

REVIEW STUDY OF INTELLIGENT STREET LIGHT SYSTEM

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ABSTRACT:

In India, energy consumption plays a major role in day to day life. The outcome is that a large portion of electrical energy used by the Street lighting is wasted unnecessarily if the road traffic is minimum. Conventional street light systems are switched on/off for fixed duration of time. If smart street light is designed and implemented in the cities then, lot of power can be saved. Use of LED lamps over Conventional Street lamps reduces the pollution and increase the life span of lamps. LED lamps has better luminous efficacy as well as better color rendering index. The system is modified in such a way that will automatically turn off during daytime and operates only during the night. System automatically minimizes the intensity of the light after midnight meanwhile if any vehicle passes by then respective set of lamps will be on at maximum intensity.

KEYWORDS:

LED Lamps, Vehicle Detection Sensor, LDR, LCD, Arduino Board

INTRODUCTION:

In recent years, environmental issues have gained attention at international level. As such an energy conservation for illumination in large scale tasks such as street lighting is gaining importance at a high level. Street lights are the large consumer of energy in the cities and an intelligent street light system based on LED lamp.

In earlier days, street lamps were controlled manually where a control switch is set in each of the street lamps. The proposed system replaced common bulbs with energy saving LED lamps which can reduce energy consumption by up to 80 percent. The intelligent street light is able to detect daylight as well as vehicles and vary the intensity of the LED street lamps. For illumination, HID Lamp are use as light sources. Power consumed by HID lamps and the amount of CO₂ released from it have raised to minimize the consumption of electricity used by the street lights, the best solution is to control the intensity of light. Initially, there will be detection of day and night. It is detected by using Light Dependent Resistor global issues. Because of this LED array illumination has grabbed the attention as an energy reducing light source illumination if road using LED lamps requires about one third to one half of the electric power in comparison with HID lamps.

In recent years LED lighting may replace previously used light sources such as HID lamps. Such system results in the development of energy-efficient technologies that leads to reduction in energy consumption and carbon footprints. This system can be applied in all places which need timely control such as streets, stations, schools, and electricity sectors. In addition, the system integrates temperature and humidity sensor that will not only monitor the streetlight but also climate change and it will be displayed on LCD.

WORKING:

I. Night Detection:

To minimize the consumption of electricity used by the street lights, the best solution is to control the intensity of light. Initially, there will be detection of day and night. It is detected by using Light Dependent Resistor (LDR), when its sense the darkness as intensity of daylight diminishes

the resistance of LDR will increase and after threshold level Arduino will detect night mode. During peak hours consider 6pm to 12pm traffic density is high so during this interval LED lamps will be working at full intensity (100%).

II. Intensity Control:

Now after midnight the traffic density reduces so if the lamps are still on there will be wastage of electricity. To overcome this problem we are decreasing the intensity with the time. For this purpose we are using Pulse Width Modulation (PWM), by adjusting the duty cycle intensity of lamp can be controlled. Actually with decreasing the duty cycle the intensity of light also reduces. We will be decreasing the duty cycle with predefined percentage of decrement. At dawn when LDR senses the Day light after threshold level lamps will be OFF automatically.

III. Vehicle detection:

Meanwhile during night hours if any vehicle crosses the motion detector sensor then the particular set of lamps will glow at 100% intensity and when it crosses the next sensor the previous lamps will return to its normal working. This process will continue till the vehicle crosses the street.

IV. Weather Sensor:

For monitoring weather conditions here we have used temperature sensor (LM35) and humidity sensor. This data can be stored and will be displayed on LCD display.

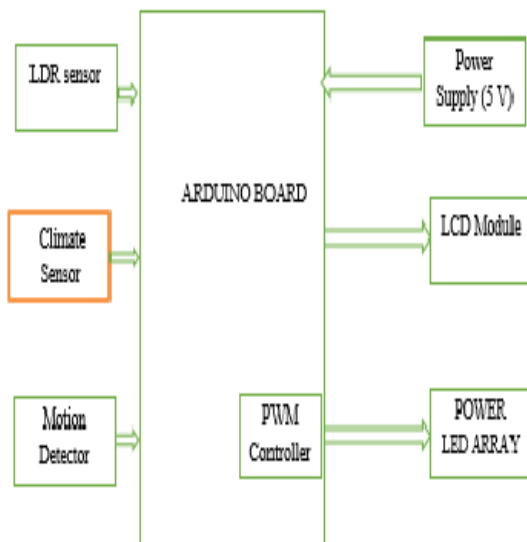


FIG : Block diagram of intelligent street light system

ADVANTAGES:

- Street light automation controller helps in energy saving and management.
- Maintenance cost is reduced.
- Energy used and cost declined, because the lights dim at night when there is low activity.
- Light pollution is reduced because the street light don't shine at full brightness and it has better accuracy.
- Safety is maintained because the lights are dimmed, not turned off completely

CONCLUSION:

The system solution is intrinsically scalable, so it can be immediately enlarged to any particular extensions which can be made according to the requirements and needs, set by public administrations. Also we can save a large amount of energy by properly controlling the intensity of light. As LED lamps do not cause any pollution and it has a great lifetime so it can be easily implemented and overall this system is highly beneficial. This type of system will provide a long time return in future as it consumes less power than normal system.

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