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INGENIOUS STREET LIGHTING SYSTEM USING IR SENSOR

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ABSTRACT

The paper deals with making a smart street light that would enable itself when it comes in contact with an obstacle i.e. a vehicle for an instance and turn off when there is nobody around . The system requires infrared sensors , Led's

I bread board , relay and a battery for making the entire idea functional . The IR sensors that are responsible for detection of an obstacle would be manually placed between street light poles , on detection of an obstacle ; they would send electrical signals to the bread board . The relay that would be powered

by a battery source will then eventually turn on the street lights of the location where the obstacles is detected . This proposes the of idea of illuminating the street only when required and turning of the lights immediately when not in need. It hence saves the power consumption

Keywords: infrared sensors, smart street light, bread board (key words).

I. INTRODUCTION

Automation plays an rapidly important role in the world economy and today's life. Automatic systems are being preferred over manual system. This project work shows automatic streetlights control as a result of which power is less consumed to some extent.

Nowadays, we human beings are manufacturing large amount of vehicles for the purpose of transportation. So it is the fact that we would need double the number of roads for those vehicles to be moving from source to destination. In the same way, we need millions of LED's and street light bulbs for the same road to enlighten the streets. Here, the amount of electricity wasted for keeping those street lights continuously working is abundant and the lights were still kept on even when they weren't used. An ingenious street lighting system can cut municipal street lighting costs as much as 40% - 80%. An intelligent street lighting system is a system that adjusts light output based on usage and reduction of power consumption.

This is a necessity to establish a technique that would automatically turn on the street lights, on encounter of a vehicle passing by and turn them off when there is of no use. The LEDs are more efficient technique for the modern world of street lighting system. When the modern type LEDs street lighting system is inculcated, we can replace the traditional way street lamping system such as incandescent, fluorescent and High Pressure Sodium Lamp. But, LED technology is an efficiently highly difficult process which needs a combined of production lines, high-precision manufacturing process and extremely top quality materials. Hence, this technique works highly efficient system of the ingenious street lighting system using these Infrared sensors and LED lights including an interface for managing and controlling purpose. Therefore, here we have decided to take up this system that are most economically lesser of cost and for implementation is technically less complex.

Street lighting is the most important one for today's environment. The street lighting are simple but leads to urbanization as that number of street lights are increasing rapidly day by day with density high traffic. Therefore, we have to consider several factors while designing the street light technique such as intensive street lighting

system for safety of community member and road users during night time that reduces the crime and minimizing its effect.

Before, the street lights were controlled manually, where each street lights were set to control switch. Later came up with the use of sodium lamps of high pressure called optical control method. Now a days, this techniques are widely used to recover with new upcoming , this method operates by automatically setting up light during dusk and turning it off after drawn automatically in the morning. Because of these technologies developing nowadays, the road lighting can be considered with the installation area and performance.

II. STREET LIGHTING SYSTEM ARCHITECTURE

A. System Model

The system architecture of the ingenious street light system consists of IR sensors, LEDs, Arduino, bread board and jumper wires. The infrared sensors have placed beside the poles of the street lights which would sense the obstacle (vehicle) . These Infrared sensor can measure the heat of an object as well as detects the motion would then pass an electrical signal to the central sensor box of the street, consisting of a arduino. This arduino is responsible for the entire process powered by an external battery source. Then it initiate LED lights of the street where the vehicle(obstacle) is detected, here by enabling the driver of the vehicle to drive through a dark street. The light is illuminated at the part of the street where there is some obstacle and turn it off immediately when there is no use.

