SMART AUTO TRASH BIN

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Abstract

Smart Auto Trash Bin is a new automatic trash bin designed to be used by every community, especially for people with disabilities or sick people to get rid of garbage. This automatic trash bin can start operating if the sensor located on the front of the trash will detect or identify an object that approached it within 10-80cm and automatically the trash can open and within 1 minute after that the trash will be closed. If the waste in it is full, the LED lights will turn red and the buzzer will sound in short bit sound. In the event of a fire in the Buzzer system, the Buzzer system will sound long and it will send information via short message (SMS). Subsequently, various phone numbers are placed into the application so that when a fire the message will be sent to all the phone numbers.

Key-word: Smart Auto Trash Bin, automatic trash bin, buzzer.

1. Introduction

Technology advancement today is in line with the wishes of Malaysians who want a simple, fast and comfortable life (K. Ashton, 2009). The smart auto trash bin project is developed to facilitate carers and disabled people to throw trash into the trash bin without opening and closing the cover. Not only to unlock and close the cover using technologies like arduino, sensor and buzzer to become another innovative hardware at the Sungai Petani Special Kids Association. Arduino operates an open-source single-board micro (Arduino, S. A., 2015). In this project, the arduino works as it closes and opens the lid automatically. Additionally, additional packing in this project is buzzer, LED and GSM lamps. When the rubbish is full or reaches the specified level the LED light will glow. Additionally, the buzzer will sound the trash can be burned and it will send information via SMS.

2. Problem Statement

Referring to Siti Mashitah, a deterrent at the special children's association of Sungai Petani, Kedah. He stated that special children in the association had problems because they were hard to throw trash into the bin. They need to use wheelchairs to dispose of garbage and children with no hands or feet forced to help others. Additionally, the detergent also faces the same problem when the waste bags are full or heavy they are difficult to remove trash, they need to put the heavy garbage bag on the edge first and then just open the trash can to remove the trash. They were forced to open the trash cans repeatedly to see the trash was full or not. Their trash can have been fired. Therefore, we created a project that is an automated waste bin whose users simply do not have to open the trash can open it on its own when the user needs to stand in front of the trash can and it will open up, therefore, we hope this project can help a little bit against Kanak special forces and guards are united to address the problem.

3. Project Objectives

The goal of this project is to create this automated trash prototype to facilitate users, careers and people with disabilities. To achieve the above goals, several objectives have been identified:

i) Creates a configuration on the trash bin model in relation to Arduino and uses sensors to detect or identify users approaching within 10-80cm.
ii) Using the sound system (Buzzer) to know the trash can happen fire and also use the LED to notify the user that the trash can already be full.
iii) In the event of fire information will be sent via SMS using GSM.
iv) Make an application to add a phone number.

4. Project Scope

The scope consists of three, the scope of the user, the scope of the location, and the scope of the system:

i) User Scope
The user's scope consists of two guardians and a disabled person.
ii) Scope of Location
This project involves the Sungai Petani Special Children's Association. Although this project is just a prototype, it is developed almost identical to the actual situation.
iii) System scope
The scope of this project system is to use arduino, sensor, buzzer, LED, motor servo as well as Global System for Mobile Communication (GSM).

