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AUTOMATIC ROOM LIGHT SYSTEM FOR POWER SAVING

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ABSTRACT

T*his paper discusses about* automatic *switching of home lighting system for power savings. In this paper proposed a circuit that will control the main switch, which will be turned on only if a person is detected.The proposed circuit is based on IR sensor and microcontroller or Arduino Uno board.The human detection circuit can also be used to count the number of person present in the room.The basic idea behind this paper is to save the amount power wasted when the home lighting system is on even in the absence of human being.*

Keywords: - Automatic light controller, microcontroller, PIR sensors, Arduino Uno.

I. INTRODUCTION

In recent years the people are looking forward for the automation in their day to day life. And even now the people are eager to save energy consumed in day to day life People are becoming lazy to switch off the lights while leaving the room. So the large amount of energy is wasted if the light is ON in the absence of human being. Generally, in public and private sector companies, offices most of the people are not interested to switch OFF the consumer electronic appliances like fan, light etc., if they are not present. As more and more consumer electronic and home appliances are used, the size of them is becoming large; power consumption in home area tends to grow. Moreover, useless power consumption occurs in the absence of human being in public and private sectors. Using the automation in switching the home lighting system large energy will be saved which will in turn save the money of the owner of the house. Now the people are looking forward for automation in all simple tasks they need to do. The people are trying to reduce human efforts. The automatic switching of home lighting system actually reduces the human efforts. By the use of automatic switching the person will not have given attention towards turning OFF the lights while leaving the room, this system also helps to reduce the power wasted when the lights, fans and other electric appliance are ON in the absence of any person. The components used are IR sensor for detection of human being.

II. Proposed circuit descriptions.

For the proposed system of power saving mode of house lighting controller,the intensity of lights depending upon the no of person present in room [3] . Proposed design is divided into different three parts, microcontroller circuit for controlling entire system with Wi Fi module, Human detector with PIR sensors and Relay system for automatic switching.

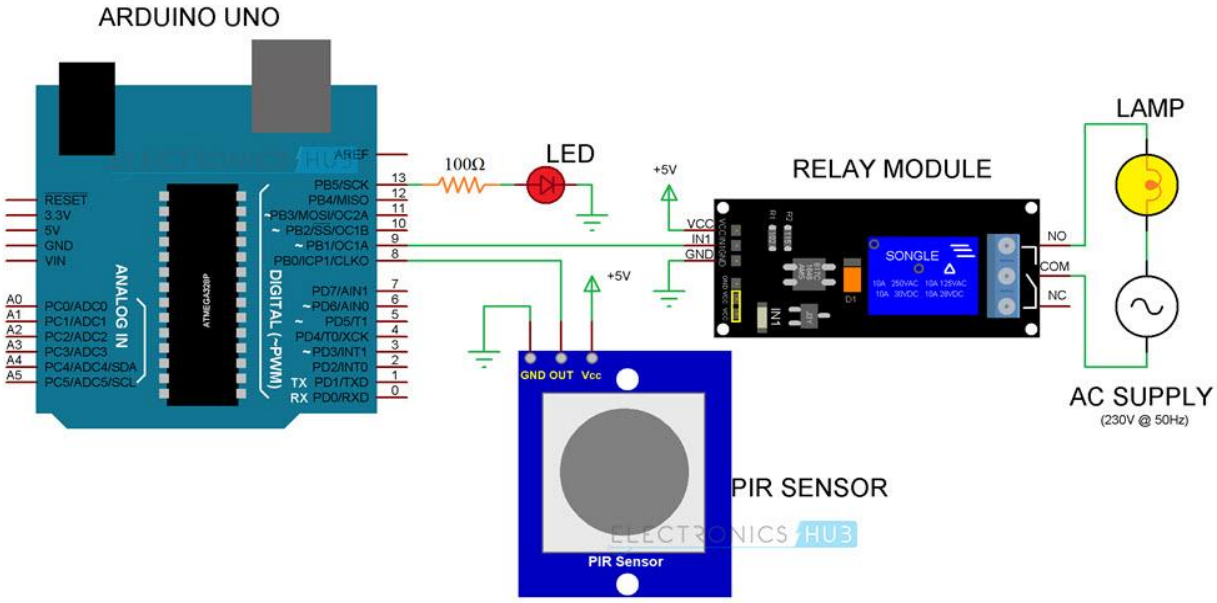

Figure 1: Block diagram of Proposed automatic room light system

III. Details of proposed system components

PIR Sensor and Relay Module*:*

PIR sensors are more complicated than many of the other sensors (like photocells, FSRs and tilt switches) because there are multiple variables that affect the sensors input and output. To begin explaining how a basic sensor works. The PIR sensor itself has two slots in it each slot is made of a special material that is sensitive to IR. When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal comes in the vicinity of the sensor, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the warm body leaves the sensing area, the reverse happens, whereby the sensor generates a negativedifferential change. These change pulses are what is detected.

