



# Smart Street Lights

Divya Adwani<sup>1</sup>, Aarya Kusumbiya<sup>2</sup>, Harshit Rai<sup>3</sup>, Prasana Dewalwar<sup>4</sup>  
BE Student<sup>1,2,3,4</sup>

Department of Computer Science and Engineering  
Datta Meghe Institute of Engineering Technology and Research, Wardha, India

## Abstract:

A Road light is a raised wellspring of light on the edge of a street or walkway, which is turned on or lit at a specific time when dull. Real advantages of road lighting offers increment in security and avoidance of mishaps during the dim hours. As indicated by examines it is seen that darkness results in huge number of accidents and fatalities particularly those including people on foot wherein walker fatalities are 3 to 6.75 times almost certain in dark than in light. A number of road light control frameworks have been created to decrease and control vitality utilization of a town's open road lighting frameworks. However, our methodology on this circumstance includes programmed task of road lights relying on the dim and controlling a circuit of road lights with explicit counterbalances and system working conventions. These may include sending and accepting guidelines through independent information systems at high recurrence over the highest point of the low voltage supply or may include remote also. We will utilize different conventions just as perfect equipment for this sort of lighting. The control center is intended to manage the information with the goal that it can know the state of every streetlight present in particular zone. As indicated by the outcomes the control center offers requests to every streetlight to control the switch state and brightening of the lights. Thus, we are mainly emphasizing on the maintenance and updates between the pole locations and line man through desktop application. Our major hardware requirements comprise of Arduino Mega, GSM module sim800a, LDR'S, Relay circuits etc. We will also be analyzing the air pollutants present in that particular area with the help of sensors like MQ135 soldered to microcontroller. This application will help in meeting the problems of all the MSEB offices and their overheads for regular maintenance for the street lights. It will also make the life of common man much easy and their complaints will no more be suspended ensuring their safety at night on streets with the reduction in road accidents.

**Keywords:** Arduino Mega, GSM technology, Internet of things, Pollution detection, Remote monitoring, Smart street lights.

## I. INTRODUCTION

The concept of a smart city integrates information and communication technology, also the physical devices connected via network to optimize the operations in city based on the ideology of intellectualization of city management. Hence, the city is said to be smart when it delivers information about the processes in it, based on the analysis of which certain actions and decisions are taken to make the city more safe, convenient and comfortable for residents. Preferably, the city ought to adjust to the requirements of every individual throughout everyday life and turn out to be increasingly customized.

The concept of a smart city with smart streets should implies the use of new technologies in the construction of buildings and structures, climate changes, economic restructuring, the transformation of the processes and methodology of street light management, the use of modern information technologies to improve efficiency, optimize the operations in city and hence improve the quality of life. On the off chance that we think about the idea of a smart city from the perspective of data innovation, it includes the trading of information between urban foundation offices, agents of the city organization, occupants and representatives of associations working in the civil economy, and control and supervisory administrations to make the city increasingly maintainable and proficient.

The analysis of the information exchanged among the supporters of the urban environment, with the assistance of

automated frameworks, makes it possible to carry out an online response and interactive change of infrastructure to the requests of residents and MSEBs. Different developing countries are gradually beginning to become smart country by bringing data advances into their environment and surrounding.

In this project, we will think the services provided, to analyze the world patterns in the field of "Smart Cities" with modern approach of "Smart Street Light Monitoring". Smart cities needs smart and fast connectivity, Iots will be one helping us with this. Internet of Things also known as IoT is an ecosystem of connected physical devices that allow them to connect, interact and exchange data which are accessible through the internet. The 'thing' in IoT could be anything. For instance it could be an individual with a heart screen or a car with inherent sensors for example physical items that are allotted an IP address and can gather and exchange information over a system without manual help or intercession.

The job of embedded technology in the objects is to assist them to interact with internal states or the external environment, which thus influences the choices taken. We can associate gadgets embedded in different frameworks to the web through Internet of Things.

Articles or gadgets can speak to themselves carefully and can without much of a stretch be controlled from anyplace through IoT. Guaranteeing more methods for expanding productivity, improving wellbeing and IoT security this availability

encourages us to catch more information from more places. An automated framework intended to expand the proficiency, exactness and precision of MSEBs via consequently controlled switching of street lights is known as GSM based street light monitoring and control framework. It comprises of an Arduino micro-controller. On setting for time delay, micro-controller switches ON/OFF the street lights and sends the updates through GSM modem to the predetermined lineman of that zone. This can be said as the smart method for overseeing street lighting frameworks. In this undertaking there are essentially two modules, including the server and the customer side. The GSM modem which is associated with the micro-controller is comprised by the customer side while the server side comprises of the JAVA based web server, which collaborates with the client, GSM communication administrator and the database.

## II. METHODOLOGY

The objective of the project is achieved by developing Hardware along with a desktop application. The hardware consists of Step down Transformer, Bridge & Filter, Microcontroller, Current Sensor/Voltmeter, Light Sensors [LDR], and Network module. The transformer, bridge, etc were used to convert the 230V AC power supply to 5V DC supply (which provides power to microcontroller). To detect the outdoor conditions the LDR1 is used, the LDR1 senses that the outdoor conditions if its dark outside then it would send the signal to the microcontroller. The microcontroller in turn would generate the signal which controls the relay that drives the turn on/off mechanism of the light.

