AUTOMATIC VEHICLE DETECTING STREET LIGHTS

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Abstract: Smart Street Light spotlights on different restriction and difficulties identified with traditional and old street lights that are confronted now days and the answer for the deal with those issues by embracing the vision of a smart street light. The noteworthiness of this vision is "a completely mechanized bidirectional force conveyance of power and information between the road lights and all the directions in the middle". Smart street lights are vitality effective as well as extremely dependable. The primary thought in the present field advances are computerizations, power utilization, and expense adequacy. Automation is implied for the decrease of labor as the human has gotten to be excessively occupied and even incapable, making it impossible to discover time to switch the lights. Presently a day's everybody are mindful of the availability of limited power sources like coal, biomass, and hydro and so on. Unnecessary wastage of power in the street lights is one of the noticeable power loss. Two sensors viz. The light dependent resistor (LDR) and object sensor which are utilized as a part of the smart street light framework to recognize day and light and distinguish the movement of walker and vehicle separately. The LDR identifies the vicinity of daylight and naturally turn off the street lights in the day time and turn it on without daylight which decrease the issue of manual switching of road lights. The object sensors identifies the movement of any object and offer command to the microcontroller to glow the road lights with 100% intensity and without any movement in the street give command to the microcontroller to glow with 10% of its maximum intensity. Here I have utilized an Arduino Uno to control all the command from LDR and Object Sensor and execute them legitimately. Fundamentally it acts as the mind of the entire framework.

Index Terms: **Arduino, LDR, Object sensor, etc.,.**

I. INTRODUCTION

The thought of outlining a new framework for the street lights that don't devour immense measure of power and light up vast zone with high intensity. Smart Street lights framework is an essential piece of the smart city which represents 10-40% of aggregate power utilizations which is a discriminating attentiveness toward general society powers. So a vital and productive vitality advancements are to be executed for monetary and social security.

Background of Study:

The present framework is similar to, the road lights will be exchanged on in the night prior to the sun sets and they are exchanged off the following day morning after there are adequate lights on the streets. The hindrance of the framework is that we require manual operation of the road light which needs labor. In sunny and rainy days, ON and OFF time differ discernibly which is one of the significant hindrances of the present street lights systems. Conventional street lighting systems are online most of the day without purpose. The consequence is that a large amount of power is wasted meaninglessly. With the wide accessibility of adaptable lighting innovation like light transmitting diode (LED) lights and all over accessible remote web association, quick responding, dependable working, and power moderating street lighting frameworks get to be reality. The reason for this work is to portray the Smart Street Lighting framework, a first way to deal with perform the interest for adaptable smart lighting frameworks. The goal of this undertaking is to plan an automated lighting framework which focuses on the saving of power; to construct a vitally energy efficient smart lighting framework with integrated sensors and controllers; to outline a smart lighting framework with particular methodology plan, which makes the framework adaptability and expandability and configuration a smart lighting framework which similarity and versatility with other commercial products and mechanized automated system, which may incorporate more than lighting frame.

Problem Statement:

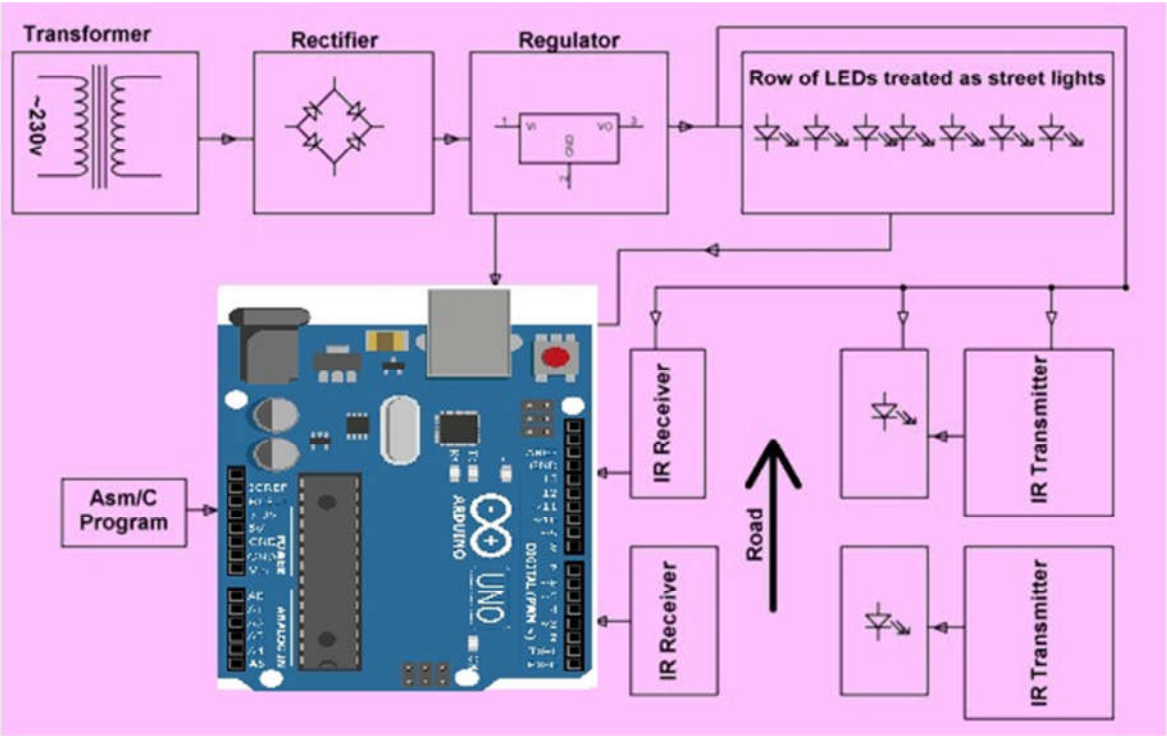
Statement [1]: Street lights are on in the presence of sun light.
Statement [2]: Street lights are on in the absence of any vehicle and pedestrian.

