



# ROOM APPLIANCES CONTROLLER USING PIR

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**Abstract:** In last few years as we have seen that automation has taken place in many recent innovations. So we will be keeping towards automation which is applied in the room switching system. So this paper a prototype is proposed in which the PIR Sensor (motion sensor) sense the human motion presence in the room. From this project energy efficient technology has been proposed (for less use of electricity in room). By the implementation of this project, we can reduce the cost of switching system, power bills and can save the electricity. The aim of this project is to modify the manual switching system into smart automatic switching system and reduce the wastage of electricity. This smart automatic switching system can be implemented in many indoor rooms like houses, colleges, offices and hospitals etc. where there is no need of appliances in continuously ON state but needed in ON state only when someone is present.

**Keywords – PIR Sensor, Relay Module, Cost Effective, Energy saving, Room Appliances.**

## I. INTRODUCTION

As we know our world is facing energy crises due to advancement in technology and wastage of energy. So that we introduce the our module to save the most of energy. In this project, advanced the switching system to save more energy by giving smartness to the switching system. [1] Now, the people are looking forward for automation in their life and even now the people are excited to save the energy conserve the energy. Now more and more people are used electronics and home appliances and the size becoming large. The power consumption is also tends to grow and the unusable power consumption is more occur in the non-appearance of human being. By make use of our project gadget consumption of electricity can be reduced and electrical appliances can be turned OFF & ON automatically [2]. In gadget you don't need to turn ON & OFF the appliances by self. This is the main advancement of our project.

## II. ABOUT THE MODULE DESCRIPTION

### 1) PIR SENSOR

A passive infrared (PIR) sensor is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They're most frequently utilized in PIR-based motion detectors. The term passive refers to the fact that PIR devices don't radiate energy for detection purposes. They work entirely by detecting infrared (radiant heat) emitted by or reflected from objects.



**Fig. (2.1) - PIR SENSOR**

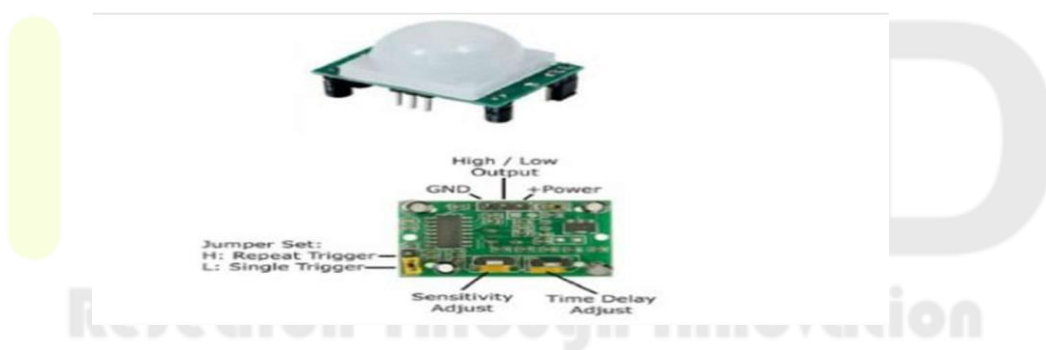
**1.1) SPECIFICATION**

**Table (1.1) – Specification of PIR**

Voltage	4.8v -20v
Current(idle)	<50 micro amp
Output	3.3 v /0 v
Delay Time	.3s-200s, up to 10 min
Lock Time	2.5s
Trigger	L= disable, H= enable
Sensing Range	<120deg, within 7m
Temperature	-15- +70deg C
Dimension	32(screw)*24 mm(lens)

**1.2) PIN CONFIGURATION**

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**Fig. (2.2) Pin Configuration of PIR**

PIN NAME	DETAIL
Pin 1 VCC	Source Terminal
Pin 2 OUT	Output Pin
Pin 3 GND	Ground

### 1.3) Working of PIR Sensor

A PIR sensor includes two main parts like pyroelectric sensor and fresnel lens. In the following diagram, the sensor is a round metal including a rectangular crystal within the center. A fresnel lens is a special lens that focuses the IR signals on the pyroelectricsensor. Here, the pyroelectric sensor is capable of detecting different infrared radiation levels.

### 2) ARDUINO UNO

Arduino is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVRmicrocontroller Atmega328.

It consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. The ArduinoUno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/Oports, 6 pins can be used for PWM output. It allows the designers to control and sense the external electronic devices in the real world.

