

Design and Implementation of River Water Cleaning Machine

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Abstract: *Water is a basic need for all living beings, it is important to maintain the cleanliness and hygiene of water. Water gets polluted due to many reasons such as waste from industry, garbage waste, sewage waste, etc. Most of the time, the water bodies are cleaned manually with human labor which requires a lot of time and cost. Hence there is a need to incorporate technology such that cleaning work is done efficiently and effectively and human intervention is minimum. The proposed system is a remotely controlled robot that collects surface water trash and the collected waste can be easily disposed. The system effectively cleans wastes found in rivers and lakes such as plastic wastes, garlands, bottles, and other wastes found floating on water.*

Keywords: Sentiment analysis;

I. INTRODUCTION

Water is an important resource to survive on the earth, it covers over 70% of the earth's surface, amongst only 3% of that is drinkable water. Water is called a universal solvent which means it can dissolve most of the substances including toxic materials from factories, sewage, chemicals, etc. Because of this, water is completely polluted by human activities. The major problem that living organisms face is water pollution which means the introduction of foreign materials into water bodies. The major causes of water pollution are sewage disposal, garbage, and liquid wastes of households and chemical industries. Discharging these chemicals into water bodies is harming the lives of the aquatic ecosystem as well as the water becoming non-drinkable.

Indian rivers like Ganga contribute over 40% of water for the Indian population across 11 states, serving an estimated population of 500 million people which is very high compared to any other river in India, but it was ranked second most polluted river in the world in 2017. The government had undertaken a project called the Namami Ganga program in 2014 with a budget of around 20,000 crores to clean the holy river, Ganga. Similarly, there are a lot of problems regarding water pollution under the Godavari River, which affects human life and the beauty of the Godavari River[4]. Likewise, many of the projects have been undertaken by the government to control water pollution. The impact of water pollution is widespread. It causes many severe water-borne diseases such as diarrhea, trachoma, hepatitis, etc., in humans. According to WHO, 22% of all communicable diseases are water-borne diseases. The maximum impact is on marine animals because their survival is completely dependent on water. Due to the abundant growth of algae, the oxygen content in the water becomes lesser, which may lead to the death of fish and other marine organisms.

Modern lifestyle is more dependent on disposable plastic; the amount of plastic being thrown /littered in water bodies is increasing every day. The amount of time and labor charges used to maintain and clean public water places are huge[1].

Proposed system focuses on providing a solution to the above issues, by designing fully autonomous robot that can clean water parks /water bodies by controlling the robot remotely.

Literature survey

There are various works carried out on the surface water trash collection system. [1] Proposed a plan for a garbage gathering system viable and effective for tidying up waste from rivers, channels, and lakes. The trash gathering system is explicitly coordinated to the application for getting up a wide assortment of debris, including gliding litter, trash, logs, disposed of tires, and others. The integrated system incorporates the usage of IoT technology that can monitor and

control the entire process. From the interest and need of cleaning contaminations in the conduit's territory, the vessel has been created to suit the prerequisite of working at places other than the seaward zone, giving more decisions for the utilization of cleaning garbage and waste from the water environment.

[2] proposed the design of a cost-effective remote-controlled floating waste removal robot where manufacturing and maintenance costs are kept very affordable. The prototype can collect trash weighing up to 10 kg and clean an area of about 3000 square centimeters drawing only 45 watts from the battery.

[3] Presented the design of a waste collection system which uses conveyor belt connected to the front line of the boat. Boat movement is established using a remote-control application by incorporating an RF module along with an encoder-decoder pair. The principal feature of this boat is the collection of refuse and floating weeds from the surface of the water into a removable basket. In [4] Machine has been designed to clean river water surfaces a remote-operated river-cleaning machine was fabricated which manpower, time consumption can be reduced by automating the operation of river cleaning with the help of a motor and chain drive arrangement.

The existing systems have a complex design and are expensive despite effective working. Hence a new model which has simple design and is cost effective is proposed in this paper.

II. METHODOLOGY

In this paper a new surface waterthrash collection The proposed system is shown in Figure1

The robot has a Bluetooth device through which the communication between the robot and human is done, the person can control the robot within the Bluetooth range using a mobile application known as Bluetooth electronics. A fabric net is attached to the robot which passes through the entire area of the water park/area and collects all the floating wastes/bottles/plastic covers etc. The robot can be used 24/7 hence keeping the water body clean.

