DETECTING THE FAILURE OF STREET LIGHT

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Abstract

"Detecting the Street light Failures across a City" is an automated system which automates the streetlight. The main aim is to analyse the Pattern of Street light is to reduce the power consumption. The streetlight will be turned ON when there is dark otherwise the lights will be switched OFF. With advancement of technology, things are becoming simpler and easier for everyone in today's world. Automation plays an important role in reducing the human work. Thus, we save a lot of energy. The system application in street light control for each lamp will reduce the usage of electricity and maintenance cost, and increase the lifetime of street light.

Introduction

"Detecting the Street light Failures Across a City" is a simple and powerful concept, where we search a location based on Google maps, and then based on street it switches ON and OFF the street light automatically. In this system manual works are removed. Street lights can be fitted with sensors to turn ON and OFF, based on the luminosity. If it gets dark earlier in the day, the light can go ON automatically. They also have a specific location on a map, with a latitude/longitude value. It automatically switches ON/ OFF lights based on the luminosity of Sunlight. The objective of this project is to remotely control the street lights using software. There are tens of thousands of street lights across any city. These street lights are controlled centrally in some cities, and locally in others. Many times, we see problems like street lights not switched one, some failing repeatedly, some being ON during the day etc. These lead to increased consumption in many cases, and calls to the electricity agencies.

Literature Survey

"Detecting the Street light Failures across a City" is all about to control the power consumptions of streetlights and eliminating manpower. During daytime there is no requirement of street lights so that the street light will be OFF until the light level is low. In the present generation human has become too busy, and is unable to find time even to switch off the lights whenever not necessary. Hengyu Wu, Minli Tang [1] proposed about the core technology of streetlight control system based on AT89S52 single-chip microcomputer. It integrates power consumption. Gong Siliang[2] describes a remote streetlight monitoring system based on wireless sensor network. The system can set to run in automatic mode. Main advantages of street lighting includes: increase in safety and prevention of accidents.

Proposed System

- The objective of this project is to remotely control the street lights, where we have programs to generate data for luminosity, along with the latitude and longitude of the location.
- We use simulated random data to set the light to ON/OFF based on the luminosity values (if it becomes dark, the light needs to be turned ON. If there is more natural light, the street light goes OFF).
- Creating a database to save data about the state of the street light and the luminosity.
- We use analytical tools to visualize the data - on a map. To show which lights are ON, OFF - and the ability to filter them.

Module Description

This module is divided into 4 phases:

I. Entry of Location
II. Entry of Street

III. Entry of Status
IV. Entry of Maintenance

I. Entry of Location

- **Introduction**: Stores the locations details.
- **Input**: location id and location name.
- **Processing:** The Locations information's along with Latitude and Longitude values are stored in Location Record table of Streetlight database.
- **Output:** This information helps to store the particular Locations information. Admin can view all the location information from Google map.

II. Entry of Street

- **Introduction:** Stores the Street details.
- **Input:** Street Id, Street Name and number of Streetlights.
- **Processing:** The Street information's along with Location Id values are stored in Street Record table of Streetlight database.
- **Output:** Here it helps to store all the Street information along with the Location Id. So that Admin can view all the Streetlight details.

III. Entry of Status

- **Introduction:** Stores the Status of Streetlight.
- **Input:**Light_id,Date,Luminosity,Status, Work Condition.
- **Processing**: The Streetlight's working condition values are stored in status Record table of Streetlight database.
- **Output:** Here it helps to store all the Streetlight working information. So that Admin can view all the Status of Streetlight.

IV. Entry of Maintenance

- **Introduction:** Stores the Maintenance condition of Streetlight.
- **Input:** Light ID, Date of repair, Status, Work Condition.
- **Processing:** The Streetlight's repair condition values are stored in Repair Record table of Streetlight database.
- **Output:** Here it helps to store the entire Streetlight repair and maintenance information. So that Admin can view all the details of the record after repair.

RESULT AND DISCUSSION

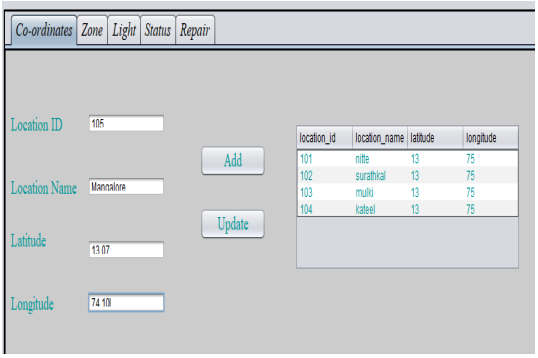

Fig1

In this module, we enter location id and location name ,then it will give latitude and longitude coordinate values from Google API then it will save into the database.

