



WATER CLEANING RC BOAT

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Abstract: The main goal of the project is the development of an RC (Remote Control) water purification boat that offers a new solution for dealing with water pollution in smaller water bodies such as ponds, lakes and rivers. This project focuses on the design and construction of a prototype autonomous RC boat capable of collecting floating dirt and debris. The boat is equipped with sensors, a collection mechanism and a remote control interface for efficient operation in various water conditions. The project emphasizes sustainability by using eco-friendly materials and a solar energy system that reduces the environmental impact of the ship itself. In addition, the boat is designed to be modular and easy to maintain, ensuring long-term usability. The integration of real-time data processing enables optimal navigation and allows the ship to navigate through obstacles and adjust its path for efficient waste collection. This research highlights the potential of combining automation with environmental management, opening avenues for future developments in water pollution control using innovative technologies.

Keywords: Water Cleaning, Remote Control Boat, Environmental Sustainability, Pollution Control, Waste Collection, Autonomous Navigation, Solar Power, Eco-friendly Design, Water Pollution Management, Technology Integration.

I. INTRODUCTION

Rivers, lakes, and ponds are some of the biodiversity treasures that are well known to humans and environmental systems; unfortunately, these water bodies are constantly under the threat of pollution as a result of human activities[1]. Most importantly, this problem can bring forth some innovative yet cost-effective solutions, especially where there is limited access to large-scale clean-up equipment. Such innovations include the water-cleaning RC boat. It is a small, remote-controlled vessel water-cleaning by scavenging floating debris, plastics, and contaminants from water surfaces[2].

It is said to be effective, scalable, and affordable compared with existing alternatives for cleaning water. The boat that is controlled remotely operates in water bodies, targeting highly polluted areas which cannot be reached by using larger equipment[3]. It incorporates principles of robotics, engineering, and environmental science in order to produce solutions sustainable for future water cleanup. It has a built-in collection mechanism (nets and conveyor belts), propulsion system, and sensors installed in the RC boat for effective waste collection with reduced labor costs and manual intervention while operated remotely[4]. Above all, it was aptly compact and mobile so that even urban water bodies, nearly surrounded by infrastructure, can house very limited services to deploy larger scouring systems. In addition, it is energy efficient with the recent design considering solar panel incorporation as an example of rechargeable batteries, which minimizes evil into the environment. This water-cleaning RC boat is also contributing in making the environment cleaner and greener by fighting surface-level pollution to create better impact on the freshwater ecosystem toward waste effects[5].

II. LITERATURE SURVEY

[6]. Dr. Imran A. Khan et al. "Design of River Cleaning Machine" In this paper author has designed and implemented River cleanup machine that can carry the waste surface trash from the water bodies, this may ultimately lead to reduction of pollution. Arms is hooked up to boat for cutting purpose of the plants which arms the aquatic life.

[7].T. Deng, X. Xu et al , "Automatic Collaborative Water Surface Coverage and Cleaning Strategy of UAVs and USVs" This paper addresses the challenge of utilizing unmanned equipment for water inspection and cleaning, proposing an automatic cleaning strategy based on UAV-USV collaboration. We developed a partition-based coverage algorithm and an autonomous obstacle-avoidance trajectory planning algorithm. To optimize task allocation, we employed a balancing factor with the particle swarm algorithm and proposed a multi-ship scheduling and assignment algorithm. Experimental results demonstrate the computational efficiency and cleaning effectiveness of our algorithms. These advantages are significant, but further work is needed to address challenges such as accounting for water flow and wind, which impact path planning accuracy and image quality.

[8]. Akash shahu et al , The "Remote Controlled Unmanned River Cleaning Boat" project tackles India's growing water pollution problem, particularly in rivers and ponds, by collecting floating waste efficiently. Unlike conventional methods, which are labour-intensive, costly, and time-consuming, this eco-friendly boat operates on renewable energy and eliminates the need for manpower. This project is ideally suited for cleaning bodies of water, such as the Ganga River. The project supports government initiatives, such as "Namami Ganga" and "Narmada Bachao," and contributes to reduced pollution, improved human health, and protected aquatic life.

[9].M. Mohamed Idhris et al, "Design and Fabrication of River Waste Cleaning Machine" The current state of India's national rivers, plagued by sewage and pollutants, prompted this project. The government has initiated several river cleaning projects, including "Namami Gange" and "Narmada Bachao." This machine aims to clean river water surfaces. Automation plays a crucial role in modern manufacturing, enabling faster production rates. This project involves fabricating a remote-operated river cleaning machine to reduce manual labour and time consumption .The machine utilizes a motor and chain drive arrangement for automated operation. RF transmitters and receivers control the cleaning machine. Automation can be achieved through various means, including pneumatics, which offer a low-cost solution. India's religious festivals, such as Ganesh Visarjan and Kumbh Mela, significantly contribute to water pollution in rivers like the Godavari. This pollution poses a threat to aquatic life and human health. The proposed "River Cleanup Machine" aims to remove waste debris from water surfaces and safely dispose of it. The machine harnesses hydropower to extract waste, plastics, and garbage from rivers.

