International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 04 | April – 2025 DOI: 10.55041/ISJEM02621
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

VEHICLE MOVEMENT BASED STREET LIGHT USING ARDUINO

Tanuj S. Nangare, Vaishanav S. Kadam, Nikhil N. Menge, Siddharth M. Khavale,
Prof. Prasad P. Pawar
Students, Department Eletronics & Telecommunication
Engineering Lecturer, Department of Electronics & Telecommunication
ZEAL Polytechnic Pune Dhayari-Narhe Road, Narhe, Maharashtra, India

Abstract: Smart Street Light is an automated system which automates the street. The main aim of Smart Street light is to reduce the power consumption when there are no vehicle movements on the road. The Smart Street Light will glow with high intensity when there are vehicles on the road otherwise the lights will remain dim. With advancement of technology, things are becoming simpler and easier for everyone in the world today. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization, whereas mechanization provided human operators with machinery to assist the users with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. The research work shows automatic control of streetlights as a result of which power is saved to an extent. Smart Street Light provides a solution for energy saving which is achieved by sensing an approaching vehicle using the IR sensors and then switching ON a block of street lights ahead of the vehicle with high intensity. As the vehicle passes by, the trailing lights turn dim automatically. Thus, we save a lot of energy. So, when there are no vehicles on the highway, then all the lights will remain dim.

Introduction

Automation plays an increasingly very important role in the world economy and in daily life. Automatic systems are being preferred over any kind of manual system. We can also call it an "SMART STREET LIGHT SENSING". Intelligent light sensing refers to public street lighting that adapts to movement by pedestrians, cyclists and cars. Intelligent street lighting, also referred to as adaptive street lighting, dims when no activity is detected, but brightens when movement is detected. This type of lighting is different from traditional, stationary and illumination, or dimmable street lighting that dims at pre-determined times.

The research work shows automatic power is saved to some extent. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist the users with muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Basically, street lighting is one of the important parts. Therefore, the street lamps are relatively simple but with the development of urbanization, the number of streets increases rapidly with high traffic density. There are several factors need to be considered in order to design a good street lighting system such as night-time safety for community members and road users, provide public lighting at cost effective, the reduction of crime and minimizing it is effect on the environment.

At the beginning, street lamps were controlled by manual control where a control switch is set in each of the street lamps widely used in the country. The method operates by set up an optical control circuit, change the resistance by using of light sensitive device to control street lamps light up automatically adjust and turn off automatically after dawn in the morning.

- **LITERRATURE SURVEY**

Arvind Sriram, Praveen Kumar D., Vishnudharansini s. 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 control of streetlights as a result of which technologies: a timer, a statistics of traffic flow magnitude, photodiodes, LED, power transistors.

K. Santha et al 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.

Srikanth et al 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 thing.