Disadvantages of Classical Street Light:

- Street lights are remain on when there is a visible spectrum of light.
- These street lights need a manual switching operation.
- It also needs man power.
- These street lights are unnecessarily glowing with its full intensity in the absence of any activities in the street.
- High power consumption and waste of energy.
- Less reliable.
- Manual hectic operation due to change in season and climate.

To face the various problem mentioned above in the conventional lighting system we need a lighting system that is well equipped with recent inventions and technology. As it is well known to everyone is that the natural sources to generate power is limited and we are wasting so much of energy meaninglessly. So if we can use automation in this particular case so that all the street lights can be switch on and off automatically when it is really necessary. And if we can use controller circuits to implement a model so that all the street lights can only glow with its maximum intensity when there is activity in its region otherwise it should glow at a minimum given intensity. So that we can save a huge amount of power. With the inventions of light emitting diodes which has a small amount of power consumptions and high efficiency; we should use light emitting diodes instead of all classical fuse bulbs. With the help of all these sensor available in the market; we should have 100% control over the street for the safety and security of lives in the streets along with a flexible transportation system.

II. BLOCK DIAGRAM OF AUTOMATIC STREET LIGHTS



Components in block diagram

- transformer
- rectifiers
- capacitors
- voltage regulator
- aurdino
- IR sensor
- led
- resistors

III. DESCRIPTION

1. TRANSFORMERS

A transformer is a static electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. A varying current in one coil of the transformer produces a varying magnetic field, which in turn induces a varying electromotive force (emf) or "voltage" in a second coil. Power can be transferred between the two coils, without a metallic connection between the two circuits. Faraday's law of induction discovered in 1831 described this effect. Transformers are used to increase or decrease the alternating voltages in electric power applications.

Since the invention of the first constant-potential transformer in 1885, transformers have become essential for the transmission, distribution, and utilization of alternating current electrical energy.[3] A wide range of transformer designs is encountered in electronic and electric power applications. Transformers range in size from RF transformers less than a cubic centimeter in volume to units interconnecting the power grid weighing hundreds of tons.

2. RECTIFIERS

In a Full Wave Rectifier circuit two diodes are now used, one for each half of the cycle. A multiple winding transformer is used whose secondary winding is split equally into two halves with a common centre tapped connection, (C). This configuration results in each diode conducting in turn when its anode terminal is positive with respect to the transformer centre point C producing an output during both half-cycles, twice that for the half wave rectifier so it is 100% efficient as shown below

3. ELECTRONIC FILTERS

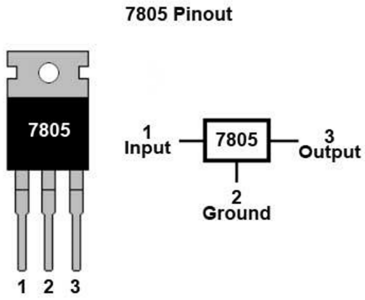
Electronic filters are circuits which perform signal processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones, or both. Electronic filters can be:

CAPACITOR

- passive or active
- analog or digital
- high-pass, low-pass, band-pass, band-stop (band-rejection; notch)
- discrete-time (sampled) or continuous-time
- linear or non-linear
- infinite impulse response (IIR type) or finite impulse response (FIR type)

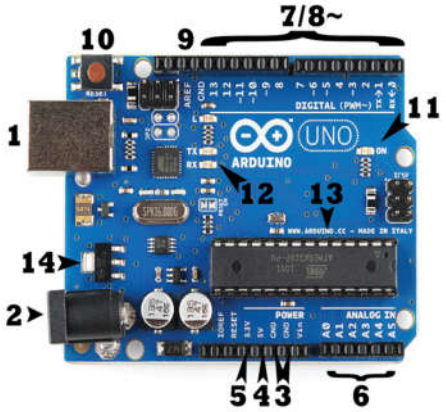
4. VOLTAGE REGULATOR

A voltage regulator is a system designed to automatically maintain a constant voltage level. A voltage regulator may use a simple feed-forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements. In automobile alternators and central power station generator plants, voltage regulators control the output of the plant. In an electric power distribution system, voltage regulators may be installed at a substation or along distribution lines so that all customers receive steady voltage independent of how much power is drawn from the line.



