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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SOLAR POWERED RIVER TRASH CANS MONITORING USING GLOBAL SYSTEM FOR MOBILE (GSM)

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Power) with Honours.

by

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **Development of Solar Powered River Trash Cans Monitoring Using Global System for Mobile (GSM)**

SESI PENGAJIAN: **2018/2019**

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I hereby, declared this report entitled “Development of Solar Powered River Trash Cans Monitoring Using Global System for Mobile” is the results of my own research except as cited in references.

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Author’s Name : HARYANTI BINTI AHMAD TAMIN

Date :

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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfillment of the requirements for the degree of Bachelor of Electrical Engineering Technology (Industrial Power) with Honours. The member of the supervisory is as follow:

Signature: .....

Supervisor: PN. INTAN MASTURA BT SAADON

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ABSTRAK

Pemantauan Sampah Sungai Berkuasa Solar Yang Menggunakan Sistem Global Untuk Mudah Alih digunakan untuk membersihkan sungai daripada sampah sarap yang terapung di permukaan air. Sistem ini menggunakan tenaga mesra alam iaitu sistem solar sebagai sumber tenaga utama. Dengan menggunakan penderia inframerah jarak sebagai suis, Arduino UNO R3 sebagai pengawal mikro dan Global sistem untuk mobil sebagai penghantar isyarat kepada pihak berkuasa dalam sebuah sistem pengumpulan sisa sungai automatik telah dapat dibina. Pengumpulan data dan ujian yang dilakukan di bawah sinaran matahari telah membantu untuk memilih bilangan solar panel dan saiz bateri. Prototaip ini dapat menyumbang idea tentang bagaimana untuk membina suatu sistem yang boleh mengurangkan pencemaran sungai. Secara realitinya, projek ini dapat membersihkan sungai dengan lebih berkesan.

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ABSTRACT

The Solar Powered River Trash Cans Monitoring using Global System for Mobile (GSM) is used to clean and remove solid waste that floats on the river. This system uses environmentally friendly energy that is solar system as a major energy source. Using the IR distance sensor as switch, Arduino UNO R3 as a microcontroller and Global System for Mobile (GSM) as a sending alert to operator is an automatic river waste collection system was developed. Data collection and testing under the sun have helped to choose the number of solar panels and battery sizing. This prototype can contribute ideas on how to build a system that can reduce river pollution. In reality, the project is able to clear the river more.

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DEDICATION

To my beloved parents

Ahmad Tamin Bin Kassan (father)

Padzilah Binti Mat Akib (Mother)

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ACKNOWLEDGEMENT

Bismillahirrahmanirrahim.

Alhamdulillah and a great thanks to Allah for His willing to give me the permissions and strength to complete this final year project. I also want to express my deepest appreciation to my supervisor, Pn Intan Mastura Binti Saadon for his guidance and supervision throughout the project. There are no proper words to convey my gratefulness and respect for all the guidance and information given regarding to the project of “Solar Powered River Trash Cans Monitoring Using Global System for Mobile (GSM)”.

My greatest gratitude also extends to my Academic Advisor, En Mohamad Syahrani Bin Johal for all the support, guidance, and information given according to the flow of the final year project from the start till the end. I also want to thanks my parents, family and my friends for their unconditional trust, support and patience. I would not be able to complete this project without all the supports, wise ideas, and tips from all the people around me. Thank you.

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LIST OF SYMBOLS

°C	-	degree celcius
W/m^2	-	Watt per meter square
V	-	Voltage
A	-	Ampere
W	-	Watt
cm^2	-	centimetre square
Wh/day	-	Watt.hours per day
AH	-	Ampere Hour
°	-	degree

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LIST OF ABBREVIATIONS

DC	-	Direct Current
AC	-	Alternate Current
PWM	-	Pulse Width Modulation
MPPT	-	Maximum Power Point Tracking
PV	-	Photovoltaic
VMP	-	Maximum Power Voltage
IMP	-	Maximum Power Current
GSM	-	Global System for Mobile

CHAPTER 1

INTRODUCTION

Background

Malaysia meets progressively genuine strong waste issues in waterway and has embraced different strategies accordingly as of late. Activity is expected to stop this contamination before it destroys the nature. They are implanted with moral and ethical values that arrange them towards thinking about the earth. To changes Malaysia into insight of 2020, tourism sector is a portion of National Key Economic Areas (NKEA) in the 10th Malaysia Plan (2011-2015). Therefore, a Solar Powered River Trash Cans Monitoring Using Global System for Mobile (GSM) is developed in this project to reduce river contamination. This model may contribute some thought on the most proficient method to make a system which will scale back watercourse contamination. In Europe, this system is already used since a long time ago. However, in Malaysia, this technology has not been expanding, but this system is suitable to be used because Malaysia climate is the best to store solar energy.

First and foremost, this system is utilizes by renewable energy which is solar energy. The solar energy created by the sun is going to be consumed by module and alter into DC voltage output. At the purpose once the system is ON, the motor can activated with high starting torque to turn the water mill and conveyor belt. Next, a conveyor belt turns to get waste and trash on the river surface. At that point, all waste and trash will be put away

inside a trash cans. When the IR distance sensor detects trash inside the trash cans at a certain height (10 cm to 80 cm) and Arduino UNO R3 will stop the conveyor from operating and send the trash cans to land while active the GSM module for send alert to operator. In a real situation, this project will be able to reduce manpower.

