

IoT BASED ENERGY EFFICIENCY and FAULT DETECTION SMART STREET LIGHT USING GSM

Dr.P.Rajasekar¹, N.Jayasri², P.Anusha²,Y.Hariprasanna²,Sk.Mehanaz²

¹Professor, Department of ECE, Narayana Engineering College, Gudur, AP, 524101

²UG Student, Department of ECE, Narayana Engineering College, Gudur, AP, 524101

1drpr1197@gmail.com, jayasrinandimandalam@gmail.com

Abstract -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 SYSTEM". Intelligent light sensing refers to public street lighting and traffic control that adapts to movement by pedestrians, cyclists and cars. Intelligent street lighting and traffic control, 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 predetermined times. The proposed work shows automatic control of streetlights and traffic light control as a result of which power is saved and can control traffic cognition 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.

Key Words: Arduino UNO, GSM, Power supply, LED, IR Sensor, LDR Sensor.

1.INTRODUCTION

The main function of the streetlight is to illuminate the street at dark hours. Earlier, the street lighting was very simple and also accounted for less investment as the number of streets were less. But, with rapid urbanization the number of streets increased rapidly and this led to increase in number of street lights and investment associated with them. For designing a proper street light various factors are to be considered which includes its efficiency to provide proper lighting on the street, its harmful environmental effect, installation and running cost etc. So before designing a street light all these factors should be considered properly and efforts should be made to

incorporate technologies which are more cost effective like the one we have discussed here is street light control and fault detection.

Embedded system implementation

Introduction:

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, and store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

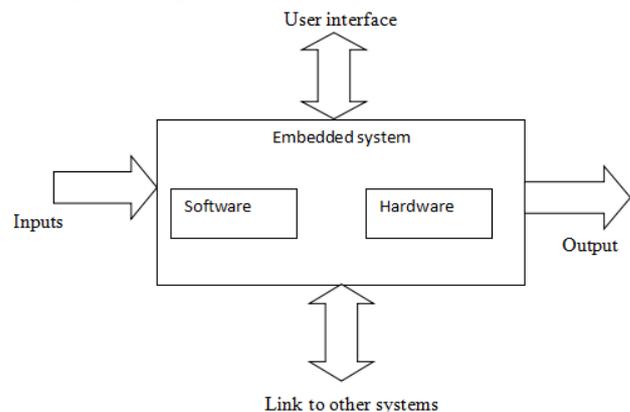


Fig: Overview of embedded system

2. LITERATURE SURVEY

B. K. Subramanyam1 et al.

worked on intelligent wireless street light control and monitoring system, which integrates new technologies, offering ease of maintenance and energy savings. Using solar panel at the lamp post By using LDR it is possible to save some more power and energy, and also we can monitored and controlled the street lights using GUI application, which shows the status of the lights in street or highway lighting systems.

P. Nithya et al. [3]

In their work on Design of Wireless Framework for Energy Efficient Street Light Automation suggested an Intelligent management of the lamp posts by sending data to a central station by ZigBee wireless communication. With the suggested system, maintenance can be easily and efficiently planned from the central station, allowing additional savings. Srikanth M et al. [4], in their work on ZigBee Based Remote Control Automatic Street Light System. This streetlight control system helps in energy savings, detection of faulty lights and maintenance time and increase in life span of system.

Anila Devi Y et al.

Worked on GSM Based Remote Control System of High Efficiency Intelligent Street Lighting System Using A Zigbee Network of Devices and Sensor. New intelligent and smart street light system is designed with wireless technology for maintenance and network of sensors for controlling. In which, they used high efficiency LED lamp which consumes less energy with high life time and which are supplied with renewable energy of solar panels.

3. EXISTING METHOD

We have seen in the number of cities where the street lights is the one of the huge energy expense for a city. Currently we have manual system where the light will be switched ON in the evening before the sunset and they are switched OFF next day morning after there is sufficient light outside. So, there is lot of energy waste between ON and OFF timing.

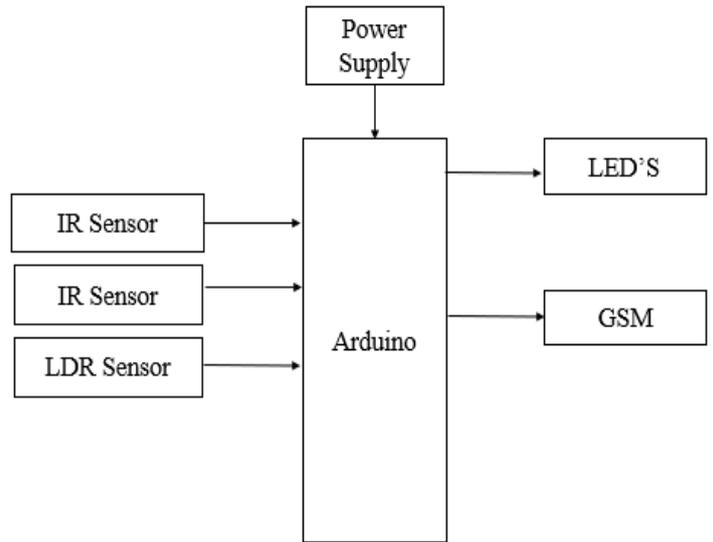
Drawbacks:

- Manual Switching off/on of Street Lights
- More Energy Consumption
- High expense
- More manpower.

