

IOT Based Automatic Street Light Control and Fault Detection System

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Abstract— The conventional street lighting maintenance and control system still remains ancient in this era of revolution and technological advancement. The evolution of the Internet of Things (IoT) bring the revolutionary changes of the web world. Thus we use this technology to cater to the maintenance and control processes of street lighting system. The proposed system enables maintenance and control of the street lights and makes it easier to monitor and control its operation. The system will detect faults in the street lights to intimate the control room to take immediate action. It has the automatic fault detection and light sensing. It aims to design a system, which is free of any human intervention and provides quick maintenance functionality. In the current scenario, the street lights are automatically switched ON at every evening and is switched OFF the next morning. This project gives a solution for fast repairing and maximizes the ability to control the street lamps remotely and efficiently based on the weather conditions.

Keywords: Internet of Things (IoT), Street Light Control, Fault Detection System

I. INTRODUCTION

This project presents an idea of developing an IoT based application to monitor and control streetlights efficiently and improve its maintenance facilities. Now-a-days, street lights are the most important aspect of the city as it leads to most of the accidents due to lack of proper light. To detect the faults in the lamps at remote location, the proposed system is very much useful. Based at the aforementioned concerns, innovations in efficient street light control structures is a must. We advise a scalable, holistic and efficient answer that provides lighting only when necessary (consistent with the instant weather conditions) with the goal of lowering the human involvement. It will also make large contributions to the safety and security of the metropolis roads via presenting an over current situation may cause short circuiting which may lead to fatal accidents. Thus sensors are used to detect the current flow in order to avoid any mishaps.

II. RELATED WORK

Previous work has been referred which proposes a lot of challenges related to the street lighting. In 2015, K. Abhishek and K. Srikanth, has written a paper that provides an energy efficient solution to control the street lights using LED and ZigBee protocol. In 2017, J. Arthi, W. Lydiapreethi, B. Gunasundari, has written a paper that conveys the elimination of manual operation for controlling the street lights by making it smart using IoT. In 2016, Ravi Kishore Kodali and Kopulwar Shishir Mahesh [7], has written a paper that proposes a low-cost implementation of MQTT using ESP8266. Basically, in the outside world scenario the things with sensor capability, sufficient power supply and connectivity to internet makes Internet of things (IoT)

possible. For the growing technology, it is the necessary to have a cost effective and low bandwidth protocol like Message Queuing Telemetry Transport (MQTT) Protocol. It facilitates intelligent remote control as well as ability to adapt to the environmental conditions.

III. AIM & OBJECTIVE

A. Aim:

In the current scenario, the maintenance and fault detection process of streetlights is completely manual. The basic aim of our proposed system is to automate this entire process to save time, energy and resources and also increase the feasibility. Overcome the drawbacks of the existing application. Alternative to traditional maintenance and control process of streetlights.

B. Objective:

The application would be able to detect faults easily and provide required maintenance by generating alert messages through email to the admin control room and Power optimization. The application will use raspberry pi to providing alerts message to the admin control room.

IV. LIMITATIONS OF EXISTING METHOD

Street lights are switched ON at a pre decided time and switched OFF at a pre decided time. It requires manpower to maintain and control the streetlights. · It is a time-consuming process. Until and unless there is a complaint or the maintenance personnel goes for a check there is no fault intimation. · It does not provide the feature of- the staff will not be able to initiate a repair until there is any intimation of fault.

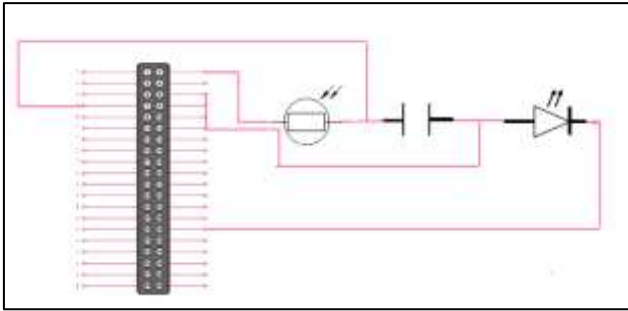
V. PROPOSED SYSTEM

Our proposed system enables maintenance and control of electric poles i.e. the streetlights. It will be easier to monitor and control the operation of streetlights. The system will detect faults in the streetlights to intimate the control room to take immediate action.

