



## EFFICIENT USE OF STREET LIGHT USING LDR AND ARDUINO

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### Abstract

**This paper demonstrates an easy, tough and energy efficient street light intensity control system which does not need much maintenance. The concept is sensing the brightness in the surrounding environment and controlling the intensity of streetlights accordingly. LDR Sensor is affixed to sense the luminosity in the environment. The system uses Arduino board for controlling the intensity of LEDs. A cluster of LEDs acts as a streetlight. The system is more dependable than systems with time slots and requires less perpetuation as compared to other available system. Also the cost of maintenance and the cost of setup is low as compared to other existing system. The manly labour in this is nearly neglegible. The solution to energy conservation is to eliminate time slot and introduce a system that could sense brightness of the environment and act accordingly so that seasonal change would not affect the intensity of street lights preventing accident. Also, LEDs should replace HID lamps due to their dimming feature, another reason are that they are more reliable.**

**Keywords: LED, arduino, LDR, resistor, HID**

**RESEARCH AREA: IOT**

### INTRODUCTION

Living on a planet where everything is programmed from your laundry to your sealing

fan . World spins across the word robotization and the one which may be computerized are told that they are cutting edge since they constrain in the contribution towards people. All of them are independent for work individually and in that way, they are sparing time and cost by being more proficient from manual ones. Be that as it may, some of the works still cant make their way into these computerized campaign. The main aim of this undertaking is to construct and execute an automatic control of LED along with Photoresistor which is connected with an Arduino board. As we all know that streetlights nowadays are wastin most of the electricity as they are even switchedd on during the day due to the person who is on duty to switch them off forgets some of the lights. The main focus of this project is to construct a system such that it deletes the humuan effort completely. The project is based on LDR or a photoresistor which will be the main focus of our project some amount of thrash hold energy will be given or saved in the Arduino and as the intensity of light in the surrounding decreases from the value of this thrashhold value provided the street light will turn on auto matically and as the intensity of light increases from the thrashold value the street light will be switched off automatically. As now the human work has been reduced to zero the accourance of error will be neglegible and we will be able to save a huge amount of energy wich is being wasted everyday.

## **LITERATURE REVIEW**

Light control system using Ldr and arduino is a whole new idea in the world of street lights. In the wake of experiencing numerous exploration papers which were found on the lighting system were only based on their working and not on the consumption of energy or electricity the main thought process of doing this extend make another diagram system for the road lights that don't eat up massive measure of energy and light up tremendous zone with high force. Savvy Street lights system is a basic bit of the making shrewd city which speaks to 10-45% of total power uses which is a segregating mindfulness toward general society powers utilization. So it is key and profitable essentialness method for progressions are to be executed for fiscal and standardized savings. that too a large portion of the papers are based on the infrared collectors and very few of them are based on the working of LDR and LED by clock method or by the human. Some were found to be controled by the remote GSM/GUI systems which will likewise devour heaps of energy . Programmed Street light is the winged animal from Flintstones which will naturally kill on and all the road lights without daylight and turn it off within the sight of daylight so it will expend heaps of energy. Worldwide Journal of Engineering Research and General Science Volume 4, Issue 2, March-April, 2016 ISSN 2091-2730 785 www.ieee.org Ancient Lighting framework have been kept to two alternatives on and off, because of it had their own offer of hindrance. This sort of activity implied vitality misfortune because of constant task greatest voltage however genuine necessity may be less relying outwardly condition wheather light is requiredor not . The most straightforward answer to it is by adjusting lights as indicated by the outside condition. This is the thing that we are expecting to do in our savvy lighting framework.

## **IDENTIFICATION OF NEED**

“Efficient use of street light using LDR and ARDUINO” is very convenient to implement and quite easy to understand. The most important thing is that it can be implemented by users in their daily life. The need of designing such a system is to act as a helper for the people who sometimes miss the important mails or the deadlines.

## **FEASIBILITY STUDY: -**

Feasibility studies aim to objectively and rationally uncover the strengths and weaknesses of the existing system or proposed venture. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well-designed feasibility study should provide historical background of the project. Generally, feasibility studies precede technical development and project implementation. The assessment of feasibility study is based on the following factors:

- 1) Technical Feasibility
- 2) Operational Feasibility

## **OPERATIONAL FEASIBILITY**

Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development. The operational feasibility of the system can be checked as it solves the problems and reduces the complications occurring in the paper-pencil test.

## **CONCLUSION OF FEASIBILITY STUDY**

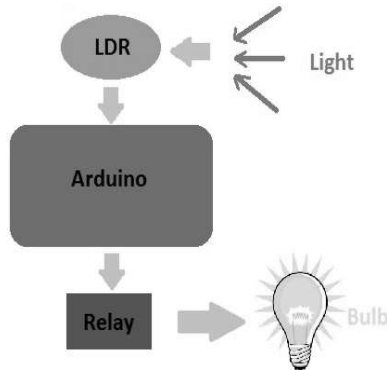
- 1) Technical Feasibility:  
The system can be implemented using computer software & hardware.
- 2) Operational Feasibility:  
The system efficiently operates & reduces manual computation and time of processing, reducing cost of paperwork and human errors.

