STREET LIGHTING SYSTEM USING SOLAR POWERED LED LIGHT

MEGAT MUHAMAD SHAFIQ BIN MEGAT SAMSUDIN

FACULTY OF ENGINEERING TECHNOLOGY

UNIVERSITY TECHNICAL MALAYSIA MALACCA

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FAKULTI TEKNOLOGI KEJURUTERAAN
Tel : +606 234 6623 | Faks : +606 23406526

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STREET LIGHTING SYSTEM USING SOLAR POWERED LED LIGHT

By

MEGAT MUHAMAD SHAFIQ BIN MEGAT SAMSUDIN

B071310040

PROJECT SUPERVISOR

MRS. SUZIANA BINTI AHMAD

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY

FACULTY OF ENGINEERING TECHNOLOGY
UNIVERSITY TECHNICAL MALAYSIA MALACCA

2016

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ABSTRACT

The most popular renewable energy is solar energy as it is free and clean. The energy produces by the sun can directly converted to electricity by using solar panel. Many projects or applications in this world are using solar energy as one of the sources and one of it is solar street light. Compare to the conventional street light, it depends on the power grid. When fault occur on the power grid, the street light unable to light on. Light Emitting Diode (LED) will use to replace the High Pressure Sodium (HPS) as the LED doesn't produce any pollution meanwhile HPS light bulb produce carbon monoxide because it has mercury in the bulb. Main purpose of this project is to design a street light system which is can minimize power consumptions by using the power from transmission line. This project will use PIC16f877A as a main circuit it will control all the LEDs, Light Dependent Resistor (LDR) will control the light. Light Dependent Resistor are very useful in sensor circuit as the resistivity depends on the amount of light hit on its surface. In order to control the brightness, Pulse Width Modulation (PWM) will be used as it is the simple method. During day light, the LED will not be turn on as the Light Dependent Resistor (LDR) has lower resistivity. When the day become darker (night), the LDR have a high resistivity. Hence, the LED will turn on for only 10% brightness when no movement of vehicle or pedestrians. In this project, there two Passive Infrared (PIR) motion sensor that will be used to detect vehicle movement. The first sensor will be placed a few meters away from the first light pole and the second sensor will be placed a few meters after the last light pole. As the first sensor detect any vehicle movement, the LED will turn on 100% and at the same time, the sensor will count until 30 second after the vehicle pass through the last pole of Passive Infrared (PIR) motion sensor. As the last vehicle pass through the last sensor, the LED will turn on 10% brightness. This system able to save power consumptions as it only operate 100% when there is a vehicle approach.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Street lightings can be street light, light pole, lamppost, street lamp which were place on the edge of a road or walkway. The principle reason for road light is to light up the street so that the people on foot and others street client can have an unmistakable vision particularly around evening time. Beside that, street lighting can also improve the safety for drivers, riders and pedestrians during the hours of darkness. Pedestrians and vulnerable road users suffer from decreased visibility in the dark too. The employments of road light are vital particularly in provincial zone as the are encompassed by forest. It is risky for the villagers to utilize the street during the evening since they can't see the state of the street plainly. For these reasons, providing street light system can be one of the ways to overcome the problem.

In the backcountry zone there are no power supplies from the utilities organization. This venture is intended to defeat the issue particularly in rustic range. A sunlight based controlled road light is a perfect answer for provincial territory since there are no power supplies from utilities organization. This framework utilizes sun powered to gather radiation from the sun amid day time. Rechargeable batteries were utilized to store vitality amid light and it will be then utilized as power supply around evening time. This framework is reasonable in backcountry range because it is very affordable cost efficiently in term of maintenance.

The utilization of road lighting framework utilizing sun powered fueled LED is expanding because of its favorable circumstances, for example, earth neighborly, vitality productive and financially savvy. Figure 1.1 beneath demonstrates the contrasts between sunlight based fueled road light utilizing LED and routine road light. It demonstrates that the LED road light are brighter than the others. The customary road light should be kept up for at regular intervals in the mean time the LED road light, the maintenance is free for just about 5 years. Along these lines, it can diminish the maintenance cost. The routine road light gets the supply from transmissions line and if there are any defaults happens, the customary road light was not able light up the road. The road lighting framework utilizing sun oriented fueled LED are the perfect arrangement as it didn't depend exclusively on the transmission line and can even worked amid power outages.

Figure 1.1: The distinction conventional street light between LED street Light

1.2 Problem Statement

Kampung Sungai Buaya are one of the rural areas located in Rawang, Selangor. The Figure 1.2 beneath delineates the way that the greater part of the villages uses to go in and out amid daytime and night. The street is situated amidst the woods which can see from figure 1.2 beneath. It is extremely unsafe for the villagers to utilize those pathways during nighttime since there are no street light provided and it can lead to an inevitable accident. The villagers were left no options, whether they like or not they have to use the path to go to work. That is only road that is connected to the city. In order from them to live and to feed themselves they have to use the path even in the hours of darkness.

