

STREET LIGHT MALFUNCTION
DETECTION SYSTEM

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Computer System & Networking)

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Lampu jalan memudahkan orang yang menggunakan jalan pada waktu malam kerana ia dapat menerangkan kawasan yang gelap. Ia juga boleh meningkatkan keselamatan pemandu atau pejalan kaki untuk mengelakkan kemalangan kerana mereka dapat melihat rintangan atau halangan yang akan datang ke arah mereka. Tetapi jika lampu jalan rosak, ia berbahaya bagi pemandu dan pejalan kaki kerana risiko kemalangan di kawasan gelap sangat tinggi. Oleh itu, Street Light Malfunction Detection System ini dibangunkan untuk mengesan kerosakan lampu jalan secara automatic dan memudahkan jabatan penyelenggaraan untuk membaiki pada lampu jalan yang rosak. Masalah yang perlu diatasi oleh sistem ini adalah untuk mengurangkan laporan kerosakan yang manual. Street Light Malfunction Detection System adalah sistem yang mengesan lampu jalan rosak secara automatik dan menghantar mesej ke komputer menggunakan Wi-Fi. Oleh itu, sistem ini akan membantu untuk mengesan lampu jalan rosak dan, penyenggara boleh pergi terus ke lampu jalan rosak untuk dibaiki. Objektif projek ini adalah untuk mengenalpasti faktor kerosakan ringan jalan, untuk membangunkan Street Light Malfunction Detection System menggunakan Internet of Thing (IoT) dan untuk menilai sistem prototaip Street Light Malfunction Detection System. Teknik yang digunakan dalam projek ini adalah dengan menggunakan teknologi Internet of Things (IoT) yang merangkumi Arduino Uno, Sensor (LDR), sensor arus elektrik, LED dan Wi-Fi Module. Sensor LDR digunakan untuk mengukur intensiti cahaya dan sensor arus elektrik digunakan untuk mengesan aliran arus elektrik. Oleh itu, jika tidak ada cahaya atau aliran elektrik, system ini akan menghantar mesej kepada komputer melalui Wi-Fi.

ABSTRACT

Street light provides a great support and benefit to the peoples that use the road at night. It also can enhance safety for drivers or pedestrians to prevent an accident because they can see upcoming obstacle towards them with the support of light and increased the vision of them on the road. But if the street light is broken, it dangerous for the drivers and pedestrians because the probability of accident can occur is high. So, this Street Light Malfunction Detection System is developing to automatically detect the fault of street light and ease the maintenance department to do the maintenance for broken street light. The problem that need to overcome by this system are to decrease the manual registration report or report through phone call so, Street Light Malfunction Detection System is hardware applications which detect the broken street light and automatically send message to the maintenance department using Wi-Fi module. Thus, this system will help to locate which one of the street lights is broken along the road. Then, the maintainer can go direct to the broken street light to be repaired. There are a few objectives of this project which are to identify the street light malfunction factors, to develop street light malfunction detection system using Internet of Thing (IoT) and to evaluate the prototype of the street light malfunction detection system. The technique for this project is by using Internet of Things (IoT) technology which includes Arduino Uno, Light Dependent Resistor (LDR) Sensor, current sensors, LED and Wi-Fi module. The LDR sensor used to measure the intensity of light and the current sensor used to detect the current flow. So, if there is no light or the current flow, then the system will send report to the computer through Wi-Fi.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Development of street light provides a great support and benefit to the peoples who need to use the road at night. The street light can be uses to secure urban areas. It also can improve quality of life because the place that has light can extend the hours of activity. Other than that, street light can also provide good safety for drivers and pedestrians, (RoSPA, 2017). But if the street light is broken, it will reduce the visibility of the drivers or pedestrians outside of daylight time at the road and it dangerous for them that use the road because the possibility of accident can occur is high.

There is a lot of Internet of Thing (IoT) that can reduce human energy as the world developing rapidly in technology for example receiving warning message to your phone when an IoT device detect a danger situation nearby, (Mitchell, 2018). So, this IoT is present as network devices that can sense and collect data from our surrounding and it can be use and process for variety purpose. There is a lot of benefit that Internet of Thing (IoT) provides to human or industry for example the benefit of IoT is reduce energy consumption.

The proposed of Street Light Malfunction Detection System is hardware applications which detect the broken street light and automatically send message to the computer using Wi-Fi. This project is using Arduino devices that detect the present or absent of light and current flow. So, this system will help to locate which one of the street lights is broken along the road. Then, the maintainer can go direct to the broken street light.

1.2 Problem statement

Street light can increase visibility to drivers or pedestrians outside the daylight time on the road. It also can enhance safety for drivers or pedestrians to prevent an accident because they can see upcoming obstacle towards them with the support of light on the road. But if the street light is broken, there will be a dangerous possibility that can happen to the drivers. The street light is poorly designed and there are so many burned out street light that can decrease the vision of drivers or pedestrian.

There is a report centre that can be manually registered by the public or the residence of area if any street light is broken. The report can be made over a phone call or register the report manually. Then, the report is recorded by the authorities department before they proceed to another action. But sometimes the action did not immediately taken by them which lead the process to fix the broken street light to be delayed and can lead to insecurity for drivers or pedestrians.

An interview has been conducted with Jabatan Kerja Raya (JKR) Dungun staff named Wan Nor Afzan, she said the maintenance process will be made at night time to check the broken street lights along the road after a report has been made by the residents of the area. Thus, it gives difficulty to the maintainer to wait until night time check to locate which street light is broken. Then, the process to fix the broken street light will be delayed.

Other than that, the department needs to hire a maintainer to check the broken street light. So, it will cost the department to hire them. Because of the long process of repairing the street lights, it will cause the road to be in the dark. An interview also conducted with UMPH maintenance staff and he said if the lamp is broken, someone need to report manually in ECOMM system. So, Street Light Malfunction Detection System can overcome this problem by sending a fault message report through Wi-Fi.

With the IoT technology, this problem can be minimized where the Street Light Malfunction Detection System automatically detects broken street lights and sends detailed information to the department. Thus, the process of repairing street lights can be resolved quickly and easily.

1.3 Objective

The goal of this project is to develop a system that will detect a broken street light on the road. The objectives of the project are:-

- I. To develop Internet of Thing (IoT) street light malfunction detection system using Arduino platform
- II. To evaluate the prototype of the street light malfunction detection system

1.4 Scope

The scopes of this project are:-

- I. Case study – Smart Campus
- II. Simulation on 3 street lights

1.5 Thesis organization

This report contain five chapters includes Chapter 1, Chapter 2, Chapter 3, Chapter 4, and Chapter 5 includes introduction, literature view, method that will use, result and conclusion. The chapter 1 contains an explanation of introduction, problem statement, objective, scope, expected result, and thesis organization. Then, Chapter 2 will explain about the project and the comparison between the current existing systems. Chapter 3 will explain about the method use in the project including the hardware and software. The result of the project and the implementation will be explained in Chapter 4. The conclusion of the project will be explained in Chapter 5. And lastly, the used reference will list in the reference source.

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