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Automation in Street Lights

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Abstract: ***The paper on 'Automation in street light' broadly aims to develop an energy efficient system by using automation in street lights which is controlled by an Arduino UNO. The street system widely present consumes more power and requires huge energy supply. To overcome this problem, there is need to create a system which will save energy ,power and also take into consideration safety measures of local ones . No pedestrians or vehicle will face any problem as smart lights will automatic glow before they arrive and will get dim as soon as vehicles leave the place .***
The moments of light is controlled by sensors, these sensors will execute task by detecting presence of objects as obstacles . Prototype consist of Arduino UNO R3, LEDS, IR sensors, batteries etc. Arduino UNO is an important part of model to code the circuit and to conquer desired outcome.
Keywords: USB-Universal serial Bus, IR – infrared sensor, LDR – light dependent resistor, LED – light emitting diode

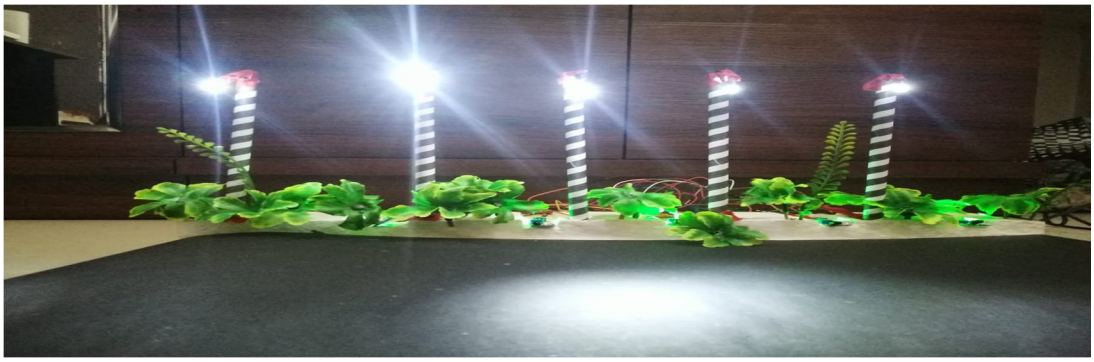
I. INTRODUCTION

Many of the existing street light systems in localities , around the city are still functioning on outdated technologies i.e. these mechanisms gets on when intensity of light decreases and switch on when intensity of light increases . But it is matter of great concern that these lights glow for about 12 hours with same intensity indicating wastage of power and energy . So there is need to develop or integrate the existing systems as per the demand. It is found that there is no need to utilize the lights continuosly for about 12 hours because whenever there is no movement of vehicles or pedestrians, light should get dimmed , hereby we can save power . This is where automation in street light comes into picture . Here we work on principle that lights get dim when there is no movement of vehicles on road and bright up by sensing presence of objects. Providing an efficient street light system depicts the social and economic stability of city . So implementation of such systems will surely reduce maintenance price ,power supply and also will help to reduce accidents and malpractices taking place on road . Such system are definitely going to improve the appearance of the neighborhood.

II. COMPONENTS

1) *Arduino UNO R3:* Arduino is a open source microcontroller board consist of microchip ATmega328 . Operating range of Arduino is 5V,it consists of 14 digital pins ,6 analog input pins along with USB connection , power jack , ICSP headers and reset button . Simply connect Arduino to battery or computer with help of USB to get started.
2) *LDR:* LDR is based on principle of photoconductivity . It responds to light by changing the resistance values . LDR for street lights must be positioned in such away that other light source will not shine on it.
3) *IR Sensors:* IR sensors are used to sense the presence of objects by emitting infrared light and operates by detecting the reflected rays . The emitter is IR LED and detector is IR photodiode.

These sensors are going to provide input based on detection of obstacle by utilizing sensors working principle.
Besides, LEDS as a source of light and battery of 9V to provide electric supply to mechanism is being used.



