



## INTERNET CONTROLLED STREET LIGHTS

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### ABSTRACT

The aim of automated streetlight management system using IOT is the conservation of energy by reducing electricity wastage as well as to reduce the manpower. Streetlights are the elemental part of any city since it facilitates better night visions, secure roads, and exposure to public areas but it consumes a quite large proportion of electricity. In the manual streetlight system, lights are powered from sunset to sunrise, but we will forget to switch off some times. Sometimes we even forget to switch on the lights.

This energy wastage can be avoided by switching off lights automatically. The saved energy can be efficiently utilized for other purposes like residential, commercial, transportation etc. This can be achieved using an IOT enabled streetlight management system. To switch on the lights, we need to operate the buttons in our smart phone using IOT based App. And the sun light intensity can identified in the Smart phone IOT app. Based on this data the user can be switched on the street lights and monitor the status.

### INTRODUCTION

Today, digitalization has scaled up the functioning of lighting beyond illumination. Internet of Things (IoT) in lighting has enables the designer to produce fully integrated systems that can be connected seamlessly with a wireless network or Ethernet. The user can remotely monitor and control lighting systems with this connected system with advanced controls and sensors. This has led to the emergence of smart street

lighting, playing a significant role in the development of smart cities of the future. Upgradation of regular street light to connected smart street lights, which can be remotely accessed, controlled and managed, thus optimizing operations offers benefits like reduction in energy consumption by 50 per cent, minimizing maintenance costs, lowering CO2 emissions and curbing light pollution. IoT in street lights ensures that street lights are automatically switched on



once the sun sets and switched off after dawn. The system also sends alerts for each light that needs attention, to reduce failure and the need for sudden repair. Therefore, the avoided generational capacity can be ascertained from the reduced consumption of electricity. The system also helps note the exact consumption of energy, which is used to define the cost to be paid. The smart street light controller must be installed on the light pole which consist of microcontroller along with various sensor and wireless module. The smart street light controller installed on the street light pole will control LED street lighting depending on movements of the object in the street. The captured data cane transferred to base station where the energy gets stored using wireless technology to monitor the smart system. The smart system can be operated either manually or automatically. The control system will switch ON and OFF the street lights at needed timings and can also vary the intensity of the street light according to the necessity.

In most of the cities, the street lights are ON when it is not need and It is OFF when is needed. Because of these situation the huge energy expenses for a city gets wasted. Usually, the lights are ON in the evening

after the sunset, it continuous to be ON till the sun rises in the next day morning. This paper focuses on reducing the energy by automatically switching ON and OFF- street lights. When vehicles come to the street/road the sensor will capture the movements of the vehicles then lights automatically ON. Otherwise automatically OFF the lights.

The first paper describes<sup>1</sup> the managing urban services that include convenience, health, safety and comfort is proposed. The other paper describes the cloud computing infrastructure in the recent years 2,3 found Published by: Longman Publishers [www.jst.org.in](http://www.jst.org.in) 307 | Page IoT using Smart Street Light System useful for smart city concepts, but this deals with only technology to support the processing and storage of captured data. The other author focused on concepts of cloud and IoT and, in particular, the solutions to the real time applications. Paper 4 which will support for smart city concepts both IoT and cloud computing concepts are hybrid together to render the new location-based, reduced latency and improved QoS pervasive and ubiquitous services. The paper 5 describes how data can be managed in cloud. The commercial offering smart Things 7 and

Open Cloud 8 are already available for technology support to smart city. All these discussed information are to support Smart Street Light System to reduce the energy in cloud and IOT. In the intelligent management sensors, lamps, power supply are merged to implement the smart street lighting system.

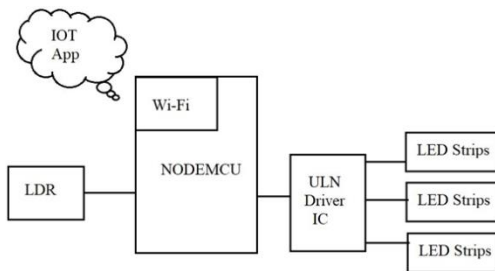
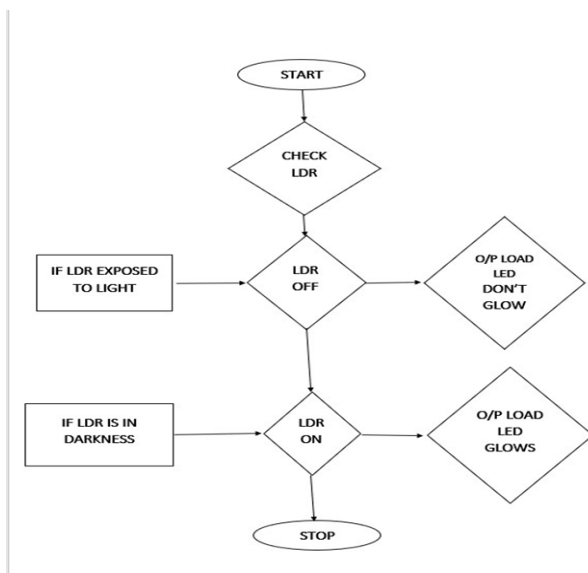


