DEVELOPMENT OF THE SMART DUSTBIN MONITORING SYSTEM BY USING GSM & GPS REAL-TIME LOCATION

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BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY

(Industrial Automation & Robotics) WITH HONOURS

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Faculty of Electrical and Electronic Engineering Technology

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A thesis submitted
in fulfillment of the requirements for the degree of
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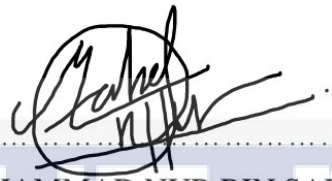
Signature: 

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirements for the degree of BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (INDUSTRIAL AUTOMATION AND ROBOTICS) WITH HONOURS with Honours. The member of the supervisory is as follow:

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ABSTRAK

Pembangunan sistem Pemantauan Tong Sampah Pintar dengan menggunakan lokasi masa nyata GSM & GPS adalah sistem automatik yang dapat digunakan oleh semua lapisan masyarakat. Di samping itu, tong sampah juga dilengkapi dengan kaedah pengiriman maklumat melalui pesanan ringkas (SMS) dan lokasi masa nyata GPS. Arduino akan diprogram sedemikian rupa sehingga ketika tong sampah diisi, ketinggian yang tinggal dari ketinggian ambang akan ditampilkan. Teks yang dihantar adalah lokasi sampah. Sistem pengesan kuantiti dalam tong sampah menggunakan sensor ultrasonik dan memberikan pesanan ringkas (SMS) untuk menghantar kedudukan kepada pengurusan sampah untuk membersihkan sampah penuh. Setelah tong sampah dibersihkan, orang boleh menggunakan tong sampah semula. LCD akan memaparkan peratusan tahap di tong sampah. Tong sampah ini juga menggunakan sensor ultrasonik untuk membuka penutupnya dan boleh digunakan oleh orang kurang upaya. Sensor ultrasonik akan diletakkan di bawah penutup tong sampah dan menghadap ke bawah. Penutup akan terbuka secara automatik apabila kedua-dua sensor ultrasonik mengesan objek. Sensor ultrasonik yang mengawal penutup akan diletakkan di hadapan tong sampah, dan yang lain berada di atas penutup dan menghadap ke atas. Sistem pemantauan tong sampah pintar yang menggunakan lokasi masa nyata GSM & GPS juga akan memudahkan pengurusan pembersihan di pasar raya atau kawasan awam untuk membuat pemantauan tong sampah yang penuh.

ABSTRACT

Development of the Smart Dustbin Monitoring system by using GSM & GPS real-time location is an automated system that can be used by all levels of society. Besides, the dustbin is also equipped with a method of transmitting information through short messages (SMS) and GPS real-time location. Arduino will be programmed in such a way that when the dustbin is being filled. The text sent is the location of the trash. The system detector quantities in the dustbin using an ultrasonic sensor and provides short messages (SMS) to send a position to the management of waste to clean the full trash. Once the dustbin is cleared, people can reuse the dustbin. This dustbin also uses an ultrasonic sensor to open the lid and can be used by people with disabilities. The ultrasonic sensor for calculating level waste will be placed under the bin lid and facing down. The cap will automatically open when the two ultrasonic sensors detect an object. Ultrasonic sensor for managing the cover will be placed in front of the dust bin, and the other one is on top of the lid and facing up. Smart Dustbin monitoring system using GSM & GPS real-time location will also facilitate the management of cleaning in a supermarket or public area to make the monitoring of dustbin full.

DEDICATION

Specially dedicated to my beloved parents and family

ACKNOWLEDGEMENT

First of all, I would like to thank Allah SWT, The Almighty, a place where I pray and surrender, who has given me strength and ability to complete the project on time. The success and outcome of this project required a lot of guidance and assistance from many people, and I am incredibly fortunate to have got this all along with the completion of this project. I want to express my gratitude to my supportive and caring supervisor Encik Muhammad Fareq Bin Ibrahim, for giving me much guidance and helping me to complete this project. He also guiding me through this project, despite being extraordinarily busy with his duties, and keeping me on the correct path.