Figure 1.2: The location in Maps

The greater part of the villagers rode motorcycle to go to work and a large portion of the worked in a factory which is located at thee opposite side of the street. Some of them work until late night. Since the street situated amidst the woods, the street client can't see what's before them since it is excessively dark. Road lighting framework utilizing sun oriented fueled LED light is a perfect answer for keep any unavoidable mishap from happening.

1.3 Problem Situation

Figure 1.3 beneath delineates the genuine circumstance utilizing the street amid evening time. It is absolutely dark and the vision of the drivers most presumably will get to be distinctly hazy. It won't be any problem for the drivers during daytime as they can see the road clearly but it is almost impossible during nighttime as they will only depend on the car light. Many people travel at night and fortunately we still have many native animals living in our environment. This situation can lead to robbery and accident cases. For example, the driver swerving to avoid hitting an animal can be major cause of car crashes. Beside that robbers will stay hiding at the bushes and the driver won't be able to see them because it is to dark. This issue should be understanding at the earliest opportunity since it is probably that the general population will endure genuine wounds and the rate of repetition mishap and wrongdoing rate could go higher.

Figure 1.3: The road during night

1.4 Objectives

- Study the efficiency of solar street light system.
- Design a cost effective and low maintenance street light.
- Develop a street light system using solar powered LED light.

1.5 Scope of project

This street light is produced to light up the street amid evening time furthermore to keep mischance cases from happening. It is also to ensure the safety of the road drivers as well as the pedestrians. These days, the preservationist road light is relying upon the transmission line which delivered power from utilities. In the event that there is any breakdown happened on the transmission line, the road light can't work. Road light will on naturally around evening time with or with no appearance of vehicle which can prompt to misuse of vitality. As the advancements raise, such a large number of sort of road light have been outlined and a standout amongst the most prevalent is LED light. If can were compare with conventional light, even thought the bulb is very cheap and easy to catch however it is high in maintenance in term that you have to change the lamp frequently. This project is applying to beat these issue.

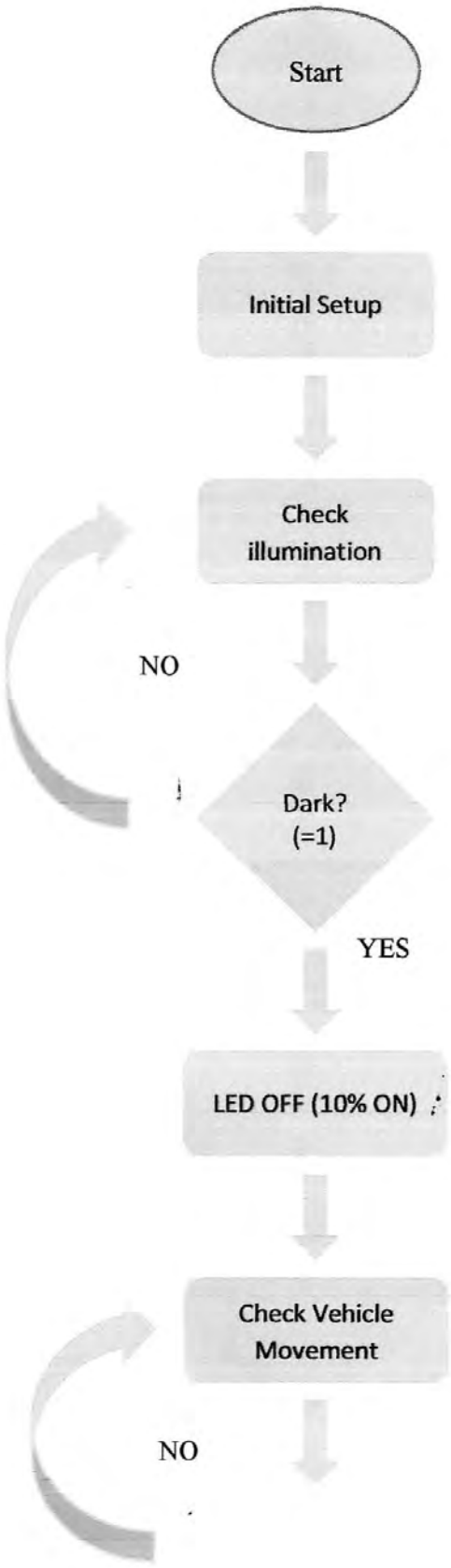
In their day time, the batteries will have charged by sun based load up to store vitality then around evening time, the rechargeable battery is use as a supply to turn on the LED. In the end it will spare vitality, sun based vitality is renewable vitality and the vitality source which is straightforwardly delivered by the sun can changed over to power by utilizing sunlight based. Sun oriented road light can spare vitality contrast with ordinary road light.

