An Intelligent Lighting System for Domestic Application

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Abstract—The aim of our project is to develop a energy-saving smart lighting system for industrial and domestic used. The LED have the properties of low power consumption and low cost .The hardware of proposed control modules are PIC based controller, light intensity measuring sensor, and power supply. The most waste of energy is caused by the inefficient use of the consumer electronics. particularly, a light accounts for a great part of the total energy consumption. Various light control systems are introduced in current markets, because the installed lighting systems are out dated and energy-inefficient. However, due to architectural limitations, the existing light control systems cannot be successfully applied to home and office buildings. Therefore, this project proposes an domestic and commercial intelligent lighting system considering low power consumption using intellectual property.

Index Terms— PIC16F887, PIR Sensor , LDR Sensor.

I. INTRODUCTION

This project is implemented on PIC, the sensor which detects the day light is used to switch outdoor lighting and the PIR sensor which detects the entering person into room are used here to regulate the indoor lighting intensity. Saving the electricity is not difficult. Just by turn off the light when leaving the room, turn off computer when finish the work, unplug electronic instrument when finish recharging. There are many existing system are available in markets, but the installed lighting systems are outdated and energy-inefficient so we designed smart lighting system. Lighting is the most visible form of electricity consumption. We need secured, affordable and environmentally sustainable energy because of environmental problems such as climate changes and global warming, etc. caused by excessive use of energy. Lighting control systems provide many benefits such as operational convenience, scheduled control, reduced energy consumption and moderation of peak demand. Automated lighting control is one of the important components in intelligent buildings and green buildings. Modern lighting control systems have evolved from hardwired circuits and analog signals into flexible digital solutions, and many intelligent technologies have been proposed for digital lighting control systems. Lighting controls not only offer electricity savings, but also offer further benefits depending on the application they can improve comfort, reduce maintenance costs and impart greater flexibility to the use of a workspace. Lighting controls are best deployed as a reliable means of turning off the lighting. People will turn lights on when they need them, sometimes they forget to turn them off. There are some effective devices that control the automatic switching on and off of lights. These include movement sensors such as Passive infra-red (PIR), Ultrasonic or Microwave, daylight sensors and timers. By increasing the efficiency of lighting system, there can be significant energy saving and reduction in peak load.

These appliances include electric fan system, air conditioning system, and water heater among others. Using appropriate sensor networks, the environmental conditions where these appliances are used will be continuously monitored and the data sent to a microcontroller unit which in turn uses these data as a basis for either switching ON or OFF the appliances. The overall effect is that energy is efficiently utilized and saved while the intended purpose for which these appliances are used in the first place is not compromised. The system allows automatic control of household appliances like lamps, fan, etc. through situation awareness such as user movement or the brightness of surrounding.For increasing the efficiency of lighting system.

Automated lighting control is one of the important components in intelligent buildings and green buildings. Modern lighting control systems have evolved from hardwired circuits and analog signals into flexible digital solutions, and many intelligent technologies have been proposed for digital lighting control systems. Lighting controls not only offer electricity savings, but also offer further benefits depending on the application they can improve comfort, reduce maintenance costs and impart greater flexibility to the use of a workspace. Lighting controls are best deployed as a reliable means of turning off the lighting. People will turn lights on when they need them, sometimes they forget to turn them off so it makes waste of light. To reduce the wasre of light we have implemented such an intelligent system.

II. BLOCK DIAGRAM

The block diagram for the proposed system is shown which consists of:

PIC PIR Sensor LCD Display LDR Bulb controller Temperature Detector Fan and AC controller Power supply

Block Diagram Description: PIC16F 887

The PIC16F887 is one of the latest products from Microchip. It features all the components which modern microcontrollers normally have. For its low price, wide range of application, high quality and easy availability, it is an ideal solution in applications such as: the control of different processes in industry, machine control devices, measurement of different values.

