

# Design And Practical Implementation Of Intelligent Street Light System By Using IoT Platform

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**Abstract:** The internet of things (IoT) are able to implement transparently a very large amount of heterogeneous end systems, while digital service provides open access to sub set of data. The focus of this paper is smart street light system. In this system the street light systems are automatically ON and OFF according to the situation. This smart light system automatically detects the movements of the object on the street. In the traditional system IR sensor is used to detect the object. The microcontroller is used to control the process involve the net. This paper is focused on the controlling intensity of the light considering the object movement near the light. Two different sensors named light sensor and photo electric sensor are used. Once if the sun light goes under the visible region then this system automatically switches ON light. As soon as the sun light is visible then automatically switches OFF lights. This Smart light system is used to reduce energy consumption. In this smart system the system uses some of the sensors. This smart system is used to avoid unnecessary usage of electricity. The entire smart system is designed to operate using artificial energy source. The LDR sensors are used to sense the human being and light intensity of a particular area and transmits the data in wireless to the EB section. This smart system is best suited for street lighting in remote urban and rural areas where the traffic is very low.

**Keywords:** IOT (Internet Of Things); LDR; Street Lights; Wifi Module; ESP8266;

## 1. INTRODUCTION

The Street lights are the major requirements in today's life for safety purposes and avoiding accidents during night. Providing street lighting is one of the most important and expensive responsibilities of a city. Lighting can account for 10-38% of the total energy bill in typical cities worldwide. Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for economic and social stability. The fixtures of street lights indirectly have assisted the public and government in reduction of crime rate and accidents in the area. It also encourages social inclusion by providing an environment in which people feel they can walk in hours of darkness. Despite that in today's busy lifestyle no one bothers to switch it OFF/ON when not required. Inefficient lighting wastes significant financial resources each year, and poor lighting creates unsafe conditions. Energy efficient technologies and design can cut street lighting costs dramatically. The main consideration in the present field technologies are Automation, Power consumption and cost effectiveness. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the sources of the power are getting diminished due to various reasons. Designing a cost efficient system is very important as the requirement is more. In order to overcome this problem, automatic street light control methods are introduced. The main objective of our project is to provide a better solution to minimize the electrical wastage in operating street lights, in this era of automation

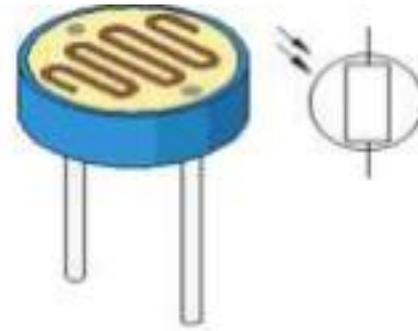
humans are restless and are not in a position to regulate the manual operations in any field, a rapid advancement in embedded systems has paved path for the design and development of microcontroller based automatic control systems. Our project presents an automatic street light controller using light dependent resistor (LDR). By using this system manual works are removed. The street lights are automatically switched ON when the sunlight goes below the visible region of our eyes. It automatically switches OFF the street lights under illumination by sunlight. It is a simple and powerful concept, to switch ON/OFF the street light system automatically. It automatically switches ON the streetlight when the sunlight goes below the visible region of our eyes and switches OFF the streetlight when ample amount of sunlight is available. The component used for light sensing is a Light Dependent Resistor. By using the LDR we can operate the streetlight automatically, when ample amount of light is available the streetlight will be in the OFF state and when it is dark the light will be in ON state, it means LDR resistance is inversely proportional to light falling on it. When the light falls on the LDR it sends the commands to the control circuit that it should be in the OFF state and the streetlight turns OFF. This project exploits the working of a transistor in saturation region and cut-off region to switch ON and switch OFF the lights at appropriate time with the help of an electromagnetically operated switch.