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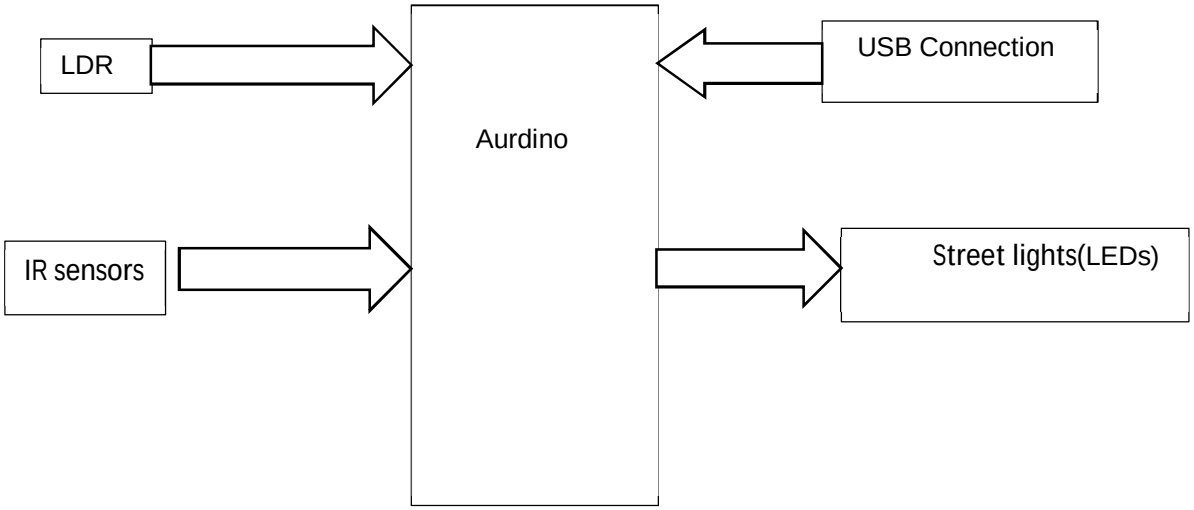
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III.LITERATURE SURVEY

The automatic street lights are needed in order to overcome power losses , energy losses and also to overcome environmental problems ; in order to lower down the heating effect caused by continue on mode of street lights. The researchers in the current field have successfully implemented the smart street light systems using solar energy as an power supplier to circuits thereby saving the energy followed by Arduino and light detecting sensors ,IR sensors ,for human detection more significantly PIR sensors are used . In some recent work on this particular topic , researchers have also used the piezo sensors for detection of objects . The working model showcased in this paper use Arduino UNO R3 with microcontroller and specific IR sensors with transmitter and detector along with LDR , LEDS as output providers. Power to circuits are provided with help of external battery supplies. These systems should be implemented and are easy to implement at parks ,in parking areas ,on roads ,highways etc .

Block Diagram

:



IV.METHODOLOGY

The basic objective to create such a system is to provide an energy efficient street light system by minimizing the use of power and energy . With the help of some basic components like Arduino , IR sensors , LDR and also LEDs we are going to control the switching mode of street light .

The input of LDR goes to analog pin of Arduino and other pin of LDR is connected to the (5V) supply. The LDR will detect the presence of sunlight present in surrounding and accordingly provide input to the Arduino . If sunlight falls on surface of LDR it will forward input as zero which means circuits are in off mode otherwise if there is no any interaction of sunlight on surface of LDR then input as 1 will be forwarded to Arduino and circuits will switch on by emitting the light by LEDs . After this IR sensors will get activated .IR sensors consist of pins in supply is provided to VCC and ground pins and output of IR sensors goes to Arduino as input value.

