Intelligent Wireless Street Lighting System

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Abstract: Lighting systems, particularly within the public sector, are still designed per the previous standards of reliability and that they don't usually profit of latest technological developments. Use of renewable energy sources instead of typical power sources, therefore taking care of the environment is another advantage of this system. In this paper a wireless street lighting system is developed. It consists of set of sensors to detect the presence of humans and checking for the intensity of light and transmitting the light in wireless.

I. INTRODUCTION

The energy wastage via street lights in public sectors can be controlled and reduced by using three types of aspects.

The first one, and maybe the most intuitive, is the use of recent technologies for the sources of light. The LED technology is thought as best solution but it offers several edges. But Researchers have already thought of this risk, coming up with advanced street lighting system based mostly on LEDs.

The second solution is to use of remote management system based mostly on intelligent lampposts that send info to a central management system, simplifying the management and maintenance. Finally, the third solution is to use of renewable energy sources instead of typical power sources, therefore taking care of the environment. In this field, solar energy is the most often used resource.

This paper aims at unification of the three prospects, making an intelligent lamppost managed by a remote controlled system that uses LED-based lightweight supply and is powered by renewable energy (solar panel and battery). The management is implemented through a network of sensors to gather the relevant info associated with the management and maintenance of the system, transferring the data in wireless mode using the ZigBee protocol.

II. GENERAL CONCEPT OF THE SYSTEM

In this new system the system with LDR sensor, PIR sensor, Zigbee is used to intimate the status of humans use, light intensity and street light ON/OFF status to the EB section to avoid wastage of energy by glowing street lights in unwanted areas. The whole system is operated by using artificial energy source called solar and with battery backup.

The PIR and LDR sensors sense the persons and light intensity of a particular place and transmits the data in wireless to the EB section with Zigbee. Depend upon the data received the controller will turn ON/OFF the street light in wireless communication. This system is appropriate for street lighting in remote urban and rural areas where the traffic is low at times.

The following block diagram explains all the concept of system.

A. Light Dependent Resistor

A Light Dependent Resistor (LDR, photoconductor, or photocell) is a device which has a resistance which varies according to the amount of light falling on its surface.
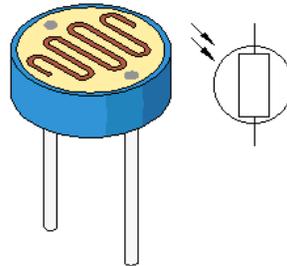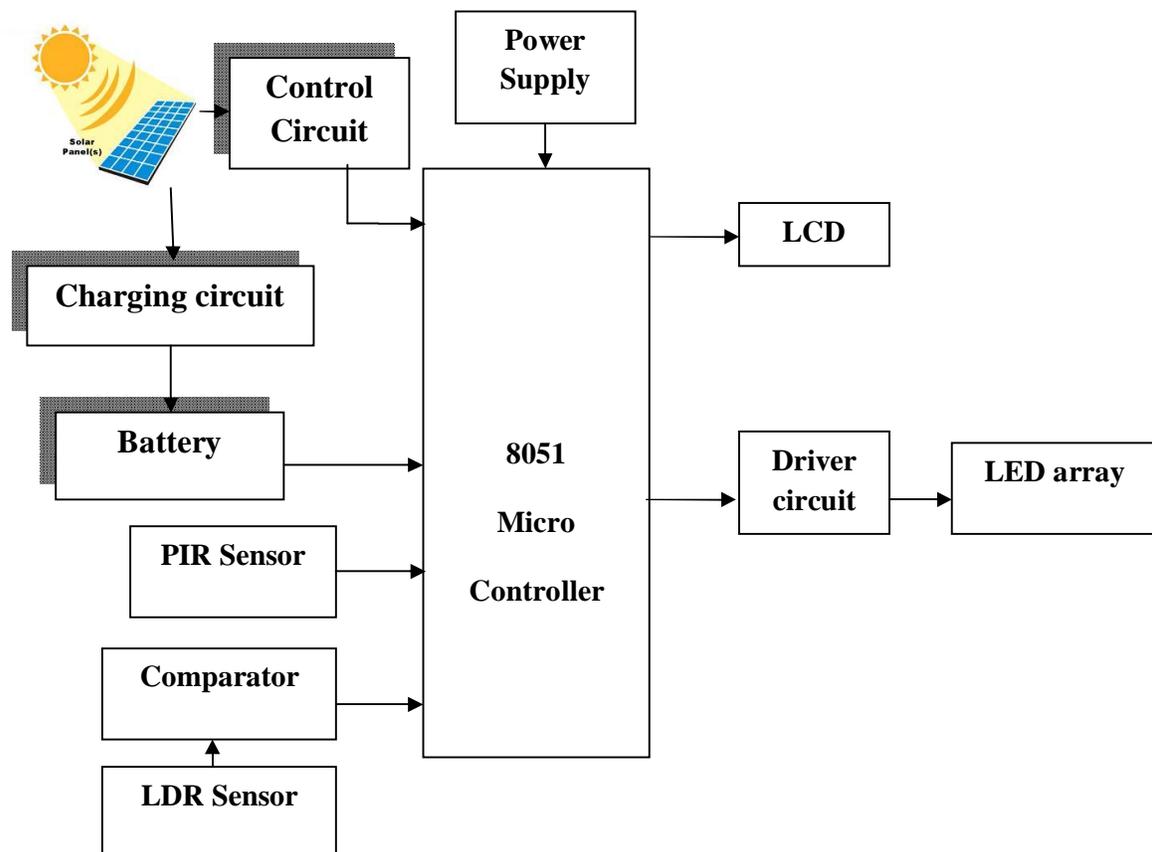
Figure 2. LDR

Figure 1 Block diagram

B. Passive Infrared Sensor

A PIR(Passive Infrared Sensor) detector is a motion detector that senses the heat emitted by a living body. These are often fitted to security lights so that they will switch on automatically if approached. They are very effective in enhancing home security systems.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.

C. Comparator

Comparator compares light intensity given by LDR with its threshold value.The result is given to the microcontroller.

D. Microcontoller

Microcontoller controls functions of the system.It will get the input from LDR and PIR sensors and transfer the result to EB section via Zigbee.In this system 8051 microcontroller is used for control the whole system.General port configuration of 8051 is given below.

Port 0: input /output or address output.

Port 1: input/ output.

Port 2: input /output or higher address byte.

Port 3: input /output or alternative functions.

E. LCD

LCD(LIQUID CRYSTAL DISPLAY) is a type of display used in digital watches and many portable computers. LCD displays utilize to sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them.

16×2 LCD is used.16 is used to indicate number of alphabets and 2 indicates number

of columns.

F. Power supply

Power is taken from a renewable energy source called solar energy with battery backup.It is given to the microcontroller and parts in circuit.

G. LED

LED used indicate the status of the street light .It is ON when street light is ON and it is in OFF state when street light is OFF.

III. CONCLUSION

In this paper a proposal of an intelligent street lighting system is described that integrates new technologies, offering energy savings.The proposed system is especially appropriate for street lighting in remote urban and rural areas where the traffic is low at times. Independence of the power network permits to implement it in remote areas where the classical systems are prohibitively expensive. The system is versatile, extendable and totally adjustable to user needs.

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