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TRASH CLEANING BOAT DESIGN AND FABRICATION

Shivaprakash S[1], Akash Mitra[2], Shehzar Sheriff [3], Sheshdhar Prakash[4]
1.Assistant Professor, Department of Mechanical Engineering, New Horizon College of Engineering, Bengaluru-560103,Email: SHIVAPRAKASHGTTC@GMAIL.COM
2. UG Student, Department of Mechanical Engineering, New Horizon College of Engineering, Bengaluru-560103, Email: AKASH.KGA@GMAIL.COM
3. UG Student, Department of Mechanical Engineering, New Horizon College of Engineering, Bengaluru-560103, Email: SHEZPHONE@GMAIL.COM
4. UG Student, Department of Mechanical Engineering, New Horizon College of Engineering, Bengaluru-560103, Email: SHESHADHARAYAS@GMAIL.COM

Abstract— The motive of the project is to automate the cleaning of water bodies to reduce pollution caused by human wastes such as plastic. "Trash collecting boat" is used to pick up floating debris mainly plastic wastes with the help of conveyor. The boat is also fitted with an mechanical arm which with the help of servo motors is able to push the bulky materials towards the conveyor. The boat is automated with the help of Bluetooth system so it can be operated by a cell phone having Bluetooth system in it.

Keywords— Bluetooth controlled boat, Cleaning Boat, Belt conveyors to pick trash, wireless controlled boat, water bodies cleaning boat, Control through phone, Bluetooth operated

I. INTRODUCTION

Disposal of plastic waste has emerged as an important environmental challenge in this world where plastics make up as much as one-tenth of solid waste stream. Plastic waste disposal is a major challenge due to non-biodegradable nature of plastics.

Since mass production of plastic began in 1940s and 1950s. The amount of plastic debris entering marine and fresh water ecosystems has increased by several orders of magnitude. However, recently the accumulation and potential impacts of plastic pollution has recognized as an emerging environmental issue.

World plastic production has increased dramatically from an estimated 1.7 million tons in 1950 to 311 million tons in 2014.Coinciding with an increase in production, the amount of plastics in the aquatic environment has been steadily increasing, and plastics and plastics particles (i.e., micro plastics, items< 5mm diameter) are now commonly found in freshwater and marine systems around the globe.

II. PROBLEM STATEMENT

While plastics are named for their primary monomeric ingredients, plastics typically contain additives that modify the properties of the pure polymers to increase pliability, resist ultraviolet radiation, reduce flammability or degradation, or impart other preferred physical characteristics to the finished product. These additives can leach from the plastic to the surrounding environment and as the plastic fragments and weathers; more chemicals are able to leach.

Many animals that live on or in the sea consume flotsam as mistake, as it often looks similar to their natural prey. Bulky plastic debris may become permanently lodged in the digestive tracks of some animals, blocking the passage of food and causing death through starvation or infection. Tiny floating plastic particles also resemble zooplankton, which can lead filter feeders to consume them and cause them to enter the ocean food chain.

III. SCOPE OF THE PROJECT

The presented prototype of "Trash Cleaning Boat" is our project for the 6th semester. Our projects aim at cleaning of water bodies which can be controlled through Bluetooth communication. This project has a lot of room to grow more economical and innovation in this project is easy and less costly. On the basis of it design and estimating cost and availability it is very cheap and very useful for the society.

This project can be run on solar power by using solar panels and can also be used for cutting harmful weeds in water bodies by adding few modifications.

This project will be an aid to Swatch Bharat Abhiyan (Clean India Mission) as proper solid waste management is done after the collection of trash from water bodies.

IV. METHODOLOGY

We have used micro controller system for the control of the boat making it fully automated and it can be controlled through Bluetooth system.

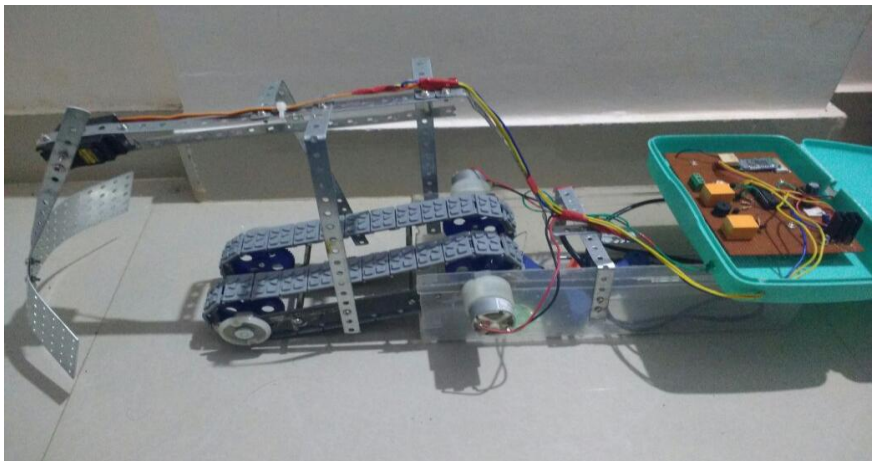

Fig. Trash collecting boat

The Bluetooth system used is HC05 and this is used to connect the controller of the entire setup to the cell phone.

