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GSM Based Street Light Automation

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ABSTRACT: The latest trend in the technologies related to wireless communication has led to the emergence of several engineering designs for human requirements. The creeping interests in the wireless and GSM based projects, we came up with this idea of developing a simpler, multipurpose, cost-effective design to control the on-off street lights via short message service (SMS). Commands are sent to street light for night lighting Applications system through user' mobile as data through SMS (Short Service Messages) providing a cost effective, reliable far reaching access to the user. The coded SMS is sent to the light relay system to base station controller that receives the messages, decodes the messages, initiates required automation operations and responds to the successful initiations by a reply to the user.

KEYWORDS1. Power source +12 volt (dc), GSM circuit, microcontroller, street light and contractor, Sim

I.INTRODUCTION

GSM based street light automation is basically used to control street light automatic by the help of GSM module (global system for mobile communication).It is designed to performing & increase the efficiency of street light even more during in nights. . It consists of an 89C51 microcontroller which on setting of time delays switches ON/OFF the street lights and sends the update through a phone to the specified phone number. This is the best way of managing a street light system. There are two modules client server & server side. The client server consists of GSM module which is connected to the microcontroller. The server side consists of web server; it has a core engine which interacts with the user, database and the GSM communication manager. By applying the proposed system, streets can be illuminated with lower power consumption lamps, low operating cost, and low CO_2 emissions and environmentally friendly. it is best used without any disadvantage as compared to other.

II.SYSTEM MODEL AND ASSUMPTIONS

.Hardware implementation of Auto light intensity and Auto switching system control for Smart Street lighting system is proposed. We used AT COMMAND for functionally of street light just like server used. By sending a SMS onto microcontroller by the help of mobile they read it and match by itself .if microcontroller are accept them then, street light is ON vice versa for OF01 .we are used contractor against to relay to protect and control of maintained of supply. There is inbuilt circuit are here power supply are given to module therefore by the help of ac capacitor we reduce the ripple and then convert into dc by the help of bridge rectifier further by using antenna they transmit the MSG to micro controller the read and accept if they match with at command after then MSG should be received led light emitted and unit of street light 1or unit 2 or unit 3.all of them should be open. Vice versa they should be OFF. In this diagram we are using this type of methodology

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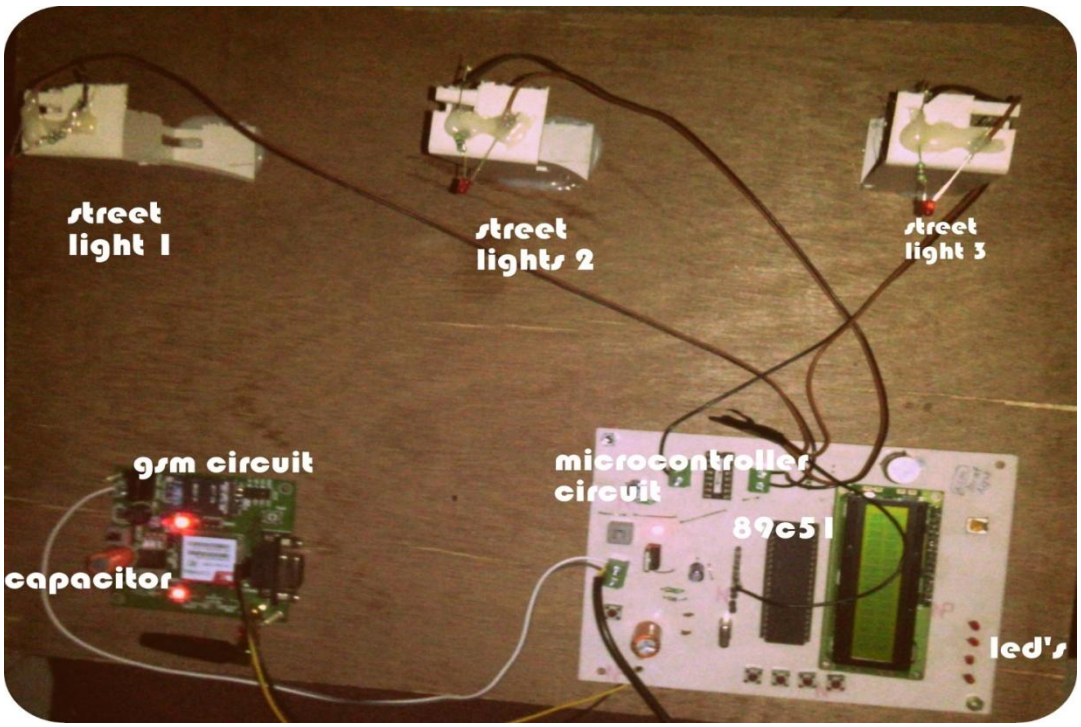

