



PROTOTYPE POWER USE EFFICIENCY SYSTEM ON RFID AND PASSIVE INFRARED ELECTRONIC DEVICES

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ABSTRACT

The problem that is often faced today is when we travel out of a room and we forget to turn off electronic devices in the room which results in a surge in costs that must be paid for wasteful use of electronic goods, in this modern era many ways can be done to make automatic system that aims to help human work, in this system the author makes a system that can save electricity usage. By using the PIR sensor to detect movement, and if there is movement inside the room then the electronic goods will live and, if the user wants to use power without having to turn off automatically, then the user can use the RFID card to be affixed to the electronic goods will continue to live until the card is removed from the RFID module, and the buzzer will sound if the user attaches the card to the RFID module incorrectly, to make it easier for the user to see the current conditions, then install the LCD to make it easier for the user to know the current condition.

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1. INTRODUCTION

There are many reasons for the increased use of electrical power, one of which is that users forget to turn off the electricity when leaving the room. Electronic items in the room are always used for a specific purpose. As in a room, lights are also used as lighting, fans to cool the room. Because of the frequent activities to turn off electronic items in the room that users forget when they are about to leave the room, the author makes a prototype that can control electronic devices to turn off automatically when the room is empty or no longer in use, namely a prototype system of efficiency of use. power on electronic devices based on rfid and passive infrared.

2. THEORETICAL BASIS

2.1 ARDUINO UNO

Arduino Uno includes a microcontroller module with a low price and has a pretty good control. The component in this system is an Arduino 8 bit made by Atmel Corporation with the type name ATmega. Arduino uno is equipped with 20 I/O pins which function to directly connect Arduino with other components, the 20 I/O pins consist of 6 analog input pins and 14 digital input pins, which will be used according to the input value needs to be used. [1]



Figure 1. Arduino Module

2.2 PIR (Passive Infrared Receiver)

PIR (Passive Infrared Receiver) is an infrared based sensor. PIR doesn't emit anything like IR LED. As the name implies 'passive', this sensor only responds to energy from passive infrared rays that are owned by every object it detects. With the installation of this PIR sensor, if there is human movement that passes through the PIR sensor, the sensor will detect the presence of humans.[2]



Figure 2. Pir (Passive Infrared receiver)

2.3 LCD (Liquid Crystal Display)

LCD is a tool that has a function to display a size or number, so that it can be seen and known through the crystal screen display. LCD serves to display data from the sensor when it detects an object. [3]



Figure 3. LCD (Liquid Crystal display)

2.4 RELAY

A relay is an electromagnetic switch which is operated by a relatively low voltage which can be activated at a higher voltage. The core of the relay is an electromagnet that is produced from a coil of wire contained in the relay building. [4]



Figure 4. Relay

2.5 RFID Modules

RFID (Radio Frequency Identification) is a form of development of wireless technology that is used as a substitute for barcode technology. This technology works by utilizing radio transmission frequency waves to identify an object in the form of a small device called a tag or transponder (transmitter + responder).



Figure 5. RFID Modules

From the above reference, the author makes a system of power usage efficiency on electronic devices using PIR and rfid sensors as security. Here the author is interested in making a thesis entitled "Prototype of Power Usage Efficiency System in Electronic Devices Based on RFID And Passive Infrared".

3. RESULT AND IMPLEMENTATION

3.1 POWER USAGE EFFICIENCY SYSTEM FLOWCHART

A system flow chart is a picture that shows the flow of data from a source in an object and then through one process that transforms it to another.