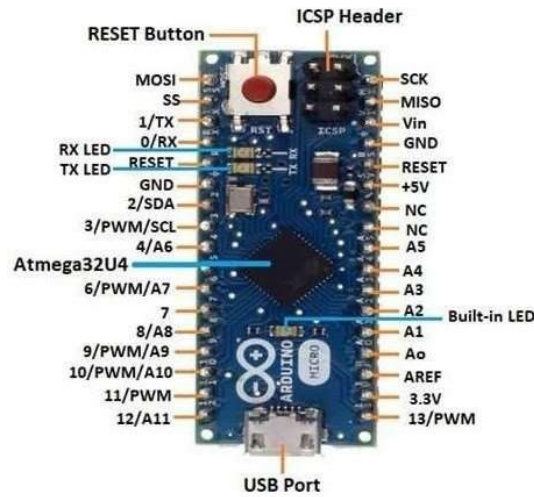


**Fig.(2.3) Arduino UNO**

### 2.1) SPECIFICATIONS

**Table (2.1) Specification of Arduino UNO**

Microcontroller	Atmega328p- 8bit
Operating voltage	5V
Input Voltage	6v-20v
Clock Speed	16MHz
Flash Memory	32 KB
EEPROM	1KB
Digital Input	24
Analog Input Pin	6



**Fig. (2.4) Pin Configuration of Arduino**

**Table (2.2) Pin Configuration of Arduino UNO**

PIN NUMBER	PIN NAME
1	RX/D0
2	TX/D1
3,4,5,6,7,8,9,10,11,12,13,14	Digital Input Pins
15	GND
16	Analog Reference
17,18	D18 &D19
19	Not Connected
20	Voltage Reference
21	Reset
22	3v
23	5v
24,25	Gnd
26	Vin
27, 28, 29, 30, 31, 32	A0-A5

### 3) RELAY MODULE

The relay is the device that open or closes the contacts to cause the operation of the other electric control. It detects the intolerable or undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the affected area. Thus protects the system from damage.

**Fig. (3.A) SRD Relay**



**Fig. (3.B) SSR Relay**



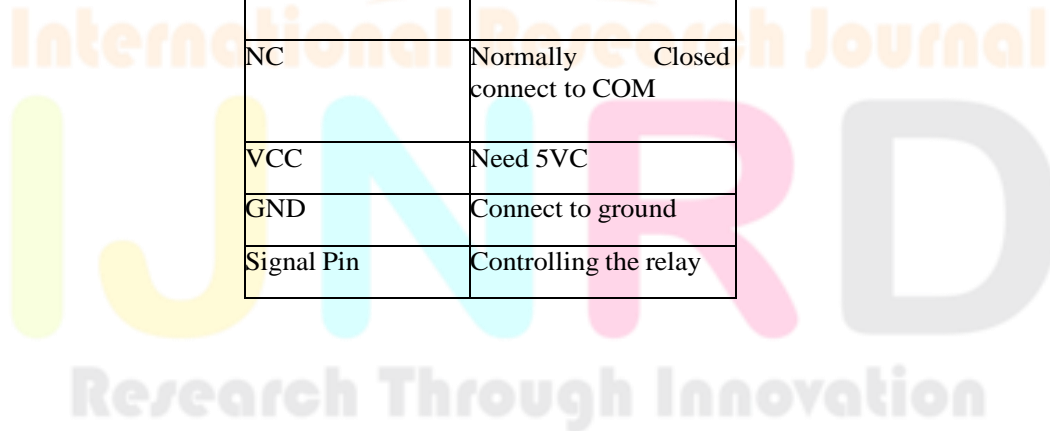
**3.1) PIN CONFIGURATION OF RELAY**



**Fig. (3.1) Pin Configuration of Relay**

**Table (3.1) Pin Configuration of Relay Module**

PIN NAME	PIN FUNCTION
NO	Normally Open provide signal
COM	Common Contact Connect to load
NC	Normally Closed connect to COM
VCC	Need 5VC
GND	Connect to ground
Signal Pin	Controlling the relay





### III. WORKING OF SWITCHING SYSTEM

The working of the project is basically based on theory that at the beginning, when there is no one present in room and no any human movement then the PIR Sensor will not detect the any motion & its OUTPUT Pin stay low and the appliances are off. When someone is enter in the room and infrared radiation in the room is identified by PIR Sensor then output of PIR Sensor become high. The data OUT from PIR Sensor which is connected to Pin 2 of Arduino. Then Arduino will trigger the relay module.

