Intelligent LED Lighting System for User Satisfaction

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ABSTRACT

Energy saving solutions have been become increases essential in recent years because of environmental issues such as weather change and global warming. Ecological problems are very important issues and these problems are mostly caused by the unnecessary use of energy. A light accounts for approximately 20 percent of the world's total energy use.thus the related study of an energy efficiency lighting system have been done various researchers around the world. The innovation of a light emitting diode LED is estimated to significantly alleviate the energy consumption of a light because the LED lighting device consume 50 percent of the energy consumption compared to the fluorescent lighting device. The proposed system intelligent House LED lighting system consist of different sensors, communication modules,signalconditioning,LED light panel and LED light driver. The intelligent Household lighting control system can reduce energy consumption as automatically controlling the intensity of lighting through situation awareness, such as awareness of user movement or brightness of surrounding.

ARTICLE INFO

I. INTRODUCTION

Saving energy is become one of the most essential Issues these days. The most waste of energy is caused by the inefficient use of the customer electronics. mostly, a light accounts for a huge part of the overall energy utilization [7]. The industrial report from the U.S. Department of energy shows that about 15 percent of total energy consumption can be reduced by using light control according to user's living pattern [4]. However, since the existing lighting control system can support only simple on/off or dimming control according to user movement or brightness of surrounding, it is tough to be applied to complex environments such as house or office. The complex environment means that there is a range of control requirements, because of the presence of a variety of users [1]. Because of this limitation of existing system, they are mostly installed in the places such as the front door or the hallway .Furthermore, since the existing system are designed without considering user satisfaction, it is not appropriate to the places such as house and office where user satisfaction is more essential factor than cost benefits due to energy saving ; thus a innovative smart light control system should be designed considering both energy efficiency and user satisfaction . All equipment considered,

Design goals of the new smart lighting control systems are as follow should be designed to exploit the use of an LED. The new intelligent lighting control system should be designed to have the communication capability designed to control based on the situation understanding and enhance both energy both energy efficiency and satisfaction. Therefore, this projected system an intelligent household LED lighting system.

All things consider, design goals of the new intelligent lighting control system are as follows:[1]
1. The innovative intelligent lighting control system should be consider to maximize the utilize of an LED.
2. The new intelligent lighting control system should be considered to have the communication capability.
3. The new intelligent lighting control system should be considered to control system on the situation understanding.
4. The new intelligent lighting control system should be considered to improve both energy efficiency and user approval.
5. Therefore, this paper proposes an smart household LED lighting system considering energy efficiency and user approval.

6. The proposed system utilizes multi sensors or and wireless communication skill in organize to control an LED light according to user's state and the surrounding.

7. The proposed LED lighting system can autonomously adjust

Therefore, this paper proposes an smart household LED light system considering energy efficiency and user approval .The proposed system utilizes multi sensor and wireless communication technology in categorize to control an LED light according to the user's state and the surrounding. The proposed LED lighting system can separately adjust the minimum light intensity value to improve both energy efficiency and user satisfaction.

II. METHODOLOGY

The design of intelligent household LED lighting system with a motion detection sensor, illumination sensor, and wireless communication interface. here presenting the proposed system with system architecture and important scheme.In proposed system there are two sensor are used one is the PIR sensor, another is BH1750 Luminance sensors. According to model of system PIR sensor is
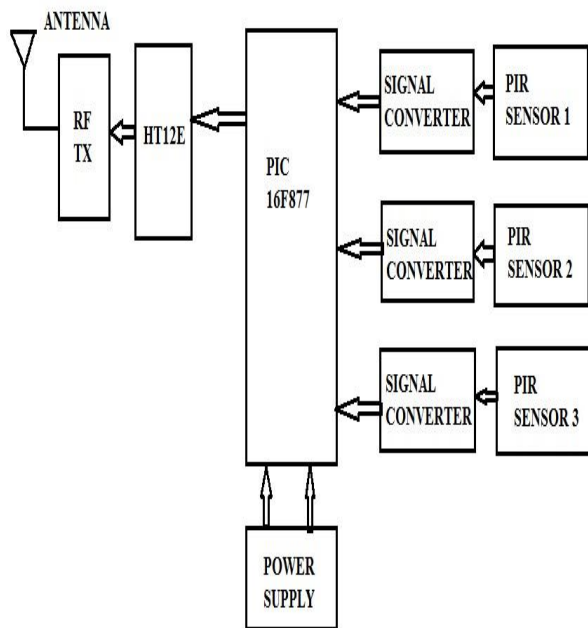

Block diagram of proposed system

placed in washroom. then PIR sensor will detect the motion and then it interfaces with the MCU. After interfacing with MCU it gives on/off command then the light is on in washroom.Another part of proposed system is that there is also used a one another PIR sensor which is placed at door. When a human or any type of motion is detected then it gives the signal to the MCU. Due to that MCU activate another sensor BH1750 luminance sensor. this sensor calculate the value of environmental brightness.