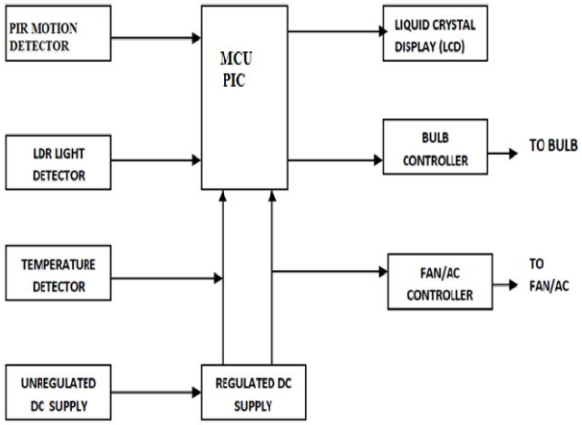


Fig 1. Monitoring System Block Diagram Of Energy Efficient Lighting System For Domestic Application

Features :-

1.It support RISC architecture.
2.It has operating frequency of 0-20 MHz. 3.It support 8KB ROM memory and 368 RAM memory.

PIR Sensor

Passive Infrareds sensors (PIRs) are electronic accessories which are used in some security alarm systems to detect motion of an infrared emitting source, usually a human body. The pyroelectric sensor is made of a crystalline material that generates a surface electric charge when exposed to heat in the form of infrared radiation. When the amount of radiation striking the crystal changes, the amount of charge also changes and can then be measured with a sensitive FET device built into the sensor. This radiation energy is invisible to the human eye but can be detected by electronic accessories designed for such a purpose.

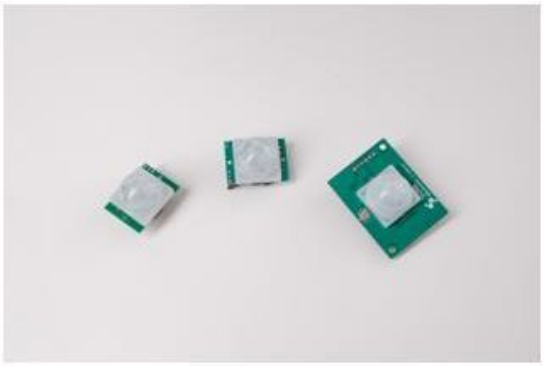
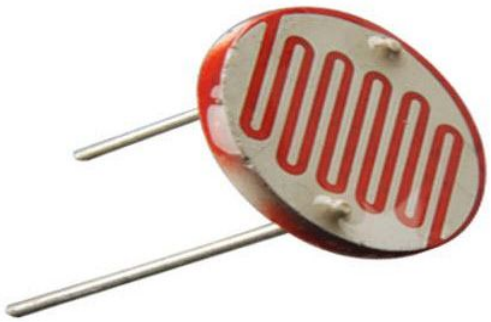


Fig. PIR Sensor

LDR Sensor

To add to the functionality of the system, the LDR has been used to continuously monitor the level of illumination of the environment. The resistance of the LDR used has an inverse relationship with the intensity of the ambient light as depicted in Figure. The illumination level of the environment being monitored results in variation in the voltage drop across the LDR.



LCD Display

The LCD display is used to display the no of peoples detected by the IR sensor. It also displays power consume by the circuit.LCD display uses read/write and enable pin to display information on screen.

Power Supply

A 5V power supply is used to design an intelligent lighting system.Power Supply consist of Transformer ,rectifier ,filter and three terminal voltage regulator.

III.CONCLUSION

In order to use efficient Electricity we propose an Intelligent Lighting System, which automatically regulates the lighting system outside & inside of house and timely displays the consumed Energy.

IV.FUTURE SCOPE

In future we can implement this project with fine adaptive control tuning along with user interface application for different mobile operating systems like Android, IOS and windows mobile. Intelligence in the Energy Saving System allows them to be used anywhere in a process industries with little modifications in software coding according to the requirements.

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