

GSM BASED AUTOMATION OF STREET LIGHT

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Abstract: In today's world, power saving is very important and difficult. Though there are many power generation methods, it has become very difficult due to insufficient resources. So, saving of power is the need for our society.

A Street light, lamppost, street lamp, light standard, or lamp standard is a raised source of light on the edge of a road or walkway, which is turned on or lit at a certain time every night. Major advantages of street lighting includes prevention of accidents and increase in safety. Studies have shown that darkness results in a large number of crashes and fatalities, especially those involving pedestrians; pedestrian fatalities are 3 to 6.75 times more likely in the dark than in daylight. Street lighting has been found to reduce pedestrian crashes by approximately 50%. This project is about how power can be saved in street lights. The main objective is to control the street lights (dim during dawn and dusk time as well as bright during night time) using passive infrared motion detector . The engineer at Electricity Board (EB) can control the street lights of various areas through Global System for Mobile communication (GSM).

1 INTRODUCTION

Basically, street lighting is one of the important parts of a city's infrastructure where the main function is to illuminate the city's streets during dark hours of the day. Previously, the numbers of street lamps are relatively simple but with the development of urbanization, the number of streets increases rapidly with high traffic density. There are several factors need to be considered in order to design a good street lighting system such as night-time safety for community members and road users, provide public lighting at cost effective and the reduction of crime.

GSM based street light monitoring & control system is an automated system designed to increase the efficiency and accuracy by automatically timed controlled switching of street lights. GSM based street light monitoring & control system consists of a p89v51rd2 microcontroller which on setting of time switches ON/OFF the street lights and dims at 12mid

night for reducing power consumption and when any movement is detected it bright. This is smart way of managing street lighting systems. There are basically two modules which include the client side and the server side. The client side consists of the GSM modem which is further connected to the microcontroller. The server side consists of the cell phone it has a core engine.

There are four LED for indication of bulb. Solar street lights are immensely useful as standalone source of light on streets and in premises, gardens and industrial appliances. Solar Street is also available in power LED version. Automatic dimming after preset time in the evening is optionally provided. LEDs are automatically put on dimming mode after 4/5/6 hours after dusk. This saves on panel and battery cost.

II RELATED WORKS

1. Conventional method

The most common method which is used, utilizes man power to do tasks such as switching on/off of street lamps. This is very tedious and difficult job to do and workers have to perform it on daily basis.

2. GSM based RFID approach to automatic street lighting system

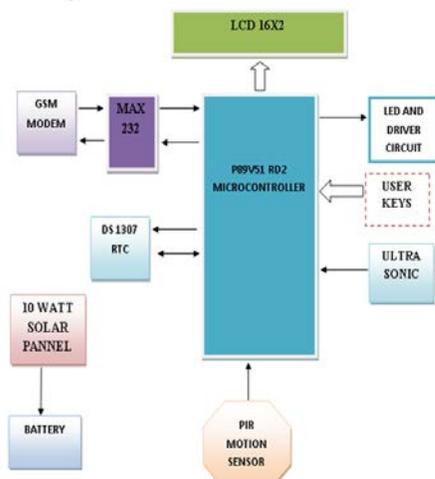
Saving of power is the need for our society. The main objective is to control the street lighting using Dual Tone Multi Frequency (DTMF). RFID reader is fixed in the street light and the tags are given to individual houses, the user has to show his tag to the reader and the information will be intimated to the server through GSM. The engineer may respond to the issue immediately. GSM is used to transmit the data to the server like load balancing, disconnection of power and complaints. Regarding power in the houses, balancing a load is the major issue in the electricity. To overcome this problem current transformer is used. The function of current transformer is used to send the load details continuously to controller. Already the loads values are predefined in the microcontroller are compared with the present value. If the values are more than the predefined values, it will automatically send a message through GSM .

