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Vehicle Movement Street Light with Automatic Light Sensing

Suresh Kumar[1], Hrithik[2], Vinit Prasad Reddy[3], Dnyaneshwar Rao.

Abstract - *When there are no vehicle movements on the road, the primary goal of a smart street light is to use less energy. When there are cars on the road, the Smart Street Light will glow brightly; otherwise, the lights will stay dull. The research demonstrates automatic control of streetlights, which results in some electricity savings. The Smart Street Light offers an energy-saving solution by using IR sensors to detect an approaching vehicle and then turning ON a block of street lights in front of the vehicle at high intensity. The tail lights automatically dim when the car moves by. As a result, we conserve lots of energy. Consequently, without any vehicles*

Key Words*: *Arduino uno, IR Sensor, LDR Sensor, LED

1. INTRODUCTION

2. The importance of automation in both daily life and the global economy is on the rise. Any type of manual system is favored to automatic methods. The phrase "SMART STREET LIGHT SENSING" is another term for it. Public street lighting that adjusts to the movement of pedestrians, cyclists, and vehicles is referred to as intelligent light sensing. When no activity is detected, intelligent street lighting, also known as adaptive street lighting, dims; however, when movement is detected, it brightens. The research demonstrates automatic control of the streetlights, which results in some electricity savings. Automation goes beyond mechanization in the context of industrialization. Automation significantly reduces the need for physical labor, whereas mechanization provides human operators with equipment to help users with muscular requirements of work.

3. PROPOSED SYSTEM

The automatic street light control system operates on 12V DC supply. The streetlight controller has a photoconductive device whose resistance changes proportional to the extent of illumination, which switches ON or OFF the LED with the use of transistor as a switch. Light dependent resistor, a photoconductive device has been used as the transducer to convert light energy into electrical energy. The central dogma of the circuit is that the change in voltage drop across the light dependent resistor on illumination or darkness switches the transistor between cut-off region or satuaration region and switches OFF and ON the LED.

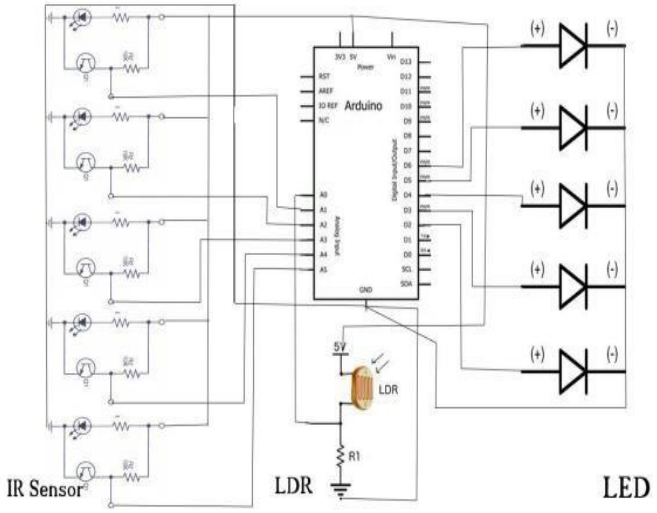

Fig -1: Circuit diagram of Smart Street Light using IRSensors

4. EXPERIMENTAL WORK

Steps included in building a Smart Street light.
1. Output of the LDR pin is connected to A0 (analog) port ofArduino Uno board.
2. Connect all output of the IR sensors to port numbers A1, A2, A3, A4 and A5 respectively (analog) which is the input

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signal to the Arduino board.
3. Connect the ground of all the IR sensors to GND port.
4. The output signals from LED are connected to port number 5, 6, 9, 10 and 11 respectively.
5. Again connect all the negative terminals of LED's to GND
port.
6. Power is passed to the Arduino (7-12V)

4. HARDWARE MODULE

The Hardware Of Smart Street Light Circuit are:1.Power Supply
2.Arduino Uno3.IR Sensor 4.LDR Sensor 5.LED's

4.1. Power Supply

There are many types of power supply. Most are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices.
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A power supply can by broken down into a series of blocks,each of which performs a particular function
Regulator eliminates ripple by setting DC output to a fixed voltage
By using step down transformer we can convert high voltage(230v) to low voltage(5v or 12v) and with the use of rectifier we convert this ac signal to dc signal with some distortion and by using filter we removes all unwanted components (ripples) and finally regulates the voltage of 5vor 12v based on user requirement.