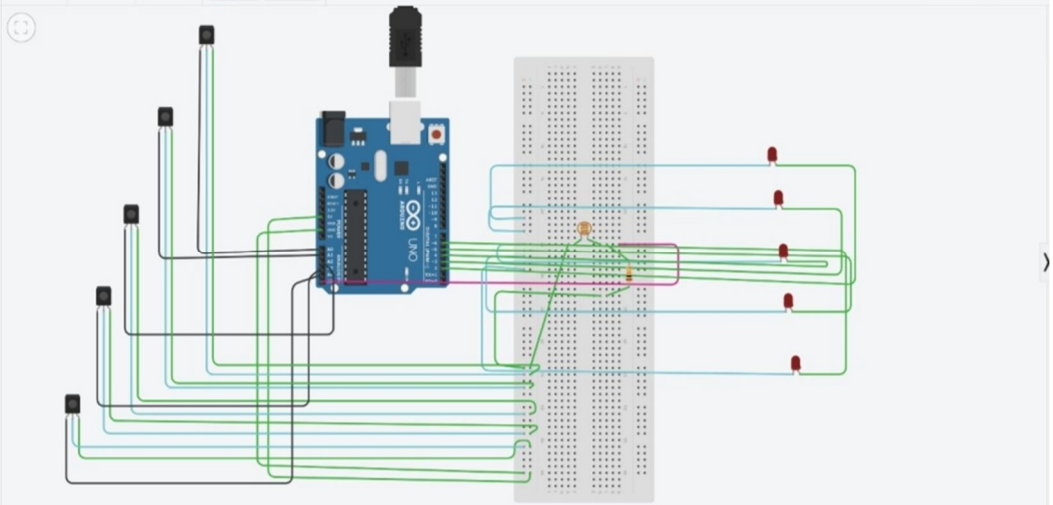
On providing supply to IR sensors there will be continuous emission of IR rays by emitter of IR sensors and when an obstacle comes in contact with sensor , rays get reflected back ; detected by receiver . After detection of rays by IR sensors , this will generate 1 as output in IR sensors and through output pin will go to Aurdino as input . The Aurdino code will work according to input provided , if it get input as 1 it will on LEDs will full intensity otherwise when there is no any detection of obstacle IR sensors will give input as zero to Aurdino and accordingly circuit will be in dim state .

And in morning or in presence of surrounding light LDR will provide inputs to circuit to switch off completely . By applying this system we can overcome the problems faced regarding conservation of energy and power supply also .

Care should be taken that time delay bin switching circuits is also necessary so that short periods of darkness (ex. When a bird flies over LDR in day time or when headlights of a car shine on LDR during night) will not switch the lights on or off.

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V. CONCLUSION

'Automation in street lights' primly focus on automatic turning on and off of the street lights . The model based on this paper is going to provide an energy efficient system consuming less energy and providing the street lights with the required intensity . Systems make use of sensors Arduino board to on and off the circuits . These street lights will be in operating mode when it sense the absence of surrounding light , further IR will get on and will glow with maximum intensity in presence of obstacle or will be dimmed in absence of obstacle otherwise street lights should be in off mode in presence of surrounding i.e daylight . Automatic street lights are capable of replacing the existing , dated systems and are going to contribute towards making the cities smart , efficient with minimum maintenance.

VI. RESULT

Implementation of automatic street lights are going to make existing street lights more energy efficient and such systems are also contributing to reduce the temperature of surrounding hereby proving themselves to be environmental friendly. Besides by properly coding the Arduino to on and off the circuits according to input provided and analyzing corresponding outputs ; the desired output can be acquired.

