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A Survey on Smart Security and Adaptive Street Light Integrity in Electric Poles

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ABSTRACT: The Main Ideology is for providing smart security solution along with the people Security and adaptive lighting in street lights. The largest expense of a city may be mainly because of street light system. A smart street light can be used to cut the wastage of Electrical energy up to 50-70%. And for the purpose of women and children safety, there are some security measures taken such as wrist bands, smart watches and mobile applications which may not be affordable or operatable by everyone. So my idea is mainly used for implementing alarm/frighten button on the street light poles which raises an alarm to the nearby police station in-case of any emergency or danger. A 360 degree or 180 degree camera is placed on top of the street light and traffic poles to track the actions performed on the road. So that camera can capture the entire things happened on the street. Whenever the button is pressed by the person in emergency, a text message and a notification will be sent to the nearest police station using GSM or Wi-Fi module (like ESP8266) while the system is connected to internet. When there is no internet connection, a text message can be sent with the help of GSM module. When the message is delivered, admin can see the footage by logging in and can take the required actions. Also a buzzer is implemented in the system to create an alert in the surrounding when the button is pressed. Each square measure's street lights are connected to the actual area's station house. In addition, we can also track the intensity of the light using sensors and it is done using the wireless system to control the energy consumption.

During the night time the street light gets automatically ON, as the sun appears it gets automatically OFF which can be controlled using Light Dependent Resistor (LDR) sensor. When the sunlight falls on LDR, its resistance decreases and makes the light to switch off. When the sun sets, light do not fall on the sensor, so its resistance increases and triggers the light to switch on. We can also control the street light system based on detection of objects or vehicles using Infrared (IR) Sensor where it detects the object by measuring the heat of the object and by its motion. IR sensor is also be used to vary the intensity of the light. Upon sensing the movement of the vehicles or object the sensor transmits the data to the Microcontroller which makes the light to switch ON and will be dimmed otherwise. The manual operation can be reduced. Thus the system is mainly designed to ensure safety and to prevent energy wastage.

KEYWORDS: Light Dependent Resistor (LDR), Infrared (IR), ESP8266, Global System for Mobile (GSM), Internet of Things (IoT), Street Light.

I. INTRODUCTION

The IoT could be a system of reticulate computing devices, mechanical and digital machines, objects that are given with distinctive identifiers and jointly the pliability to transfer info over a network whereas not requiring human-to-human or human-to-computer interaction. An IoT system consists of web based or web enabled smart devices that uses sensible and embedded processors, sensors and communication hardware to collect, send and acts on the data acquired from the environment. The increase in the threat to women and children is a very serious concern in the society. Crimes like chain snatching pick pocketing etc takes place on streets are increasing. Government has extended few solutions in this concern. Many CCTV cameras have been installed all over the cities. This solution comes to help only after the crime takes place. And also for the purpose of women and children safety, there are some security Measures such as wearable and smart devices and mobile applications which will notify a group of people or a particular person via google map integration for location etc when the person using it is in danger. Main drawback of such devices and applications is that they are not affordable by poor or medium class people in the society.

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It may be difficult to operate for the person who has no idea about the technology. There may be a chance of lost or people may forget to carry it wherever they travel.

A straight forward and effective resolution to the current would be dimming the lights throughout off peak hours. Whenever presence is detected, the lights around it'll glow at the conventional (bright) mode. This is able to save tons of electrical energy on a large scale and additionally scale back value of operation of the streetlights. We shall be able to check the fault status of street light on internet using IoT from anywhere in real time so that it can be solved during the process. The manual operation can be reduced if it is implemented. The system Should be designed in such a way that Security and prevention of energy wastage is executed.

II. RELATED WORK

This paper concentrates on the need of automatic street lightweight system and therefore the peculiar manner of implementation with embedded system tools. As automation booming within the trade with a quick pace, the necessity of replacing the primitive operation of street lights with quite intelligence is important. The previous systems were enforced with LDR and IR sensors; here the presence of movement within the roads area unit perceived by IR sensors and LDR powers the road lights solely once evening. The surplus use of IR sensors and energy concerned within the on top of operation area unit reduced in our image. Here we have a tendency to use piezo electrical sensors to observe the movement within the roads instead of IR sensors. The microcontroller MSP430 because the brain to manage the processes involved¹. Results/Findings: The results are found to be terribly encouraging and therefore the sample results area unit given within the results section of the paper. LEDs area unit getting to be important lighting possibility in close to future because of its peculiar low power consumption and price effective nature. Our image can facilitate in eliminating this metallic element vapour street lamps with higher semiconductor diode comprised lamps operated neatly victimization LDR, and piezo knock detector [02].

