iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.51617

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Automatic Street Light On and Off Using LDR

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Abstract: Automatic Street Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes.
This is done by a sensor called Light Dependant Resistor (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes.
By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even the sunlight comes and also switched on earlier before sunset. In this project, no need of manual operation like ON time and OFF time setting. This project clearly demonstrates the working of transistor in saturation region and cut-off region. The working of relay is also known.

I. INTRODUCTION

An automatic street lighting system is designed to automatically switch ON the street light alongside the roads or the light lamp just outside our house on the onset of dark weather or switch them off automatically after sunrise or during the light hours.We need to save or conserve energy because most of the energy sources we depend on, like coal and natural gas can't be replaced. Once we use them up, they're gone forever.

Saving power is very important, instead of using the power in unnecessary times it should be switched off. In any city “STREET LIGHT” is one of the major power consuming factors. Most of the time we see street lights are controller has an LDR which is used to detect the ambient light. If the ambient light is below a specific value the lights are turned ON. A light dependent sensors is interfaced to the pic 18f452 microcontroller it is used to track the sun light and when the sensors goes dark the led will be made on and when the sensor founds light the led will be made OFF.It clearly demonstrates the working of transistor in saturation region and cut-off region.

The working of relay is also known Microcontroller and the code is written in c language in MikroC ide, the resulted value can be seen with the help of UART or LCD display. Automatic Street Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes.

This is done by a sensor called Light Dependent Resistor (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes.This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch.

A street light, lamppost, street lamp, light standard, or lamp standard is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certain time every night. Modern lamps may also have light-sensitive photocells to turn them on at dusk, off at dawn, or activate automatically in dark weather.

II. COMPONENTS REQUIRED

1) Transistor
2) LDR (Light Dependance Resistor)
3) Resistors
4) LED (Light Emitting Diode)
5) PCB (Printed Circuit Board)
6) Battery
7) Power Supply

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III. CONNECTION PROCEDURE

1) Insert first transistor Q1-BC547 (NPN) on PCB board shown in the circuit diagram
2) Connect another transistor Q2-BC547 (NPN) on PCB board shown in the circuit diagram.
3) Connect wires across emitter pin of both transistor and negative terminal of battery on the PCB board.
4) Connect a wire across collector pin of transistor Q1 and base pin of transistor Q2.
5) Connect a resistor 1k across positive terminal of battery on the PCB board and collector pin transistor Q1.
6) Connect LDR (Light Dependent Resistor) across positive terminal of the battery and base terminal of transistor Q1
7) Insert a transistor 330 ohm across base pin of transistor Q1 and negative terminal of battery.
8) Connect a resistor 330 ohm across positive terminal of battery and anode terminal of LED connect the cathode terminal of LED to collector pin of transistor Q2.

IV. RELATED WORK

The working of automatic street light is described here. The circuit can be used to switch on incandescent garden light bulbs at desk and switch off them at dawn. A 10 mm encapsulated light dependent resistor (LDR) here works as the twilight detector.

The whole circuit can be housed in a very small plastic cabinet. For powering the circuit AC household supply is needed. With a little skill and patience, you can easily modify this circuit to drive a number of white LED strings, instead of the incandescent bulb load at the output. When ambient light is normal, transistor T1 is reverse biased by the low resistance of LDR. Multiturn plastic trimpotP1 sets the detection sensitivity. If ambient light dims, transistor T1 turns on to drive the triac T2. Now the lamp load at the output of T2 energises. When the ambient light level restores, circuit returns to its idle state and light(s) switched off by the circuit.

If you wish to operate the, light bulb(s) on a little reduced power, just replace the triac T2 with a suitable silicon controlled rectifier (SCR). This may give a long life to the incandescent load. Finally, the LDR should not be mounted to receive direct sunlight. It may be mounted at the top of the enclosure, pointing to the sky say southwards.

LDR offers Very high Resistance in darkness. In this case the voltage drop across the LDR is more than 0.7V.This voltage is more sufficient to drive the transistor into saturation region. In saturation region, IC (Collector current) is very high. Because of this IC. The relay gets energized, and switches on the lamp. LDR offers Very low Resistance in brightness. In this case the voltage drop across the LDR is less than 0.7V.

V. ADVANTAGES

1) Energy savings
2) Low cost
3) Safety and Security
4) Automated operation
5) Very flexible
6) Easy to manufactured in sunny and rainy days, on and off time differ notice which is one of the major disadvantages of using timer circuit or manual operation for switching the street light system.

VI. APPLICATIONS

A. Lighting switch

The most obvious application for an LDR is to automatically turn on a light at a certain light level. An example of this could be a street light or a garden light.

B. Camera shutter control

LDRs can be used to control the shutter speed on a camera. The LDR would be used to measure the light intensity which then adjusts the camera shutter speed to the appropriate level.