5. Methodology

In developing a network, there are several methods or methodologies that need to be used so that project development trips are more systematic. The main methodology of the network design process is known as the network development life cycle (NDLC) as shown in Figure 1 (Stiawan, 2009).The analysis phase consists of software requirements, hardware requirements, interviews, observations and documentary collections. In addition, the design phase is comprised of two types of designs, physical designs and logical designs. In the prototype simulation phase, he implemented a prototype on the Smart Auto Trash Bin project. The project needs to be implemented using a prototype for repairs and testing has been done before that. The prototype is developed using board-based material to illustrate real hardware such as Arduino and Sensor. The implementation phase uses a frequency band operated using the RF module transreceiver and new microcontroller (Paul, 2012). Here every trash can have different parts with frequency in the band. This change led to the Arduino transmitting module connected to the Arduino Uno board to transmit 315MHz frequency, received by the Arduino receiver module which is also connected to Arduino Uno. During the last phase of the monitoring was conducted at the Sungai Petani Special Children's Association, Kedah and received feedback from the guardians about the project being developed. If there is any problem related to removing waste and this project will solve the problem.
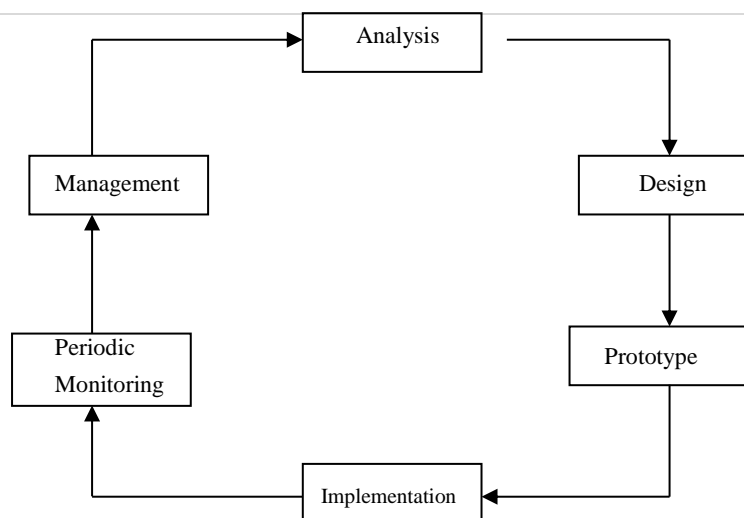

Figure 1: NDLC Structure Model.

6. Previous System Study

Refer to Cabilo & Gallardo (2014), in an electrical engineering degree report. Garbage bin is one of the most important things in everyday life. Mostly it is made of plastic or iron and its function remains the same where it is one of the places to dispose of any waste materials that are not needed anymore. In addition, referring to Fahiszrulzaki, M., & Yusof, M. (2015) in the report of Engineering Technology.

The first system used is the information transmission system via short message (SMS). It has been renovated by establishing a garbage connection with the Global System for Mobile Communications (GSM). This system will provide short messaging information (SMS) to the garbage cleaning management to make cleaning or collecting the full garbage. The Project Smart Dustbin Monitoring Using GSM will also facilitate cleaning management in a supermarket or shopping complex to monitor the full trash bin.

Figure 2: The Previous System

There are also other garbage bins by using the example of Smart Garbage Bins (SGBs), created by Chung-Ang University Ingsung Hong students who are working on collecting waste dump data to avoid wastage of locals, it also performs various techniques through wireless communication communicate with the server to collect and analyse the status and information of the population collected using this SBGs system (Jom & Kan, 2007).

Figure 3: Types of garbage cans that have multiple systems according to their use types.

Referring to Aswadi, Khairul, and A'zemin (2007) in the electrical engineering degree report, he has reviewed the Automatic Trash Compactor. This system is one of the previously developed projects, involving automated trash cans using the Peripheral Interface Controller (PIC) as a control unit, where it is suitable for use in high speed hikes such as restaurants and parking lots. This compact trash is designed to compress and mandate waste so it can be easily removed. Additionally, it was created to facilitate one without the need to change the plastic or the full waste bag.

7. Project Physical Design

Physical design is how to build the hardware used by means of connecting electronic components in the form of symbols, sending and delivering components during this project work as shown in Figure 4.
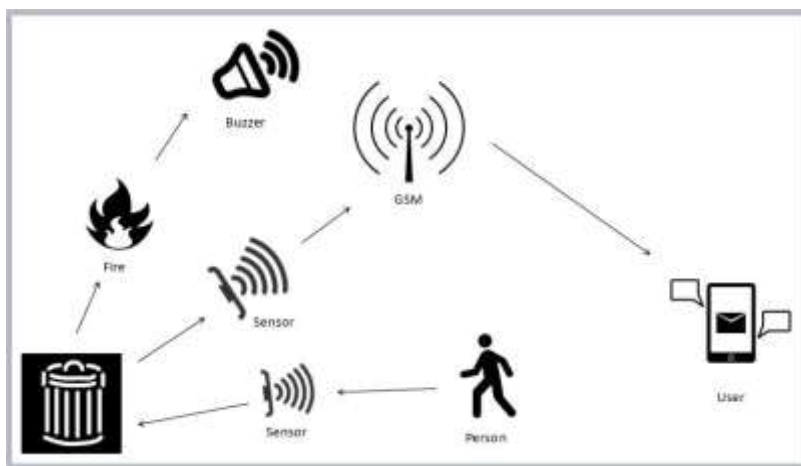