Fig.1 Circuit diagram of gsm based street light automation

The architecture consists of these specific features

- Gsm sim (sim900)
- Gsm circuit (capacitor, power supply 2.7V, antenna)
- Grounded wires
- Microcontroller(89c51,4 register bank,80 bits of general purpose data memory)
- Led lights
- Crystal oscillator (5MHz)
- Street lights per unit
- PCB (single layer coated).

III.EFFICIENT COMMUNICATION

GSM based street light automation describe the new economical solution for managing the street light and power saving energy. This system consists of electrical device, GSM modem and control circuitry. The client server directly connected with the web based application to control any street light from any one position. By using java application maintained the complete street light recoded if we wish to switch OFF/ON any particular street light, server will send a GSM SMS to that street controller to take action. Street controller will receive that SMS and will decode it and finds out the particular street light which needs to put ON/OFF by using relay circuit. Here the street controller 89C51 is connected to GSM modem through its UART port (Serial Ports). 89C51 cannot connect to GSM modem directly due to disturbance in voltage levels. So modem is connected directly through voltage level convertor MAX 232. There are 2 lines TX (TRANSMITTER) & RX (RECIVER) connected to the MAX 232.The MAX232 is connected to GSM modem via RS 232 cable. An oscillator circuit of 5 MHz is connected to the 89C51. One of the port of 89C51 is connected to relay driver circuit which will help 89C51 to switch power OFF/ON of the street lights.89C51 will continuously reading the serial port after every second for new SMS. Ones the SMS came it will try to forward that SMS from GSM modem using AT commands. It will decode it and finds the particular street light which needs to

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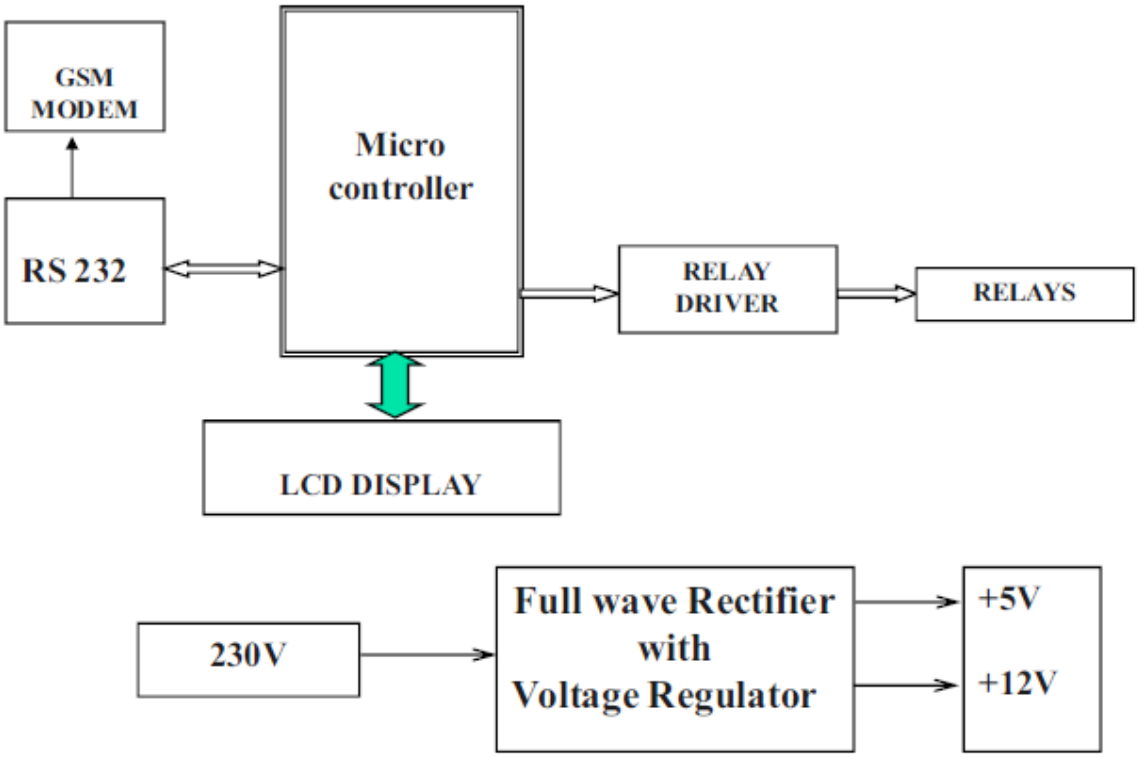