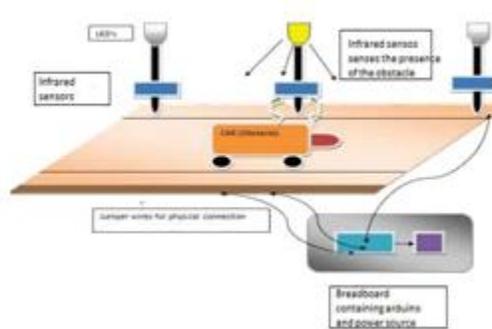


Fig: street lighting system Architecture

B. Infrared sensor

An infrared sensors is an electronic device that senses the an aspects around it. An IR sensors measures the intense of an object as well as the movement. All the objects radiate some thermal radiation and that is detected from the infrared spectrum which are not visible to our naked eyes. The IR light is converted into an electric current, and this is detected by a voltage or amperage detector

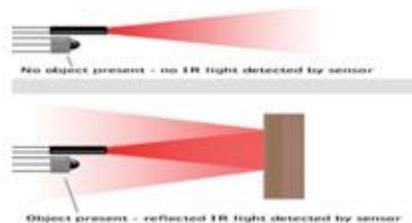


Fig: IR Sensor

C. Arduino UNO

It is an open source platform used to build an IOT projects. It has been used in manufacturing of microcontroller and its kit for building digital objects for this digital world. In this platform embedded physical circuit board and piece of software. Arduino Uno is a microcontroller board of ATmega328. It consists of 14 digital I/O(inputs and outputs pins) out of which 6 are used as PWM outputs, a 6 analog inputs, ceramic resonator of 16MHz, a power jack, a USB connection, reset button and ICSP header. Powering it with a AC-to-DC adapter or battery to get started or it can be simply connect it to a computer with a USB cable.

*Fig: Arduino UNO**D. LED*

A light emitting diode is a p-n junction semiconductor lead diode light source, which emits the light when activated. The electrons are able to recombine with electrons-holes pair within the device. When a current is applied to the device, and releasing energy in the form of photons. This is called as electroluminescence. LEDs consume low energy and which is smaller in size and switches fast.

*Fig. LED Lights**E. Breadboard*

A breadboard is temporary prototype solder less device of an electronic test circuit designed component. The jumper wire's lead is connected to the holes of the breadboard which takes the connection of the entire system.

III. RESULT AND DISCUSSION

In this project works on the basis of hardware and software part. The result of this project deals of the street lights glow on only when the obstacle(vehicle) is passed by or present in the surrounding. As when the vehicle or an obstacle is passed off the street lights which were on will glow off and the street lights corresponding the obstacle glows on. The starting and ending of every road, the Street lights will be on in order to inform the vehicle's driver that the road is ahead and at the end to inform that the end of the road. Implementing this technique to the present modern world, the less power consumption will be and technically ease to implement with much lesser cost. Speed of the vehicle can be avoided. This technique is more versatile and highly implementable.

Inculcating this leads to overcome the evil problem such as high power consumption, traffic circumstances, low color rendering of the street lights, high cost, street light does not glow on rapidly and quite slow, less working span etc.

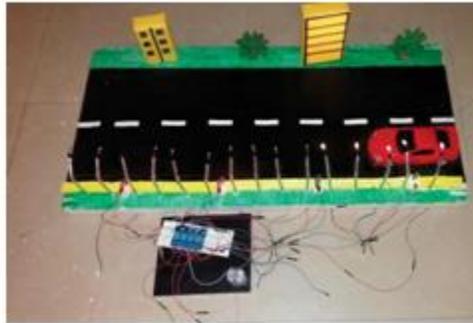


Fig : Status of the Light is ON after obstacle detection

IV. CONCLUSION

It adopts dynamic control methodology for lighting street. The system is extendable, versatile and entirely efficient for the user need. This system works conveniently in the darkness, reducing waste of energy. System inculcate highly efficient LED's to ensure correct illumination and assure energy savings and more efficient. It proposes the technique of illuminating the street only when its needed and turn off of the lights when it is not needed. Hence it saves the power consumption that was once utilized unnecessarily. The proposed system is used for street lighting in rural areas and remote urban. Compare with existing system it will give better result, more efficient, less cost. The system works in the darkness, avoiding waste of energy. Sensors enable the system to operate solely when necessary.

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