

An Autonomous Aquatic System for the Removal of Water Hyacinth

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Abstract - Nowadays, the very common problem in the stored water bodies is the unwanted aquatic plants. They grow on the surface of the water. The unwanted plant grows on water surface is called water hyacinth (*Eichhornia crassipes*). It is very harmful for water body as it has very diverse effect on the aquatic life of water body. Researchers have estimated that over 8 months, 10 water hyacinth plants can reproduce into 655,360 plants, covering approximately half a hectare. Its capacity to grow quickly and form dense mats on the surface of the water can cause streams to become blocked and aquatic habitats to be degraded. The water body became poisonous due to water hyacinth contamination. The contaminated water cannot remain useful for the drinking or agriculture purpose. This proposed system possible options for the sustainable management of water hyacinth and gives a general overview of the difficulties involved in removing it. Water hyacinth removal is a difficult task that calls for a multidisciplinary strategy, such as putting dangerous chemicals into water bodies or by backhoe machine, but it cannot be useful for the water bodies which is deeper. This abstract provides the brief idea of the removal of water hyacinth effectively by the help of autonomous water body drone which is cost efficient and which can be controlled by the remote control. It consists of collection mechanism which is the part of drone. It collects the water hyacinth and put it into the waste bin attached to the drone.

Keywords: Autonomous Aquatic System, Removal of Water Hyacinth, Water, Unwanted plant, Unwanted aquatic plants.

I. INTRODUCTION

The “Automated Water Hyacinth Cleaning Machine” used in that places where there is waste debris in the water body which are to be removed. This machine is consisting of waterwheel driven conveyer mechanism which collect & remove the wastage, garbage & plastic wastages from water bodies. This also reduce the difficulties which we face when collection of debris take place. A machine will lift the waste surface debris from the water bodies, this will ultimately result in reduction of water pollution and lastly the aquatic animal's death to these problems will be reduced. It consists of Belt

drive mechanism which lifts the debris from the water. The use of this project will be made in rivers, ponds, lakes and other water bodies for cleaning upper water waste debris. From this project we hope to clean the surface water debris from bodies. Similarly, they are lots of problems of water pollution which affects the acoustic, human life & beauty of Godavari River. Some photo graphs are shows the water pollution in water body.



Figure 1: Water hyacinth in water body

This invention relates to skimmer boats, i.e., work boats for collecting and disposing of floating solid waste materials in harbors and waterways. The invention is more specifically directed to highly maneuverable vessels equipped with means for picking up floating debris, means for storing the debris on the vessel, and means for discharging the debris from the vessel to a storage area, which may be ashore or which may be another vessel such as a barge. Many work boats and vessels have been proposed for collection of floating solid waste and other debris. These may typically be formed as a catamaran-type hull, i.e., a pair of pontoons or sponsons, or as a monohull, with paddle wheel or screw drive propulsion, and an operator station. In one typical trash skimmer design, one or more hydraulically powered open mesh conveyors are positioned between the pontoons of a catamaran-type twin-hull vessel. Twin over-the-rear propellers are used to propel and maneuver the vessel, and these can be tipped up for cleaning weeds and debris from the propeller blades. A main pickup conveyor extends off the front end, and extends into the water to catch the floatables, which it picks up and carries back to a main storage conveyor. When the storage conveyor is completely loaded, the boat is taken to a discharge position where the debris can be transferred to a truck or barge or other

facility. A rear conveyor at the stern of the craft carries the debris from the storage conveyor up and back to drop it into the barge or on-shore storage facility. In some cases, a separate, on-shore conveyor can be used to pick up the trash discharged vessel.

II. LITERATURE SURVEY

M. Mohamed Idhris, M. Elamparthi, C. Manoj Kumar Dr.N. Nithyavathy, Mr. K. Suganeswaran, Mr. S. Arun kumar, DESIGN AND FABRICATION OF REMOTE CONTROLLED SEWAGE CLEANING MACHINE [1].

