

Smart City with Environmental Monitoring and Security in Emergency Conditions

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Abstract- This system is designed as project for development under smart city. The project is made for saving energy by making the ON/OFF of street lights as automatic. The project is implemented with smart embedded system that controls the street light based on detection of sunlight. During the night time the street light gets automatically ON during the day time it gets automatically OFF. The ON/OFF can be accessed anywhere anytime through internet. A phone camera is used for continuous recording. A new provision of panic button is added for emergency situation. When someone pressed this panic button, images of that current situation are captured and send to nearby police station through the cloud account and also it sends an emergency message alert to the number which is registered. And the access of that cloud account is given to the particular police station by which they can view the incident's spot. Each area's street lights are connected to the particular area's police station and each of them has a cloud accessible account This system also calculates different sensors values such as humidity, gas, temperature, noise and light sensors. The manual operation using GSM technology is completely eliminated. Thus the system is mainly designed to ensure safety and to prevent energy wastage.

Index Terms- Streetlight, panic button, sensors, microcontroller, phone camera.

I. INTRODUCTION

The largest expense of a city is mainly because of street lights. A smart street light can be used to cut the municipal waste up to 50-70%.The project is mainly used to track the crimes and accidents happening at the road using panic button and to prevent energy improvidence. Whenever the sunlight is detected the light will be automatically made OFF and the same information can be accessed through internet, which can be made ON/OFF using iot. The street light (ON/OFF Status) can be accessed from

anytime, anywhere through internet based on the real time system.The street light controller is installed on the pole lights along with a microcontroller, sensor and communication between the street lights is based on the controller installed on the pole of the street light.The controller controls the LED street lights. The sensor senses the sunlight, gas ratio, noise ratio, temperature and sends the information to the microcontroller which acts upon, based on the given condition. The values of these sensors are continuously updated on the server side. Here the operation of manual mode is avoided and everything is automatized. According to the requirements the control system will be made to switch on-off the lights at required timings. A phone camera is present inside the system to record the entire happenings on the street when outsiders pass the road. When an emergency situation like theft, harassment is found to happen, a panic button is provided at the reachable height which can be pressed by the person. As a result images are captured of that current situation and send to nearby police station with an message that "There is an emergency in particular area". Each police station is provided with a cloud accessible account. The main idea of this system is to ensure safety and reduce energy consumption.

II.LITERATURE SURVEY

Previously street lights are controlled by the sensors according to the presence of sunlight. Also the sodium vapor lamps are replaced by the LEDs due to this cost is reduced and also from this we can prevent energy consumption. But in existing system CCTV cameras are used for continuous surveillance of the roads when the outsiders are passed. But as we are using CCTV for recording the entire happening on the road the cost must be high for this system. Also in the existing system any kind of emergency alert or

message provision is not provided. Electricity has become one of the major need of present day civilization . Therefore a non conventional power generation is needed. This another system focuses on the need of automated street light system and therefore a peculiar way of implementation with embedded system tools. Here electricity is generated by using piezoelectric material. Ever time when a vehicle is passed over the road large amount of potential energy is wasted due to friction. In this project we have a tendency for generating electrical power in a non conventional method by simply running the vehicle on the piezo electric device. By using microcontroller we are able to glow the lights supported vehicle position, by using piezoelectric impact piezo electric device converts that energy in rechargeable battery. By using LDR we can control the street light on day times without human beings. Although all these different types of facilities are provided in different system but we have combined all these approaches in a single project. As we are using phone cameras instead of CCTV the cost is also reduced, and also this phone is used for connectivity to the server through Wi-Fi and connectivity to hardware through Bluetooth controller.

III. IMPLEMENTATION DETAILS

The system is proposed for evaluating different sensors values and also capture the images in case when the panic button is pressed. Following fig. shows overall working of System with the flow.

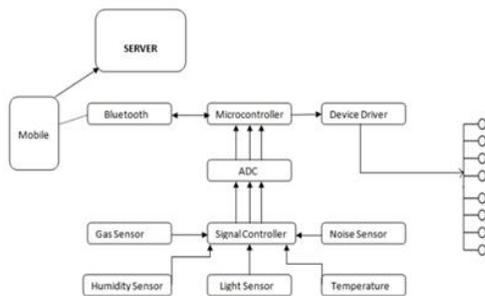


Fig: Architecture for Smart City

The system consists of different kinds of sensors like noise sensor, temperature sensor, gas sensors, humidity sensor and light sensor. Also there is a android phone used for continuous recording and captures the images whenever the panic button is pressed. There is a microcontroller ATmega32

3.1 Sensor reading :

- Gas sensor
- Noise sensor
- Light sensor
- Humidity sensor
- Temperature sensor

3.2 Camera Image Capturing :

In this module, after the panic button is pressed the phone camera captures the images of the current situation and send to the server via Bluetooth connectivity. Also an emergency message alert is send to the registered mobile numbers that "There is an emergency in the particular area".

3.3 Hardware Control :

In this module, we are using microcontroller ATmega32 which belongs to AVR family. Microcontroller receives the signal of light sensor from the ADC which helps in automatic ON/OFF of street lights.

3.4 Monitoring The Sensors Reading :

In this module, Microcontroller receives the sensors values which are sent to the server via Bluetooth controller and those sensor readings will get monitored and continuously updated.

IV.RESULTS

The system result in less power and energy consumption due to use of LED lights. We can view the values of different sensors like temperature, noise, gas, light and humidity. Based upon the sensors values we can act accordingly to the condition. Suppose, if an accident happened on road, the noise sensor value will automatically get increased. If there is fire then the gas sensor value will raised. So, overall the main motive of this system is to ensure safety and energy consumption.

V. CONCLUSION

The main aim of this system is to cut down energy consumption and ensure safety. Due to the provision of panic button crimes can be detected easily with the proof for the police. Whenever there is an emergency condition like accident the panic button is pressed by anyone. Also this system creates safety for women to

walk without fear on the road anytime. From this system we can prevent thefts like harassment or other thefts. The system is cost effective, reliable, prevents energy wastage.

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