An overview of the proposed system is stated below:

- The system involves sensing various parameters of the pole in order to take necessary further action
- The Raspberry Pi3 is used in the circuit which will assist in message generation and passing.
- Python programming language will be used to program this.
- The LDR sensor will sense the intensity of light of the pole. If the sensor threshold level is less than 0.5 the street lights are turned ON else OFF
- Due to accidents or any other causes street lights are damaged .it will detect the damaged light and intimate an alert message to the control room through raspberry pi.

VI. CIRCUIT DIAGRAM



VII. RASPBERRI PI

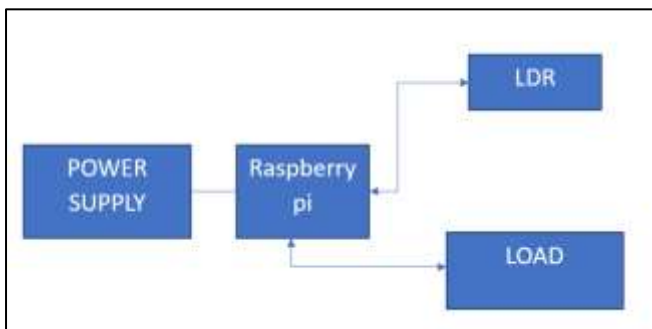


The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards, mice and cases). However, some accessories have been included in several official and unofficial bundles. According to the Raspberry Pi Foundation over 5 million Raspberry Pi's were sold by February 2015 making it the best-selling British computer.

VIII. SCOPE

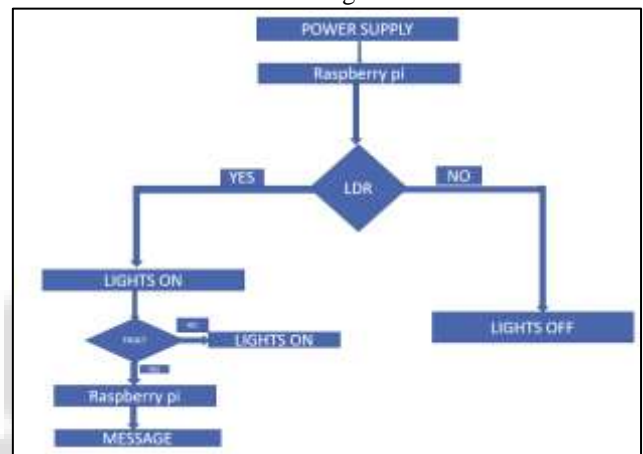
This application can help reduce manpower by automating the traditional methods of maintenance and control and also help in detecting any kind of defects with the electric pole. We can extend this project by increasing the no. of poles connected to a circuit. Also, we can integrate solar panels so as to use solar energy in order to light the luminaries in the lamps which will in turn harvest natural resource and save conventional energy.

IX. BLOCK DIAGRAM



X. METHODOLOGY

Methodology implemented for our software development is raspberry pi. The Raspberry Pi3 is used in the circuit which consists of an inbuilt Wi-Fi module which will assist in message generation and passing and is based on Raspbian Operating System. Python programming language will be used to program this. The LDR sensor will sense the weather condition i.e. whether the it is day or night. Based on the LDR value the lights will be turn ON or turn OFF automatically. If it is night and there any problem in any street light, then we can get the mail regarding the details of such fault light pole. This process is done with the help of raspberry pi and we can find out the fault bulb based on current monitoring process. Which is used to find the fault bulb for the pole. In this process we need to give the pole numbers to each and every pole, to identify the pole easily and to intimate it to the nearest power station with the help of Gmail. Raspberri pi has the inbuilt wi-fi module in order to get the mail for intimation.



FLOW CHART

XI. CONCLUSION

The negligence of the street lights maintenance could have heavily burdened the government to exceeding cost and delay in maintenance. The manual controlling of streetlights can lead to delayed maintenance work. The proposed project will eliminate this anomaly and improve efficiency and controllability of the city poles that prove to be an essential aspect for the well-being and safety of the citizens.

REGERENCE

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