

DESIGN OF AN INTELLIGENT AND EFFICIENT LIGHT CONTROL SYSTEM

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Abstract: Recently, many researches has been carried out to save the energy in many aspects such as producing a device which consumes very less energy or designing a system which helps to reduce the power consumption using the existing devices. In this paper, a room light control system is proposed which is named as light control system (LCS). This proposed system will able to provide the needed light which provides the satisfaction of users and will provide energy saving and management.

In this paper the Lighting Control System and the decision making algorithm, are discussed. As per the algorithm the system will first check any occupant is there in the room. If so then the system will check the intensity of light in the room and if it is low then it will switch on the light.

Our proposed system can able to minimize the energy consumed for lighting in a room and can able to provide it efficiently.

Keywords: Lighting Control system, Energy saving, LDR, PIR sensor

1. INTRODUCTION:

Power saving have become a necessary thing in our day to day life. Many conventional power saving methods such as using electrical devices which consumes very less energy or cutting off the entire power supply for a scheduled time for a particular area are not efficient and there will be a lot discomforts to the users and cost may also increase to use a low power electrical device.

Buildings are responsible for up to 40% of energy usage. Most part of this energy is used mainly for maintaining good lighting such that the workers feel comfortable. Nowadays the newly constructed modernised or automated buildings may have lighting system to improve the comfort of occupants and to

save the energy. But there are large number of old buildings which contains the traditional lighting system. To reduce the energy consumption in those types of buildings and to help the owners of that building in terms of saving electricity bill an intelligent and an effective method is discussed in this paper.

Because of advancement in Sensor technology a very cheap and portable methods to measure our surroundings are available.

The amounts of light required to for a good environment to work comfortably in various areas are shown in table 1 which is recommended by CIBSE lighting guides.'

4. SYSTEM DESIGN:

4.1 Block diagram:

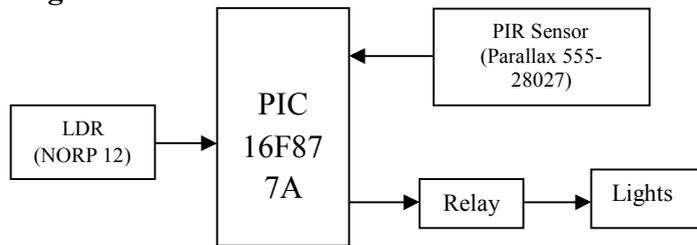


Figure 2 Block Diagram for the proposed system.

This system can be implemented using a PIC 16F877A, a LDR, A PIR sensor and the lights can be controlled by relays. The LDR sensor will keep on sensing the intensity of light and sends it to the microcontroller. The PIR sensor will send a signal to the microcontroller if there is any occupant in the room. If anybody is present in the room then the microcontroller compares the sensed value of intensity in the room with the value already stored in the microcontroller. If the sensed value is less than the value stored in the microcontroller then the light will be switched on by connecting the relay.

5. ALGORITHM:

Step 1: Start

Step 2: Check whether any occupant is there in the room using PIR sensor.

Step 3: If any Occupants is there means then compare the intensity of light in the room which was sensed by LDR. If nobody was there means then after some time delay again go to step 1.

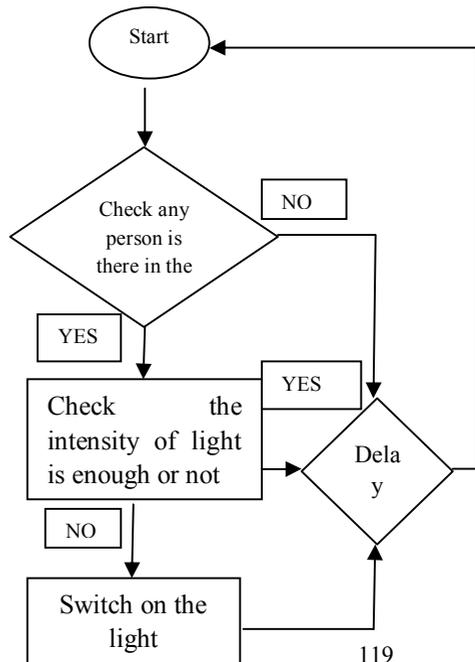
Step 4: If the sensed intensity is less than the required level, then switch on the light or if it was enough means then after some time delay proceed to step 1.

As per the algorithm our system will first check whether any occupants are there in the room with the help of PIR sensor where the system has been installed. If any occupants are there then it will check the value of light

luminance which is sensed through LDR and then the sensed value will be compared with the value stored in the microcontroller, if the value is less than the lights will be switched on or if the sensed value is greater than the stored value then it will wait for some time and again it will from the first.

While checking for occupants if no one is there in the room then the system will wait for some time (delay), which can be programmed in the microcontroller then it will start from the first step.

6. FLOWCHART:



7. RESULTS:

The proposed system has been implemented in a room with four lights each of 40 watts. Since it is normal classroom where evening classes are also conducted the intensity required has been set to 500 lux which was set as the reference level in microcontroller. Before implementing this system, around 800 watts of energy was consumed per day. After implementing this system in that room it has been considerably reduced to 480 Watts. Thus on using this system a large amount of energy can be saved.

8. CONCLUSION AND FUTURE WORK:

The proposed system can able to reduce the power consumption to the maximum limit and also this system will help us to keep the working environment in a pleasant and comfortable manner.

In this system the number of persons present in the room (Person counter) can be included and also the data transmission from PIR sensor to microcontroller can be implemented through wireless such that the system will become a scalable one in the sense a single system can able to control a large number of rooms. Apart from these things the system can be upgraded to allow the users to configure the intensity of light in real time.

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