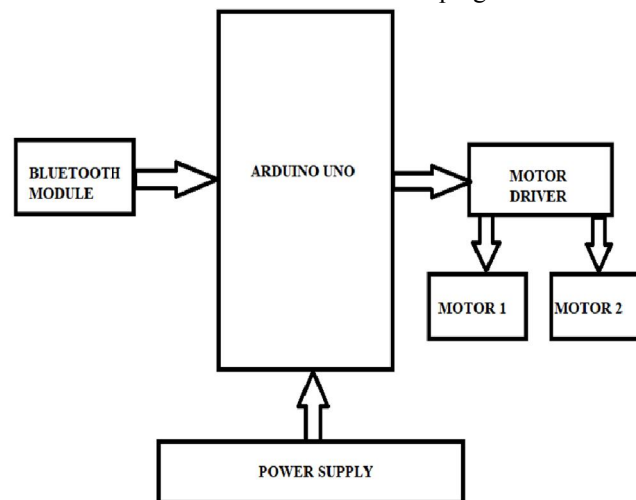


Figure 1. Block Diagram of the Proposed System

The brain of the complete system is the Arduino microcontroller, in this system we have a Bluetooth module that will help to control the robot's movement, and we have a motor driver which will help us to control the motors by providing the required power to the motor.

At the beginning of the project, we have to connect to the Bluetooth module which is present in the river cleaning robot by using the mobile application known as Bluetooth electronics, in which we can add buttons for a robot to move to know for backward, forward, left, and right.

After connecting of Bluetooth of the robot with the mobile application we can now leave the robot in the river in the water for cleaning the river and we can control the robot using the mobile application when we click the forward button in the mobile application the robot will move forward the same for backward, left and right.

The net has been attached to the backside of the robot with the support of treads. When the robot moves near the waste object, then the waste object will be collected in the net and when the net is filled, we can bring back the robot. Authors and Affiliations

2.2 Software Description

Arduino IDE is the software used to write-compile-upload programs to Arduino. It is an open-source software. Procedure to Install Arduino Software (IDE)

The code that you write inside the Arduino IDE. The Arduino code that you write is called a sketch. The Arduino code itself is a derivative of the C and C++ programming languages but with some Arduino-specific functions and structure. So, if you program an Arduino, you're programming in C and C ++ programming languages. So those are the three components that make up what" Arduino is", and roughly what it does.



Figure 2. IDE software

2.2 Design and Implementation

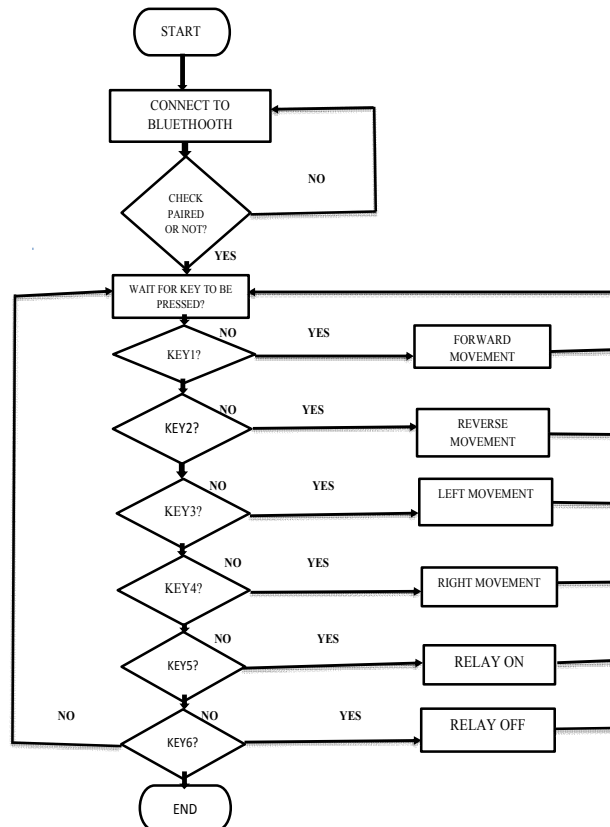


Fig 3. Flow chart of proposed system

From the above flow chart, we can tell how the machine will run first we have to start the machine with connect to Bluetooth it will check paired or not the device if it will not pair then it will go back to Bluetooth after connecting the Bluetooth it will go to keys. If we press key 1 it indicates the forward movement then press key 2 which indicates reverse movement similarly for keys 3,4,5 and 6 it indicates the left movement, right movement, relay on, and relay off respectively. If doesn't work, the key will go to the pressed keys and after this it will end the working of the machine. As an artificial intelligence language model, I don't have access to specific information on every project or machine that has been designed and implemented for river water cleaning. However, I can provide a general overview of the design and implementation process for such machines and some of the potential results.

