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Design and implementation of Intelligent Power Saving System

[1] Anchala Baid, [2] K. S. Sultan Basha, [3] Mariya Fatima, [4] Koyalkar Kedar Nath,
[5] Shaik Mohammed Rasool
[1,2,3,4] B.Tech student, Dept. of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana India.
[5]Assistant professor, Dept. of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana India

Abstract: These days, human has become too busy and is unable to search out time even to switch off the lights wherever no longer quintessential. To avoid wasting the electrical power there's some suggestion.This can be seen extra more often than not within the case of street lights. The present method is in this sort of way that the lights will probably be switched on in the night before the sun sets and they are switched off the following day morning after there's sufficient light on the roads. But the specific timings for these lights to be switched ON are when there's absolute darkness. With this, the power will likely be wasted up to some extent. This project offers the exceptional answer for electrical energy wastage. Also the manual operation of the lights system is totally eradicated. The predominant purpose of this task is to save energy. All lights are prepared with the energy-saving function with a view to flip itself to the dimming level mechanically after the viewers' leaving. PIR (Passive Infrared) sensors are utilized within the approach.

Key Words: PIR Sensor, Microcontroller, Fan, Light,

I. INTRODUCTION

Today in all public areas the Lighting system is one of most important element in exhibition space, ex. museum or art gallery. How to protect photosensitivity exhibits to make the higher exhibition quality is a key subject in light environment design research. It can make use of artificial illumination more efficient and higher comfort degree. Artwork normally need be view at the center by track light system which typical lighting is 3000 K at 200 lux. Besides, there are other lighting systems that are used for increase lightness or as movement guide sign in the same space. All lighting systems become complicated and influence the view of seeing. By using some sensors to save the power energy.Therefore, the exhibition space managers are faced with the constant demanding of gaining greater control of the indoor environment, under increasing budgetary constraints. Furthermore, the conservation of artwork in exhibition space is also a very well known problem, either in exhibition rooms or in archival collections. Monitoring the environment is one of the most important tasks and concerns of all exhibition space. Nowadays, video camera application systems can be seen in exhibition, but most of them are expensive and without personal privacy. A Passive Infrared sensor (PIR sensor) are utilized in the system instead of a video camera for the purposes of both cost-down and privacy issue.

A PIR sensor is a device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of human motion detectors. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. In order to properly conserve the artwork it is critical to continuously measure and control some parameters, such as radiation and lighting. It is also crucial to consider that the desire values of these parameters depend on the type of materials that constitute the artwork. That is, depending on the type of works that are in exhibition or in storage rooms, different rooms may have different requirements regarding environmental conditions. Hence, it will be necessary to design the lightings to have network interface to let them be able to be connected together to form an intelligent lighting system.

In this Paper, we proposed a low cost and intelligent lighting system in exhibition space which is able to detect the approach of the visitors and then turn the lighting onto the normal intensity to let the exhibition be bright enough. All lightings are equipped with the energy-saving function

which will turn itself to the dimming level automatically after the visitors' leaving. The follows will describe system architecture, experimental results and then give a brief conclusion.

Tradational cicuit:

The sensor is a device which is used to detect the changes in events or quantities and it produces approximate outputs. An infrared sensor is an electronic device which is used to measure the heat of an object and also detects the motion. It can emit in order to sense some aspects of the surroundings. Let us discuss about IR sensor .

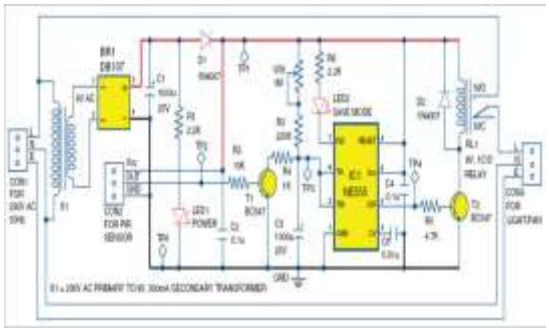

Fig. 1: Basic Circuit Model [1]

Demerits: Infrared sensor use dual beam transmission, one side with transmitter for emitting infrared ray, the other side with receiver for receiving the ray.Infrared beam sensor can nottransmit over long range distance.

II. PROPOSED METHOD

The below mentioned hardaware and software requirement of the project is useful to construct the circuit.