3. Automatic street light control system using LDR

Nowadays, human has become too busy, and is unable to find time even to switch the lights wherever not necessary. The present system is like, the street lights will be switched on in the evening before the sun set and they are switched off the next day morning after there is sufficient light on the roads. Two sensors are used which are light dependent resistor LDR sensor to indicate a day/night time and the photoelectric sensors to detect the movement on street. The microcontroller PIC16F877A is used as brain to control the street light system. The light sensor will detect darkness to activate the ON/OFF switch, so the streetlights will be ready to turn on the photoelectric sensor will detect movement to activate the streetlights. LDR, which varies according to the amount of light falling on its surface, this gives an inductions for whether it is a day-night time, the photoelectric sensors are placed on the side of the road, which can be controlled by microcontroller PIC16f877A. The photoelectric will be activated only on the night time. If any object crosses the photoelectric beam, a particular light will be automatically ON.

III BLOCK DIAGRAM

The overall block diagram of “GSM BASED AUTOMATION OF STREET LIGHTS” as shown in figure 3.1.



GSM based street light monitoring & control system is an automated system designed to increase the efficiency and accuracy by automatically timed controlled switching of street lights. This project describes a new economical solution of street light

control systems. The control system consists of a GSM Modem, RTC, solar panel, battery, LCD and LED control circuitry. This also includes client server mechanism where user can directly interact with GSM to control the Street light of any place from single position. Base consists of cell phone. When we want to switch ON/OFF any particular street light, authorized person will send a GSM SMS to that street controller to take necessary action. Street light controller will receive that SMS and will decode it and finds the particular area street light which needs to put ON/OFF using relay circuit. Here the street controller P89v51rd2 is connected to GSM modem through its UART port (Serial Ports). P89v51rd2 cannot talk to GSM modem directly due to mismatch in voltage levels. So GSM modem is connected through voltage level convertor MAX 232. Only 2 lines RX & TX are connected to the MAX 232. The MAX232 is connected to GSM modem via RS 232 cable. An Oscillator circuit of 11.0592 MHz is connected to the p89v51rd2 .Serial port after every second receives new SMS. Ones the SMS came it will try to fetch that SMS from GSM modem using AT commands. It will then decode it and finds the particular street light which needs to put ON/OFF using relay circuit. The entire street light lamps are connected to relay driver. A solar lamp is a portable light fixture composed of a LED lamp, photovoltaic solar panel, and a rechargeable battery. Solar lamps recharge during the day. At dusk, they turn on and remain illuminated overnight, depending on how much sunlight they receive during day.

RESULTS

During the presence of sunlight there is no need of external light. Therefore during the day time from 5am to 6pm street light consisting of 10 LEDs are made OFF. During night time from 6pm to night 12pm all 10 LEDs are made ON. But during mid night there is no need of full brightness. Therefore during mid night only 6 LEDs are made ON and rest are made OFF. Thus power is saved when there is no object movement and all 10 LEDs are on when object movement is detected.

MERITS, LIMITATION AND APPLICATIONS.

Merits

1. Any authorized person can control the whole city's street lights through a single point of control and can control energy consumption.

2. As street lights can be switched ON/OFF according to the time automatically or manually at the specific location, effective use of energy is achieved.
3. It is a reliable and a low cost communication mechanism. It can bring up easy deployment so as to integrate with the current system.
4. Streets lights can be switched on or off in alternate patterns also. Ease of installation is there. There are no hidden engineering costs. It is highly scalable.
5. You can add nodes anywhere in the network and the network software will look after the connections for you.
6. Dimming of lights according to the required intensity is possible and by movement of any living object.

Limitation

1. Usage of solar channel leads to increase in cost.

Applications

1. The system is built to provide remote access to street lights by accessing them just through a server.
2. This power can be diverted to different areas under load shedding and attempt to reduce the problem of load shedding can be achieved.

Conclusion

The GSM based automatic Street light control system based light intensity and traffic density, in todays up

growing countries will be more effective in case of cost, man power and security as compared with today's running complicated and complex light controlling systems. Automatic street light controlling system puts up a very user friendly approach and could increase the power saving.

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