Fig. 2 functional block diagram

The entire street light lamps are connected to relay driver circuit. Base server will run a Java application which will maintain complete street when we want to switch ON/OFF any particular street light, server will send a GSM SMS to that street controller to take necessary action. Further, with By using the auto switching system of Smart Street light we can also reduce energy consumption because manually operating lighting system are not switched ON earlier before sunset and also not switched OFF properly after the sun rise. In healthy condition street light operates in a normal working condition by turning ON and OFF automatically for night and day light, but in unhealthy condition the street light does not turn ON or OFF and it sends a feedback message to control room to notify the host. The host is able to turn ON or OFF the street light manually and wirelessly with the help of graphical user interface. In a fault condition, the street light sends an Error message to the control room to alert the host or operator regarding the fault. The operator Notified and takes further action to carry out repair works. As compared to the conventional street lighting system, the smart street system offers high reliability, low maintenance. The feedback system allows the street light to respond with the control room reporting its daily status and condition Mobile should not only used for MSG but also for web application

IV.SECURITY

Works on profile basis i.e. all street lights are ON from 6:30pm to 6:30 am, in other words street lights are functioning Completely for 12hrs a day. Assuming 20 nodes to be working. Power consumed by them will be given as:

- Bulb used =150 W=0.150 kW
- Number of nodes = 20 nodes
- Number of working hours per day = 12hrs
- Power Consumed/day = 20 * 12 * 0.150= 36 kWhr i.e. 36 * 30 = 1080 kWhr/month
- Monthly Bill for 20 nodes (Rs3/kWhr) = 1080 * 3 = 3240Rs per month Comparison with the intelligent system:
- System operates on Sun rise and sunset timing – saves 4% to 8% of energy
- In normal functional time system corrects voltage if goes beyond certain limit– saves additional 7% to 10% energy
- At low traffic time (programmable) system enters in to energy saving mode – saves additional 45% to 50% of energy

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- At mid night or very low traffic time staggering starts (programmable) – additional 7% to 10% energy saving

V. RESULT AND DISCUSSION

By sending a SMS to microcontroller circuit by the help of GSM circuit through mobile the unit of street light automatically switch ON/OFF. LED should indicatewhether the street light is on or off and they should be control by using fix timer. Therefore wastage of time and requirement of skilled worker is reduced to a great extent.We can monitor and control more parameters and devices. We used in various rooms like seminar hall, conference room, and study rooms in college where the capacity of room is limited and should not be exceeded. So the project will display the actual number of street light is work.

VI.CONCLUSION

Thus message is decide whether the street light should ON/OFF by the help of gsm and microcontroller circuit It enables regulate their communication strategies according to dynamically changing network environment. Street lights should work on the systematic manner by the help of circuit and huge reduction in power consumption on whole around the world it is less costly and effective in manner .it should reduce the time wastage of human effort and control from one place or any common panel. Provide the better efficiency to do work

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