



# A Survey on Smart Streetlight Management for Energy Conservation

Thore Trupti<sup>1</sup>, Kadam Kavita<sup>2</sup>, Dhananjay Pawar<sup>3</sup>

T.E. Student, Department of E&TC, SNJB's KBJ Engineering College, Chandwad, Maharashtra, India<sup>1</sup>

T.E. Student, Department of E&TC, SNJB's KBJ Engineering College, Chandwad, Maharashtra, India<sup>2</sup>

Assistant Professor, Department of E&TC, SNJB's KBJ Engineering College, Chandwad, Maharashtra, India<sup>3</sup>

**ABSTRACT:** Generally the streetlight on the streets are off during day time and ON during night time. but we all know that traffic on the roads is getting rare at the time of midnight. approximately after 12 pm the no.of vehicles on the road are very less, but streetlights are ON for full night. because of this a significant amount of energy is get wasted. To avoid this energy loss we are designed a system which can monitor a streetlights according to the presence of vehicles. in short the streetlight on the roadside is off normally.it contain a sensor which can detect the presence of vehicle and send this message to the controller which controls the turn off and turn on of streetlight. when sensor sense the vehicle then it will send the message to the controller. controller will turn on the light for particular time period .once the vehicle is passed ,then sensor again send the message to the controller .now controller will turn on the lights. By using this system we can save a significant amount of enegy this system is easy to design , easy to implement, and easy to operate. we are using AT-mega 328p controller to perform all the operations. To complete the system operations properly we are using LDR for light detection, IR motion sensor in interfacing with AT-mega328p.

**KEYWORDS:** ATmega328p controller, traffic light management ,intelligent energy saving, smart streetlight management.

## I.INTRODUCTION

Automatic streetlight controll system is a simple powerfull concept, which uses transistors as a switch. by using this system manual works are 100% removed.it automatically switches ON lights when the sunlight is not there.this is done by LDR(light dependent register)which sense the light actually like our eyes.by using this system energy consumption is also reduced,because now a days the manually operated streetlights are not switch of even the sun light comes and also switch ON earlier before sunset. In this project ,no need of manual operation.

Generally the streetlights along a roads are continuously on during night time .but as the traffic get reduces during midnight the lots of energy get wasted. To avoid this energy loss we are designing a system which consist of sensors and based on microcontroller. The sensors are used to detect vehicle. The output of sensors are given to the microcontroller. According to sensors output microcontroller will turn ON/OFF the streetlights

In this project ,we are using IR Sensors for detecting the vehicle. Also LDR (LIGHT DEPENDENT RESISTOR) is used to controlling the ON/OFF of streetlights on the intensity of sunlight. Output of both sensors are given to the controller AT-MEGA 328P.this controller will turn off the lights during day time, and turn ON during night time. Also during night the lights will turn ON when vehicles are detected. due to this a significant amount of energy can be save.



Fig.1: SMART STREETLIGHT SYSTEM

## II. LITERATURE SURVEY

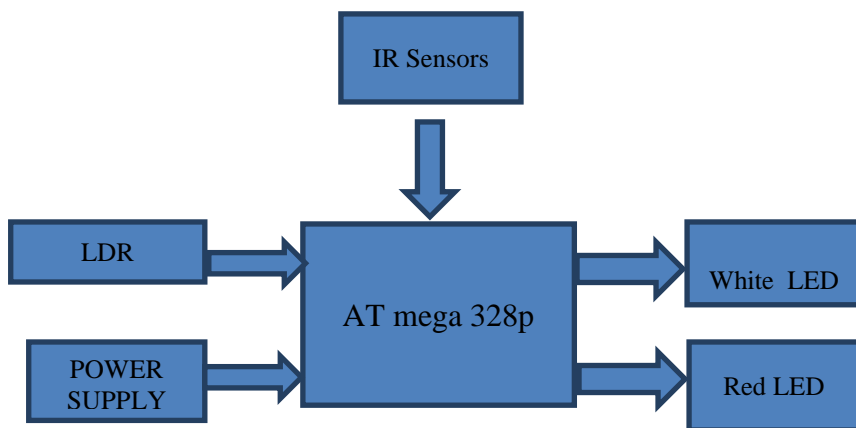
Hengyu Wu, MinliTang[1], propose about The core technology of the street light control system is an AT89S52 single-chip microcomputer. It integrates a power circuit, a fault detect circuit, a photosensitive detection circuit, an infrared detect circuit, an LCD display circuit, a street light control circuit, an alarm circuit, a pressed key control circuit and so on. This system can automatically turn on or off the lights and controls the switches according to traffic flow. It expands the fault detect circuit and the corresponding alarm circuit. It also has a convenient and flexible button control circuit to switch on and off functions mentioned above. Main weakness is that they didn't say about the working principle behind the system. It also said to use fault detection circuit which when it is damaged, the voltage is zero, so it will create a problem. This paper is a theoretic proof and shows only simulation result but not as a real time set up experiments. The focus of this paper is to build a way for the framework which may lead to many follow up research activities in the Low-rate and also plan to investigate the applicability of this proposal to detect performance. GongSiliang[2] describes a remote streetlight monitoring system based on wireless sensor network. The system can be set to run in automatic mode, which controls streetlight according to Sunrise and Sunset Algorithm and light intensity. This control can make a reasonable adjustment according to the latitude, longitude and seasonal variation. Also this system can run in controlled mode. In this mode, we can take the initiative to control streetlights through PC monitor terminal. In addition, the system integrates a digital temperature-humidity sensor, not only monitoring the streetlight Real-time but also temperature and humidity. The system is equipped with the high-power relay output and can be widely applied in all places which need timely control such as streets, stations, mining, schools, and electricity sectors and so on. But in this work a wireless network for streetlight remote control is discussed. In particular, the novelty of the proposal is in the location awareness of nodes, which cannot self-localize themselves. Prototypes have been built using costly hardware. The capability of the ranging measurements, the basis for localization, is not characterized and showing some problems on the order of one meter. In near future, location aware routing algorithms will be developed that will improve the efficiency of the network. Street lighting system Gustavo W. Denardin[3] deals about a control network for a LED street lighting system. The use of LEDs is being considered a promising solution to modern street lighting systems, due to their longer lifetime, higher luminous efficiency and higher CRI. The proposed control network enables disconnection of the street lighting system from the mains during peak load time, reducing its impact in the distributed power system automatically consumption, decrease the management cost and monitor the status information of each street lighting unit. In order to meet the system requirements, a wireless sensor network based on IEEE 802.15.4TM standard is employed. Its network layer is implemented using geographic routing strategy, which provides low overhead and high scalability features. However, due to well-known drawbacks of the existing techniques, a novel routing algorithm is proposed. Simulations show that this algorithm leads to a significant improvement of routing performance when applied to sparse large scale scenarios, which is the case of street lighting system. Field tests have been performed on IEEE 802.15.4-compliant wireless control units. The obtained experimental results show that the proposed control network is able to meet the requirements of a LED street lighting system. It mainly deals about safer roadways with intelligent light system to reduce power consumption. This system has automatic street light intensity