With the help of this Bluetooth system the operator is able to operate from a far distance and the network ability is set to a specific set of range.

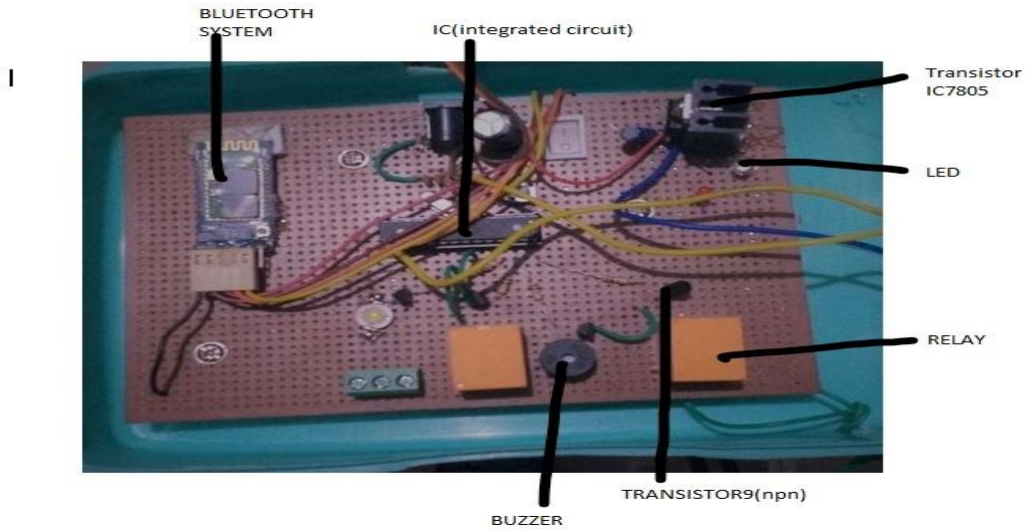

Fig. Components of Controller relay

The Bluetooth system has 6 outputs.

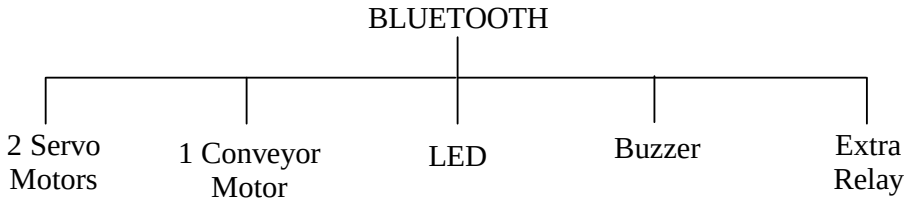

Fig. Outputs of the system

The Bluetooth system then transmits the information to the different components (outputs) through the relays. The relays are a controlling system which is connected to a micro controller setup and which is indirectly is in contact with the conveyor motors. So it facilitates the easy flow of information from circuit board to the conveyor motors, which by then facilitates the movement of the wheels and helps the plastic chain link (conveyor belt) to rotate.

Through microcontroller information is passed to the transistor which acts as a relay switch. Here our transistor can be called as a "transistor as a relay switch".

When the relay is on through transistor and which is in the condition of normal open , then the circuit is completed or switched on and the mechanical components starts working. And similarly when the relay is under normal closed condition the component working will be arrested.

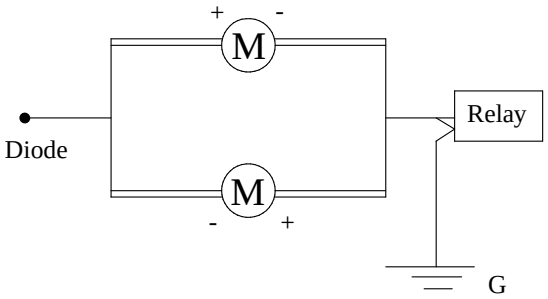

Fig Motor connection circuit layout

The two conveyor DC motors are used on opposite sides and the motors are connected to wheels. The wiring system is connected in parallel combination between two terminals of the motors, the reason being in order to make both the motors to run in opposite direction hence causing the conveyor belt to run in the same direction. Through relay under normal open condition the information is gathered by the motor and thus rotates the wheel and plastic chain.

V. CONCLUSIONS

Modern services are becoming polarized. With the emergence of more and more automatic terminal services, modern services are also gradually becoming unmanned.

The project "Trash Collecting Boat' id designed which is very much economical, easy to operate and helpful for water cleaning and it can be modified with more cleaning capacity and efficiency.

Thus this automated water cleaning system helps in cleaning of water bodies and helps in decreasing the impact of pollution in water bodies and organisms living in it.

A few conclusions drawn from the present work are as follows:

1) This innovation is easy and less costly.
2) This project "Trash Collecting Boat" is designed with the hope that it is very much economical and helpful to river and pond cleaning.
3) It has a lot of room to grow more economical.
4) On the basis of it design and estimation cost and availability it is very cheap and very useful for the society.

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