4. PROPOSED METHOD

In this proposed system we are implementing IR Sensors, LDR, and LED's. GSM is Using for message purpose. In this the LED's will glow brighter whenever the vehicles cross the IR Sensor. LDR is to check whether the lights ON in day time. If any of the LED's is ON in morning time using LDR it will detect day time and will switch OFF all the LED's. If any LED is broken then also message will be send to the authorities. All these actions are displayed on LCD.

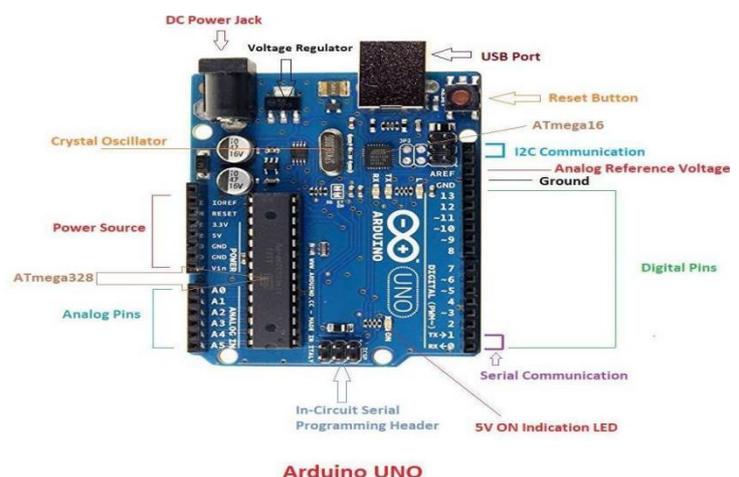
Block Diagram:



5. NUMBER OF MODULES

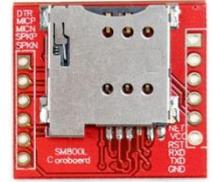
A. Arduino UNO:

- **Arduino Uno** is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328.
- First Arduino project was started in Interaction Design Institute Ivrea in 2003 by David Cuartielles and Massimo Banzi with the intention of providing a cheap and flexible way to students and professional for controlling a number of devices in the real world.
- The current version of Arduino Uno comes with USB interface, 6 analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output.
- It allows the designers to control and sense the external electronic devices in the real world



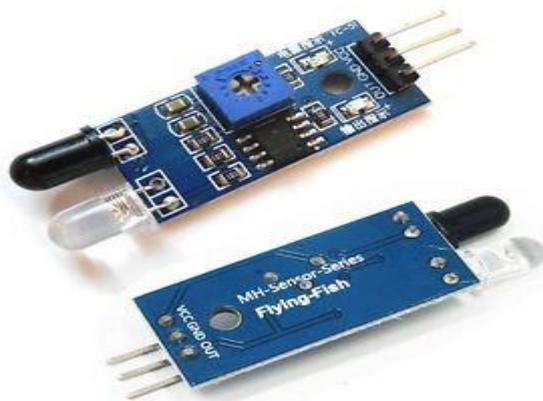
B.LDR SENSOR:

A Light Dependent Resistor (also known as a photoresistor or LDR) is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light-sensitive devices. They are also called as photoconductors, photoconductive cells or simply photocells.



C.IR SENSOR:

An [infrared sensor](#) is an electronic device, which emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a [passive IR sensor](#). Usually in the infrared spectrum, all the objects radiate some form of thermal radiations.



E.LED

The lighting emitting diode is a [p-n junction diode](#). It is a specially doped diode and made up of a special type of semiconductors. When the light emits in the forward biased, then it is called as a light emitting diode.



D.GSM:

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

6. RESULTS



7. CONCLUSION

This project Smart Street Lighting System for Smart City is a cost effective, practical, eco-friendly and the safest way to save energy and this system the light status information can be accessed from anytime and anywhere. It clearly tackles the two problems that world is facing today, saving of energy and also disposal of incandescent lamps, very efficiently. Initial cost and maintenance can be the draw backs of this project.

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