control based on the vehicular movement and switching ON and OFF of street lights depending on the light ambiance. This will help in reducing the power consumption during hours of meager road usage. The street light module is installed consequently for every certain distance. This paper also aims at reducing road accidents by detecting consumption of alcohol by the driver. This can be implemented using alcohol sensor module which contains skin sensor, breath alcohol sensor and proximity sensor. The skin sensor and breadth alcohol sensor detects the presence of alcohol content and the proximity sensor helps in detecting any kind of malpractice. The novelty of this paper is to effectively reduce the energy consumption of the street lights by controlling the street light’s intensity, sensing both human as well as vehicular movement and injury and death caused by drunk driving can be prevented by prior sensing of the alcohol content in drivers by a simple.

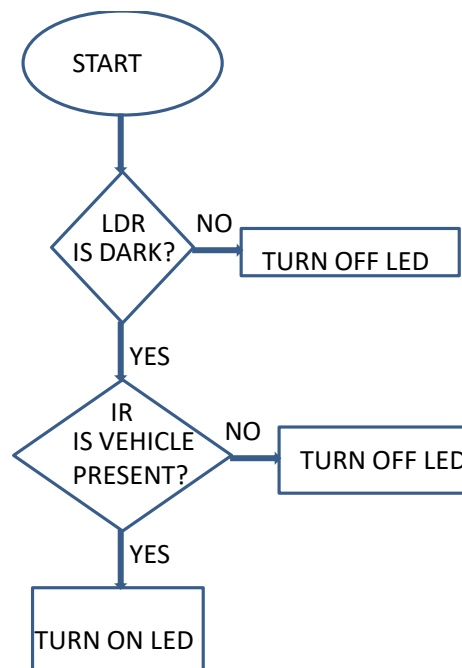
**III. SYSTEM DESIGN**

**A. BLOCK DIAGRAM**



**Fig 2: Block diagram : smart streetlight management for energy conservation.**

**B.FLOWCHART**



**Fig.3: Flowchart**



#### IV.SYSTEM WORKING

We are using ATMEGA 328P microcontroller for this project. In which we are going to control streetlights for conserving the energy in the absence of vehicle. We are using IR SENSOR for vehicle detection, it gives the output as HIGH when vehicle is detected and in the absence it gives output low. the output of IR sensor is given to the microcontroller and according to this output ,the microcontroller controls the streetlights i. e Streetlights are connected to microcontroller, the microcontroller TURN ON the lights when vehicle is detect i. e when the output of IR sensor is high and it TURN OFF lights when output of IR is low.

LDR is a light dependent resistor basically it work as light detecting sensor. the output of a LDR is given to the microcontroller. The LDR gives output high when the sunlight is absent and it gives low when sunlight is present. According to the output of LDR microcontroller controls the streetlights i.e when ouput of LDR is high it turn on the LED's and when the output of LDR is low it turns off the LED's.

We can save the energy for future use and we can control the loss of the power. We can can implemented this project for the home lamp or the night lamp of the room. This can be also use for signals.

#### V. CONCLUSION

More effective in case of cost , manpower and security as compare with todays running complicated and complex light controlling systems . Automatic streetlight controlling system puts up a very friendly approach and could increase the power. This the streetlight controller using LDR based light intensity & traffic density, in the todays up growing countries will be paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamps ON/OFF.

Each sensor control turning OFF/ON the lightning column .the street light has been successfully controlled by microcontroller. with commands from the controller the lights will be on in the places of motion, when it's dark. Further more drawbacks of the streetlight using timer has been overcome, where the system depends on photoelectric sensor. Finally the control circuit can be used in a long roadways between them.

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