Figure 4: Project Physical Design

8. Project Logical Design

Logical design refers to the logical used to describe the network or how a network is connected. A logical design illustrates the position of each wire attached to each hardware. Logical designs are steps where devices on the network are organized and how devices communicate with each other. The logical topology, on the other hand, is the step in which the signal acts on the network media, or the way the data goes through the network from one device forward regardless of the physical device connection as Figure 5
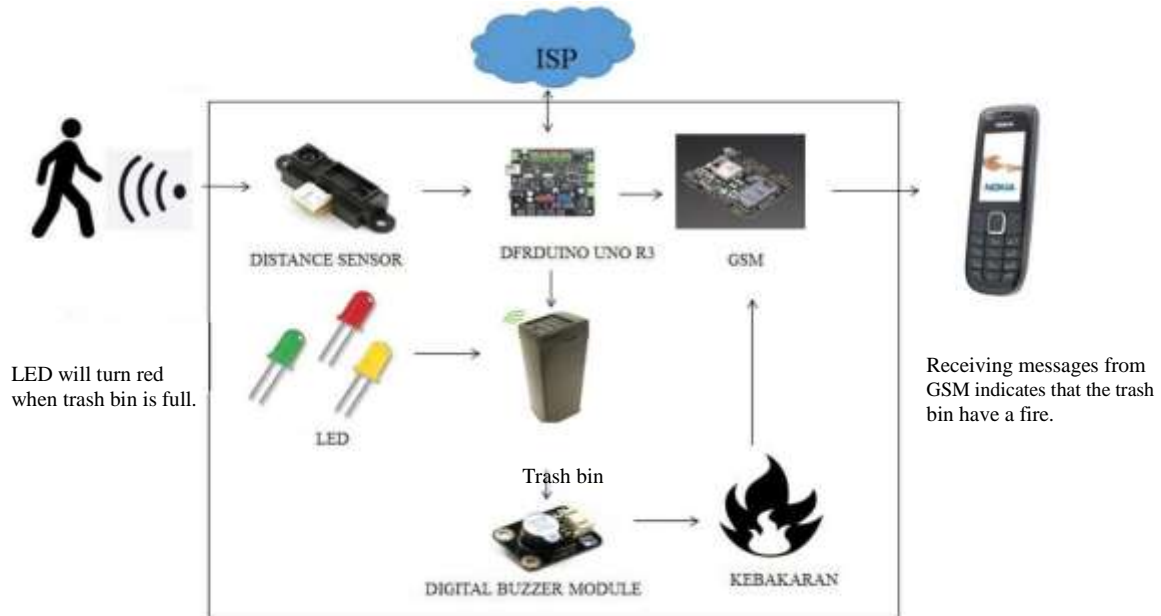
Figure 5: Project Logical Design

9. Important of Project

By developing this project, the cleaners and disabled people or those who are not capable of being able to dispose of the garbage easily. In addition, they also do not need to use a lot of crap to waste. They do not have to open the trash can, because when they approach the trash they will open on their own. Additionally, this project uses a distance sensor where the buzzer's full buzzer sounds and the buzzer flame sensor will also sound indicating that a fire occurs within a few moments will be sent to the detergent.

10. Conclusion

In conclusion, the developed Smart Auto Trash Bin has achieved its objectives as well as meeting the expected goals. Guardians and persons with disabilities can easily remove trash without using their hands or feet. This automatic trash can help the user not to trouble themselves especially people with disabilities to get rid of trash. Overall, the System brings benefits and convenience to the caretakers and people with disabilities. This is because every objective that needs to be addressed when developing this project has been achieved during the analysis of the design. This system revenue can be as helpful and easy as possible for users or employees who use this trash. It is hoped that this system can contribute to the universal community to improve the quality of life.

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