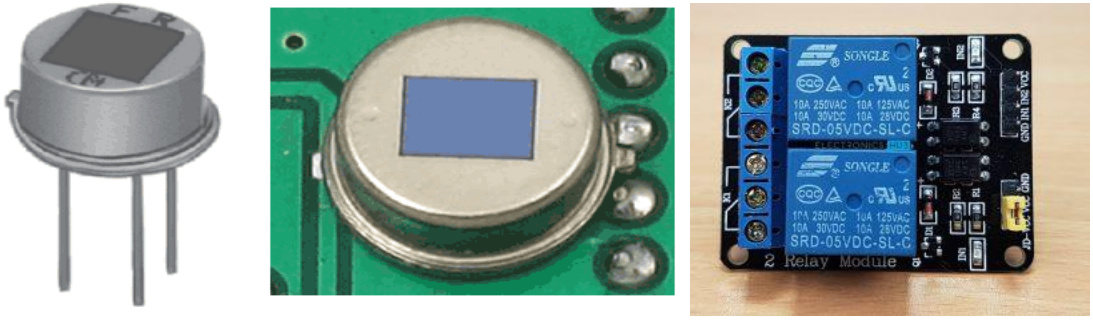

Figure 2: Diagram of PIR sensors and Relay Module available for the system

A Relay Module is a very useful component as it allows Arduino, Raspberry Pi or other Microcontrollers to control big electrical loads. We have used a 2-channel Relay Module in this project but used only one relay in it.

IV. IMPLEMENTATION and OPERATION OF PROPOSED MODEL

PIR Sensor's Data OUT Pin is connected to Arduino's Digital I/O Pin 8. An LED is connected to pin 13 of Arduino to indicate whether the light is turned ON or OFF.The IN1 pin of the Relay Module is connected to Pin 9 of Arduino. A bulb is connected to mains supply through relay. One terminal of the bulb is connected to one wire of the mains supply. The other terminal of the bulb is connected to the NO (Normally Open) contact of the Relay Module.COM (Common) contact of the Relay is connected to the other wire of the mains supply. Be

careful when connecting this part of the project. the Automatic Room Lights using Arduino and PIR Sensor is a simple project, where the lights in the room will automatically turn on upon detecting a human motion and stay turned on until the person has left or there is no motion.

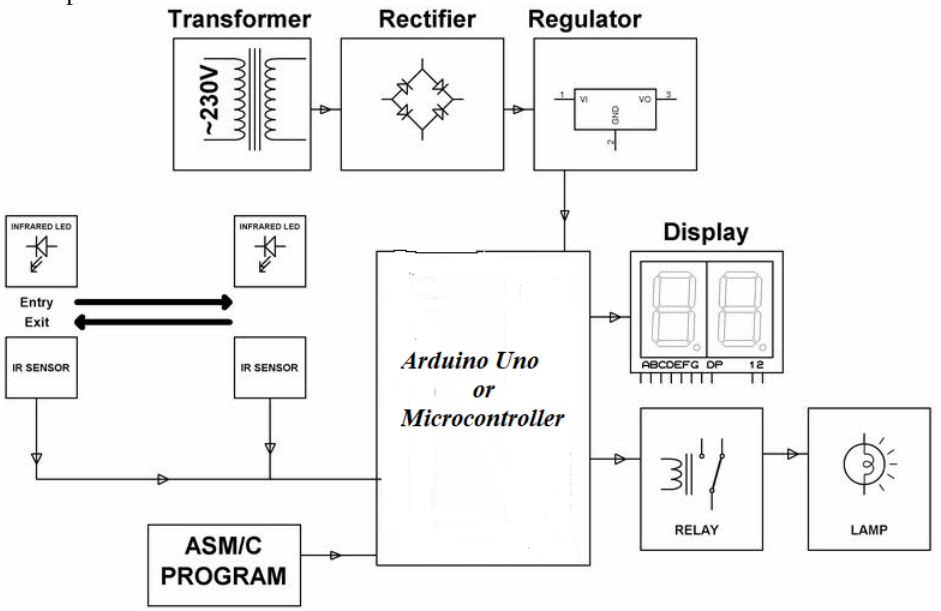

Figure 3. Circuit Diagram of proposed system

Initially, when there is no human movement, the PIR Sensor doesn't detect any person and its OUT pin stays LOW. As the person enters the room, the change in infrared radiation in the room is detected by the PIR Sensor.As a result, the output of the PIR Sensor becomes HIGH. Since the Data OUT of the PIR Sensor is connected to Digital Pin 8 of Arduino, whenever it becomes HIGH, Arduino will activate the relay by making the relay pin LOW (as the relay module is an active LOW module).This will turn the Light ON. The light stays turned ON as long as there is movement in front of the sensor.If the person takes a nap or leaves the room, the IR Radiation will become stable (there will be no change) and hence, the Data OUT of the PIR Sensor will become LOW. This in turn will make the Arduino to turn OFF the relay (make the relay pin HIGH) and the room light will be turned OFF.

V. CONCLUSION

Now a day huge amount of power is misused in daily life just for the reason that of human trend of presencelethargic. From the survey it is known that 1 unit of power protected is equal to the 1 unit of power manufactured. So this misused energy can be preserved and can be contribute to large amount of saving of power using automatic room light control system. In the proposed system first detection of human being entering in the room can be done through already existing Ultrasonic sensor but its cost is very high as compare to the PIR sensors. The total effective cost of proposed system is very low as compare to existing system for home and offices.

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