Automatic Illumination Adjustment of Window Using LDR Sensors

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Abstract- *In this paper, the illumination of the room is controlled based on the ambiance light present outside a building. The project design consists of two LDR sensors, with one LDR sensor used to sense the illumination of a room and another LDR sensor used to sense the environmental light [1], [2], [3]. The input for room illumination is set by the user, and the window will be opened when the room light value goes below the threshold value or otherwise it will be closed. When the room illumination becomes insufficient for the user even after opening the windows, the room lights will be switched ON automatically [1].*

Keywords- LDR Sensors, Arduino UNO, Stepper motor, Bulb.

I. INTRODUCTION

The idea of designing an illumination control system is to control the room illumination. This describes automatic illumination light based on the embedded system using LDR sensors which can be used at rooms, companies, personal places, and banks etc. In this system, illumination is controlled using LDR sensors. According to the value of LDR sensors, the illumination is controlled. In the daytime, when there is a need for less light [5], LDR sensors sense the light and accordingly the programmed stepper motor will adjust the window. When there is a need for more light LDR sensors sense the light in the nearby area and based on the amount of light required the window will be opened and bulbs are turned ON automatically.

II. LITERATURE SURVEY

[i] Automatic Brightness Control Using LDR Sensors: In this system brightness is controlled using LDR sensors and array of LED's which are interfaced with the microcontroller. According to the value of LDR sensors the brightness is controlled [1].

[ii] Arduino Based Auto Street Light Intensity Controller: The concept is sensing the brightness in the surrounding environment and controlling the intensity of street lights accordingly. LDR Sensor is affixed to sense the luminosity in the environment. The system uses Arduino is used for controlling the intensity of LEDs [4].

III. PROPOSED BLOCK DIAGRAM

The block diagram of automatic illumination control using LDR sensors is shown in the Figure.1. It consists of power supply section, LDR sensor 1, LDR sensor 2, ATMEGA 328P, Window, Arduino UNO [5], Stepper motor, Bulb.

The user sets the threshold value. The value from LDR sensor1 is compared with the threshold value. If it is less than a threshold value, then the LDR sensor2 is sensed. The LDR sensor2 value is high when compared to LDR sensor1, with the help of stepper motor the window will be opened automatically [1]. The stepper motor is used to open the window step by step according to the condition given in the Arduino and the driver circuit is to speed up the motor. After opening the window, the illumination is not sufficient with the help of relay the bulbs will switch ON.

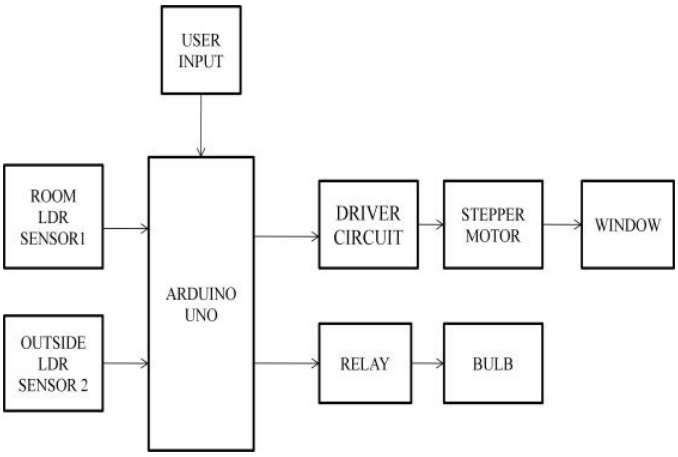

Figure.1 Block diagram of Automatic illumination control

3.1. MERITS OF PROPOSED SOLUTION

In this section some related works are – (a) To increase the intensity in homes, offices automatically (b) This system is used in dark rooms where automatic illumination of light is

needed (c) This is useful for the normal persons to adjust the room lights automatically (d) This project is useful for disabled persons who are in need of others help for their routine life.

IV. WORKING PRINCIPLE

The basic working principle of our system is based on the fact that the LDR sensor would sense the illumination [1], [4] inside the room and compare the value with a threshold value. When the illumination is not sufficient inside the room, the window will be opened. Even after the window is opened, the illumination is not sufficient then the bulbs will turn ON automatically. The Figure.2 of LDR sensor is shown below.

