Implementation of IOT based smart street light for smart city

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Abstract: As we are the budding engineer it's our social responsibility for the development of the nation. We owe something for the surrounding, the city we live. The things, devices, generation even our city is getting smart so we decided to make our project Smart too. The project is highly concern with the remote monitoring, fault detection etc. The project is related with the Street lights located in Metropolitan cities. The street lights play a vital role to enlarge the glory of a city. Now a day's every innovative technologies' ultimate goal is to automate human's lifestyle. Considering a scenario any light of the city is not working or damaged or flickering etc. The people who live nearest to it complain about that to the counsellor. Counsellor conveys the message to the Municipal Corporation, Then the allotted electrician checks and repairs the light. Apart following this lengthy procedure, our project will automatically indicate that the light is in good condition or not, The electrician will get a text message about that particular light. Side by side it will indicate that light "RED" on the web page where the authority is logged on to that; Hence they are also able to keep an eye on the work of electrician that how many days does he take to repair it. This is the ultimate advantage of the project to maintain the transparency between them. The primary motive behind implementing this project is to save the energy

Keywords: Micro-controller, ACS712 Current Sensor Module, Relay, Hardware of PCB, SIM 808L Module

I. INTRODUCTION

In the current upgrading generation of less manual and fully automated life the Intelligent street lights plays a vital role in Smart city development they are one of the glorious part of city. Our project will help to monitor the street lights. This system is very precise that it indicates within a fraction of seconds the conditions of street light on web page simultaneously it will send a text message to the lectrician using Internet of Things and GSM kit due to the utilization of remote monitoring causes reduction in mankind"s efforts. Now a day"s every innovative technologies" ultimate goal is to automate human's lifestyle. Our project consists of Node MCU, GSM, Current sensors, Lamps, 4 channel relay and a web page monitoring.

II. MAIN COMPONENTS USED

2.1 Micro-controller
The high-performance Microchip picoPower® 8-bit AVR® RISC-based microcontroller combines 32 KB ISP Flash memory with read-while-write capabilities, 1024B EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented Two-Wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching one MIPS per MHz, balancing power consumption and processing speed.

2.2 ACS712 CURRENT SENSOR MODULE
The Allegr ACS712 provides economical and precise solutions for AC or DC current sensing in industrial, commercial, and communications systems. The device package allows for easy implementation by the customer. Typical applications include motor control, load detection and management, switch mode power supplies, and over current fault protection. The device is not intended for automotive applications. The device consists of a precise, low-offset, linear Hall circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper conduction path generates a magnetic field which the Hall IC converts into a proportional voltage. Device accuracy is optimized

through the close proximity of the magnetic signal to the Hall transducer. A precise, proportional voltage is provided by the low-offset, chopper- stabilized Bi CMOS Hall IC, which is programmed for accuracy after packaging. The output of the device has a positive slope (>VIOUT (Q)) when an increasing current flows through the primary copper conduction path (from pins 1 and 2, to pins 3 and 4), which is the path used for current sampling. The internal resistance of this conductive path is 1.2 mΩ typical, providing low power loss. The thickness of the copper conductor allows survival of the device at up to 5× over current conditio

2.3 FOUR CHANNEL RELAY & ITS FEATURES

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof. The 4 Channel Relay Module is a convenient board which can be used to control high voltage, high current load such as motor, solenoid valves, lamps and AC load. It is designed to interface with microcontroller such as Arduino, PIC and etc. The relays terminal (COM, NO and NC) is being brought out with screw terminal. This is a LOW Level 5V 4-channel relay interface board, and each channel needs a 15-20mA driver current. It can be used to control various appliances and equipment with large current. It is equipped with high-current relays that work under AC250V 10A or DC30V 10A. It has a standard interface that can be controlled directly by microcontroller. This module is optically isolated from high voltage side for safety requirement and also prevent ground loop when interface to microcontroller. There are two fixed contacts, a normally closed one and a normally open one. When the coil is not energized, the normally open contact is the one that is off, while the normally closed one is the other that is on. Supply voltage to the coil and some currents will pass through the coil thus generating the electromagnetic effect.

2.4 SIM 808L MODULE

SIM808 is integrated with a high performance GSM/GPRS engine, a GPS engine and a BT engine. The GSM/GPRS engine is a quad-band GSM/GPRS module that works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM808 features GPRS multi-slot class 12/ class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. The GPS solution offers best-
in-class acquisition and tracing sensitivity, Time-To-First-Fix (TTFF) and accuracy.
With a tiny configuration of 24*24*2.6mm, SIM808 can meet almost all the space requirements in user
applications, such as M2M, smart phone, PDA, tracker and other mobile devices.

