Power Management System Using PIR Sensor

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Abstract—Intelligent energy saving system, the aim of the project is to save the energy or power, is use in places like home, libraries, industries etc. where lighting is very important. The aim of the project is use to save energy or power use in places like libraries where lighting is very important for the people who come to read books. So libraries will be well illuminated with many lamps. However, in this project work the basic signal processing of various parameters which are temperature, LDR, Relay, micro-controller etc.

Keywords—PIR sensor (Passive Infrared Sensor), LDR (Light Dependent resistance), Relay, Micro-controller, Temperature Sensor, Voltage Regulator IC.

1. INTRODUCTION

The development of any country depends to a large extend on availability and uses of electricity. We can generate electricity from renewable sources and help full for conserve non-renewable sources, renewable sources are not harmful for environment i.e. echoes friendly. All country required to conserve energy for upcoming generation to give them good life, so it's very important to conserve electrical energy. Our aim is to conserved energy or save electrical energy.

Nowadays, we can't think our life without electricity as like food, cloth and shelter. In the world usage of electricity is increasing day by day because we do not have the awareness of the importance of a electricity. This is the reason of the increasing cost of managing, conserving and distributing. This problem also occurs everywhere in the world. The level of electricity usage is high especially at classrooms or library. Thus, this energy saving project will be created. When people use electrical devices Sometimes people forget to switch off the lighting appliances. That lost the energy i.e. electricity. Based on this problem, this energy saving project will be created using PIR sensor and LDR photo resistor.

In this project we used the Passive Infrared Sensor (PIR sensor) to detect the body heat of humans. When the sensor detect nobody are in the lecture hall so the micro-controller counts the particular time in that particular time there are somebody coming into the lecture hall, the fans and

the lighting system will reset its programmed but if the hall stage empty the lighting system and air conditioner will turn off automatically.

In our paper we try to save electrical energy because we know that population increases day by day and there needs also increases, so we need to save the electrical energy by using this system and we try to send a message to the world don't miss use the electrical energy.

2. MATERIAL

2.1 Passive Infrared Sensor (PIR sensor)

A passive infrared sensor (**PIR sensor**) is an sensor to measures infrared rays (IR) light radiating from moving body of object. PIR sensor sense the heat of the object i.e. human body.

2.2 LDR (Light Dependent resistance)

It stands for Light Dependent Resistor or Photo resistor, which is a passive electronic component, basically a resistor which has a resistance that varies depending of the light intensity. A photo resistor is made of a high resistance semiconductor that absorbs photons. It also based on the frequency of the photons. The total number of electrons is dependent of the photons frequency.

2.2.1 Description of LDR

The LDR resistance is increases as darkness is increases, almost high as $1M\Omega$ but when there is light rays that incident on the LDR, the resistance is descresing to a few $K\Omega$ (10-20kΩ @ 10 lux, 2-4kOmega; @ 100 lux) depending on the model.

LDRs are very useful in many electronic circuits, especially in digital devices and more other. There are some audio application and sound system. It is used for turn ON or OFF a device according to the ambient light. On electroschematics.com we have some circuits that uses the photo resistor.

2.3 Relay

A **relay** is an electrically operated switch. A relay use an electromagnet to operate a switch mechanically, some other operating principles are also used, such as solid-state relays.

Relays are use for controlling a circuit by a low-power signal. The relays is used in long distance telegraph circuits as amplifiers they repeated the signal come from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and nowadays it use to perform logical operations in computers.

2.4 Microcontroller

A microcontroller is a small computer use in one integrated circuit containing a processor core, memory, and programmable input/output peripherals. A microcontroller is use and designed for embedded applications. Microprocessors used many computers and general use.

2.5 Temperature Sensor

The temperature sensor device is that they are used for specially designed to measure the heat of an object. However, sensors are actually measuring the change in temperature. When temperature sensor devices read an object with zero change in temperature, that point takes as an initial temperature. When a substance is heated, it usually moves through some phases solid to liquid and from liquid to gas until also change in temperature increasing or decreasing.

