Solar Hybrid Street Light With Security & Maintenance Alert

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Abstract -. This paper demonstrate the idea of adaptive street light application system .This project provides the auto switching facility which makes project smart . First of all we generate the energy from non-conventional energy source and Electrical power. Further, they used in application of street light system according to requirement of power.

Also this paper gives the best solution for electrical power wastage the manual operation of the lighting system is completely eliminated. This circuit use light dependent resistor sensor (LDR) for light operation in day and night according to the condition, light operated in dim mode when any person come on the road then system automatically sense this condition and operate the light in the mode of higher intensity .In this system we added new future that is security and maintenance alert by using LDR and GSM module for sending the message to local police station and maintenance department of local electricity authority to insure availability of light in street without interrupt. The ARDUINO is used as brain to control the street light system, where the programming language used for developing the software to the Aurdino nano is Arduino C-language. Finally, the system has been successfully designed and implemented

Keywords— *Street Light , Security ,GSM Global System ,
Arduino*

INTRODUCTION

This project is designed for LED based street lights with auto ON/OFF control using solar power from photovoltaic cells. Use of solar energy is increasing, more and more all are opting for solar energy. Photovoltaic panels are used for charging batteries by converting the sunlight into electricity. A charge controller circuit is used to control the charging. Intensity of street lights is required to be kept high during the peak hours. As the traffic on the roads tends to decrease slowly in late nights, the intensity can be reduced progressively till morning to save energy. Thus, the street lights Switch ON at the dusk and then switch OFF at the dawn automatically. The process repeats every day. LED lights are the future of lighting, because of their low energy consumption and long life they are fast replacing conventional lights world over. The intensity control helps in saving energy during late nights while traffic density on the streets is low. The Aurduino is used as a controller of street is engaged to provide different intensities at the different times of night using PWM technique, for energy saving for solar based system, using a charge controller for battery charging, overload and deep discharge protection. It automatically shifts to electricity when solar panel batteries completely discharge. Now It has maintenance system controller unit detect the light fuse if it found then it send the message to local electrical authority with pole number. If any theft found due sensor then controller unit automatically send the alert message to the patrolling police and police station with pole number all the alert is send through the GSM module fitted in Distribution box of main Pole.

A. PROPOSED METHODOLOGY

2. System model

As shown in the figure (1) the solar energy is collect from the sun rays , With the help of Solar panel , then this solar energy is pass to the Battery Charging Circuit is use to charge the battery and protect from the over voltage protection. Now the voltage level is high or low is sense by the sensing circuit and the electricity is pass to the system. The movement of the street light poles(on /off) is also sense by the sensing circuit. This sensing circuit is controlled by the microcontroller.

The microcontroller is a 40pin Arduino. From which we take the input and output points. It is the heart of the system as well as true computer on a chip , the all parameters is control by the Arduino. The solar and battery thief detector system is Install from this we would easily grabs the thieves who stolen the battery and solar panels. If any try to stole the Battery and panel, it will give the alarm to the patrolling police.

Here we also Install the pole light on/off checker and battery voltage checker which continuously monitoring the health of the solar pole and in case any fault is occurs it will give the alarm to the maintenance department.

The driver circuit is use for communication between GSM module and microcontroller.

All the alarm give to the police and maintenance department is with the help of GSM (Global Service Of Mobile). It is a world wide use for the communication
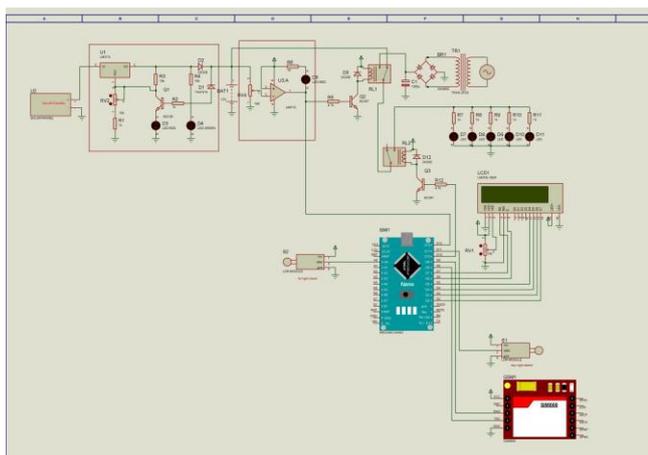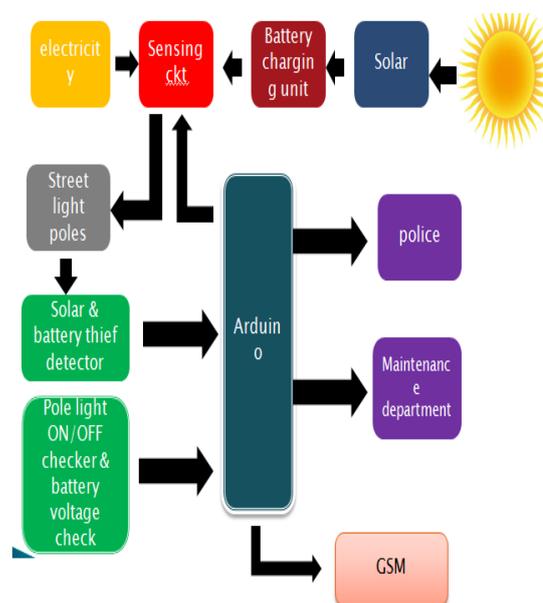

conditions in working the circuit. If the two conditions have been satisfied the circuit will do the desired work according to specific program. Each sensor controls the turning ON or OFF the lighting column. The street lights have been successfully controlled by microcontroller. With commands from the controller the lights will be ON in the places of the movement when it's dark. Furthermore the drawback of the street light system using timer controller has been overcome. Finally this control circuit can be used in long roadways between the cities. If theft found it sends the message to police if theft found and it reduce the solar panel and battery theft. It drives whole system on battery until discharge and reduces CO_2 emission.

Figure 1 circuit diagram

As shown

B. HARDWARE DISCRIPTION

The system hardware consists of Microcontroller (Arduino ATMEGA),Relay,Diode LCD, GSM module, Transformer, LDR, LED, Solar Plate , Battery .The below block diagram shows thewhole system. The hardware blocks of smart hybrid street light is shown.

Conclusion :

This paper elaborates the design and construction of automatic street control system circuit. Circuit works properly to turn street lamp ON/OFF. After designing the circuit which controls the light of the street as illustrated in the previous sections. LDR sensor, the Theft prevent sensor mean magnet sensor, Automatic switching circuit means hybrid system are the two main

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