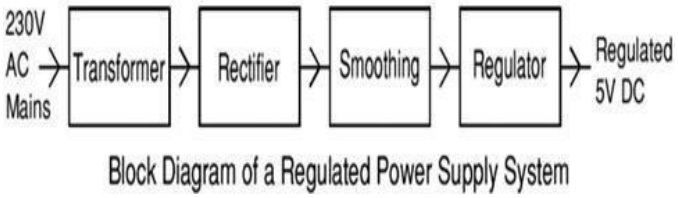

Fig. Block diagram of regulated power supply system.

4.2 Arduino Uno

Arduino Uno Specifications:

1.Microcontroller: ATmega3282.Operating Voltage: 5V
3.Input Voltage (recommended): 7-12V4.Input Voltage (limits): 6-18V
5.Digital I/O Pins: 14 (of which 6 provide PWM output)6.Analog Input Pins: 6
7.DC Current per I/O Pin: 40 mA 8.DC Current for 3.3V Pin: 50 mA
9. Flash Memory: 32 KB of which 0.5 KB used by bootloader
10. SRAM: 2 KB (ATmega328)
11. EEPROM: 1 KB (ATmega328)
12. Clock Speed: 16 MHz

Fig: Arduino Uno

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4.3 IR Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (light emitting diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.

Fig: IR Sensor

5.4 LDR Sensor:

A Light Dependent Resistor (LDR) is also called a photo resistor or a cadmium sulfide (CdS) cell. It is also called a photoconductor.
It works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases

Fig: LDR Sensor

5.5 LED's

A light-emitting diode (LED) is a two-lead semiconductor light source. It is p-n junction diode that emits light when activated. The long terminal is positive and the short terminal is negative. When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

Fig: LED's

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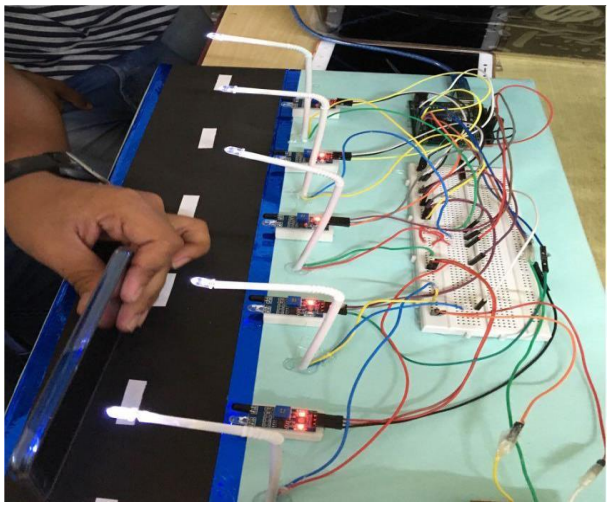

7.EXPERIMENT & RESULT

In this section, the setup of the whole research work is depicted in a step by step manner.All the components are connected to each other and thus completes the system setup.

6.CONCLUSION

The Streetlight controller using ldr based Light intensity & traffic density, in the todays up growing countries will be more effective in case of cost, manpower 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 paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF.The street lights has been successfully controlled by microcontroller. With commands from the controller thelights will be ON in the places of the movement when it's dark.

7.FUTURE SCOPE

We can save the energy for the future use and we can control the losses of the power. We can implemented this project for the home lamp or night lamp of the room. This is also usedfor the signals.

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