[10].Jignesh Vaghasia et al," Experimental Working Model of River Cleaning and Trash Cleaning Boat" This study presents a novel river cleaning boat design, specifically engineered to mitigate floating debris in aquatic environments. The proposed boat design incorporates a unique dust lifting mechanism, linked to a waste collection system, to enhance surface debris collection efficiency. The strategic integration of advanced conveyor technologies and materials can significantly augment waste collection efficiency. Future research endeavors will focus on optimizing the boat's design parameters and exploring innovative strategies to enhance its operational efficiency.

III. OBJECTIVE

1. To design a user-friendly and eco-friendly robot to clean the pond.
2. To implement a wireless control system to allow remote operation of the robot.

IV. METHODOLOGY

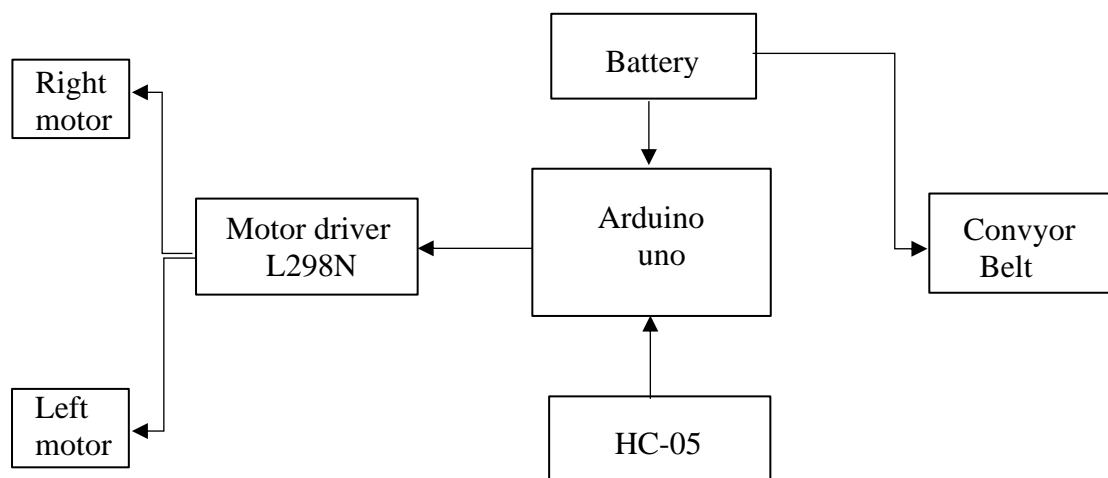


Fig.1 Block diagram of water cleaning RC Boat

A. Block Diagram

Fig 1 is the block diagram of water cleaning RC Boat using Bluetooth in which we have used the components like HC-05, motor driver , motors , Arduino uno , conveyor belt ,wheels.

B. Working

This water-cleaning RC boat operates through an Arduino Uno, an HC-05 Bluetooth module, a L298N motor driver, DC motors, and a conveyor belt mechanism to collect floating debris from water bodies. All the components of the boat are powered by a rechargeable battery and work in coordination under the control of the Arduino Uno. It is established through the HC-05 Bluetooth module, enabling a user to send commands from a smartphone. The L298N motor driver controls the navigation propulsion DC motors, meaning the boat can move forward, backward, left, or right. Another DC motor is used to operate the conveyor belt, rotating to scoop up floating debris and deposit it into a storage compartment onboard. It is the user who has to navigate the boat to the cleaning area. The Arduino interprets these commands and runs the motors as required. Optional features can include ultrasonic sensors for obstacle detection or water quality monitoring. This setup is efficient in cleaning small water bodies with ease and effective debris collection.

