

AUTOMATIC STREET LIGHT CONTROLLER USING LDR

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AUTOMATIC STREET LIGHT CONTROLLER USING LDR

A MINI PROJECT

REPORT

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In partial fulfillment for the award of the degree of

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IN

ELECTRICAL AND ELECTRONICS ENGINEERING



NEW HORIZON COLLEGE OF ENGINEERING

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Accredited by NAAC with 'A' Grade, Accredited by NBA

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

BONAFIDE CERTIFICATE

Certified that the Mini Project work entitled “**AUTOMATIC STREET LIGHT CONTROLLER USING LDR**” carried out by **Niranjan K R – 1NH18EE732, Shashidhar P H – 1NH18EE746, Shiva Prasad L P – 1NH18EE747, Shivam – 1NH18EE748** are Bonafide students of New Horizon College of Engineering submitted the report in completion of project at Department of Electrical and Electronics Engineering, New Horizon College of Engineering during the Academic Year 2019-20. It is certified that all the corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for said Degree.

Project Guide

Dr. S. Sujitha

HOD-EEE

Dr. RamKumar S

ABSTRACT

There are several ways to turn on the street lights but this project describes an Automatic Street Light Controller Circuit that uses LDR and Relay to perform automatically. The circuit employed here is an uncomplicated light/dark activated switch and contains a relay at its output, which simply turns ON/OFF a street light and further can be extended to control any electrical appliance in a household. This circuit is very easy to work around and also it is battery operated. The power consumed by the circuit is very low because of the very few components used in the circuit. The whole circuit is based on IC LM358, which is basically an operational amplifier that is configured in a voltage comparator. LDR (Light depending resistor), whose resistance is based upon the quantity of the light falling on it, is the main component for sensing the light. Along with these, a few more components are also used.

ACKNOWLEDGMENT

We would like to thank everyone who supported us during this entire period of making of this project. It would not have been possible without the kind support and help of many individuals and professors. We would like to extend our sincere gratitude to all of them. In performing this mini project, we had to take the help and guideline of some respected persons, who deserve our greatest gratitude. The completion of this project gives us much pleasure and satisfaction. We would like to show our gratitude to **Dr. S. Sujitha, Associate Professor, Department of Electrical and Electronics Engineering** for giving us a good guideline and helping for project throughout numerous consultations and guidance. We would also like to thank **Dr. Ramkumar S, Head of the Department of Electrical and Electronics Engineering** for guiding us. I am thankful to other professors also for the valuable information provided by them in their respective fields. I am grateful for their cooperation during the period of our mini project. We would also like to expand our deepest gratitude to all those who have directly and indirectly guided us in preparing this report for this mini project.

Many people, especially our own classmates and team members itself, have made valuable comment suggestions on this proposal which gave us an inspiration and hope to improve and complete the mini project. We were very excited in doing this. We thank all the people for their help directly and indirectly to complete our project successfully.

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OBJECTIVE

The main objective of this project is to automatically control the street light current by preventing excess current use or wastage.

Automatic Street Light controller uses LDR, IC(CD4011), Relay, Diode, Transistor, Resister and capacitor, to design a automatically street light using LDR is to prevent excess usage of current.

By the property of LDR during the day time the resistance is low, this is given to the IC(CD4011), then output of IC is given to Relay.

Relay passes signal to the light and lights off. As the same Process at the night time Resistance is high, Relay passes signal and Light on which allows saving the current by switching of street light automatically.

LITERATURE SURVEY

- Karthik A et all, "Design and Implementation of automatic street light control system using LDR" Internal Journal of Engineering Trends and Technology, Volume No. 35, Issue 10, may 2016.
- Sourav Kumar Ghosh et all, design and implementation of automatic street light control system using LDR Global journal of researches in Engineering, volume 18, describes the uses of motion sensor to control the intensity of light.