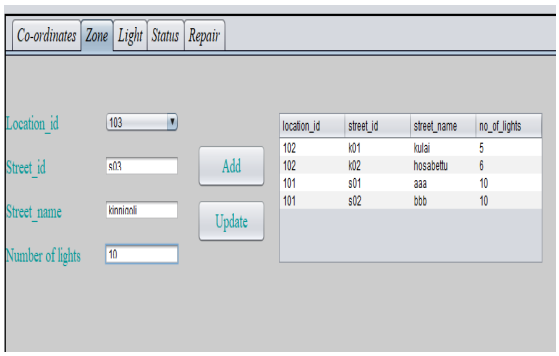

Fig2

In this module, we select location id which is existing in the database, we enter street id, name of the street and number of street lights to the particular street. Then it will save into the database.

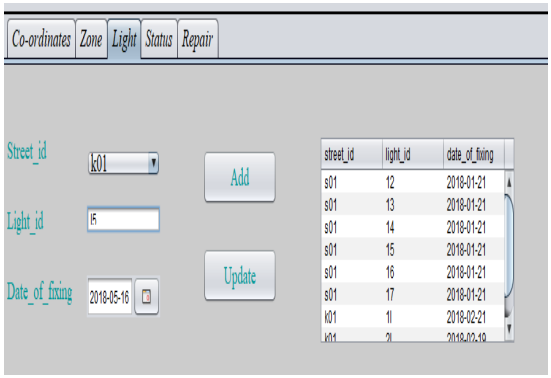

Fig3

In this module, we select street id which is existing in the database, then we enter light id and date of light fixing and it will save into the database.

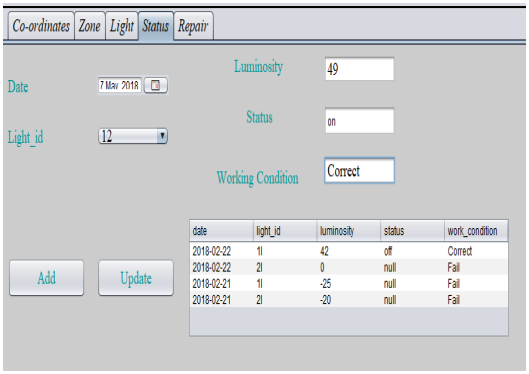

Fig4

In this module, we select date, light id (existing in the database), luminosity.

If luminosity value is less than 0 then automatically status of light will be Null and work condition will be Failure.

If luminosity value is greater than 0 and less than 45 then automatically status of light will be OFF and work condition will be Correct.

If luminosity value is greater than 45 then automatically status of light will be ON and work condition will be Correct. And it will save into the database.

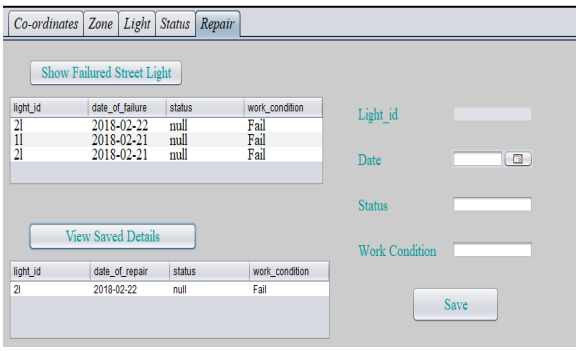

Fig 5

In this module, it will have details of failed street lights and next based on the street light id we are fixing new lights then we are going to check work condition of the new fixed lights.

Conclusion

In this paper "Detecting the Street light Failures across a City", it provides easy maintenance and helps to reduce energy consumption.

The proposed system is appropriate for street lighting in rural as well as urban areas.

It is capable of taking corrective actions in case of unprecedented events of climatic changes.

It prevents unnecessary wastage of electricity, due to manual switching of streetlights.

Future Scope

An Android app can be developed to control the street lights remotely (by just updating the value in the database).

References

[1] Hengyu Wu, Minli Tang(2010)," Design of multi-functional street light control system based on AT89S52 single-chip microcomputer",2nd International Conference on Automation.

[2] Gong Siliang " Wireless Streetlight Control System "International Journal of Computer Applications, Volume 41– No.2, March 2012.

[3] Rodrigo Pantoni, Cleber Fonseca and Dennis Brandao, "Street Lighting System Based on Wireless Sensor Network", Intech 2011.

[4] Fabio Leccese, Marco Cagnetti and Daniele Trinca (2014), "A Smart City Application: A Fully Controlled Street Lighting Isle Based on Raspberry-Pi Card, a ZigBee Sensor Network and Wi-Max", Sensors 2014