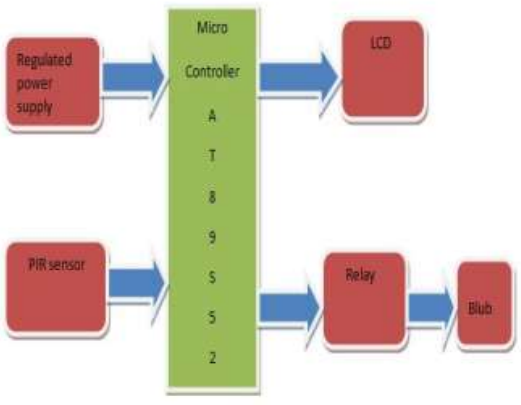

Fig. 2 Block Diagram of the Lightning controller

Fig.2 shows the block diagram of the proposed lights controller. It consists of a PIR amplifier, a micro-processor, an ID circuit, a TRIAC dimmer, a relay circuit and a network interface circuit. The PIR amplifier is designed to work with the PIR sensor to observe the procedure of the visitor. The information of the visitor's system is then sent to both the relay circuit and the micro-processor. The relay circuit will turns to ON state and the lighting fixtures shall be powered during full cycle of the AC line input wave. On this problem, the lighting fixtures works in the highest depth mode and the exhibition has the high-quality illumination. On the opposite, when the visitor leaves the lights, the PIR amplifier will output the relative data to both the relay circuit and the micro-processor.

The relay circuit will turn to OFF state and the lights will likely be controlled by way of the TRIAC dimmer circuit. The user can modify the conduct angle of TRIAC to dim the brightness of the lights. On the other hand, after the microprocessor obtained the understanding of the approach or the absence of the traveller, the identification quantity of the controller will likely be hooked up on the information after which be sent to the lighting fixtures network via the network interface circuit.

A. ATMEL AT89S52 Microcontroller:

The AT89S52 is high-performance, low-power CMOS 8-bit microcontroller with 8Kbytes of in-system programmable Flash memory. It is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industrystandard 80C51 instruction set pin out. By combining a versatile 8-bit CPU with insystem programmable Flash on a monolithic chip, AT89S52 is a powerful microcontroller which provides a cost-effective and highly-flexible solution to many embedded control applications. It provides the following standard features: 256 bytes of RAM, 8K bytes of Flash, Watchdog timer, 32 I/O lines, three 16-bit timer/counters, two data pointers, on-chip oscillator, a full duplex serial port, clock circuitry and a six- vector two-level interrupt architecture, and in addition to that, the AT89S52 is designed with static logic for operation down to zero frequency and it also supports two software selectable power saving modes. The first

mode is the Idle Mode which stops the CPU while allowing the timer/ counters, RAM, serial port, and interrupt system to continue functioning. The second mode is the Power-down mode which saves the RAM contents but freezes the oscillator, thus disabling all other chip functions until the next interrupt occurs. The on-chip Flash allows the program memory to be reprogrammed in-system.

B. PIR Sensor:

PIR sensors are passive electronic devices. Once the motion is detected by sensing infrared fluctuations, a high is sent to the signal pin. These sensors work well in detecting human motion. PIR sensors are composed of a solid state pyroelectric chip The PIR Sensor senses the motion of a human body by the change in surrounding ambient temperature. Then it turns on the load to which it is connected. The load remains on until it senses motion. The load may be any form of device, i.e. lamp, fan, alarm, etc. Once the motion is seized, it switches off the load.

Fig. 3 Basic PIR Sensor

When exposed to infrared radiation, the chip generates an electric charge and this charge is amplified by an amplifier and thus the output voltage can be interfaced with other devices. The PIR Sensor has a range of approximately 5 meters and it can sense object up to 120° within a meter range. The sensitivity is enhanced by a translucent Fresnel Lens which covers the chip and it varies with environmental conditions. The sensor adjusts to slowly changing conditions but whenever there is a sudden change it responds by making its output high.

III. RESULTS AND DISCUSSION

The lights module is carried out as shown in determine. It's modified from the product of PIR protection lamp. The PIR sensor is covered by using a white plastic and in addition a black cover to block the light from the lamp. The interior circuit is modified to have the micro-processor, the relay circuit and the network interface circuit. The TRIAC circuit is implemented in a metallic case which is separated from the housing of the module. Here a competencies meter with a knob is hooked up within the TRIAC circuit to let the person modify the dimming degree of the mild. The test of the lights module after the visitor leaves. The PIR sensor is protected through a box to simulate the depart of the visitor. The relay circuit turns to the OFF state.

IV. CONCLUSION

This project designed and implemented a lights module. It may possibly discover the approach of the visitor and then let the relay circuit actuate the lighting fixtures to work within the maximum intensity mode to let the lights be brilliant sufficient. It may possibly additionally turn to power-saving mode mechanically after the visitors depart in little while. The results exhibit that the applied module is practical work and the proposed module is valuable for the power saving reason within the lighting area. In the future, few items of the designed lighting modules can be realized and related collectively to form a lighting network. The collection of the visitors data and the security assistance of huge scale.

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Author's Profile

Shaik Mohammed Rasool currently working as Assistant Professor in ECE Dept. of Lords Institute of Engineering and Technology, Hyderabad, Telangana, India. He is having 4 years of teaching experience and field of interest is Embedded Systems, wireless communication, Digital Electronics.

Anchala Baid presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

K.S. Sultan Basha presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

Mariya Fatima presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

Koyalkar Kedar Nath presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.