Fig. Block diagram of IoT based Device Control system using Blynk



## PROPOSED METHODOLOGY

Recent days, Smart Street Light System is major component of a smart city Infrastructure. The important function is to

lighting the city streets using Sensor's to save the current or power energy .In existing system using normal street lamps. It takes more current and costs too. So use LED lamps to save the current in low amount of power. Using IoT type system is all over the world. It is used to be watch all kind of areas in the cities. AT mega microcontroller AT Mega Microcontrollers figure no 3, belong to the AVR family of microcontrollers and is manufactured by Atmel Corporation. An AT Mega Microcontroller is an 8-bit microcontroller with Reduced Instruction Set (RISC) based Harvard Architecture. Figure no 3: Microcontroller LDR sensor An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. The most obvious application for an LDR is to automatically turn on a light at a certain light level. An example of this could be a street light or a garden light. features. Infrared LEDs have to adjust the voltages. LED adapted to various operating voltages. Wi-Fi module The Arduino Uno Wi-Fi is an Arduino Uno with an integrated Wi-Fi module. The board is based on the ATmega328P with an ESP8266WiFi Module integrated. The ESP8266WiFi



Module is a self-contained SoC with integrated TCP/IP protocol stack that can give access to your Wi-Fi network. IoT using Smart Street Light System [www.jst.org.in](http://www.jst.org.in) 311Page Figure No 4: Wi-Fi Module

1) For over-speeding: if the vehicle crosses its regulation say 2 km/hour, using Motion sensor the buzzer will start to supply the sound indicating that the vehicle is crossing the regulation of the road which makes it easy to prevent the traffic.

2) For Intensity Adjustment: it increases or decreases the intensity of the lights to the accidental prone areas using the LDR sensor, if vehicle is present on the streets then intensity increases but if not then intensity decreases.

3) For Smoke detection: For Smoke Detection, it will detect the amount of pollution caused by the gases like CO<sub>2</sub>, Sulphur dioxide, nitrous dioxide and carbon monoxide polluting the atmosphere within the parts per million (PPM), it'll display a true time graph on the IOT panel to manage the amount of the pollution.

4) For GSM switching: a true time SMS are going to be generated to ON/OFF the pole, if it's found that street lights are OFF and that they are continuously on for a extended period of your time, if the road lights are

damaged then using message it can be quickly maintained.

## ADVANTAGES

1. Major advantages of street lightning include prevention of the accidents and increase in the safety.
2. Several decades ago when automobile crashes were way more common, street lightning was found to cut back pedestrian crashes by approximately 50%.
3. Lightning system also reduces crime say murder, theft and plenty of more to a great- extend.

## APPLICATION

- a. It can be used in some clocks, alarms, and other electronic devices that are dependent on sunlight.
- b. We can used it outside of house, corridors or industry area, which helps to save power. • It can be used as a street light.
- c. In sea off-shore side we can use it as a dangerous sign.
- d. Photo resistors have many uses, most of which involve detecting the presence of light. Street lights use photo resistors to detect whether it is day or night and turn the light on or off accordingly.
- e. Photo resistors are also used in digital cameras to detect how much light



camera sees and adjust the picture quality accordingly.

- f. Smoke detection.
- g. Automatic lighting control.
- h. Burglar alarm systems.
- i. Camera (electronic shutter).
- j. Strobe (color temperature reading).

## CONCLUSION

The use of power electronics is increasing exponentially across various sectors of human life. The components used in the project, like Arduino and sensors are slowly becoming an indispensable part of our daily routines. So, it is only fitting that we use them to improve efficiency in every walk of life. Keeping in mind the urgent need for energy conservation, Solar Smart Street Light System with IoT is an excellent and effective solution. It combines safe lighting protocols with consumption of minimal amount of power. The energy savings, as discussed before are phenomenal. The future scope of this project expands into speed detection and customizable area of illumination. An additional component which would lead to better functioning of the concept would be the use of LED bulbs. Despite their high initial costs, they are a viable option as they drastically reduce the power consumption. They will aid in further

saving of energy and reduction in operational costs.



## FUTURE SCOPE

The above project i.e. Solar Smart Street Light System with IoT can be powered from a battery, which can be charged during day time by harvesting the solar energy through a solar cell. The solar energy harvested from sunlight can be stored, inverted from DC voltages to AC voltage using sun tie converter. The AC voltage can be stepped up and given to the electric grid. The AC voltage from the electric grid can be stepped down, rectified and used for powering the circuit. Meanwhile, the street light can also be powered by the A.C. voltage, which is controlled by a relay switch connected to the switching part of the circuit. The above mentioned strategy will enable us to harvest solar energy in an effective way for the operation of the circuit and for powering the



street light also. Using this smart project, we can also estimate the speed of the vehicle, recognizing the number plate, recognizing the accidents took place on roads etc. This Smart Street light project not only helps in rural areas but also beneficial in urban areas too. As we are moving towards more advancement we require more power so use of renewable resources is useful and advantageous. With this project, we can even add smart parking of vehicle and it is even useful for driverless cars. This project has a bright future not only to save power but also reduced the calamities and even reduced the crime rate.

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