

Waste Controller Boat by Bluetooth Applications

Muhammad Aiman Shahrul Suhaimi¹, Hisyam Abdul Rahman^{1*}

¹Faculty of Electrical and Electronic Engineering,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

*Corresponding Author Designation

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Abstract: Ecosystem like lakes, river and ocean are precious to us. This ecosystem is needed to be protected to make sure it can live without any damages or for long time. So, our government and non-government-organizations (NGO) had made many efforts to serve or protect this ecosystem. The efforts that had been made is by using a technology robotic like an Interceptor to clean up the waste that had been made by human on the ecosystem like big river, big lake and ocean. How about the small area like small river and small waterways area? How can they be conserves and protect? In order to solve this problem, inspired by the technology of the Interceptor the Waste Controller Boat by Bluetooth Applications project is proposed. This project functionally to help cleaning the waste on the small area by collecting the waste on the water surface of the area through the Bluetooth apps. The method of this project uses the Bluetooth application to control the project prototype by using smartphone. In developing the project, there a few steps involve which is software development and hardware development. In software development, there are few software used like fritzing to design the circuit, sketch-up to design 3D model of prototype, Arduino IDE to upload code or instructions program on Arduino and Arduino Bluetooth control to connect the smartphone and the prototype. In hardware development, the prototype project was made of recycle material or unused material. The prototype hardware is believed can move well on water surface and able to collect the waste on the water surface.

Keywords: Waste Controller Boat, Bluetooth Applications, Waste Cleaner

1. Introduction

Lake, river or ocean in Malaysia is precious places an amazing place to visit. This place is an attraction for tourism in Malaysia from the local people and also the foreign people around the world. The research by touropia website [1], 12 from 23 attraction places in Malaysia are places that had an amazing water area such as Pulau Tioman and Taman Negara. In this place, the amazing ecosystem can be found and had a beautiful view.

In this big or famous area, the places will be taken care with thorough and the cleanliness of this places will through all time. How about the small area? This area must be taken care too to conserve more amazing ecosystem. So by inspired the technology of Interceptor, the boat or machine that helps in cleaning river from the waste such as Klang river, the project Smart Waste Controller Boat was develop. The objective of this project is to help the small area of waterways can be cleaned. This project prototype can help clean the small waterways area by collect the waste on the surface area.

1.2 The Waste Controller Boat

Waste controller boat can be described as the boat that helping human in cleaning or control the waste on the water surface. There are several previous research about the waste controller boat that related with this project. Example the pedal boat [2], this project prototype used a human energy for the movement of the boat. The autonomous garbage collector [3], use a ultrasonic sensor in detects the waste. The water trash collector [4] that equipped with SkyFly controller and portable trash collector [5] that focusing on collect the waste on small area of waterways with the Ultrasonic sensor.

1.3 The Remote Control

The remote control is the controller that connect the object and the controller wireless. Diversification of remote control mode is the inevitable trend of development of smart appliances [6]. In this project, the Bluetooth control was used. According to research [7], the connection of the Bluetooth is stable and also the connection between Bluetooth and the Arduino that control the Bluetooth driver are real time [8].

2. Materials and Methods

2.1 Materials

There are few components in develop the circuit of the project and the material in build model of the prototype. The component use in develop the circuit is the Arduino Uno, Motor driver (L298N), jumper wire, Dc motors and Bluetooth module (HC-05). In develop the model prototype, the material used is a plastic box, PVC pipe, polyfoam and a battery.

2.2 Methods

The fritzing software is the software that used in designed the circuit of the project. In this software, the routing of connection circuit was identified to connect the components of the circuit. The routing of the circuit was tested to check the flow of the circuit.

For the controller of the project, the smartphone was used. With the Bluetooth feature on the smartphone and the installation of the Arduino Bluetooth control on the smartphones, the apps will connect to the prototype project through the Bluetooth module (HC-05) on the prototype. This components, HC-05 will be connect with the Arduino Uno which is the brain or main components of this project. Figure 1 shows the block diagram of the whole project.