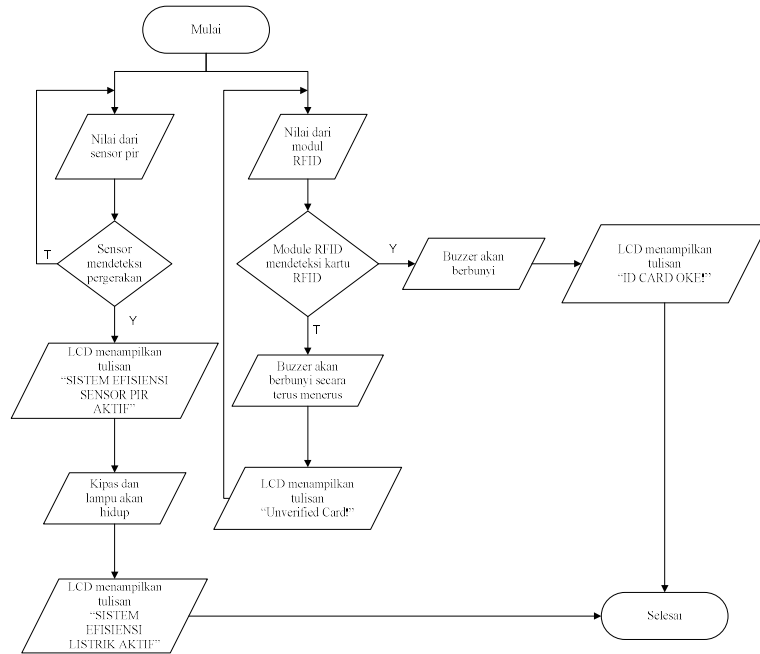


Figure 6. Flowchart of Power Usage efficiency system

3.2 IMPLEMENTATION

3.2.1 In the test of Figure 2, when there is movement of people/objects in the room, the result is that the PIR sensor will be active to turn on the lights and fans.



Figure 7. The pear sensor detects movement

3.2.2 In the test of Figure 3, when there is no movement of people/objects in the room, the result is that the lights and fans remain off.



Figure 8. The pear sensor does not detect movement.

3.2.3 In the test in Figure 4, when the lights and fans are on (active), the result is that the LCD will display the words "ACTIVE PIR SENSOR EFFICIENCY SYSTEM".

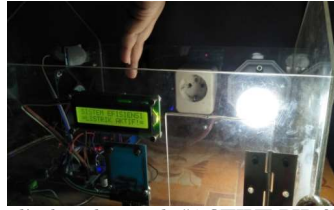


Figure 9. The LCD displays the words "ACTIVE PIR SENSOR EFFICIENCY SYSTEM".

3.2.4 In the test of Figure 5, when the RFID module detects a card that has been registered, the results are the lights and fans will turn on as long as the card is detected by the RFID module and the LCD will display the words "ID CARD OKAY!".

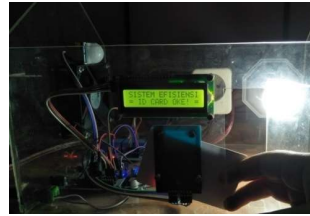


Figure 10. The RFID module detects the card that has been registered.

3.2.5 In the test of Figure 6, when the RFID module detects a card that is not registered the results are the lights and fans are off, and the buzzer will turn on continuously and the LCD will display the words "Unverified Card!".



Figure 11. The RFID module detects unregistered cards.

3.3 TEST RESULT TO TABLE

System test results can be seen in Table 1.

Table 1. System Test Results

<i>No.</i>	<i>Testing System</i>	<i>Result Description</i>
1.	There is movement of people/objects in the room	The pear sensor will activate to turn on the lights and fans
2.	No movement of people/objects in the room	The lights and fans stay off
3.	When the lights and fans are on (on)	The LCD will display the words "ACTIVE PIR SENSOR EFFICIENCY SYSTEM"
4.	The RFID module detects the card that has been registered	The lights and fans will be on as long as the card is detected by the RFID module and the LCD will display the words "ID CARD OKAY!"
5.	RFID module detects unregistered cards	The lights and fans are off, and the buzzer will turn on continuously and the LCD will display the words "Unverified Card!"

4. CONCLUSION

From the description above, starting from the process of making tools, designing, and testing that have been carried out in the context of preparing this thesis report, important conclusions can be drawn in relation to, among others:

- a) Design and manufacture of a Prototype System for Power Usage Efficiency Systems on **RFID-Based** and **Passive Infrared** Electronic Devices that can work automatically using several components, namely, **PIR** sensors, **RFID** modules, **LCDs**, fans, lights, and relays.
- b) The pir sensor can be applied to detect the presence of people so that when applied to electrical equipment the use of electrical energy can be used properly. because it turns on and off automatically based on the input value received from the pir sensor and rfid module, when the pir sensor detects the movement of people in the room, electronic devices such as lights and fans will turn on, if the pir sensor does not detect the movement of people, the device automatically electronics such as lights and fans will turn off, and automatically controlled electrical equipment will be more efficient (easy to use when humans forget to turn off electronic devices after use) than manually controlled electrical equipment.
- c) This electronic device can also turn on and off by implementing an **RFID** module that functions as an input value, when the electronic device will turn on or off.

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