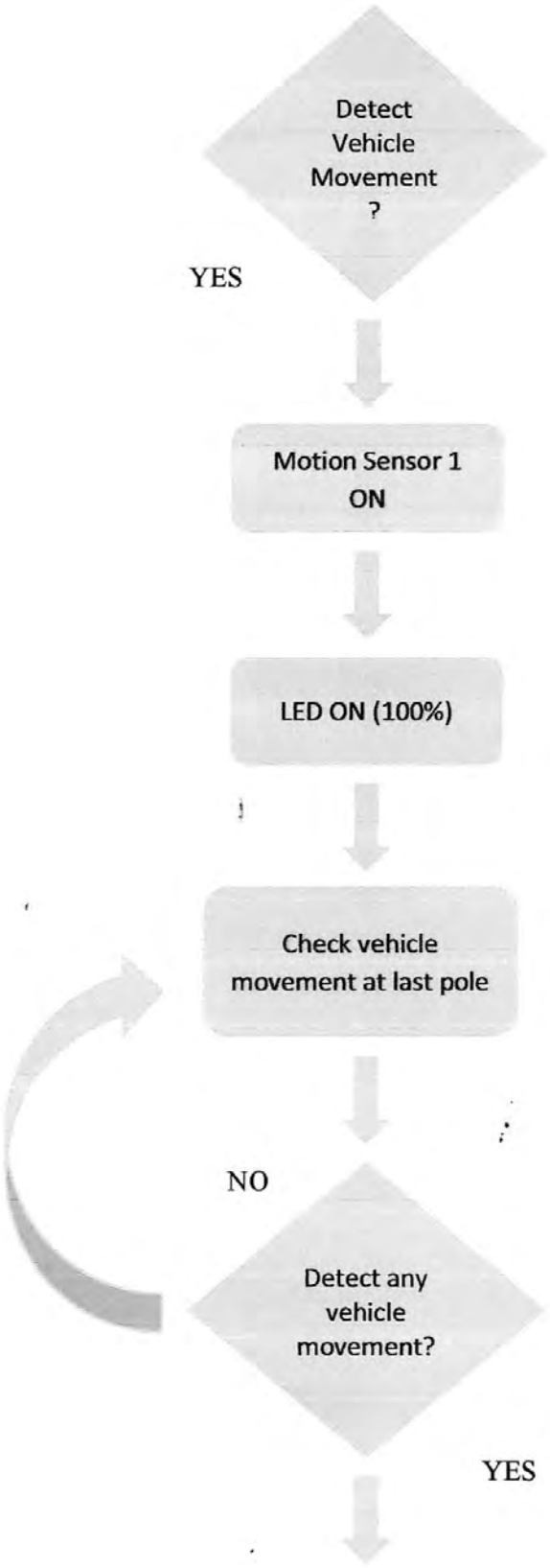
1.6 Methodology

The procedure of this venture start from the solar panel. The solar panel assumes an imperative part in this project. The solar panel gathers vitality emanations from the sun and charges over that vitality to power and it will then deliver a DC voltage yield. Rechargeable batteries will be utilized to store vitality from sun powered load up amid daytime and it will be use as power supply amid evening. A voltage controller will be utilized to keep up an unfaltering wield of voltage in a circuit. To ensure the framework work, the PIC will be utilized to pursue the framework.

Meanwhile to work the framework, the low level computing construct coding and PROTEUS programming will be utilized to show how the framework functions. This framework likewise required a clock circuit to number postpone for movement sensor. A light dependent resistor (LDR) will be utilized to detect the enlightenment level and gives input motion as voltage drop and it is helpful particularly in dim or daytime sensor circuit. For the bulb, LED will be used because of it is more cost effective and friendly environment. It is likewise last more and low upkeep contrasted with ordinary knob.

At long last, movement sensor will be utilized to send any appearance of vehicle. There will be two movement sensors which each of the sensor will be introduced at the first and last of the light shaft. The main sensor will be utilized to initiate the framework once it identifies any development of vehicle or people on foot and the last sensor which were introduced at the last post, it will dynamic the clock after the moving item go trough the shaft.