## **THEORY**

Expressed before that the principle thought process is of give a proficient and vitality sparing lighting framework by assessing the outside lighting condition and afterward changing our road lights appropriately. The circuit principally comprises of a detecting component called as LDR or photoresistor ,that is managed by and also connected to the Arduino which takes contribution of detecting component and gives its output to the LEDS. Some amount of thrashhold energy is predefined within the arduino as the amount of light in the surrounding decreases from the thrashhold value the arduino will recieve a signal and atart the process and send the output to the LED due

to which it will glow and the light will be emitted and as the value of intensity in the surrounding increases the arduino will again send the signal to the LED and it will stop glowing this will reduce the wastage of light.

**SYSTEM ARCHITECTURE DIAGRAM**



The above shown is the architecture diagram as the light fall on the LDR it will send signal to the arduino and a set of relay signals will be generated due to which the LED will glow.

**MODULES**

The current project of efficient use of street light is developed using arduino and LDR. Arduino is single-board microcontrollers and microcontroller kits for building digital devices and interactive objects. Since Arduino is a single-board microcontroller it is specifically used for repetitive task. Arduino comes as a great ally for doing electronics projects as it does not require OS or software application to run, all it needs is few lines of codes. LDR is photo-register, It is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. There are two main modules of this system first one is the connection module and the second one is the coding part.

**I. INPUT MODULE**

- \*LDR
- \* Power Supply
- \* Connection
- \* Resistors

**II. WORKING MODULE**

- \* Micro controller(Arduino)
- \* Algorithm

**III. OUTPUT MODULE**

- \*LED

\*Output on screen INPUT

**INPUT MODULE**

The connection of components with arduino are made with the help of bread board and connecting wires.

The arduino will be connected to the computer in order to provide the power supply.

The LDR will detect the light and will send the input to the arduino for the working process.

**WORKING MODULE**

The micro controller or the arduino is uploaded with the algorithm due to which the project will run.

As the arduino receives the signal from the LDR a combination of process takes place within the micro controller as per the conditions provided in the algorithm.

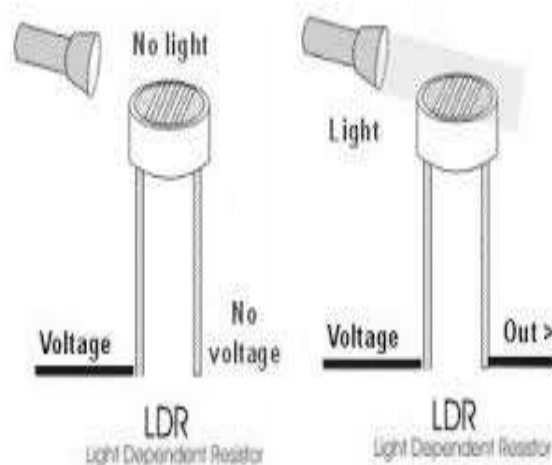
If the condition is satisfied then the output will be given in form of light in the LED and also displayed on the screen of the computer.

**OUTPUT MODULE**

The output module consist of the LED and the output window of arduino on your computer

As soon as the conditions of the algorithm are satisfied the LED will be switched on along with the output on screen.

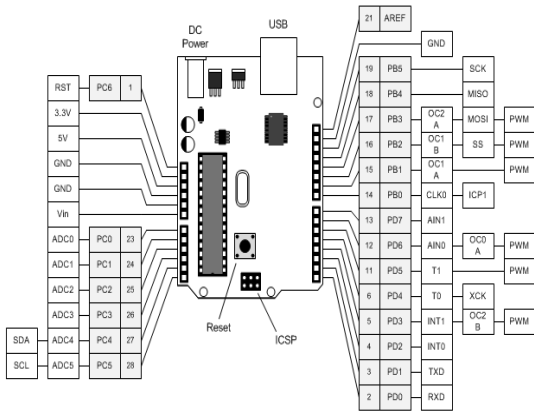
**LDR**



LDR or light dependent resistor as the name imply it depends upon the light completely. When voltage as input is given to the LDR and no light is falling on it the the LDR will not produce the output. But as the voltage is provided and the light is falling on the LDR the

output will be generated. The intensity of light falling on the LDR in this project must be more than the threshold value given before only then will the LDR produce output.

