Arduino Based Automatic Street Lighting for Energy Conversion

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Abstract: *The objective of the project is to provide automatic control and fault detection of street lamps. The lighting system which targets the energy and automatic operation on economical affordable for the streets and send information about the street lamp fault to the control room. Moreover, errors which occur due to manual operation can also eliminate. The street light system is checking the weather for street lamp ON/OFF condition. The weather is bright or dark, are sense through a LDR sensor. If the weather is bright, the system will be OFF otherwise system will be ON. The light condition is also used to check the lamp glowing status through LDR sensor. If light glows then the sensor sends the value to street light system through the Wi-Fi module. Here, also the PIR sensor is used to measure the motion of vehicle or any other object. According to the program, whenever there is no vehicle cross as the PIR sensor, the light will glow as dim. Otherwise, the light will glow as bright.*

Keywords: Battery, Arduino, IR sensors, LED, Solar Panel, Power supply, etc.

I. INTRODUCTION

In any city, ' street light ' is one of the major power consuming factors. Even in the daytime when there is no requirement of street lights, it is frequently seen that these lights remain ON violating the energy conservation rule. This continuous lighting pollutes the environment as well as increases the tariff of the electricity. The use of streetlight is in public transportation during night time or when the daylight is very feeble.

Therefore, the design and controlling of street lighting is an important area of work for maintaining safe transportation in our daily life Also, we can help out to avoid the accidents that are usually happening in the u - tums and save the life of people. In our project gives the solution to those problems. An automatic street light system using sensors and wireless modules for implements a system. The LDR (Light Dependent Resistor) sensing the weather condition. Whenever PIR sense the motion of vehicle, the street light will glow as bright or normal. Otherwise, the street light will glow as dim.

II. OBJECTIVES

This project is about Smart Street light, street light will turn on while vehicle is passing through it. Here we are using 4 IR sensors that senses the position of the vehicle, each IR sensor controls 3 LED's. When vehicle passes by a particular IR sensor it senses the position of vehicle and gives its signal to the Arduino board and it will turn on the LED's.

This project work is complete on its own in remotely and automatically switching on or off of an electrical appliance not limited to household appliances and sends a feedback message indicating the new present state of the appliance.

III. LITERATURE SURVEY

Review In recent years, many efforts have been taken by the government for Smart City and in that, they try to make system automatic rather than the existing system. There are some traditional methods are available and because of those human efforts get reduced but the wastage of electricity and light pollution still existed. So, for that implementing a more reliable system is required. For any intelligent system, it should operate automatically and it requires the systematic way to operating to maximize the quality and lifeline. Manish Kumar published the paper regarding the streetlight control in the year 2016 using Zigbee wireless module. Zigbee allows for the wireless communication lamp module and the LDR sensor the day and night variations and night lamp health condition. have proposed about Street Light Glow on detecting vehicle movement using sensor is a system that utilizes the latest technology for sources of light as LED lamps.

It is also used to control the switching of street light automatically according to the light intensity to develop flow based dynamic control statistics using infrared detection technology and maintain wireless communication among lamppost and control terminal using ZigBee Wireless protocol. It also combines various technologies: a timer, a statistics of traffic flow magnitude, photodiodes, LED, power transistors. Also have surveyed on Street Lighting System Based on Vehicle Movements. The system operates in the automatic mode which regulates the streetlight according to brightness and dimness algorithm and light intensity. The control can be made according to the seasonal variation.