From this triggering, it will turn ON the Light first then after one minute it will turn ON Fan and then after one minute it will turn ON AirCondition (A.C). These appliances turned on till there is movement in room by the human being. When there is no movement (when human being left the room) in the room, the PIR Sensor not detect infrared radiation then PIR active LOW & provide signal to Arduino and Arduino trigger the relay for appliances to turned OFF automatically.

#### 3.1) BLOCK DIAGRAM

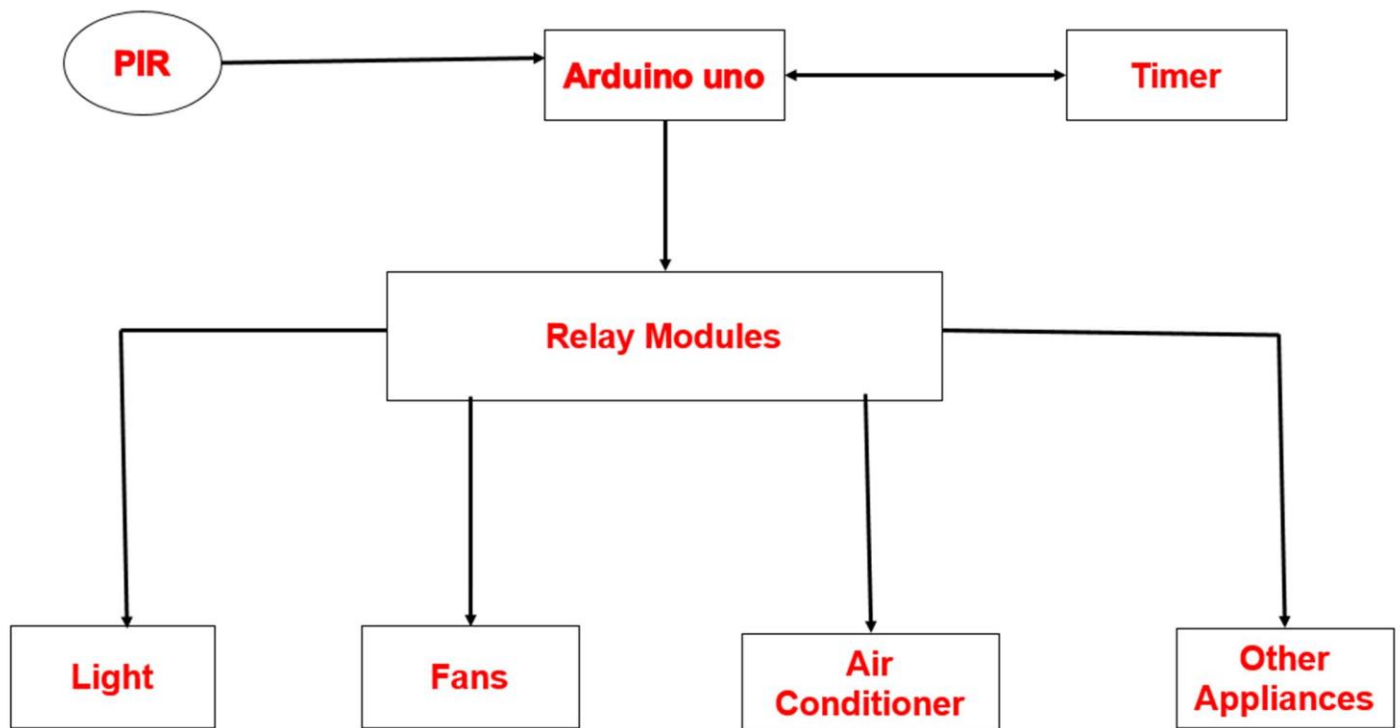


Fig. (3.1) Block Diagram of the Project

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## 3.2) FLOW CHART

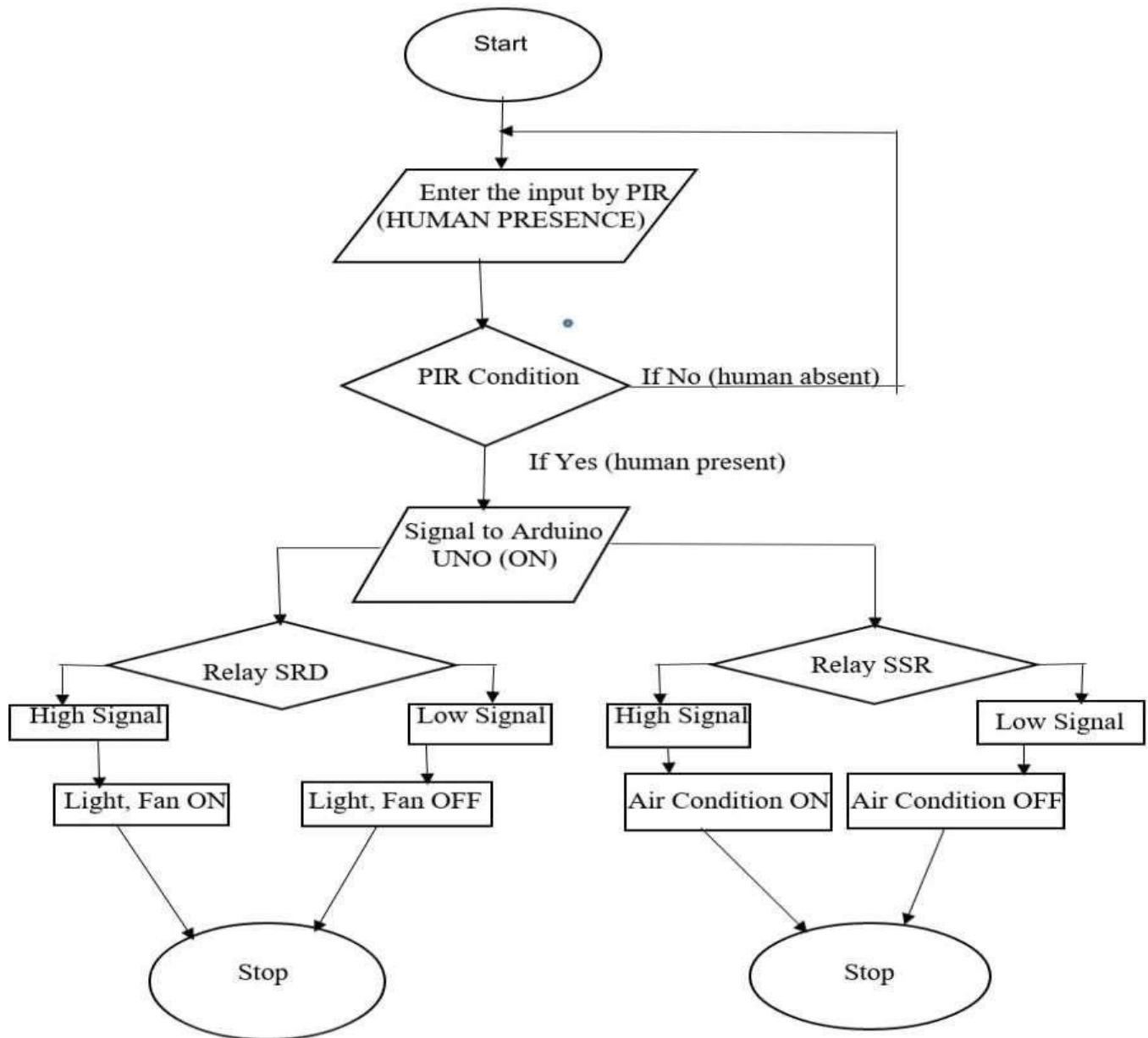


Fig. (3.2) Flow Chart of the Project

## WORKING FLOWCHART OF THE PROJECT

In above proposed flow chart, explain the signal flow of our project. Firstly, the input comes from the PIR if the condition is high then signal is forward to the Arduino and if the signal is low then the signal again back to the start. Arduino passes signal to the Relays condition. Then condition is satisfied signal passes to the next step. Then the appliances (Light, Fan & A.C.) is ON automatically with timedelay.

#### IV. CIRCUIT DIAGRAM

When any person enters in the room, the PIR Sensor detect the IR rays and give the signal to arduino and arduino provide signal to both relay module then circuit come in Active Mode.