Design Process:

1. Identifying the contaminants present in the river water.
2. Determining the optimal method(s) for removing these contaminants based on factors such as cost, effectiveness, and environmental impact.
3. Designing the machine and its components to carry out the chosen method(s) of water cleaning.
4. Testing the machine to ensure it operates effectively and efficiently.

Implementation Process:

1. Installing the machine at a suitable location along the river.
2. Operating the machine according to its design specifications and manufacturer's instructions.
3. Monitoring the quality of the water before and after the machine's use.
4. Conducting regular maintenance and cleaning of the machine to ensure its continued effectiveness.

III. RESULTS

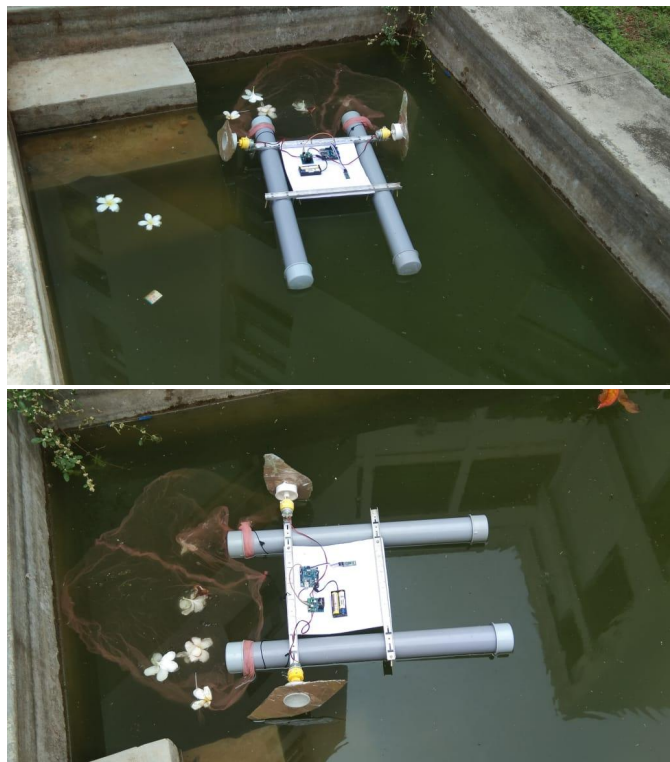


Fig 4. Results of the Proposed Model

If designed and implemented effectively, a river water cleaning machine can have several positive results, including:

1. Removal of contaminants from the water, improving its quality, and making it safer for use.
2. Increased availability of clean water for human consumption, agriculture, and other uses.

3. Reduced environmental impact from contaminants such as chemicals or microplastics.
4. Improved aquatic ecosystems and wildlife habitats.
5. It is important to note that the results of any river water cleaning machine will depend on various factors such as the machine's design, method of operation, location, and maintenance. Therefore, each project needs to be evaluated on a case-by-case basis to determine its specific results.

3.1 Outcomes

- It can be used in dams for regular cleaning.
- Due to low cost, it can be implemented in water parks.
- Can effectively reduce water pollution.

IV. FUTURE ENHANCEMENT

- Solar panels can be added to the robot, hence can automatically turn on the robot during daytime and clean it.
- Can be used to rescue and water /recuse jackets can be added to the robot.

V. CONCLUSION

This project design and implementation of a river water cleaning machine is fabricated based on literature and research from different journals and papers relevantly available and fabricated in accordance so it can provide flexibility in operation. This innovation is easy and less costly and has a lot of room to grow more economically. This project "River Water Cleaning Machine" is designed with the hope that it is very much economical and helpful to the river and Pond cleaning. Based on its design and estimating cost and availability it is very cheap and very useful for society.

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