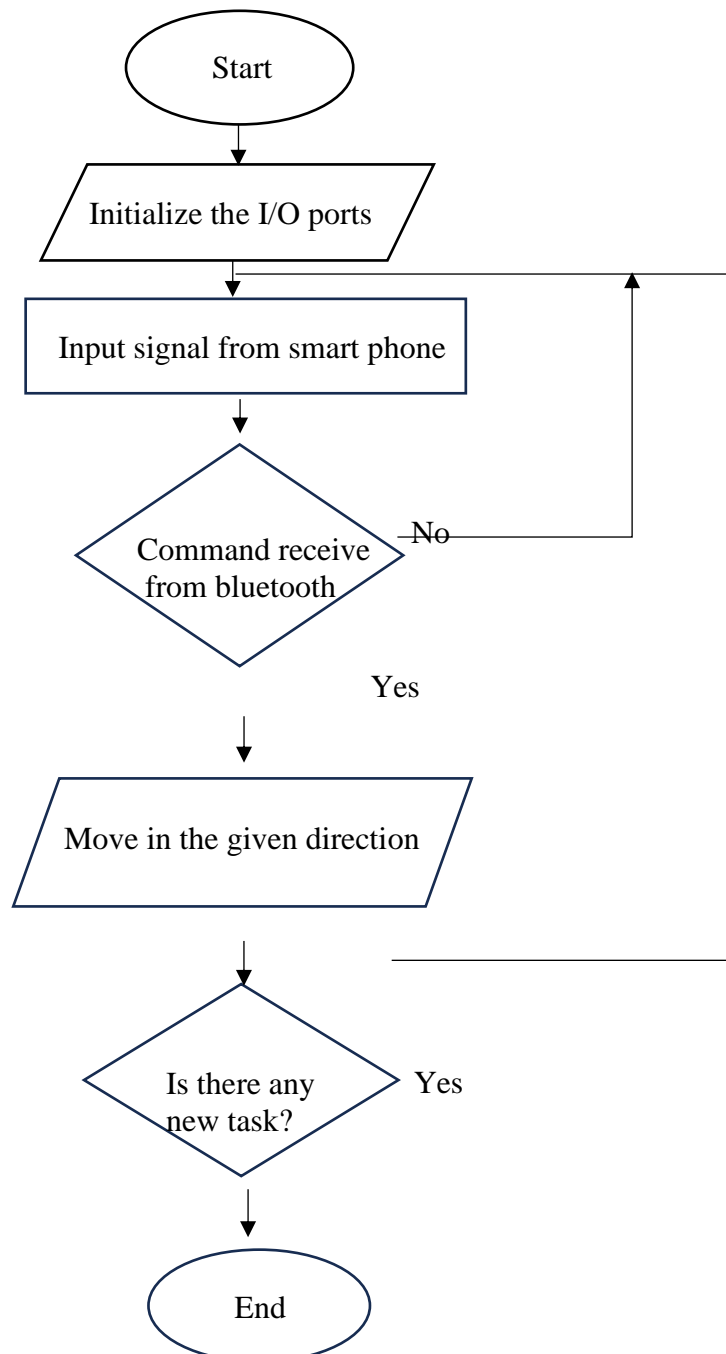
C. Flow Chart

Fig.2 Flow Chart of Water cleaning RC Boat

Fig 2 represent the flow chart of the System. The flowchart for a water-cleaning RC boat using Bluetooth shows the process of powering the system, establishing a Bluetooth connection, receiving user commands, and controlling navigation and activating the conveyor belt for debris collection. The cycle repeats until the task is complete, ensuring efficient and remote-controlled operation.

V. RESULT



Fig.3 It is collecting the debris with the help of conveyor belt

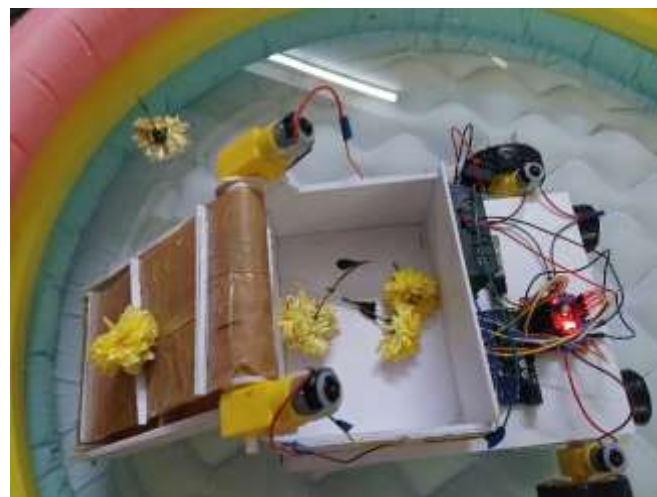


Fig.4 storing it with dust bin

VI. APPLICATIONS

- **Pollution Control:** Accumulates drifting debris in lakes, rivers and coastal areas.
- **Water Quality Monitoring:** Measures pH and turbidity, and sends the information through Bluetooth.
- **Research and Data Collection:** Collects data for scientific analysis on water pollution.
- **Community Engagement:** Engages the community in cleanup activities and educates the public.
- **Emergency Response:** Contributes to cleaning up efforts during oil spills or chemical waste disasters.
- **Aquaculture Support:** Maintains clean water environments in aquaculture farming.
- **Tourism and Recreation:** Promotes recreational activities through the cleanliness of water bodies.
- **Urban Waterway Management:** Manages and monitors urban waterways for cleanliness and navigability

**VII. CONCLUSION**

The water-cleaning RC boat with Bluetooth allows a modern and efficient answer for water pollution in smaller and medium-sized water bodies. With the help of Bluetooth, it is possible to control the vessel with smartphones or tablets from a distance; therefore, it can easily be operated with precision. Such a boat collects waste from regions where it is impossible to clean manually, thus offering cost-efficient and scalable alternatives to traditional cleaning methods. This allows for regular maintenance of water bodies while at the same time allowing future enhancements, such as sensors for monitoring water quality or autonomous navigation. While range and capacity may be a constraint in this technology, it provides an optimistic way forward to environmental conservation and local waste management.

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