2.5 BLOCK DIAGRAM & WORKING
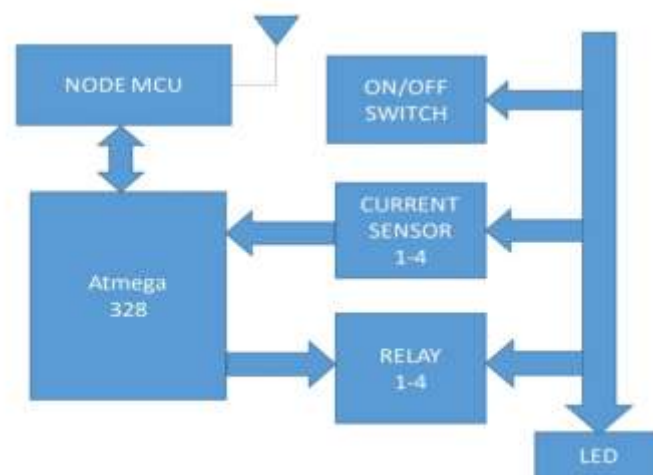
First of all the node MCU connects to the wifi using its inbuilt wifi module having programmed wifi address and its password it powers up 4 channel relay and current sensors. The current sensor continuously checks whether current is flowing through Lights or not. When LED turns of due to any reason sensors detect it and shuts the relay off and passes a signal to node MCU. The GSM kit sends a text message to electrician or any person whose no is allocated about the condition of street light. Simultaneously the data is transmitted to the server using node MCU as it was connected to the network in the beginning. Further on the web page the indicator of street lights turns "RED". After repairing them the current will flow again normally from current sensor. Again it sends the data to cloud server then the indicator on web page will again become Green as it was when the light was not damaged.