5. AURDUNO

Arduno is an open-source platform used for building electronics projects. Arduno consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduno platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduno does not need a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduno IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduno provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.



IV. WORKING

The aim of this project is to design a street light control system using 8051 microcontroller, which automatically turns on or off the street lights by detecting the movement of vehicles. At the beginning, when there is no obstacle, the IR receiver continuously detects IR light transmitted by the IR Transmitter. When a car or any other vehicle blocks any of the IR sensor, the microcontroller will turn ON the immediate three LEDs. At the beginning, when there is no obstacle, the IR receiver continuously detects IR light transmitted by the IR Transmitter. When a car or any other vehicle blocks any of the IR sensor, the microcontroller will turn ON the immediate three LEDs. The IR transmitter is placed directly in line of sight with IR receiver, so that the IR receiver continuously receives infrared rays. Once the IR receiver receives infrared rays, the microcontroller will detect Logic 1. If the infrared rays are blocked by some means, the microcontroller will detect logic 0.

So, the program for the microcontroller must be written in such a way that it will turn ON the LEDs, which means here the street lamp, when it detects Logic 0 and it will turn OFF the LEDs, when it detects Logic 1. Consider the two IR sensors i.e. IR Transmitter and IR Receiver are placed on the either side of the road. As per the circuit diagram, the IR receivers are connected to the PORT0 and the LEDs are connected to the PORT2 of the microcontroller. At the beginning, when there is no obstacle, the IR receiver continuously detects IR light transmitted by the IR Transmitter. When a car or any other vehicle blocks any of the IR

sensor, the microcontroller will turn ON the immediate three LEDs. If the car blocks the first IR sensor, the first three LEDs are turned ON by the microcontroller. As the car moves forward and blocks the second IR sensor, the corresponding next three LEDs will be turned ON and the first LED of the previous set is turned OFF. The process continues this way for all the IR Sensors and LEDs. This paper expounds the configuration and development of Smart Street lighting control framework circuit. Circuit meets expectations appropriately to turn road light ON/OFF. In the wake of planning the circuit which controls the light of the road as delineated in the past segments. LDR sensor and the object sensors are the two fundamental conditions in living up to expectations the circuit. On the off chance that the two conditions have been fulfilled the circuit will do the wanted work as indicated by the particular system. Every sensor controls the killing ON or the lighting segment. The road lights have been effectively controlled by Arduino UNO. With orders from the controller, the lights will be ON in the spots of the movements. Besides the downside of the road light framework utilizing timer controller has been succeeded, where the framework relies on upon photoelectric sensor. At long last this control circuit can be utilized as a part of a long roadway between the urban areas as well as the rural areas. The venture points were to lessen the reactions of the present street lighting framework and discover an answer for power loss. In this venture, the first thing to do is to set up the inputs and yields of the framework to control the lights of the street. The model acts not surprisingly and will turn out to be exceptionally valuable and will satisfy all the present limitations if actualized on a vast scale.

V. PROGRAM TO CONTROL DEVICES

```
int ir1=2;
int ir2=3;
int led1=6;
int led2=7;
int proxy1=0;
int proxy2=0;
void setup()
{
pinMode(ir1,INPUT);
pinMode(ir2,INPUT);
pinMode(led1,OUTPUT);
pinMode(led2,OUTPUT);
}
void loop(){
proxy1=digitalRead(ir1);
if(proxy1==HIGH)
{
digitalWrite(led1,LOW);
}
else
{
digitalWrite(led1,HIGH);
}
```

VI. CONCLUSION

This paper expounds the configuration and development of Smart Street lighting control framework circuit. Circuit meets expectations appropriately to turn road light ON/OFF. In the wake of planning the circuit which controls the light of the road as delineated in the past segments. LDR sensor and the object sensors are the two fundamental conditions in living up to expectations the circuit. On the off chance that the two conditions have been fulfilled the circuit will do the wanted work as indicated by the particular system.

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FUTURE SCOPE

The reliable intelligent driver assistance systems and safety warning systems is still a long way to go. However, as computing power, sensing capacity, and wireless connectivity for vehicles rapidly increase, the concept of assisted driving and proactive safety warning is speeding towards reality. As technology improves, a vehicle will become just a computer with tires. Driving on roads will be just like surfing the Web: there will be traffic congestion but no injuries or fatalities. Advanced driver assistant systems and new sensing technologies can be highly beneficial, along with large body of work on automated vehicles. These findings suggest that the research into autonomous vehicles within the ITS field is a short term reality and a promising research area and these results constitute the starting point for future developments.

Some of the suggestions towards extension and/or future related works are identified and are summarized below:

New sensory systems and sensory fusion is to be explored to plug additional information to the control system.

Thus, with the current and growing awareness of the importance of security, trustworthy vehicle autonomous systems can be deployed in few years.

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