COMPONENTS REQUIRED

1. 9V battery
2. Connecting wires
3. Relay 12V
4. Breadboard
5. IC CD4011
6. Diode 1N4001
7. Transistor BC 149
8. Resistors
9. Capacitor(100uf)
10. LDR(Light Dependent Resistance)

INTRODUCTION

Automatic Street Light controller uses LDR, IC(CD4011), Relay, Diode, Transistor, Resister and capacitor, to design a automatically street light using LDR is to prevent excess usage of current. By the property of LDR during the day time the resistance is low, this is given to the IC(CD4011), then output of IC is given to Relay. Relay passes signal to the light and lights off. As the same Process at the night time Resistance is high, Relay passes signal and Light on. This allows to save current by switching of street light automatically.

LDR:

LDR is a device whose sensitivity depends upon the intensity of light falling on it. When the strength of the light falling on the LDR increases the LDR resistance decreases, while if the strength of the light falls on LDR is decreased, then its resistance increased. In the time of darkness or when there is no light, the resistance of LDR is in the range of mega ohms, while in the presence of the light or in brightness in decrease by few hundred ohms. Before mounting any component in circuit is good practice to check whether a component works properly or not so that you can avoid consumption of time in trouble shouting. For testing LDR set the range of multimeter in resistance measurement. Measure the resistance of LDR in the light or brightness and the resistance must be low. Now, cover the LDR properly so that no light fall on it and once again measure the resistance. It must be high. If u got the satisfactory result, then your LDR is good.



FIG 1.1 LDR

Relay:

A relay is a switch which is electrically operable. It consists of a combined deck two to three terminals for input as well as a set of operating contact terminals for outputs as well. The switch may have any number of contacts in multiple to make contacts, break contacts, or combinations thereof.

1 Relays are used where it is necessary to control a circuit to delay by an independent 1 low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations extensively.



FIG 1.2 RELAY

Transistor BC149:

BC149 is a typical NPN type transistor therefore the collector and emitter will be left open (Reverse biased) when the base pin is held at ground and will be closed (Forward biased) when a signal is provided or passed through the base pin. BC149 has a gain value ranging from 110 to 800, this value determines the amplification capacity of the transistor. The highest amount of current that could flow through the pin of the collector is 100mA therefore we cannot connect loads that consume and use more than 100mA using this type of transistor. To bias a transistor we have to supply current to base pin, this current (I_B) should be limited to 5mA not less than that.

When this transistor is completely biased then it can allow a maximum of 100mA to flow across the collector and emitter. Saturation Region belongs to this stage and the typical voltage allowed across the Collector-Emitter (V_{CE}) or Base-Emitter (V_{BE}) region could be 200 and 900 mV respectively. When base current is removed the transistor becomes completely off, this stage is called as the Cut-off Region and the Base Emitter voltage could be around 660 mV.



FIG 1.3 TRANSISTOR(BC547)

Diode 1N4001:

A diode is an electronic device which allows current flow through only one direction and prevents bidirectional flow. That is the current should always flow from the Anode to cathode and not vice-versa. For 1N4007 Diode, the maximum current carrying capacity is 1A it with stand peaks up to 30A. Hence, we can use this in circuits that are designed for less than 1A. The reverse current through this diode is 5uA which is negligible. The dissipation power of this diode is 3W. This section gives a pure view description and extent of everything included in this Project Report. The purpose of this report is to give the complete and detailed information about our mini project. This document is primarily intended to anyone who wants to know about the automatic operation of switching on/off of the pump without manually switching it off.