From the recent survey, as a whole the largest expense of a city is mainly because of street light system. A smart street light can be used to cut the wastage of energy up to 50-70%. Nowadays, people have become too busy, and is unable to find time to switch the lights wherever not necessary. The present system is just like the power is going to be switched on within the evening before the sun sets and that they square measure shifted following day morning once there's comfortable light on. However the particular temporal order for these lights to be switched on is once there's absolute darkness. With this, the power facility is going to be wasted upto some extent. This project offers the most effective answer for electric power wastage. Also the manual operation of the lighting system is reduced. The energy consumption in entire world is increasing at the fastest rates due to population growth and economic development and the availability of energy sources remains woefully constrained. Streetlights are associate integral part of any developing neck of the woods. They are present on all major road- ways and in the suburbs too. Every day, streetlights are powered from sunset to sunrise at full strength, even when there is no one around. On a global scale, millions of dollars are spent each day on these street lights to provide the required electrical energy.

III. EXISTING SYSTEM

Nowadays, the increase in the threat to women and children is a very serious concern in the society. Crimes that take place on streets are increasing. Government has extended few solutions in this concern. Many CCTV cameras have been installed all over the cities. This solution comes to help only after the crime has happened. For the purpose of women and children safety, there are some security solutions such as wearable devices and mobile applications which will notify a group of people or a particular person when the person using it is in danger. Main drawback of such devices and applications is that they are not affordable by everyone. It may be difficult to operate for the person who has no idea about the technology. It may be lost or people may forget to carry it wherever they go.

Street light system is one of the huge expenses in a city. The cost spent is huge that all the sodium vapour lamps consume more power. Currently a manual system is used where the light will be made to switched ON/OFF i.e. the light will be made to switched ON in the evening and switched OFF in the morning. Hence there is a lot of wastage of energy between the ON/OFF. This system becomes expensive since light is made to be ON the entire night. More man power is required and periodic check is a must.

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Disadvantages -

- Security solutions such as wearable devices and mobile applications may not be affordable or operable by everyone.
- CCTV cameras are installed all over the cities which come to help only after the crime has happened.
- Switching ON/OFF is done on the street lights.
- More Energy Consumption due to the sodium vapours lamps.
- The street lights are unnecessarily glowing with its full intensity even in the absence of any activities in the street.
- Manual hectic operation due to change in season and climate.

IV. IDEOLOGY

In my Ideology, a camera can be placed on top of the street light to track the actions performed on the road and so the camera captures the entire thing on the street. Whenever the button is pressed by the person in emergency, a text message and a notification will be sent to the nearest police station using GSM or Wi-Fi module while the system is connected to internet. When there is no internet connection, a text message will be sent with the help of GSM module. When the message is delivered, admin can access the footage by logging in and can take the required actions. Also a buzzer can be implemented in the system to make an alert in the surrounding environment when the button is pressed. Each area's street lights will be interconnected to the actual area's station house.

Automated switching ON/OFF of the street lights is implemented with embedded system like micro controller that controls the street light based on detection of sunlight. After the Sun set, the street light gets automatically ON and during the sun raise it gets automatically OFF. The cost is significantly reduced if sodium vapour lamps are replaced by LED. The CO₂ emission and the light pollution can also be reduced where we protecting the ozone layer indirectly. The system should also control the street light based on detection of objects or vehicles. Whenever an object is detected the light should automatically turn ON or the lights should be dimmed.

Advantages -

- Button on the street light poles notifies the nearby police station in-case of any emergency or danger.
- Button raises an alarm to create an alert in the surrounding environment.
- Automated switching ON/OFF of the street lights.
- Intensity of the street lights can be controlled based on detection of objects or vehicles.
- The CO₂ emission is reduced where indirectly Ozone Layer is protected. Thus the light pollution is reduced.
- The cost is significantly reduced as sodium vapour lamps are replaced by LED.
- Man power can be reduced.

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