Problem Statement

Automated river trash collecting system has been developed in several countries in order to ensure clean river and to reduce manpower for manual trash cleaning. However, the existing river trash collecting system does not really help as a trash collection system because operators are not notified about the actual trash condition and the trash height inside the trash cans. For instance, in Europe the river trash collecting system is controlled manually by the operator. The operator has to check manually from time to time if the trash can is already full in order to stop the system operation. To conquer this problem, a model of Solar Powered River Trash Cans Monitoring Using Global System for Mobile (GSM) is constructed. This River Trash Cans Monitoring can help to reduce the manpower to manually monitor the trash cans of the river trash collecting system.

Objective

The main objectives to build this system are:

i. To construct one equipment to collect trash automatically in the river.

ii. To design a solar powered conveyor belt of a river trash collecting system.

iii. To design one systematic process in collecting trash and to send alert to system operator on the trash cans.

Scope of Work

This project will focus on:

i. By using solar panel as a main power source in this system to move conveyor belt by using sizing method calculation.

ii. To send alert to operator in this system by using Global System of Mobile (GSM).

Process Flow of Solar-powered River Trash Cans Monitoring Using Global System for Mobile (GSM)

Figure 1.1 shows the process flow of Solar Powered River Trash Cans Monitoring Using Global System for Mobile (GSM). First and foremost, by using PWM charger controller may charge battery completely, gave by the PV array. Next, the motor is initiated once switch is activated. When motor flip the water mill, in the meanwhile it will run conveyor belt. From that time onward, the water flow created by the water mill turns and trash into conveyor belt. At the same time, the conveyor belt can conveys junk and send it to trash cans. At the purpose once the IR distance sensor is detects trash inside the trash cans at a certain height (10 cm to 80 cm) , the conveyor belt will be deactivated naturally, and the chain will send the trash cans to the land GSM module will send alert to operator.

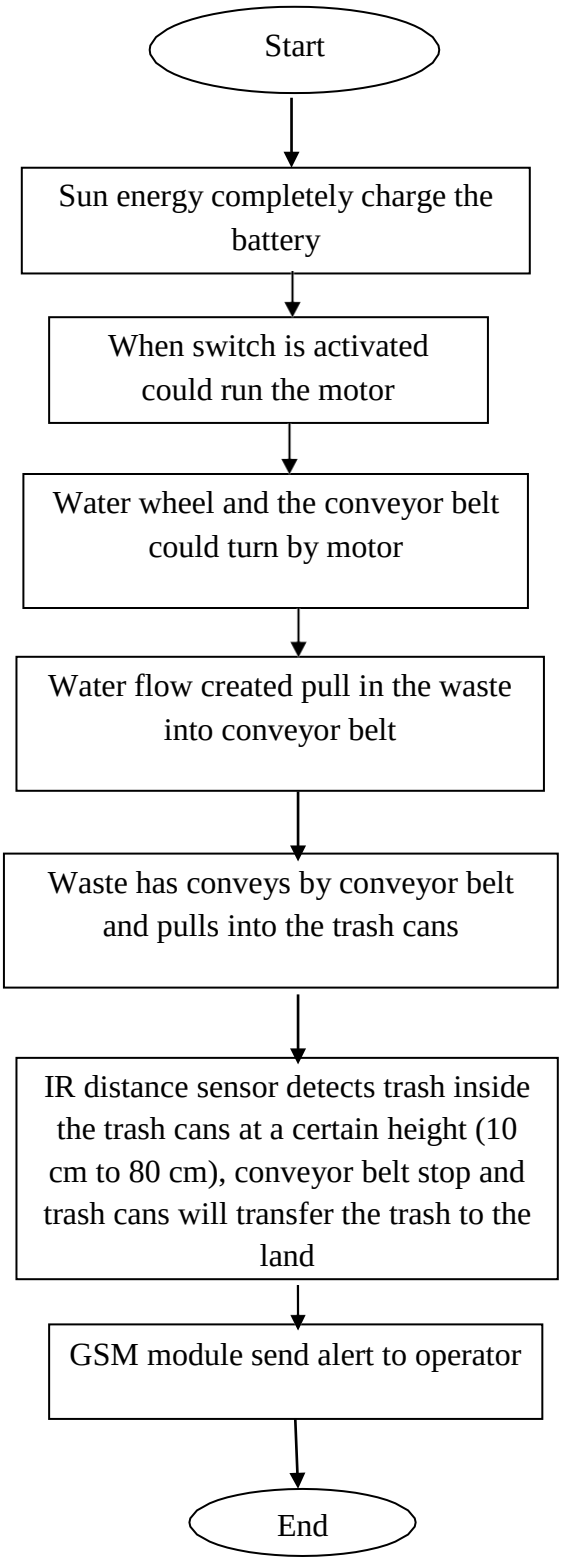

Figure 1.1: Process Flow of Solar Powered River Trash Cans Monitoring using Global System for Mobile (GSM)