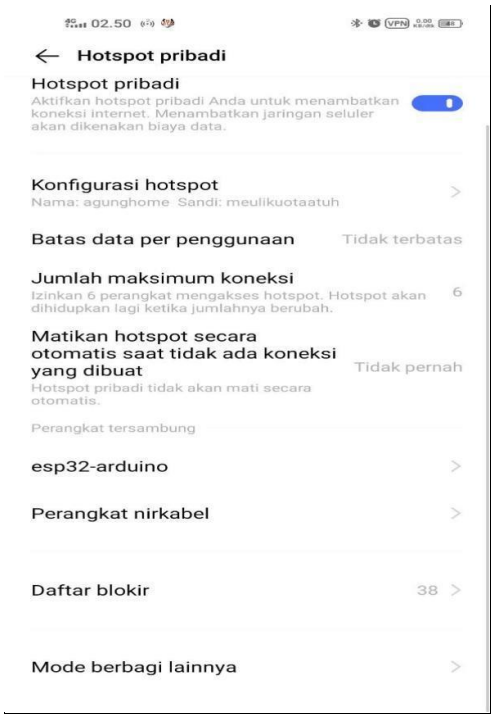

FIGURE 7 : Connectivity of Security Devices

ensure that the device is connected to a wifi that has an internet connection. If you can't connect, make sure the SSID name and password match what was set using the Arduino IDE.

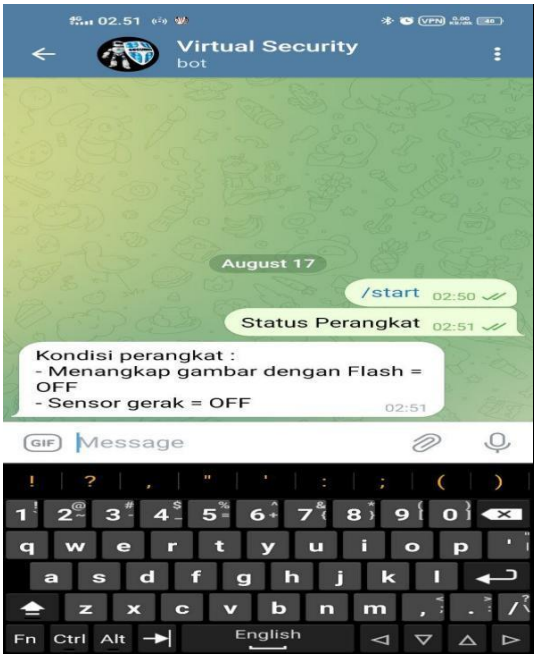

FIGURE 8.Bot Telegram

After entering the Telegram bot chatroom start with /start. The "Device Status" message sent to the bot aims to find out whether the device is working or not

FIGURE 9.Manual Shootings

Taking pictures can be done manually with the "Take Picture" command sent to the telegram bot.

FIGURE 10 : Image Capture Using PIR

By turning on pear as a trigger for capturing images, this security tool will capture images if motion is detected and will be automatically sent to Telegram. To turn it on just send the message "Turn on Sensor" and to deactivate it by sending the message "Turn Off Sensor".

Conclusion

Based on research and analysis that has been done by the author. And as the authors have described above, the authors can draw several conclusions as listed below.

1. In a fast period of time IoT has developed rapidly so that many special applications have emerged made for certain companies in certain parts with certain functions, it can be concluded that the use of cameras as a room security tool and with their respective application defaults. The security tools at Pt.Yomart kopo are felt to be lacking in terms of ability both in terms of input and output when carrying out security. Because of that, a special tool is

needed that has a better ability to secure the room at Pt. Yomart kopo so that the overall performance of the security device can be improved.

2. Faktor that hinder the optimal process of securing the room at Pt. Yomart Kopo comes from limited human resources which causes the existing security tools to be neglected due to the large amount of other work that must be done. A few things are required to be able to monitor cameras at Pt. This Yomart Kopo has several problems, such as requiring a login first, turning on the computer, and so on.
3. Location of the main weakness in the current security tool is in the monitoring section whose role is very central as a security tool in all employee rooms, namely only people who have authority can access this security tool and will result in very high inefficiencies in terms of time and energy use .

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