OBJECTIVE

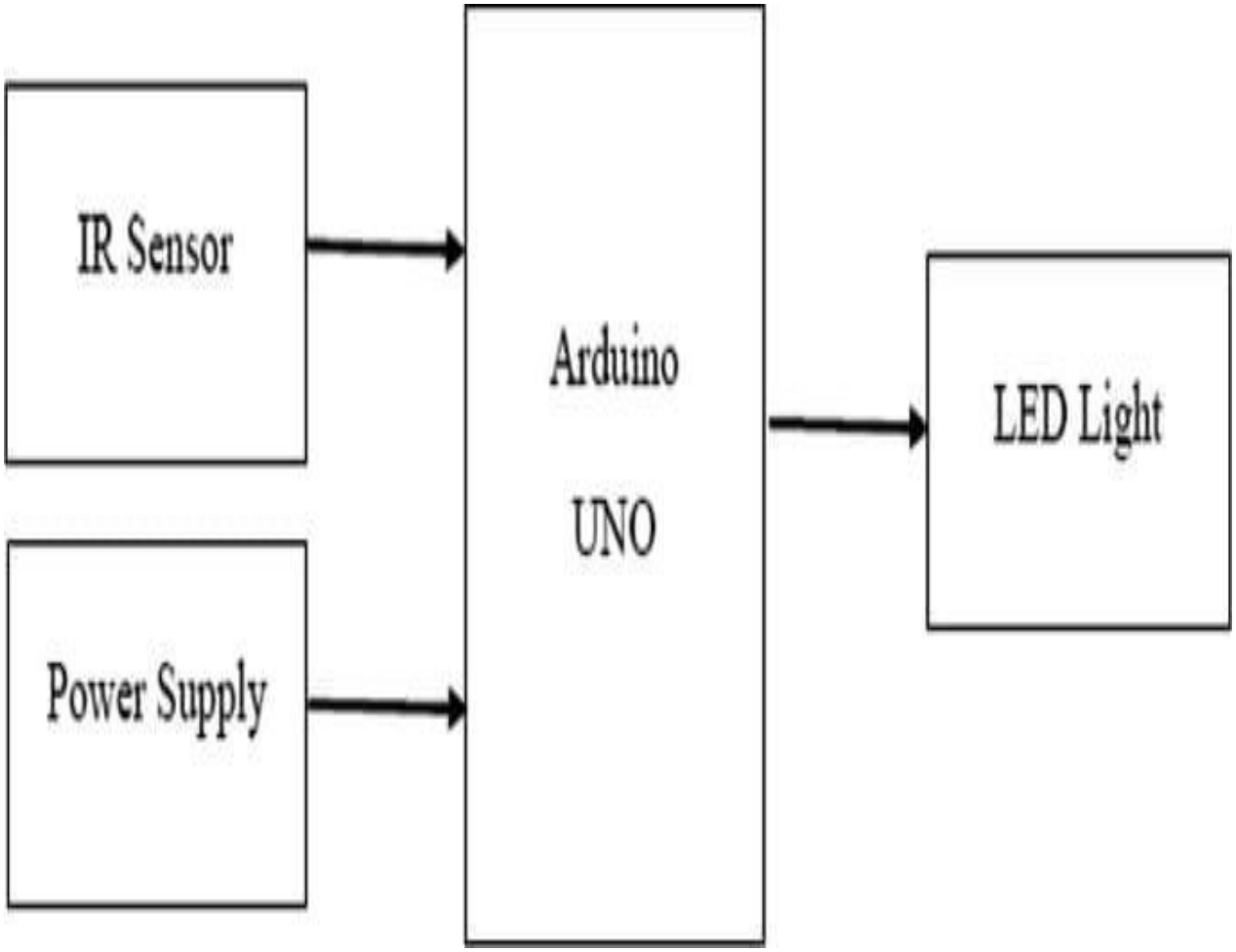
Street lights are doing more than ever in today's smart cities. With digital networks and embedded sensors, they collect and transmit information that help cities monitor and respond to any circumstance, from traffic and air quality to crowds and noise.

They can detect traffic congestion and track available parking spaces. Those very same networks can remotely control LED lights to turn on and off, flash, dim and more, offering cities a chance to maximize low-energy lighting benefits while also improving pedestrian and bicyclist safety. With street lights creating a network canopy, those networks of data can be used by more than just lighting departments, empowering even schools and businesses via a lighting infrastructure that brightens the future of the digital city. Smart lighting helps cities save energy, lower costs, reduce maintenance - all while better serving citizens and reducing energy use and CO2 emissions.

Automation and networked control can further increase your energy savings and reduce maintenance spending. Networked street lighting built on a scalable platform can reduce crime up to 10% and make roadways safer through improved visibility. Leveraging intelligent control systems can rapidly increase lighting efficiencies and traffic management.

International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 04 | April – 2025 DOI: 10.55041/ISJEM02621
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

BLOCK DIAGRAM



Advantages

- If the lighting system implements all LED lights, the cost of the maintenance can be reduced as the life span and durability of LEDs is higher than Neon based lights which are normally used as street lights.
- As the lights are automatically turned ON or OFF, huge amount of energy can be saved.
- This system less costly, less installation and maintenance cost and more efficient as compared to the others system.

Conclusion

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

- The system is now used only for One way traffic in highways.
- Continuous uses of LDR and IR sensors even in day time.
- Not switched on before the sunset. The Smart light system can be further extended to make the current system in two-way traffic, making the system more flexible in case of rainy days and introduction of ways to control the lights through GSM based service.

REFERENCES

[1]. Arvind Sriram, Praveen Kumar D., Vishnudharansini s., "Street light that glows on detecting vehicle movement". Vol- 8, ISSN- 2395 - 5317, ISSUE – 4 APRIL 2018.

[2]. K. Santha Sheela, S. Padmadevi, Survey on "Street Lightning System Based on Vehicle Movements". Vol.3, ISSN- 2319 – 8753, ISSUE- 2 FEB 2014.

[3]. Srikanth M., Sudhakar K.N., "ZigBee Based Remote Control Automatic Street Light System". ISSN- 2321 – 3361, ISSUE- JUNE 2014.