Bearing in mind previously, I am using this opportunity to express my deepest gratitude and special thanks to all the lecturers who taught in the past four years and the significant contribution that qualifies me to do my final year project.

I want to extend this to my parents Sapari Bin Kasdi and Faridah Binti Amin, for their kind cooperation and encouragement, which will help complete this project. Their advice has been my strength in moving forward and helping me focus on what I'm doing. They are my backbone and my motivator.

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m	-	metre
V	-	Volt
Hz	-	Hertz
L	-	Distance
T	-	Time between the emission and reception
C	-	Sonic speed

CHAPTER 1

INTRODUCTION

The use of dustbins is essential for those who care about cleanliness. This trash bin kept our cities clean. The truth is dustbins are held at many places in the city and the municipal authorities clear the waste in the dustbin at regular intervals. Development of the Smart Dustbin Monitoring System by Using GSM & GPS Real-Time Location is a trash can that monitors garbage level to avoid exceeding trash and sends messages through GSM when the trash level is full. The level of waste in the bin can be check using ultrasonic sensors to calculate the level of garbage. Ultrasonic sensors are also used as proximity interfaces. When an ultrasonic sensor detects an object in front of it, the lid dustbin will open within a few seconds. This feature helps users to maintain hygiene and avoid contaminating germs.

1.1 Project Background

In recent decades, urbanization has increased tremendously, and waste management has become one of the major concerns all over the world. Supermarkets or stalls is a public place where people buy raw materials to cook up household items.

Especially supermarket areas that produce large amounts of waste and cause overflowing dustbins. Waste management is less sensitive and does not take this seriously. The filled bin is not cleaned up quickly and makes it difficult for the environment to be kept clean. Many people also do not feel comfortable in messy situations and can cause illness. The overflowing dustbin leads to an unpleasant and eyesore environment and leads to various health issues. The project is intended to prevent this from becoming more serious. If we look at the current waste management process, they have a daily schedule to collect waste from the trash. Sometimes the garbage may not be filled, and they turn in empty-handed. Sometimes garbage fills fast before their reach, and the degradation of waste will lead to the growth of bacteria and viruses. This fulfilment of waste cannot be expected by waste management. This project can help make the job easier.

1.2 Problem statement

Once these smart dustbins can be implemented on a large scale, by replacing the existing garbage bin today, waste can be managed more quickly and efficiently, and at the same, it avoids unnecessary lumping of garbage on the roadside and reduces the problem of full bins. Foul smell from these rotten wastes that remain untreated for a long time, due to negligence of authorities and carelessness of public may lead to long term problems. Mosquitoes and pests can breed rapidly and spread the disease to the surrounding population. This problem may even cause dreadful conditions.

Often the old bins use a manual way to open the lid. This problem makes it difficult for people with disabilities. Use old containers with your feet or require the use of hands

to open the cover. Manual methods are not eco-friendly on all levels of people and can only be used by people with no disabilities

Advances in advanced technology now make it easier for people to do the work efficiently. All the information is available only at the fingertips. So, we should be aware of the technology around us and use it in our daily lives.

There are millions of public dustbins out there that people use and are emptied in a few days by the federal authorities. Now the problem is not all dustbins are filled at the same rate, and the dump vehicle wastes time checking every trash. This topic leads to more fuel usage, labour, and cost. The solution is a smart dustbin.

Many people are too lazy to use their hands to open the dustbin before putting in their trash because sometimes, the lid of the dustbin is too dirty for the people to touch. Even more critical, some irresponsible people throw the garbage from far away in hopes that the trash is gone into the dustbin. If not, they just let it go like it never happens. This kind of behaviour is unacceptable and will make our environment look filth generally

The other problem that we can identify about the dustbin is that even when the dustbin is full of trash inside it, there are people who still try to put their dumpster into the dustbin until there is some trash that has come off from the dustbin because there is no more room that can fit the garbage. This kind of problem also can make the environment around the trash look dirty.

Figure 1.1: Exceeding Trash

1.3 Objective

The objective of this project is:

I. To design a Smart Dustbin Monitoring System by Using GSM & GPS Real Time Location.

II. To analyse the performance of a Smart Dustbin Monitoring System by Using GSM & GPS Real Time Location.