

Smart street light using Arduino

T. H. Feiroz khan¹ Subhash Kumar², Suraj Sharma³, soumyadeep dutta⁴, saurav jaiswal⁵,
1-Assitant Professor ,2,3,4,5-Student
Department of computer science and engineering
SRM IST, Chennai, India

Abstract— Conventional street lights have been seen as a major power consumption unit. With the introduction of smart street lights, we aim to automate the process of turning the street lights on when required. Also, the use of LED bulbs assures low power consumption. The main objective of this module remains to control the intensity of the street lights in accordance with the natural daylight, which can help save energy. In addition to the aforementioned functionalities, we aim to add weather monitoring system, pollution monitoring system, and a display of these on a LED screen on the light pole. The system shall be powered by solar panel which helps the cause of saving energy. The major drawbacks of Conventional street lights have been seen as a major power consumption unit. Use of halogen bulb are not very eco-friendly and consume lot of power. Manual monitoring of streetlights can be a tedious task as well.

Keywords— Smart Street Light, LED bulb, Solar panel, Weather monitoring, Pollution monitoring

I. INTRODUCTION

street light is a raised supply of sunshine on the edge of a road or path. Street light is necessity of developed or developing society. street light needs power to glow it. existing street lights have been seen as a major power consumption unit. The 21st century is struggle hard to save electrical energy. Street lights are extremely important, but costly, therefore there is need to computing the system in a way that it is inexpensive and efficiently conserves energy. Existing street lights require manual

monitoring which can be a tedious task. The main problem that manual controls on the street lights that leads to wastage of electricity. another way in light the light are glow with full intensity where the traffic is less in night. And one more important thing that people should know about their surrounding environment. Therefore, it's become important to overcome the existing systems problem and design a new system. A system which reduces manual control and would efficiently save energy and provide a basic knowledge about environment. This could be possible by smart street light.

II. EXISTING SYSTEM DRAWBACK

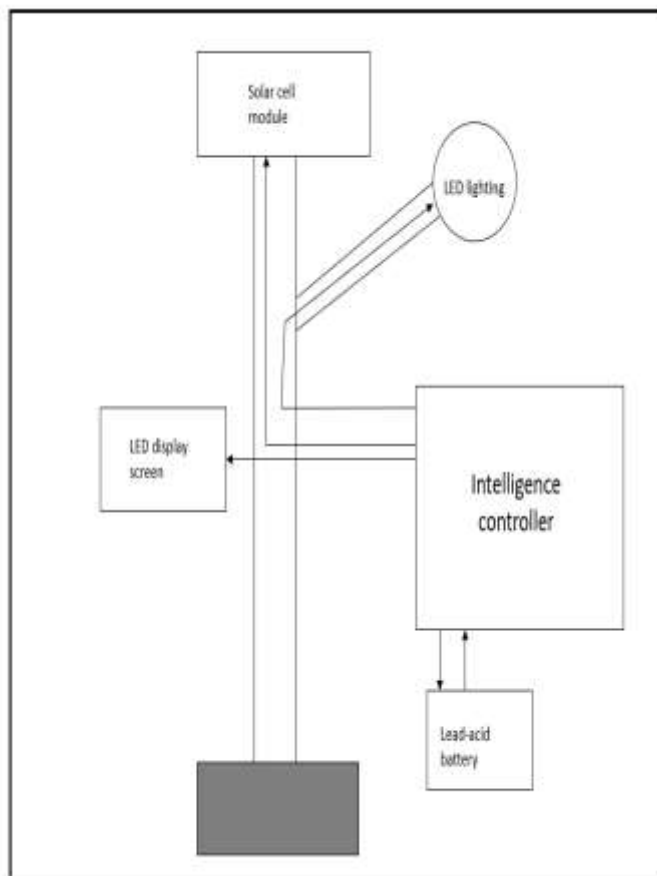
- In existing street light halogen bulbs or HID bulbs are used which are not very eco-friendly and consume lot of power.
- Existing system require Manual monitoring of streetlights. Which can be a tedious task as well.
- There are no functionalities, like weather monitoring system, pollution monitoring system.
- There is very less street light powered with solar panel.
- In today's market, labor rates are increasing day by day creating it troublesome to seek out staff once required.

