AQUA ROVER

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Abstract— **Almost all organisms on this planet are affected by water, including humans. As a result of water pollution, many marine ecosystems and freshwater ecosystems have been disturbed. Plastics make up most of the waste. Besides stagnation, they are also eaten by aquatic and terrestrial animals, which is a great threat to their existence. The Government and other resources have developed many methods for abreaction. However, many of them do not work in small bodies of water. Keeping domestic water bodies clean can solve many of the problems that threaten the existence of aquatic organisms. This problem has been addressed by developing the AQUA ROVER (prototype), which has a streamlined design to effectively clean domestic water bodies with minimal human interaction & maximum collection of waste.**

Keywords—SEA BIN, ROBOTIC ARM, PROTOTYPE

I. INTRODUCTION

Most of the living organisms rely on domestic water bodies such as lakes/ponds for their survival. Domestic water bodies have a valuable ecosystem and provide a variety of goods to humans. These water bodies have great significance, especially in India. They enhance the beauty of the landscape, provide shelter and food to many organisms, and help in maintaining the temperature.

For the past few decades, water pollution has been a major concern in most parts of the world. As the world population increases the migration to urban cities has also increased due to which most of the water bodies have been exploited in many ways. The land has been occupied by humans and due to this the proper infrastructure for garbage disposal is lacking. As a result, the domestic water bodies especially in India are being polluted.

Our objective through this project is to build an autonomous trash-collecting robot (small or large waste) that does not harm aquatic animals, safe to use, cost-effective, durable, easy to use, collects a large amount of waste in less time, and collects the most type of waste.

This project will be a huge advantage for many Government organizations or non-governmental organizations like WWF, UNDP, UNEP, ADB, and other local organizations to clean the lakes/ponds and converse the water bodies.

II. PROPOSED SYSTEM

The "Aqua Rover" can collect waste particles in two methods either using a sea bin or by using a robotic arm. Sensors and a wireless camera are attached to the rover to record and measure the presence of any waste material. With this recording, the robotic arm/ the sea bin can operate to collect the waste. The power supply for Aqua Rover is given by the solar panel or by a lithium-ion battery. The Aqua Rover can be controlled with the help of an RF controller or by a Bluetooth module
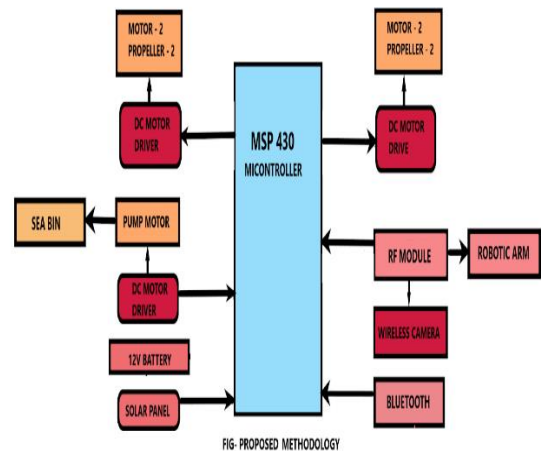

FIG1:

The work of the rover can be explained with two modules:

A. MODULE 1:
RF CONTROLLED ROBOTIC ARM: AQUA ROVER has an MSP 430 microcontroller that is interfaced with an RF receiver. These RF receivers are given instructions using an RF remote.
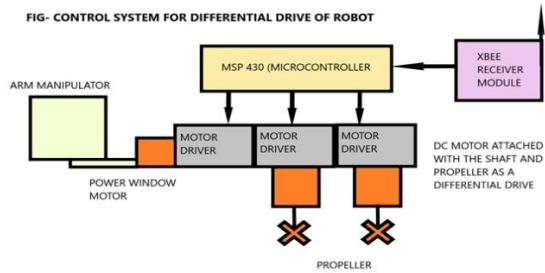
FIG2:

Button Pressed at Transmitter	Moving Direction of Robot
First(1)	Left
Second(2)	Right
First and Second(1&2)	Forward
Third and Fourth(3&4)	Backward
No Button pressed	Stop

FIG 3:

B.MODULE 2

SEA BIN MODULE: This module consists of a floating bucket. The inner part consists of a filter bag made with fiberglass matt. The floating bucket is connected to a pump. It pumps in waste along with the water. The waste is collected by the filter bag and the water is passed into the water body.
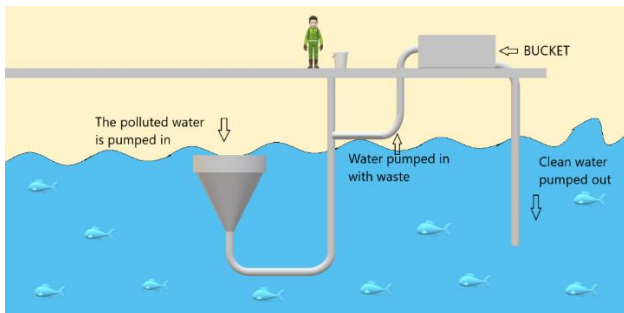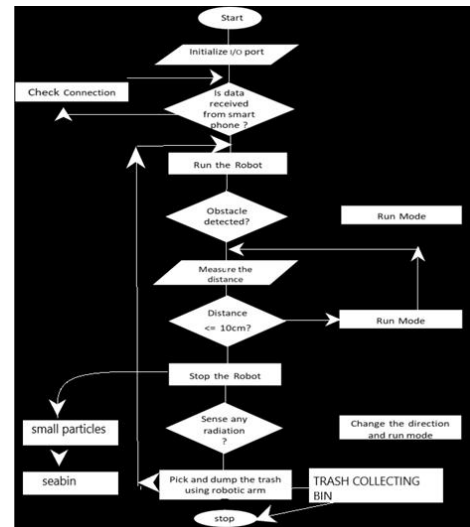

FIG4:

III.WORKING

FIG5:

Basically, this machine consists of a bucket collector equipped with ultrasound sensors, IR sensors, and PIR sensors. Surface fragments from the water are collected by the tank of the sea with a pump on the first tube, feed the pump from the second tube, and then pump from the second tube. Robotic Arm is used in combination with different sensors to collect hard plastic and paper waste on the surface of the water area. Every time the sensor detects the material, the robot arm operates to collect the material. The device is driven by two 3500 rpm DC motors for movements. All electrical equipment such as microcontrollers, sensors, etc. are connected to the Wi-Fi GSM module. It is used to control the ROVER mobile application and plan ROVER trips.
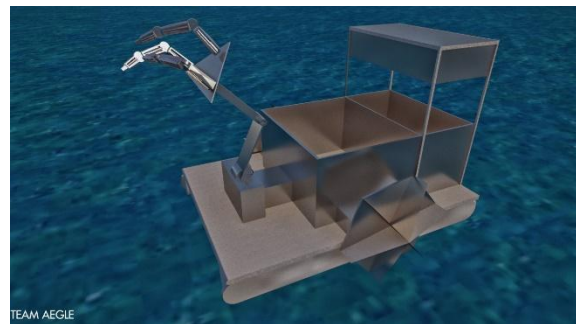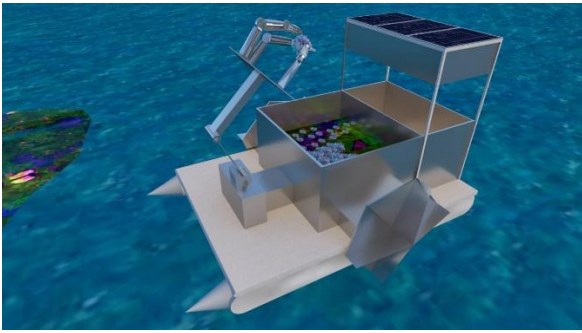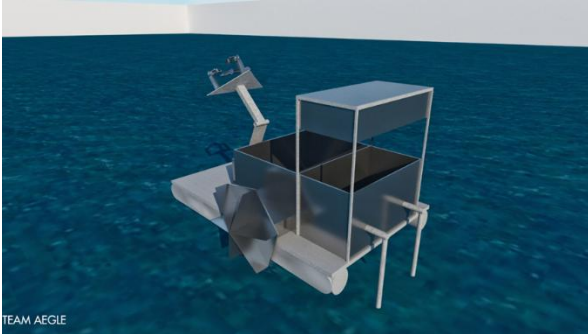
III. PROTOTYPE DESIGN

FIG6:

FIG7:

FIG8:

The Aqua Rover prototype is based on a Basic microcontroller with built-in Wi-Fi that can be powered by a lithium-ion battery. The microcontroller is coupled to the robot arm and ultrasonic sensor for testing purposes. The sea bin concept can be implemented individually by combining a water pump and filter paper. Both concepts are prototyped separately to demonstrate the basic behavior of Aqua Rover.

IV. CONCLUSION AND FUTURE SCOPE

A. CONCLUSION

Industrial waste has been dumped in many bodies of water. To save water resources, we have developed an autonomous multitasking garbage collector that can collect up to 67kg of garbage. The net weight of the prototype will be 10 kg. The production cost of the prototype is Rs.7000. The two basic concepts used in the design of Aqua-Rover are the sea tank and the robot arm (with RF module). Solar energy (renewable energy) is converted into electrical energy, which is Aqua rover's main source of energy. The prototype was built with a variety of sensors that represent the highest accuracy. The product can be manufactured within 30 days. The prototype was developed using a new technology that is easy to use and accessible to everyone.

B. FUTURE SCOPE

The waste collected by the prototype can be recycled and can be used as a source of energy. The prototype can be used in the sea/ocean for collecting the waste by upgrading the camera and connecting a transmitter and a receiver.

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