III.RESULT
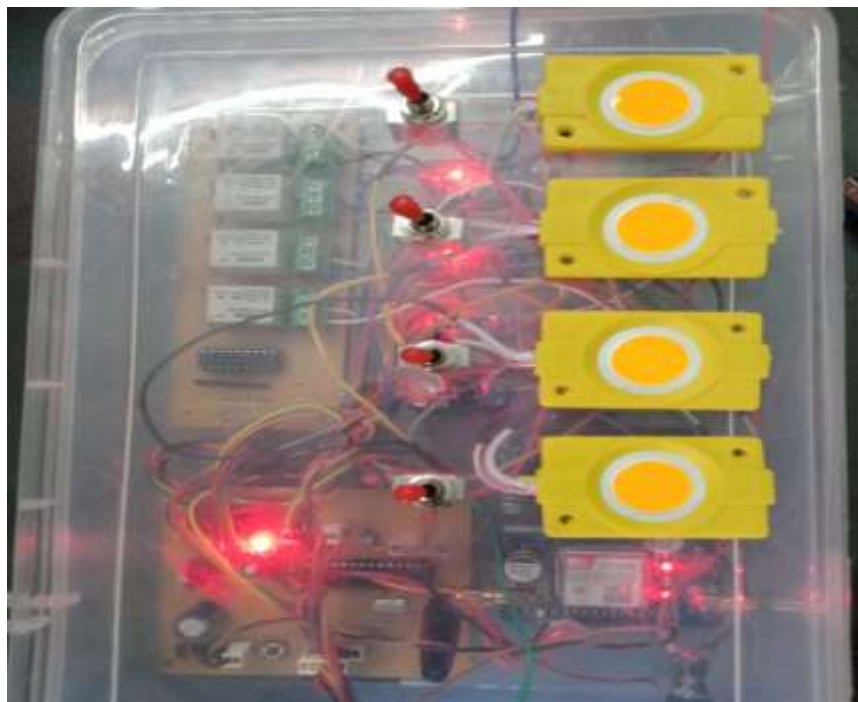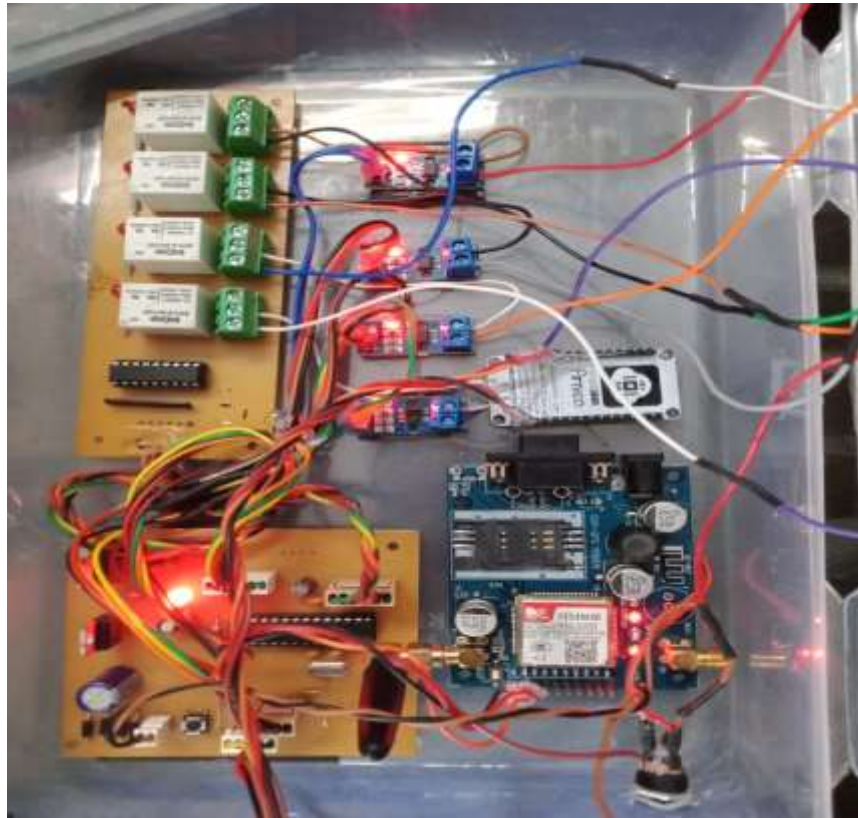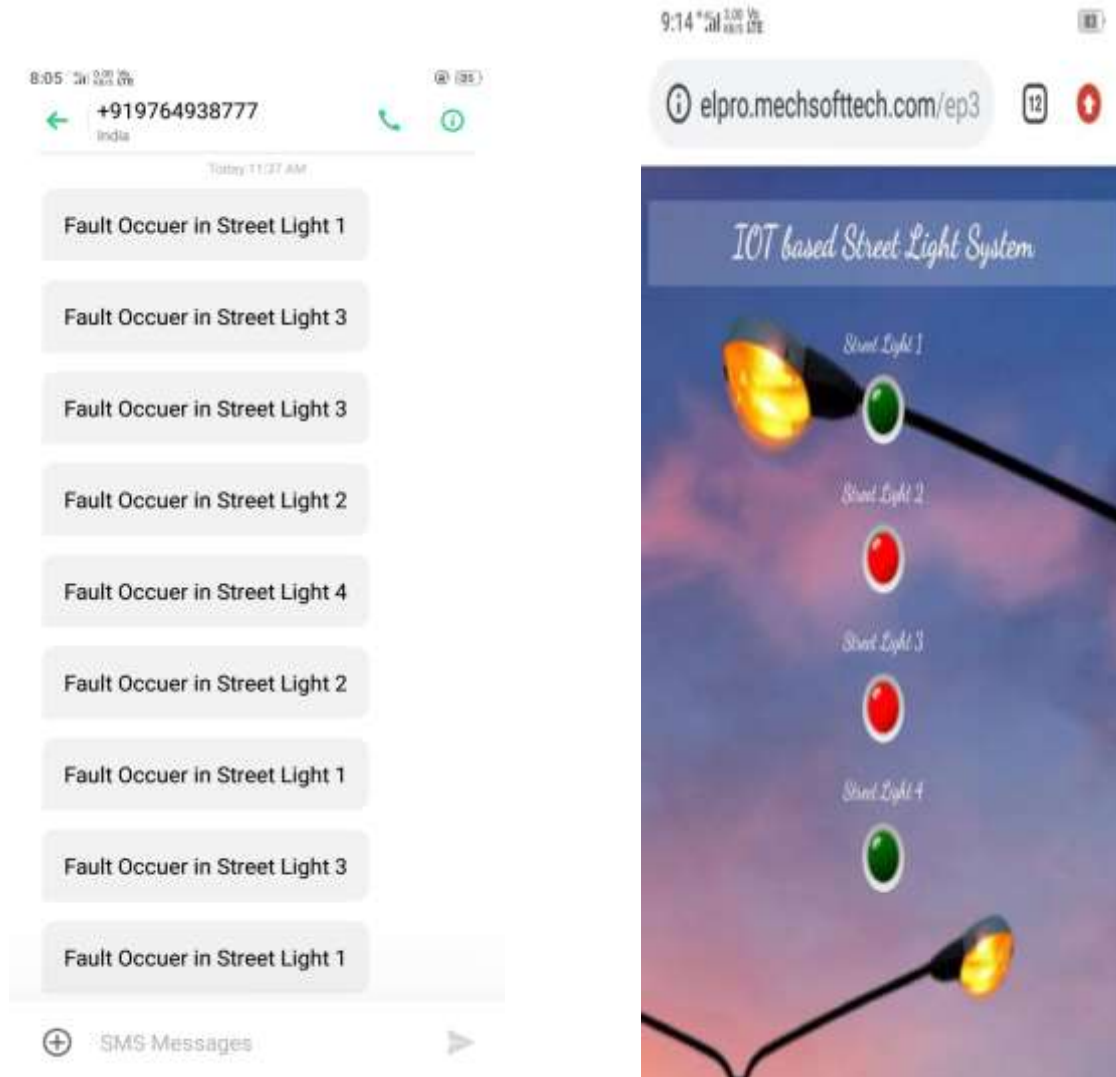
IV. CONCLUSION

Our project will be very much useful for the development of Rural Areas, as well as for the city that is denoted in the title itself. Using this technology will maintain the transparency in the workers & authorities. The future of Iot is virtually unlimited due to advancement in technology and consumers' desires to integrate devices such as phones computers with various things, devises, circuits etc. It's crucial to gain knowledge about upcoming innovative technologies and to avoid chaos. Being an engineer it's our social responsibility to make this technology more users friendly and make this available to everyone.

V. REFERENCES

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