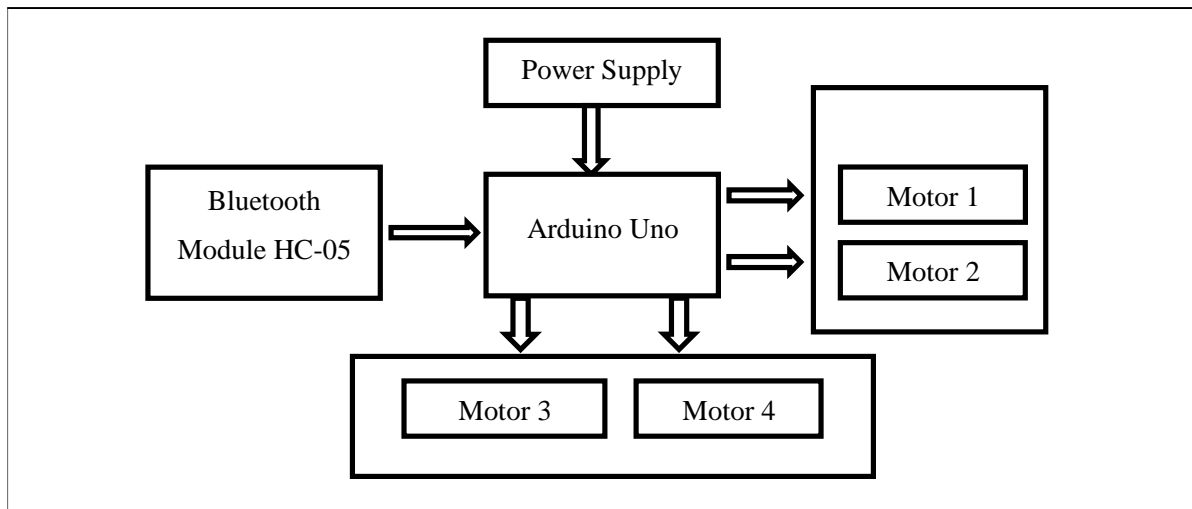


Figure 1: The Block Diagram of The Project

2.3 Characterization

In designing the 3D model of the prototype project, the sketch-up software is used. This software was used because it easy to use and also suitable in designing model or object in various field like the architecture, engineering and others field. For this project, the dimensions 3D model of this project have a 59 cm length, 45 cm wide and 20 cm length as shown in Figure 2.

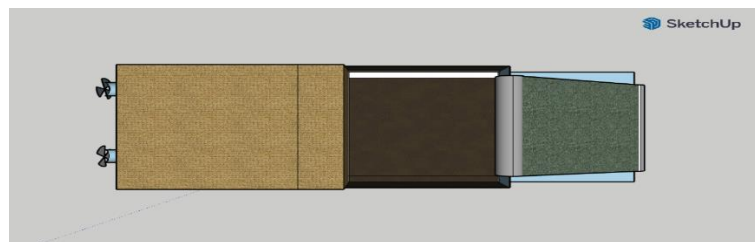


Figure 2: The 3D model of prototype

3. Results and Discussion

3.1 Prototype Design




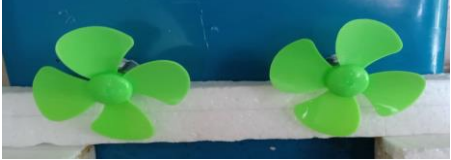

In this section, the prototype of the model will be introduced. The prototype design had a size of 65.50 cm length, 40.50 cm wide and height of 22.20 cm. It is shown as in Figure 3. The prototype will consist of two main part area which is the roller part and the engine part.



Figure 3: The Prototype Model

According to the Table 1 below, the boat will move in a four direction which is forward, left, right and stop. The movement of the prototype will be help of the 9V dc motors that connected to the 12V battery. For the roller movement, the roller for both side will rotate inside to make the conveyor belt collect the waste.

Table 1: The motor direction movement

Controller Input	Motor Movement
Boat moving Forward	
Boat moving Right	
Boat moving Left	
Boat Stop Moving	
Roller Onn	

3.2 Discussions

The discussion will be discussing of the type of waste that roller can collect. According to Table 2 below, the type of waste that can be collect on this project is like small twigs, dry leaves, plastic food or plastic bags and the type of waste that can't be collected is like the plastic bottle.

Table 2: The Types of Waste

No	Type of Waste	Description
1	Small twigs, dry leaves	Can Be Collected
2	Plastic foods, plastic bags	Can Be Collected
3	Plastic Bottle	Cannot Be Collected

According to Table 2, the types of waste that can be collect is a waste that light and also had a smooth surface area only can be grabbed by the conveyor belt. This is because the conveyor belt used had a rough surface area and also have a less in gripping somethings. Although the plastic bottle had a

smooth surface area, the weight of the plastic bottle is make the conveyor belt of the prototype cannot collect this waste.

4. Conclusion

In conclusion, this project had achieved the objectives of this project research. The design and develop the Waste Controller Boat has been successfully developed. The prototype can float well on the water surface and also able to collect waste. The design of circuit by fritzing also works. The prototype model also looks same as the 3D model illustrate in sketch-up. The control of the prototype by using Bluetooth applications also achieved. The prototype can be control with smartphones devices that had a Bluetooth features and synchronize with the Arduino Bluetooth apps that had been install on the devices. The evaluation the functionality of the Smart Waste Controller also achieved. It can be proved with the ability of the prototype that can collect the waste and also move well on the water surface.

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