Figure.2 LDR sensor

V. AUTOMATIC ILLUMINATION CONTROL

The automatic illumination control system is based on LDR sensors. A Light Dependent Resistor (LDR) is also called a photo resistor [1]. It is basically a photocell that works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases. The LDR sensor can be used in many devices like camera light meters, street lights, and light beam alarms. The Lighting Emitting Diode [3] is a p-n junction diode. It is a specially doped diode and made up of a special type of semiconductors. When the light emits in the forward biased, then it is called as a light emitting diode. The LDR sensor1 is used to sense the illumination inside the room and compared with the threshold value. After comparing the values, if the room illumination is less than a threshold value. The LDR sensor2 will sense now and if the illumination is larger when compared to LDR sensor1 then the window will be opened. After opening the window, the illumination is insufficient the bulb will be turned ON automatically.

VI. RESULTS AND DISCUSSION

The illumination inside and outside the room is sensed and analog values are displayed in the serial monitor.

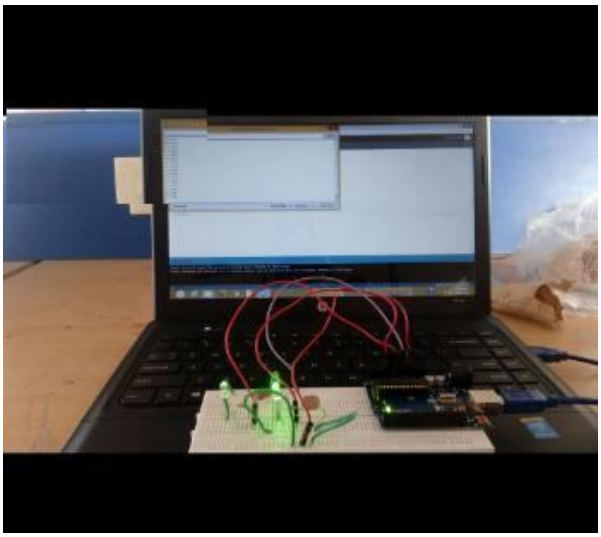

Figure.3 interfacing of two LDR'S

If LDR sensor2 is less than LDR sensor1 then the bulb turns ON automatically.

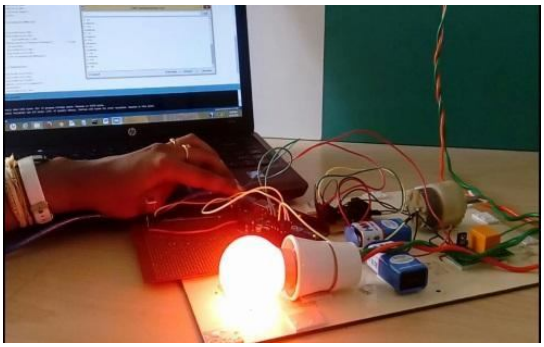

Figure.4Bulb ON

If LDR sensor1 is greater than or equal to threshold the bulb turns OFF automatically.

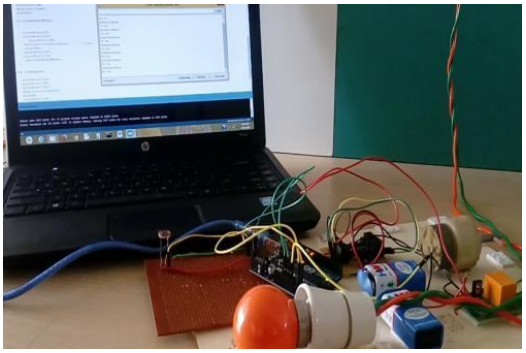

Figure.5 Bulb OFF

VII. CONCLUSION

This paper elaborates the design and construction of an automatic illumination control system circuit. It is a cost-effective system. LDR sensor is the condition in working the circuit. If the conditions have been satisfied the circuit will do the desired work according to a program. The sensor controls the window and turns ON or OFF the light automatically. The illumination has been successfully controlled by Arduino Uno controller.

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