The signal from Arduino causes the change in the pole; this pole is the one that is connected to the 230V power supply that provides power to the Street Light. Once light is turned on the next thing is to check whether the Street Light is working or not to do this we are going to use the LDR2 that will be placed next to the light the arduino will check the status of the LDR2 if it's (street light) not working then the arduino will command the GSM module to send signal to the desktop application consisting of the pole no and fault message which will be brought to notice to the authority's concerned with the Street Lighting of that area with the help of desktop application. Also the application will generate an SMS that will be sent out to the line man of that area so that he can visit the place and remove the fault in that particular street light. The application shows the list of poles with their status signal in front of them, the lights will be sorted according to the localities/area.

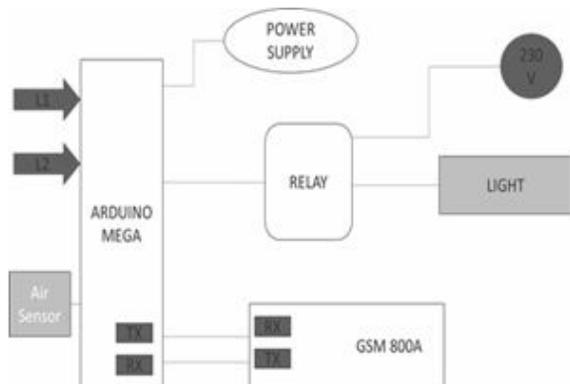


Figure.1.Circuitry

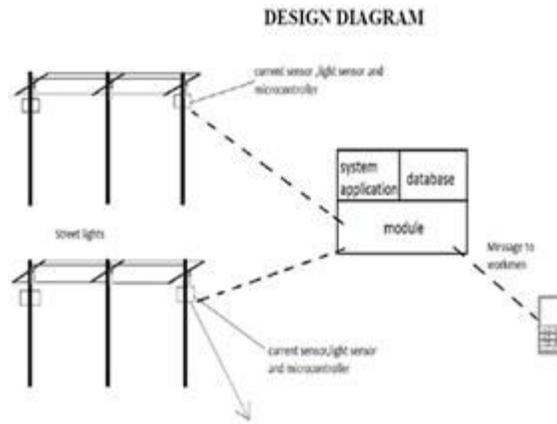


Figure.2.Implementation Methodology

The SMS contains sent to the line man contains the details like the pole no, area, error that is sent to the contact no of the line man via SMS.

## III. RESULTS

The project consists of two modules i.e. server side and client side. The server side controlled by MSEB officers has a desktop application which will display the condition of street light and the analysis of air pollutants in the form of bar graph. As depicted in figure 3 the status of street light will be visible in which the red box shows that there is fault in that particular street light. But when the street light would work properly than the color of box would change to green indicating no fault.



Figure.3.Status of Street Light

And the figure 4 shows a bar graph which would display the analysis of air pollutants present in that area based upon the sensor values on particular date of the month.



Figure.4. Bar graph

#### IV. CONCLUSION

With the combined use of software and the hardware we can eradicate the need to conduct regular survey of the street lights and can also increase the efficiency of the system as whole this in turn saves the revenue of the local authorities. Also with the automation we can save electricity that is consumed by the street lights that will lead to efficient use of the energy as in current system it is required to turn them on/off manually which is delayed due to sheer negligence of the employees. With the prompt utilization of the lights the accidents can be prevented from happening thus ensuring road safety. By eliminating the man power required in the operations we make the system less vulnerable to the environmental conditions.

#### V. REFERENCES

- [1].Simon Siregar, Duddy Soegiarto, "Solar panel & battery street light monitoring system using GSM wireless communication system." 2014 2nd International Conference on Information and Communication Technology (ICoICT) Available: <https://doi.org/10.1109/ICoICT.2014.6914078>
- [2].Mohammed Saleh Ali Muthanna, Mohammed Manea Ahmed Muthanna, Abdulkodir Khakimov, Ammar Muthanna ,” Development of intelligent street lighting Services model based on LoRa Technology”2018 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIC on Rus). Available: <https://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8307524>
- [3].Fares S. El-Faouri, Munther Sharaiha, Daoud Bargouth, “A smart street lighting system using solar energy” 2016 IEEE PES Innovative Smart Grid Technologies Conference Europe(ISGT-Europe).Available:<https://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=7837797>
- [4].C. Kruger,G. P. Hancke,T. D. Ramotsoela,P. du Toit “Smart street lights using power line communication”, IEEE Paper 2017 IEEE AFRICON, Available:<https://doi.org/10.1109/AFRCON.2017.8095718>
- [5].A.Lavric, V. Popa, I. Finis, C. Males, and A.-M. Gaitan, “An original lighting monitoring and control system using Wireless Sensor Networks use of Modern Information & Communication Technologies, pag. 167-173
- [6]. F.Leccese and Z.Leonowicz, “Intelligent wireless Street lighting system,” 11th International Conference on Environment and Electrical Engineering.