III. PROPOSED SYSTEM

This paper is based on street light development which will help to develop a smart street light. The proposed system which does not consist of any expensive hardware which if fails could be easier to

replace. The light will sense the brightness in environment and adjust the intensity as per the same. The principle used to decide the surrounding environment. Sensors are affixed to sense the luminosity. The proposed system will reduce most drawbacks of existing system. the proposed system aims to use LEDs in place of conventionally used halogen bulbs or HID bulbs. This ensures 100% automation (in exception to periodic maintenance). The proposed system aims to power the module using solar energy. In addition to existing systems, we plan to add special sensors to monitor air pollution level and weather monitoring system, so that the travelers and pedestrians have a good knowledge about their environmental surroundings.

IV. SYSTEM ARCHITECTURE



System architecture

v. CIRCUIT COMPONENTS

1. ARDUINO Uno

Arduino Uno is the brain of the project. It has 14 digital input/output pins, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller. We are using 12 pins in this project. 2 pins are used for MEGA EX sensor, 2 pins are used for motion sensor, 2 pins for brightness sensor and other 6 pins are used to control the LCD.

2. SENSORS

The various type of sensors used in this proposed system such as Air pollution sensor are device that detect and monitor the presence of air pollution in the surrounding area. Brightness sensor are device that use to sense the amount of light present and appropriately dim device light to match it. Motion sensor is a device that notice moving object, mainly people. When more people will available around light will glow with high intensity.

3. SOLAR PLATE AND CELL

Photovoltaic solar panels mop up sunlight as a source of energy to generate electricity. Which is connected to a cell that stored the energy during day time. This cell is used to powered the system.

4. CONTROLLER

A microcontroller is a small computer on a single integrated circuit. contains one or more CPUs along with memory and programmable input/output peripheral. Which control the whole function of system.

5. LED

Light emitting diodes represents our light weighting system and also the quantity of sunshine emitted by its directly associated with the quantity of sunshine within the setting that's once outside light is a smaller amount than the sunshine given by LEDS is a lot of and visa-versa

6. LED DISPLAY

This is a display screen which will display air quality and weather report of surroundings environment.

VI. IMPLEMENTATION AND OBSERVATION

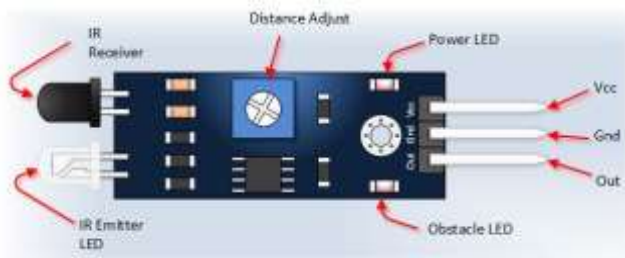


Fig.1 Arduino ir sensor



Fig.2 Arduino UNO



Fig.3 LED light

The hardware implementation of the system. It consists of a intelligence. for the implementation of smart street light we need the following component as Arduino sensor, Arduino UNO,LED light ,Arduino board as shown in fig1`Arduino sensor which is used to control the intensity of light and fig2 The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital **input/output pins** in which 6 can be used as **PWM outputs**, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs.and in fig 3 LED light is connect to all system .the connection are shown as fig 4. To connect all component. Connect all ir component and the positive pin of leds are connected to these pins of Arduino.

Fig 4 connect all component

VII. FUTURE ENHANCEMENT

Further development can be done in the proposed system to increase the system efficiency by deploying Global System for Mobile Communications (GSM) system to send automatic text message to host at the control station, range of Zigbee communication can be increased by using RF (Radio Frequency) amplifiers.

Capacity of the network can be increased by implementing higher class topologies and to have an internal database (date, time, status and location) to keep track of the street light activity for reference and maintenance purposes.

VIII. CONCLUSION

The existing system use halogen bulb which are not very eco-friendly and consume lot of power. The solution to energy conservation is to introduce a system that could sense brightness environment and act accordingly so that seasonal change would not affect the intensity of street lights. Also, LEDs should replace HID lamps due to their dimming feature. air and weather report will be displayed on screen which will be additional knowledge for people around.

V. REFERENCE

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