It includes a time cut-out function and an automatic control pattern for conserving more electricity. The whole project was implemented using a PIC microcontroller. We proposed a ZigBee based Remote Control Automatic Street Light System. The system is designed with the help of ZigBee modules that helps in detecting the faulty lights and control the light. It also discusses about an intelligent system that takes automatic decisions for ON/OFF/DIMMING considering the vehicle movement or pedestrian and also the surrounding environment. PIR motion sensor is used to detect movement of both living and non-living things.
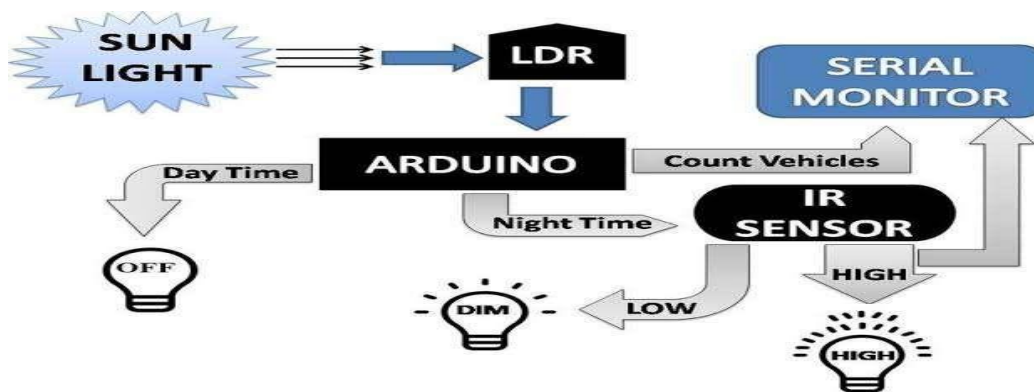

Figure: System Block Diagram

IV. PROPOSED METHODOLOGY

The Smart Street light control system adopts a dynamic control methodology. According to the proposed plan, initially when it becomes dark, all the street lights automatically glow for a few seconds and switches off. But throughout the night, only one street lights remain switched on for security concerns. When a vehicle passes by, a block of street lights glows and as the vehicle moves forward, the next block of lights starts glowing where the previous block switches off.
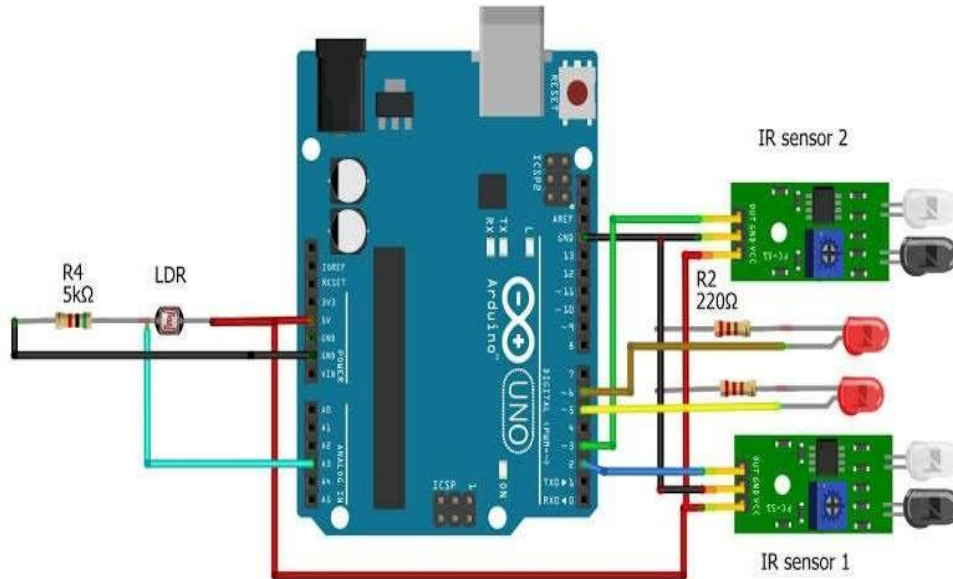
V. CONCLUSION

By using smart street light one can save surplus amount of energy which is done by replacing sodium vapour lamps by LED adding an additional feature for security purposes. It prevents unnecessary wastage of electricity caused due to manual switching of street lights when it's not required. It provides an efficient and smart automatic street light control system with the help of IR sensor. It can reduce the energy consumption and maintains the cost. The system is versatile, extendable and totally adjustable to user needs.

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