3. Block diagram Description

As shown in figure (a) the block diagram, First the PIR sensor connected to the output of microcontroller will search for any human motion in the allocated area, if motion is detected then it will give logic 1 to the controller after this the temperature sensor connected to the controller will check the room temperature if the room temperature is below set value then it will turn OFF the fan else the fan will get ON, at the same time the LDR connected to micro-controller will check weather sufficient light is present, if sufficient light is not present then the LDR will turn ON the light else not.
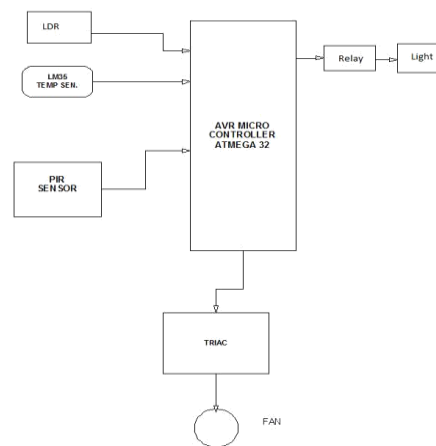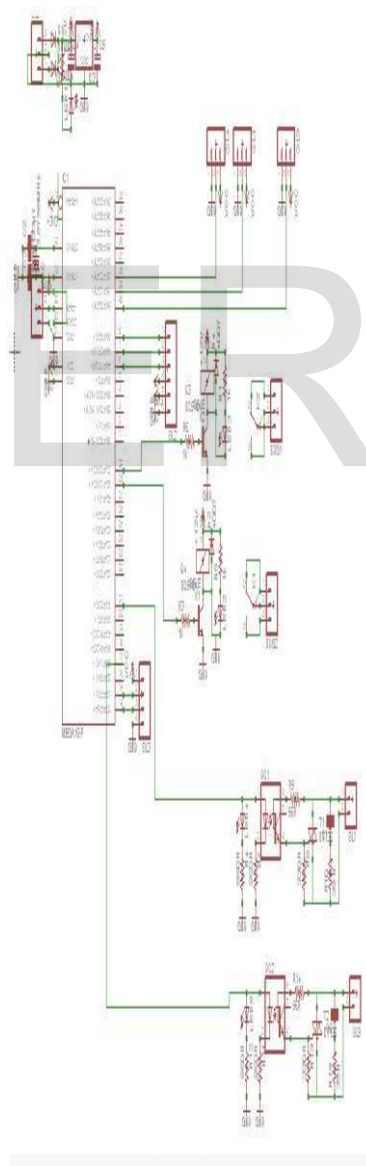

Figure (a): Block Diagram of System

Figure (b): C i r c u i t D i a g r a m

4. RESULT

As per our survey in residential meter for stair cases, we came to know that with PIR we can save overall electricity cost about 86 per tube light as shown in table below.

Approximate saving for staircases

Sr. no.	Residential meter	W/o PIR	With PIR
1.	Cost of electricity per kw	5.6	5.6
2.	Operational hours of passage tube lights	12	3
3.	Power capacity of tube light in watts	57	57
4.	Total consumption in watts	684	171
5.	Number of days	30	30
6.	Total power used by one tube light in kw	20.5	5.13
7.	Amount paid per month	115	29
8.	Savings per month per tube light		86

In this project work we have studied and implemented complete working model using micro-controller. This work induces the study of energy saving in much application. By using or implementing this project we are looking for more power conversion and high security.

5. CONCLUSION

Intelligent energy saving system is not limited for any particular application, it is to be use anywhere in colleges, industries for small process modification in software coding according to the requirements.

In future that our next generation will develop this energy saver system with wireless network. In our paper we connected the entire sensor to micro-controller with wire. This can be developed with wireless such that we place different sensor in different places. This sensor active the micro-controller with the signal instead of using wire. So we can decrease propagation delay time and cost of wiring.

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