According to width of PWM waves it set the value of intensity of internal LED. If no one is present in the room then the LED set at the Lmin(minimum light intensity), on the inverse if any motion is sensed by sensor and at the time if external brightness is more than internal LED is set at

Lmid position. If external intensity is less than internal LED is set at the Lmax(maximum light intensity)

A. PIR motionsensor

PIR sensors permit to sense motion, almost always used to detect whether a human hasmoved in or out of the sensors range. They are small, low-cost, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and devices used in homes or businesses. They are often referred to as PIR or Passive Infrared Sensor.

PIRs can detect stages of infrared radiation. Everything emits some low stage radiation, and the warmer something is. theadditional radiation is formed The sensor in a motion detector is actually split in two shares out. The reason for that is that we are observing to detect motion (change) not average IR stage. The two halves are wired up so that they cancel each other ready. If one half sees added or minus IR radiation than the other, the output will swing high or low.
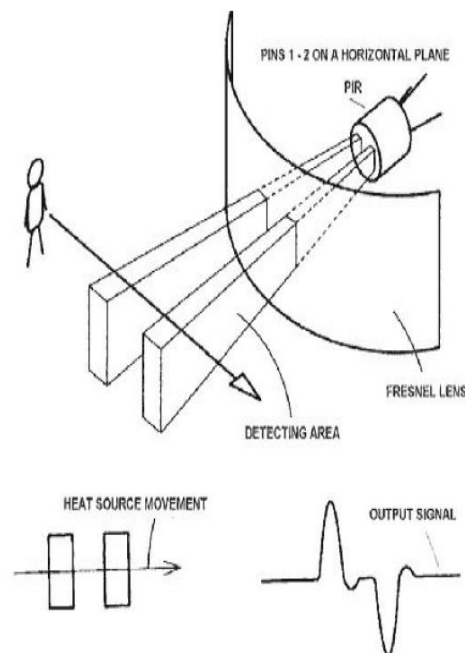
The PIR sensor itself has two slits in it, each slit is made of a special material that is sensitive to IR. The lens used here is not actually doing much and so we see that the two slots can 'see' out past some distance. When the sensor is indolent, both slots detect the same amount of IR, the ambient entire radiated from the room or walls. When a human or animal passes by, it first seizes one half of the PIR sensor, which causes a progressive differential change between the two halves. When thewarm body leaves the sensing area, the contrasting happens, whereby the sensor generates a destructive differential change.

B . BH1750 Luminance Sensor

Luminance means how much luminous flux is extent over a given area .one can think of luminance flux as measure of the total amount of visible light present. Luminance sensor senses the intensity of the ambient light on a surface area. Due to that luminance sensor is used here for detecting outer brightness specially of sunlight in environment, this value sensed by sensor is gives to the microcontroller according to signal coming from a microcontroller PWM based LED based light driver again set the value internal light intensity and on and off time

C:Receiver side
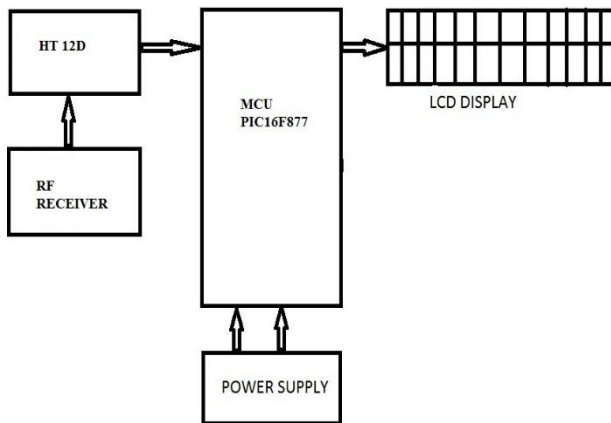
Black diagram of receiving side of proposed system

Abovediagram is a receiving side of proposedsystem. In the block diagram RF Receiver Receive the signal .Here HT12E Encoder used because easy to interface with an RF or an Infrared transmission medium. On LCD Display the LED panel on or off and Display the How many Energy saved.

III.CONCLUSION

The various light control system are introduced in current markets, because the installed lighting system are outdated and energy-inefficient. However, due to architectural restrictions, the existing light control system cannot be successfully applied to home and office buildings.

This system proposes an intelligent household LED lighting system. Utilizes multi sensors and wireless communication technology in arrange to manage an LED light according to the user state and the surroundings. The proposed system LED lighting system can separately adjust the minimum light intensity value to progress both energy efficiency and user satisfaction. We designed and implemented this system in the test bed and measured total power consumption to verify the performance. The proposed LED lighting system reduces total power expenditure if the test bed up to 21.9%

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