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Marine Robot

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ABSTRACT

State of the government found out that the major factor lead to environment cleanliness issue is due to lack of self-awareness among the citizen. The major pollution happen was water pollution where plastic waste were being littering into the ocean, rivers, and lakes. There are a lot of prevention problems that have been implemented such as manual cleaning perform using nets, enforcement of laws, and launched the awareness campaign that does not resulted to a great impression. This project designs the semi-automatic robot called as 'Marine Robot' that using Bluetooth module, Arduino Uno as a microcontroller, DC motor, servomotor and ultrasonic sensor to drive the system. The proposed system resulted to semi-automatic water surface cleaning process that could be controlled by human to improve the quality of environment especially in water pollution. In future work, rain sensor can be done to improve the system design.

Key Words: Arduino, ocean, pollution

1. INTRODUCTION

Water covers 70 percent of our planet. Its existence plays an important role in the lives of the living organisms on this planet. Ocean is a home to millions of species that is a benefit to humans such as fish. In fact, a sixth of the animal protein that human consumes came from the ocean. Oceans also generate half of oxygen and currently contains 97 percent of the world's water.

The main issue is that the ocean is being polluted by humans. The rubbish they throw in rivers and lakes are dragged by the current and enters the ocean and finally to a place named The Great Pacific Garbage patch. Most trash are plastic in the form of bottles, bag, wrap and much more.

To overcome this problem, several methods have been used. One is to by collecting manually which is by using a net connected to a long pole. Although effective, it takes time and energy to accomplish the task. Even harder should the amount of trash that needs to be clean is larger and requires transportation to reach the area such as the middle of a lake.

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Therefore, this Marine Robot is innovate to lessen the burden for humans to pick up the trash manually as well as trapped the trash easily.

2. OBJECTIVES

1. To design a robotic trash collector system by using Arduino Uno R3 as microcontroller.
2. To control the robotic trash collector by using Bluetooth module.

3. METHODOLOGY

a. Block Diagram

This system starts with the connection of the ultrasonic sensor as an input as shown in Figure 1. The application in the phone through Bluetooth module will control the movement of the motor. The Arduino Uno R3 is used as the microcontroller. When ultrasonic sensor detects trash, the LED will be on and alert the user. Then user will control the Marine Robot to trap the trash. The trash will be collected by using net that is controlled by servo motor. This process will continue until the net is full and the robot will return to user.

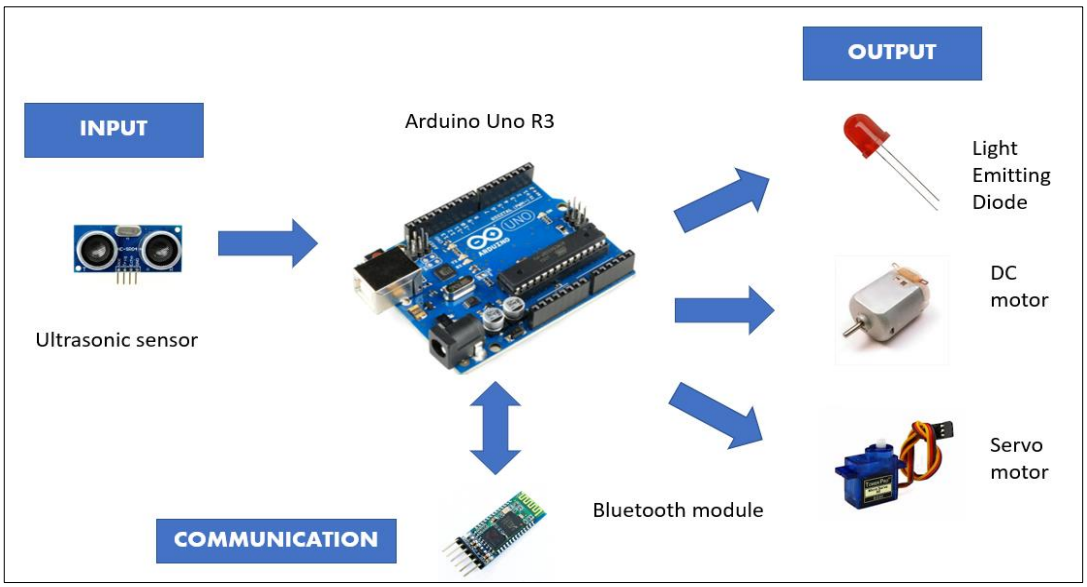

Figure 1: Block Diagram of Marine Robot

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b. Schematic Diagram

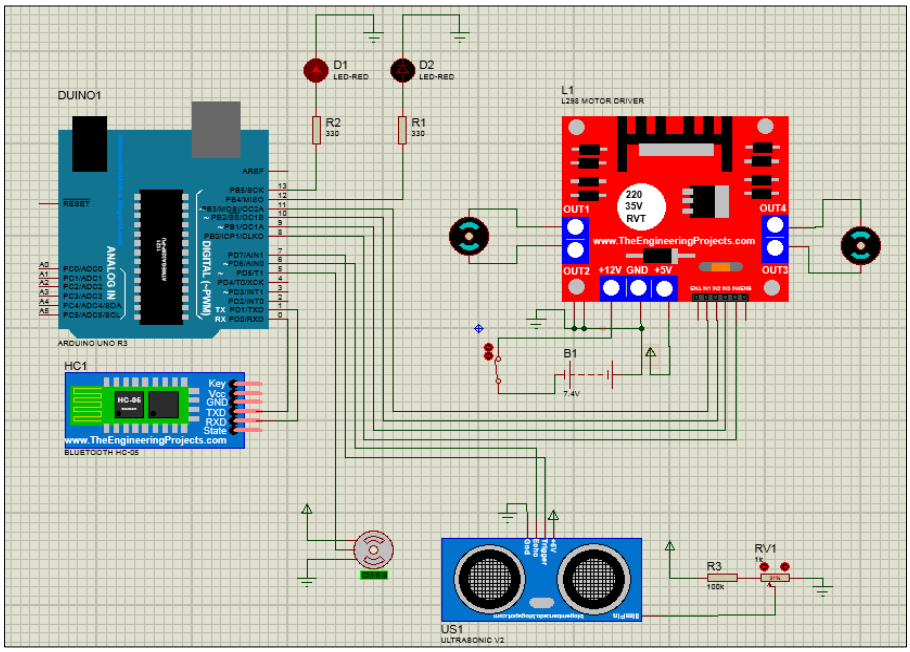

Figure 2: Schematic Diagram of Marine Robot

4. RESULTS AND DISCUSSION

The Marine Robot will be switched on first before being released on the water. When ultrasonic sensor detects the trash, the servo motor will lower the net and user will control the movement of the DC motor through Bluetooth module. Once the trash has been trapped, the net will be closed.

5. NOVELTY

The Marine Robot as a token to prevent water pollution. This project has won 'Gold Award' in 2019 International Thinker Innovation & Entrepreneurship Challenge (I-TIEC 2019).

6. CONCLUSION

The aim and objectives of this project has been achieved. The prototype of Marine Robot is successfully built and the whole system functioning. The project managed to design a robotic trash collector system by using Arduino Uno R3 as a microcontroller and Bluetooth module to control the robotic trash collector system. However, there are some limitations of the prototype. For example, only trash like plastic only can be trapped by this Marine Robot due to its light in weight. Possible future works will be discussed later. Overall, the system can be implemented successfully. The system provides a cost effective and simple solution to prevent water pollution especially in Malaysia.

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