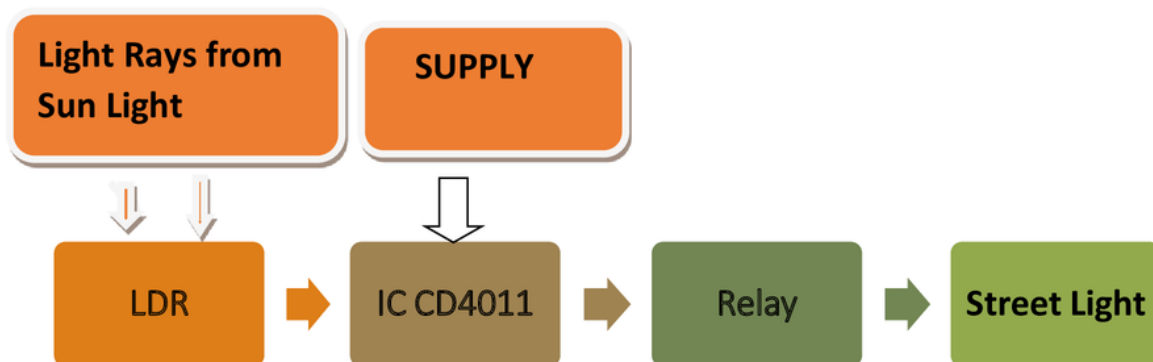
FIG 1.4- DIODE (1N4007)

PROBLEM STATEMENT

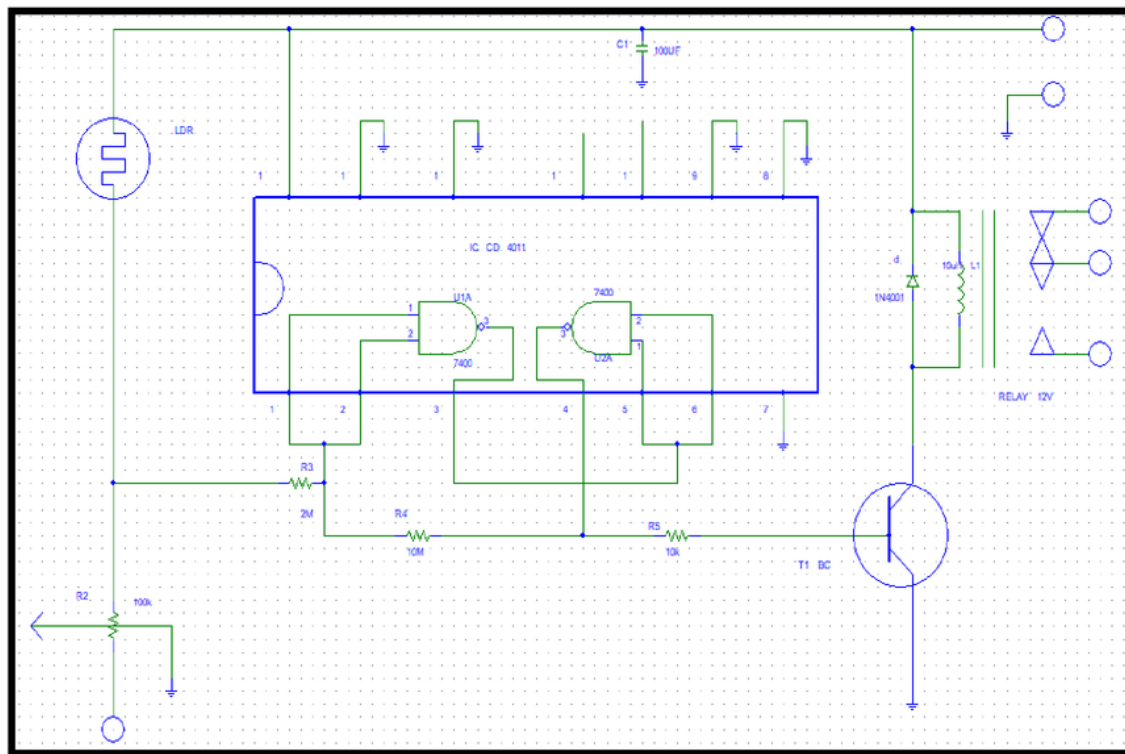
The problem which we encountered is most common in all the public places the street light will be on even in the day time and, no one will take care about the street light. So, to automatically on and off the street light, We developed the automatically street light controller using LDR, the light will be off during the day time and the light will be on during the night time manually. We solve this problem by the automatically controlling of the street light. when the day time the street light will be off and in the night time the street light will be on.