**ARDUINO UNO**

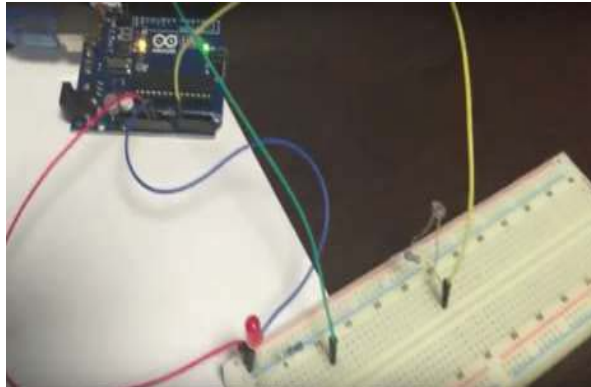


Arduino is an open source microcontroller along with AT-mega328. It is the backbone or we can call it as the brain of this project. It consists of about 14 input output pins and 6 analog pins. All the connections to the Arduino are made with the help of these pins. As the Arduino receives the input signal it works on it and produces the output. The code has to be written on the computer itself and should be compiled in its software and when compiled completely it should be uploaded to the Arduino with the help of a cable.

**LEDS**

LED stands for light emitting diode. It is based on the PN junction theory made up of semiconductors along with semiconductors. An edge emitting LED also requires a substrate in its construction. As the voltage is passed across the LED it will emit light as the output due to the movement of electrons and photons in the PN junction.

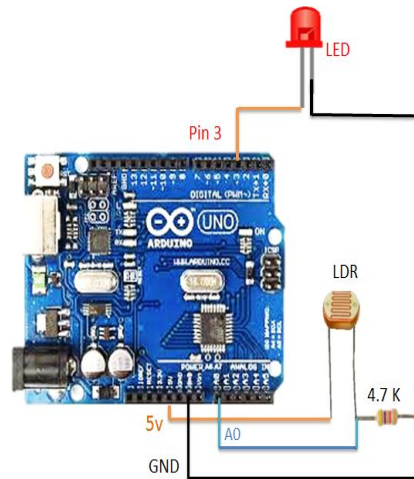
**WORKING PRINCIPLE:**



The project is based on LDR or a photoresistor which will be the main focus of our project. Some amount of threshold energy will be given or saved in the Arduino and as the intensity of light in the surrounding decreases from the value of this threshold value provided the street light will turn on automatically and as the intensity of light increases from the threshold value the street light will be switched off automatically. As now the human work has been reduced to zero the accuracy of error will be negligible and we will be able to save a huge amount of energy which is being wasted everyday.

**Connections on Arduino**

- Arduino third pin connected to LED positive terminal
- Arduino GND connects LED negative terminal through 4.7k
- Arduino 5v connects one end of LDR
- Arduino A0 pin is connected to LDR second end
- Arduino GND is connected to LDR other end with 4.7k resistor

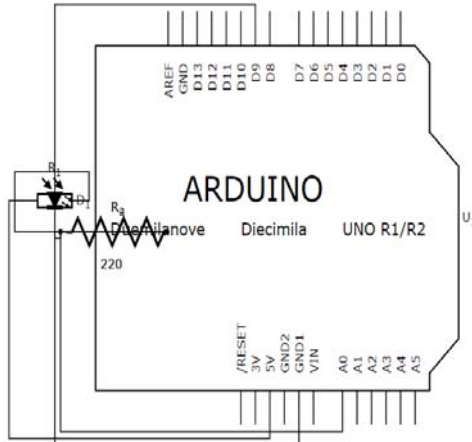


Light Detection using LDR and Arduino

**RESU**

**IT WILL BE DISPLAYED ON THE WINDOW**

At a point where there is a low amount of light the LED will glow automatically. Here we have taken the threshold value to be 100. As we place our hand on the LDR the supply of light is stopped and hence the LED glows and the output is shown on the computer screen and as the hand is removed from the LDR then the LED stops glowing as the intensity of light will be increased from the threshold value.

**SCHEMATICS VIEW:****APPLICATIONS AND FUTURE SCOPE**

- As it is a Street Light system, it is commonly used in the areas having low or no light where the light can be conserved.
- As it is implemented using LDR and Arduino, it can be further implemented as a system in which when the motion of the vehicle is detected then it will automatically turn on and vice versa.

**ACKNOWLEDGEMENT: -**

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**CONCLUSION:**

This Arduino based undertaking will give an able strategy to lighting frameworks and make the entire procedure of vitality sparing less demanding and effective. With a capacity to change the measure of light transmitted relying outwardly condition I trust this undertaking will meets desires properly to turn street light ON/OFF. In the wake of arranging the circuit which controls the road light as depicted in the past is no uncertainty an innovation with numerous future application separated from the way that it can likewise be utilized as a part of numerous present day tech, for example, head lights of vichicle, road light, parklights, mechanical lights and for some more. The use of the brilliant lighting framework will without a doubt change the world that we are seeing today.

**REFERENCES**

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