

SOLUTION FOR THE SUGGESTED PROJECT

OBJECTIVES:

1. To design and built the energy saving control system for application in NIT RAIPUR , in order to reduce energy wastage.
2. To build an automatic control system by using motion sensor (PIR sensor).

SCOPE OF WORK:

1. To develop hardware.

The microcontroller that will be used is the PIC18F4620 and the sensor is the Passive Infrared Sensor (PIR sensor).

2. To develop software using C.

Software that will be used is C. This software is used to interface with the hardware.

WORKING:

This project uses the Passive Infrared Sensor (PIR sensor) to detect the body heat of humans. This project also use C to interface with the hardware. When the sensor detects nobody is in the lecture halls so the microcontroller will calculate to 10 minutes. If within this time there are students coming into the lecture hall, the air-conditioner and lighting system will reset its programmed but if the hall stays empty the lighting system and air conditioner will turn off automatically. Besides that, other features of this system is pre-determine timer. These pre-determined time can be changed at C software which has been developed for setting of the control system. Lighting system and air-conditioner will turn off automatically at pre-determine time. In this project, the PIR sensor will be used to detect the human present in the lecture halls.

TECHNICAL DETAILS:

PIR SENSOR:

A Passive Infrared sensor (PIR sensor) is an electronic device which measures infrared light radiating from objects in its field of view. Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall.

PIR stands for Passive Infra-Red. The sensor is passive because, instead of emitting a beam of light or microwave energy that must be interrupted by a passing person in order to sense that person, the PIR is simply sensitive to the infrared energy emitted by every living thing. When an intruder walks into the detector's field of vision ,the detector sees a sharp increase in infrared energy. All objects emit what is known as **BLACK BODY RADIATION**. This energy invisible to the human eye but can be detected

by electronic devices designed for such a purpose. The term 'passive' in this instance means the PIR does not emit energy of any type but merely accepts incoming infrared radiation.

PIC MICROCONTROLLER:

Every PIC microcontroller architecture consists of some registers and stack where registers function as Random Access Memory(RAM) and stack saves the return addresses. The main features of PIC microcontrollers are RAM, flash memory, Timers/Counters, EEPROM, I/O Ports, USART, CCP (Capture/Compare/PWM module), SSP, Comparator, ADC (analog to digital converter), PSP(parallel slave port), LCD and ICSP (in circuit serial programming) . The acronym **PIC** stands for "peripheral interface controller.

TIMERS/ COUNTERS:

PIC microcontroller has four timer/counters wherein the one 8-bit timer and the remaining timers have the choice to select 8 or 16-bit mode. Timers are used for generating accuracy actions, for example, creating specific time delays between two operations.

SUMMARY:

The power supply gives the power to the total circuit by stepping down, rectifying, filtering and regulating AC mains supply. When there are no person in room, then all lights will turn OFF so that the power can be conserved. The IR sensors are placed in the room to sense the people's movement. When there are people in room, then the IR sensor will sense the people's movement immediately, it sends the commands to the PIC microcontroller to switch ON/OFF the lights and AC. The lights and AC will be turned on when a people come near to the sensor and once the people passes away from the sensor the intensity will become lower than the lights will turn OFF.