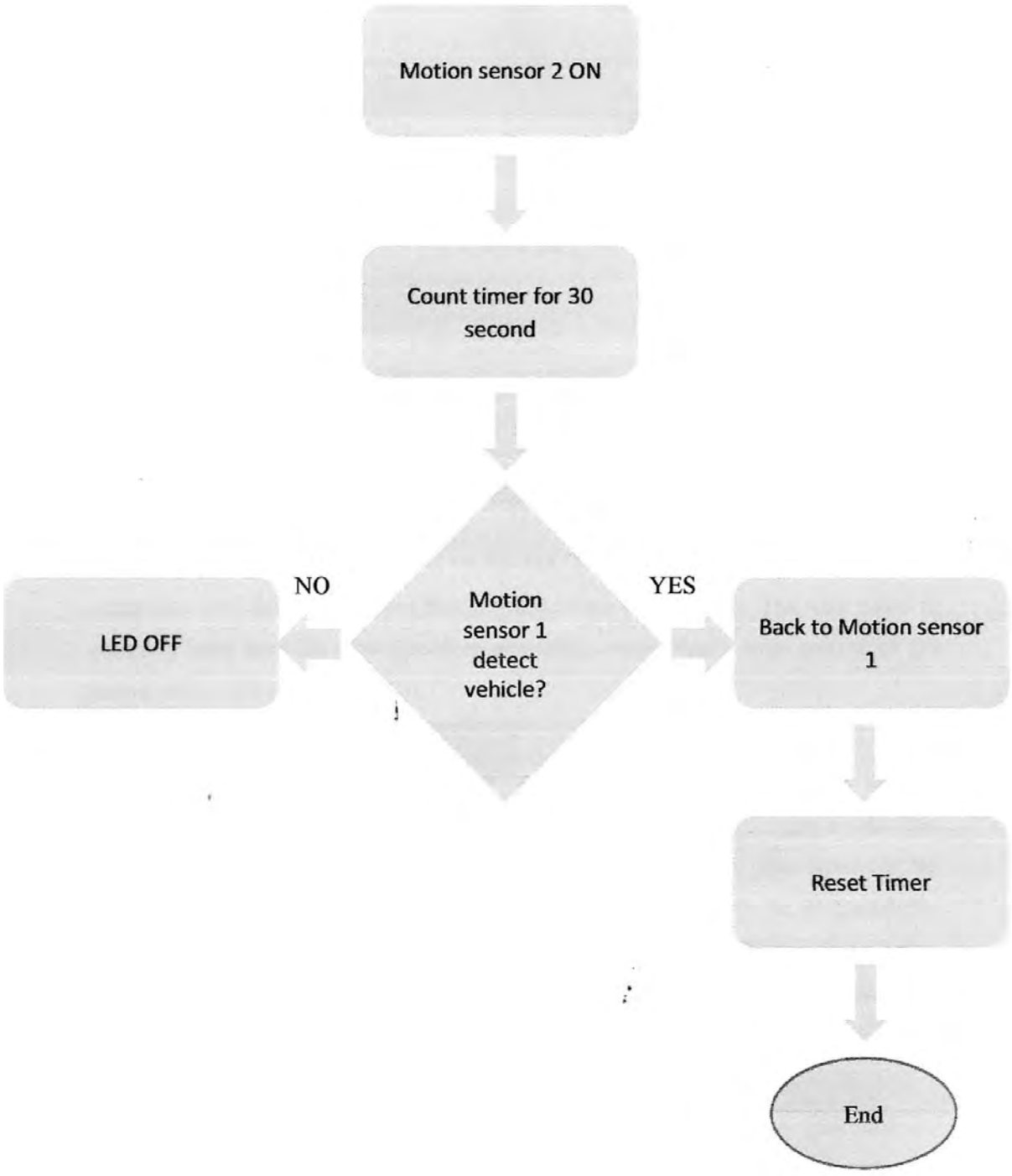


Figure 1.4: Flow chart of the overall system

CHAPTER 2

LITERATURE REVIEW

2.1 Solar Energy

Solar powered energy is created by the sun. These days, the fossil fuel request is expanding until the world knows that it will be done soon or later. The solar panel is currently have been the most prevalent renewable energy that a large portion of the nation utilize (Chua & Oh, 2012).

As the industry sector are getting bigger, there will be some issue on the development of sunlight based power industry notwithstanding challenges to interface the utilities for frame work associated photovoltaic framework. This issue can be comprehended as the innovations of sunlight based board will be progressively significant with a specific end goal to end the fossil fills use. Sun oriented vitality creates clean power (no contamination) and just little parts of aggregate radiation delivered when achieve earth (Devabhaktuni et al., 2013).

There are two parts that are required to have utilitarian solar energy generator, for example, gatherer and capacity unit. The capacity of an authority is gather the radiation and change over it into different type of vitality, for example, power. The capacity unit is utilized to store the vitality and in view of the non steady nature of sun oriented vitality. Vitality that achieves the surface of the earth is 1000 watts' square meter is equal to one of barrel oil each year square meter.