5

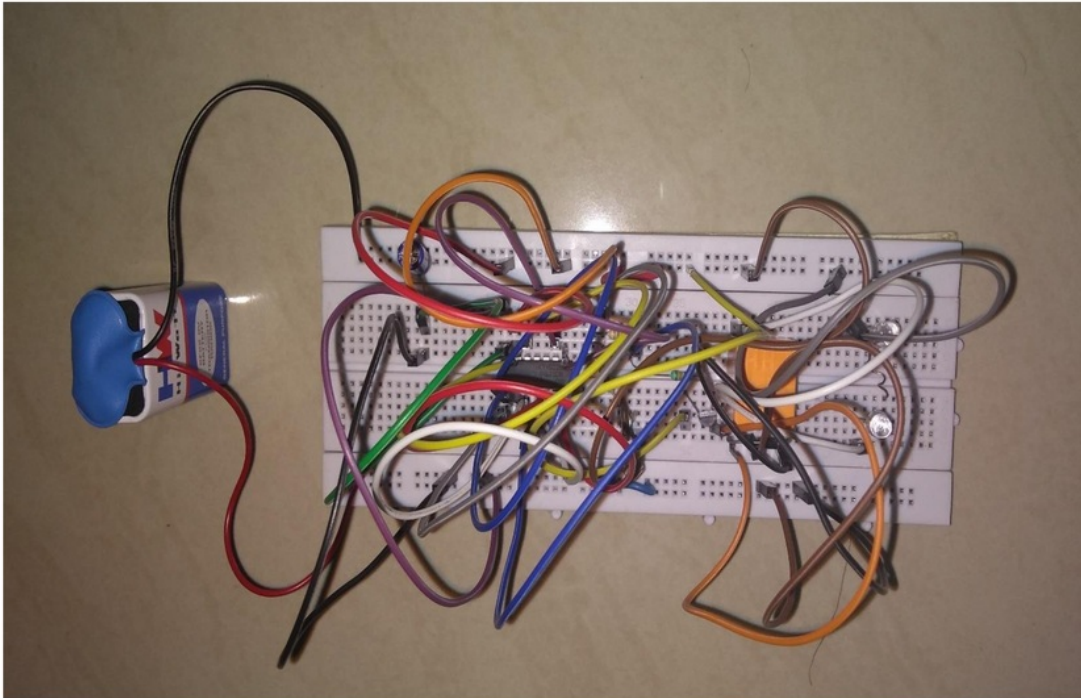
BLOCK DIAGRAM OF AUTOMATIC STREET LIGHT CONTROL SYSTEM USING LDR



CIRCUIT DIAGRAM



CIRCUIT DIAGRAM



DESCRIPTION OF THE PROJECT

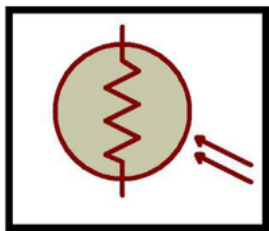
- In this Circuit, The IC used is CD4011. This IC CD4011 consists of four NAND gates, but we use only the two NAND gates.
- In two NAND gates, Input is given to the first NAND gate and the output is to the Input of the second NAND gate and we get the final output.
- The NAND gate logical operation is