## 2. RELATED STUDY

The street lighting is one of the largest energy expenses for a city. An intelligent street lighting system can cut municipal street lighting costs as much as 50% - 70%. An intelligent street lighting system is a system that adjusts light output based on usage and occupancy, i.e., automating classification of pedestrian versus cyclist, versus automotive. An intelligent street light management proposes the installation of the wireless based system to remotely track and control the actual energy consumption of the street lights and take appropriate energy consumption reduction measures through power conditioning and control. The street light controller should be installed on the pole lights which consist of microcontroller along with various sensor and wireless module. The street light controller installed on the street light pole will control LED Street lighting depending on traffic flow, communicate data between each street light. The data from the street light controller can be transferred to base station using wireless technology to monitor the system. The mode of operation of the system can be conducted using auto mode and manual mode. The control system will switch on-off the lights at required timings and can also vary the intensity of the street light according to requirement.

## 3. AN OVERVIEW OF PROPOSED SYSTEM

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000000 ohms, but when they are illuminated with light resistance drops dramatically. Photo sensors are the devices that alter their electrical characteristics, in the presences of visible or invisible light. The best-known devices of this type are the light dependent resistor, the photo diode and the phototransistors. Light dependent resistor as the name suggests depends on light for the variation of resistance. LDR are made by depositing a film of cadmium sulphide or cadmium selenide on a substrate of ceramic containing no or very few free electrons when not illuminated. The longer the strip the more the value of resistance. When light falls on the strip, the resistance decreases. In the absence of light the resistance can be in the order of 10k $\Omega$  to 15k $\Omega$  and is called the dark resistance. Depending on the exposure of light the resistance can fall down to value of 500  $\Omega$ . Light dependent resistors are available as discs 0.5cm to 2.5cm. The resistance rises to several Mega ohms under dark conditions. The figure-1 shows that when the torch is turned on, the resistance of the LDR decreases, and allows the current to pass through it.



**Fig.3.1. LDR Sensor.**

Espressif Systems "Smart Connectivity Platform (ESCP) of high performance wireless SOCs, for mobile platform designers, provides unsurpassed ability to embed Wi-Fi capabilities within other systems, at the lowest cost with the greatest functionality. ESP8266 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any microcontroller based design with simple connectivity through UART interface or the CPU AHB bridge interface.



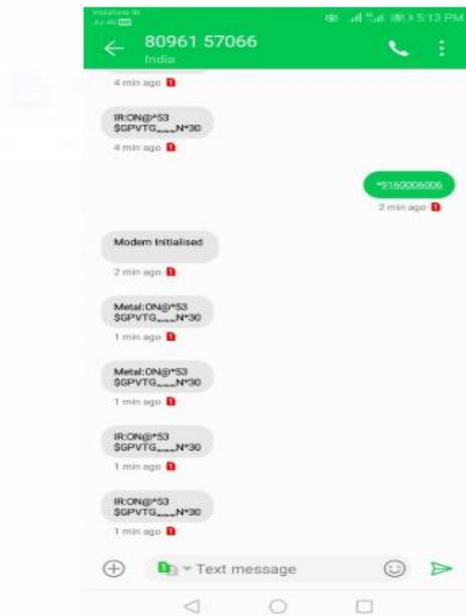
**Fig.3.1. Raspberry pi controller.**

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 watching all kind of areas in the cities. This Smart Street Light System provides good energy efficiency. It reduces cost and gives more reliability. This diagram consist sensor, light, power system. This architecture is used to sense the vehicles and act accordingly. In this diagram street lights control by the sensors. It gets the data from object. When vehicles appear to sensor then automatically lights ON. That the object moved on from sensors lights turn OFF. In this diagram its

represents the works of Smart Street Lighting System. When objects or vehicles appear to the sensors it is detect movements of the objects and street lights automatically ON. Then objects crossed to the sensors lights go to turn OFF. It is used to save the power energy.



**Fig.3.2. Working model.**



**Fig.3.4. Output results by using WIFI module.**

#### 4. CONCLUSION

The important aim of this paper is to save the current. It is mainly used to protect the power efficiently. Using sensors to save the power energy without any waste. Safe street lighting for peaceful vehicle movements. This SSLS suits for Small Street to highway roads. This system can be used in public places also like hotels, industries, etc. It is control the overflow of current. Manpower not required in this system. This SSLS are mainly used in urban areas and highways to reduce the power wastage to save the current.

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