VII. FUTURE SCOPE

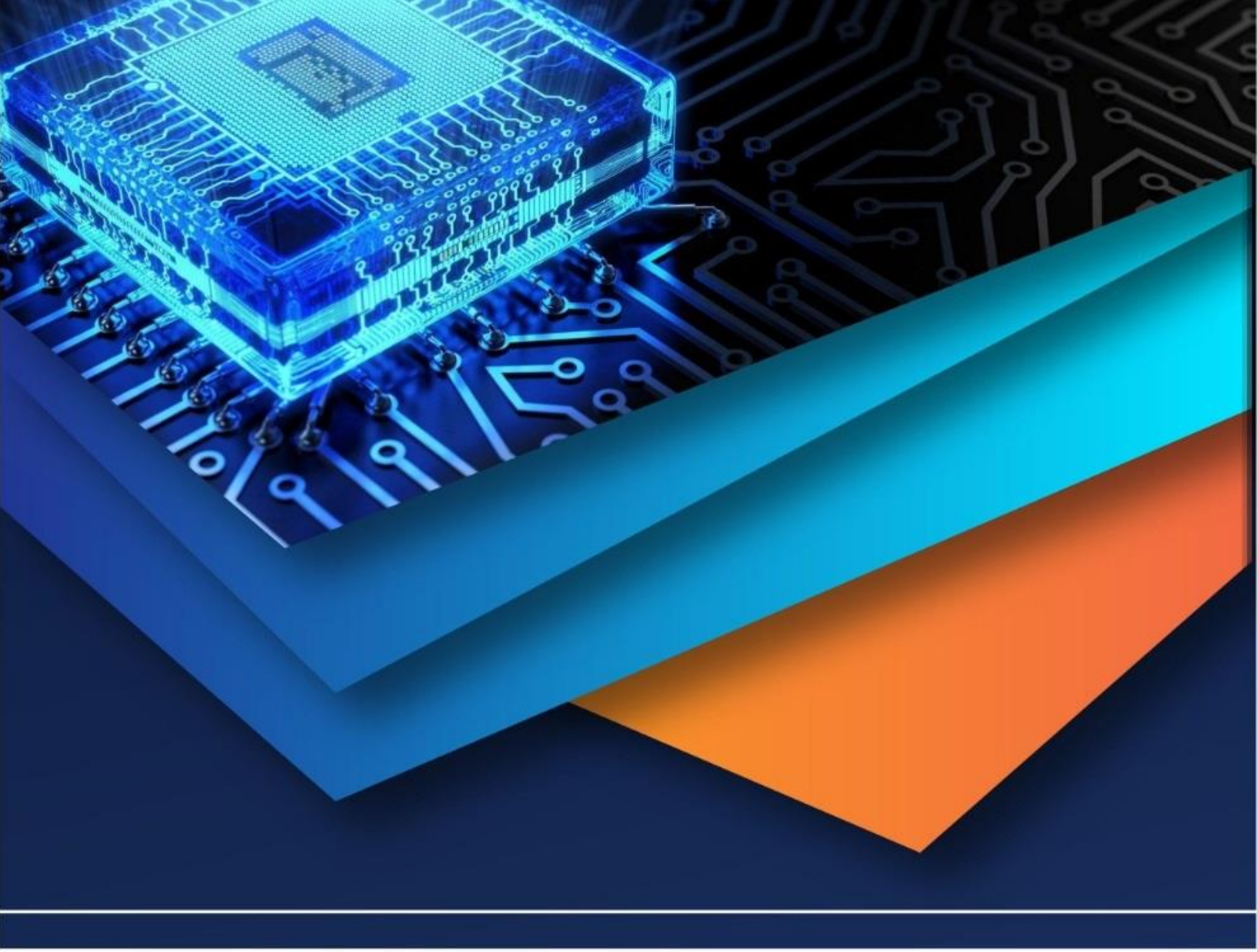
Such automatic street lights can be implemented on two and four lane highways . Moreover to make system more energy efficient solar energy can be utilized as energy supplier .

REFERENCE

[1] Existing video links
https://youtu.be/2mwVC08looc
https://youtu.be/ZGjsQpJ7Z_Y

[2] Paper references
Paper 1: file:///C:/Users/DELL/Downloads/Paper1368%20(1).pdf
Paper 2: file:///C:/Users/DELL/Downloads/IJISRT21MAR679.pdf

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