Inputs	Output
0 0	1
0 1	1
1 0	1
1 1	0

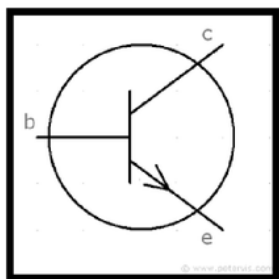
- The LDR and 2Mohm resistance is given to the input of the IC D4011. The Property of the LDR is during the day time its resistance is low. During the night time the resistance is High.
- This circuit works on the property of the ohms law. Depending upon the light the resistance value of the LDR will changing, due to varying the value of resistance the voltage value will change.
- The inputs are (0,1), '0' means during the day time the resistance value of the LDR is low. '1' means during the night time the resistance value of the LDR is high.
- When input '0' is given to the IC CD4011 the final output is '0'. The output is given to the transistor where it acts as a two way switch, the switch is off. So, the relay passes signal and light is off.
- As the same procedure when input '1' is given, the switch is on. So, the relay passes the signal and light is on.

LIST OF SYMBOLS

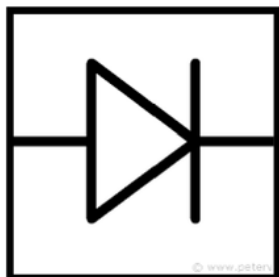
- LDR:



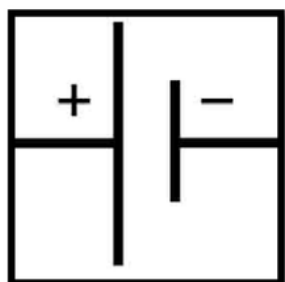
- Transistor:



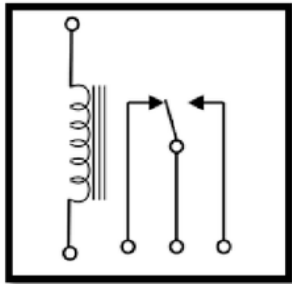
- Diode:



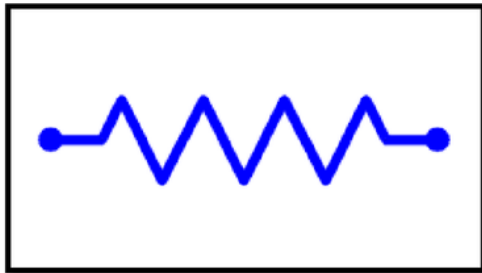
- Battery:



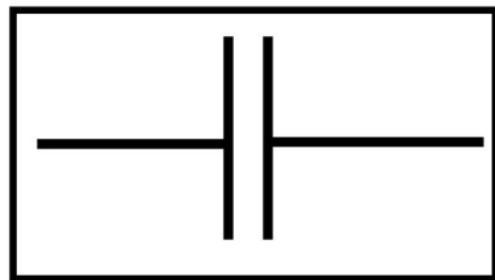
- Relay:



- Resistor:



- Capacitor:



APPLICATIONS

The system is designed for outdoor application in un-electrified remote rural areas. This system is an ideal application for campus and village street lighting. Street light gives bright light over a semi-circular radius of 30 feet. The system is provided with the automatic on/off time switch for dusk to dawn operation and overcharge / deep discharge prevention cut-off with LED indicators. Solar street light system for Roads, yards, Residential Colonies, townships, Corporate Offices, Hospitals, Educational Institutions and Rural Electrification.

- No man power required.
- Simple Construction.
- Efficient method.
- Less Consumption of electrical energy.
- Less maintenance.
- Cheap and Economical.

RESULT

The project “Automatic Street Light Control System with LDR and Relay” has been successfully design and tested. Here we are saving lot of power without any wastage, by these advanced technologies we can design many more systems which can be done by solar lights and through these solar lights we have a vast usage at the same time we can do automatic systems instead of doing it manually. ³ Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

REFERENCES

The following data for the project has been gathered from a number of sources. A list of few of the sources are:

- Karthik A et all, "Design and Implementation of automatic street light control system using LDR" Internal Journal of Engineering Trends and Technology, Volume No. 35, Issue 10, may 2016.
- Sourav Kumar Ghosh et all, design and implementation of automatic street light control system using LDR Global journal of researches in Engineering, volume 18, describes the uses of motion sensor to control the intensity of light.

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