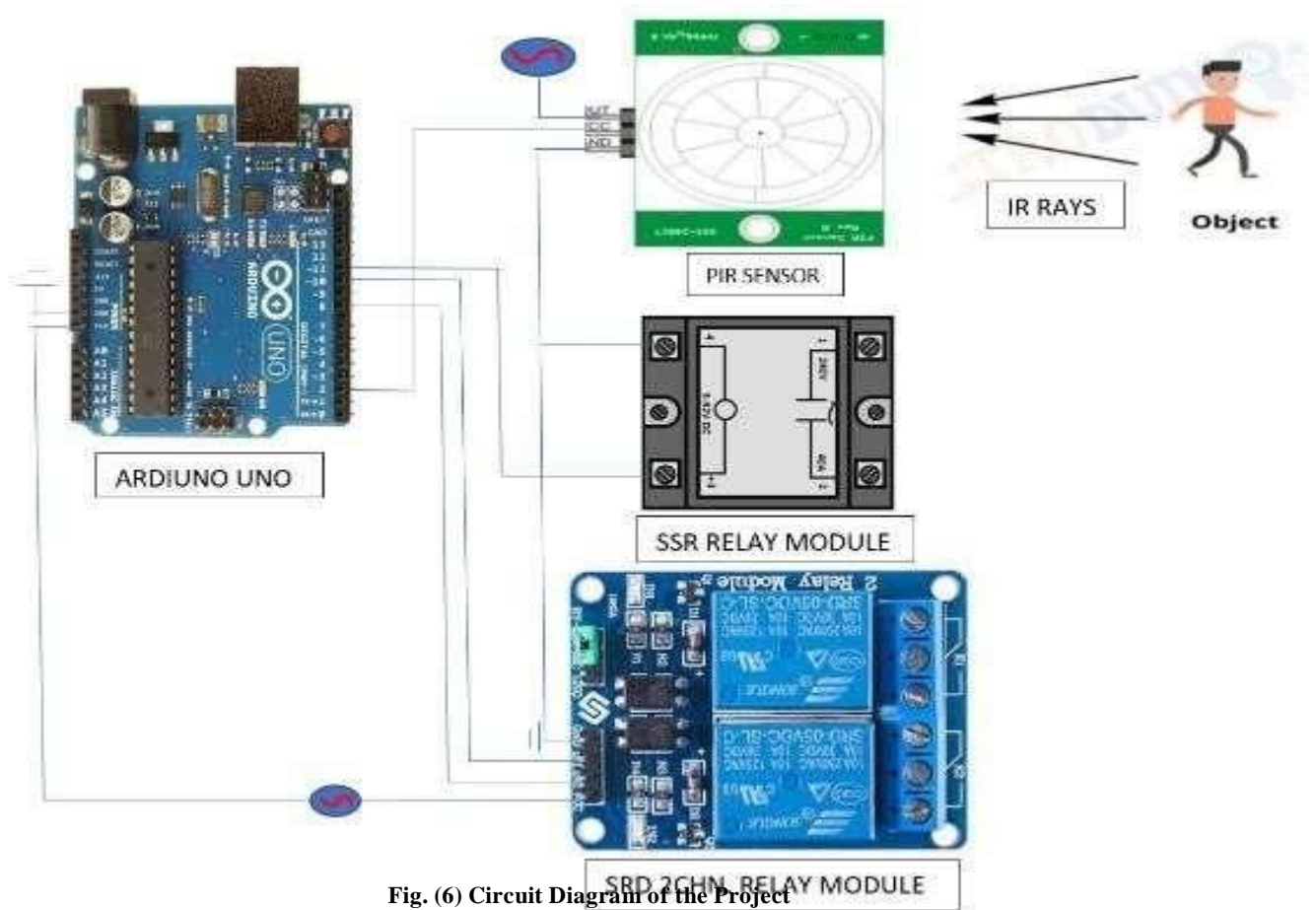


Fig. (6) Circuit Diagram of the Project

Fig. (4) Circuit Diagram of Proposed System





## V. CONCLUSION

The conclusion of this proposed system is that we can control the room appliances by using the PIR Sensor. Nowadays, a very large amount of electricity is wasted in our daily life. So, from this proposed system we can conserve the significant amount of energy and reduce our powerbills. Our proposed system is cost effective and it is easily affordable [3]. The future scope of our proposed system is that it totally work on self-automation and easy to implement in any room. So, anyone can buy this system and implement in their room and make their indoor roomfull automated.

It can also be work on Voice easily so that the whole proposed system can be controlled by voice command. Our prototype can be easily installed in indoor room likes Colleges, Cinema Halls, Houses and Hospitals.

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