1) Used in street light application.
2) Used in Domestic application.

VII. CONCLUSION

More effective in case of cost, man power and security as compare with today's running complicated and complex light controlling systems. Automatic Street Light Controlling System puts up a very user friendly approach and could increase the power. This the Street light controller using ldr based Light intensity & traffic density, in the todays up growing countries will be paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF. After designing the circuit which controls the light of the street as illustrated in the previous sections. LDR sensor and the photoelectric sensors are the two main conditions in working the circuit. If the two conditions have been satisfied the circuit will do the desired work according to specific program. Each sensor controls the turning ON or OFF the lighting column. The street lights has been successfully controlled by microcontroller. With commands from the controller the lights will be ON in the places of the movement when it's dark. Further more the drawback of the street light system using timer controller has been overcome, where the system depends on photoelectric sensor. Finally this control circuit can be used in a long roadways between them.

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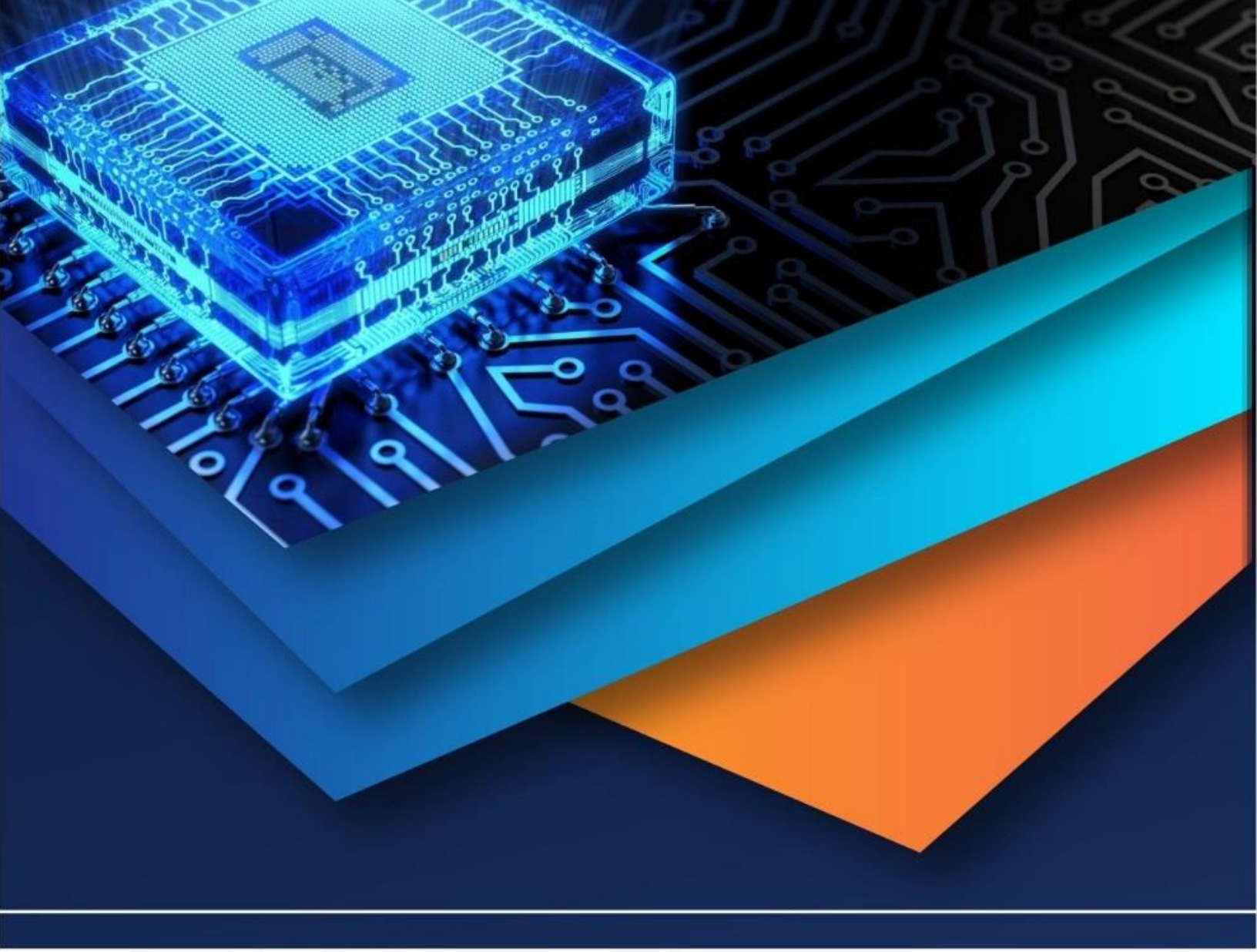

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