The motive of the project is to automate the sewage cleaning process in drainage, to reduce the spreading of diseases to human. The black water cleaning process helps to prevent pest infestations by reducing the residues that can attract and support pests. It also improves the shelf life and sensory quality of food products. In the proposed system, the machine is operated with remote control to clean the sewage. Hence, this system avoids the impacts from the sewage waste and its harmful gases. This helps to prevent the mosquito generation from the wastage. The system has a wiper motor that starts running as soon as the set-up is switched on. Two power window motors are connected to the wheel and it is driven with the help of the remote control set-up. The process starts collecting the sewage wastes by using the arm and it throws back the waste into the bin fixed in the machine at the bottom. An arm is used to lift the sewage and in turn a bucket is used to collect them. The set-up runs even in sewage area with water (limited to a particular amount) so that the wastages which floats on the water surface also gets collected. The garbage which affects the drainage is also picked up and removed. This system has limited human intervention in the process of cleaning and in turn reduces spreading of diseases to mankind. Modern services are becoming polarized.

Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P.T. Date Design and fabrication of River Waste Cleaning Machine [3].

This paper emphasis on design and fabrication details of the river waste cleaning machine. The work has done looking at the current situation of our national rivers which are dump with crore liters of sewage and loaded with pollutants, toxic materials, debris etc. The government of India has taken charge to clean rivers and invest huge capital in many river cleaning projects like “Namami Gange”, “Narmada Bachao” and many major and medium projects in various cities like Ahmadabad, Varanasi etc. By taking this into consideration, this machine has designed to clean river water surface. Conventional methods used for collection of floating waste are manual basis or by means of boat, thrash skimmers etc. and deposited near the shore of rivers. These methods are risky, costly and time consuming. By considering all the parameters

of river surface cleaning systems and eliminating the drawback of the methods used earlier, the remote operated river cleaning machine has designed which helps in river surface cleaning effectively, efficiently and eco-friendly. The “River waste cleaning machine” is used where there is waste debris in the water body which are to be removed. This machine consists of DC motors, RF transmitter and receiver, propeller, PVC pipes and chain drive with the conveyor attached to it for collecting wastage, garbage & plastic wastages from water bodies.

Pankaj Singh Sirohi, Rahul Dev, Shubham Gautam, Vinay Kumar Singh, Saroj Kumar Review on Advance River Cleaner [4].

River water is used for irrigation which in return gives food to the people. They also maintain the ecology of region and bring prosperity. We made this project to clean the river. After implementing this project, we can control the pollution of river it is very beneficial for our society. In this project turbine rotates by flow of river water and through the mechanical gear arrangement we arrange two conveyor belts. The first conveyor belt is used to pick solid waste from river and the second conveyor belt is used to draw solid waste out of river for solid waste management. Water is the source of life. It covers 70% of the Earth. But only a small portion of this precious natural resource is fit for human consumption. Out of the earth’s total water 97% is stored in oceans which are not fit for human consumption. The further 3% is stored in various sources like glaciers, rivers, lakes and under-ground aquifers. Rivers have a special place in the lives of the Indians. They consider rivers to be sacred, take holy dip during Amavasya (new moon), Purnamasi (full moon) and on other religious occasions. River water is used for irrigation which in return gives food to the people. They also maintain the ecology of the region and bring prosperity. An area without a river is considered to be poor. Unfortunately, during the past two decades water quality has deteriorated at a rapid pace. One of the major reasons for this is the solid waste being thrown to the rivers, turning them to be a dirty drain. The Ganga and the Yamuna, the two most sacred rivers of our country are no exception to it. Thousands of crores of rupees are being pumped to save the rivers through various plans. Now days we can see river pollution is biggest problem for our planet so we introduce our society with an advance river cleaner. This is an advance river cleaning system. We make this project for looking to clean river.

III. MOTIVATION

In the year 2022 the hyacinth (killer weeds) removed from the Ulhas river has returned this year. It covered almost 30 kilometers of the river, which is major source of drinking water for lakhs of residents across Thane.

- Transportation and Navigation: Navigating in areas where water hyacinths obstruct rivers can be difficult. Boats, ships, and other watercraft can navigate more easily and safely thanks to water hyacinth removal machines, aiding trade and transportation. Community Well-being: Many communities rely on affected water bodies for drinking water, irrigation, and food sources. By removing water hyacinths, these machines improve the quality of life for these communities and enhance their overall well-being.
- Aquatic life: By preventing gas exchange between the atmosphere and the water column, water hyacinth mats can lower oxygen levels in the water. Aquatic organisms require sufficient oxygen to survive, and eliminating hyacinths can enhance these conditions. There is a need to develop an automated system to cut and collect the hyacinth in water.

IV. PROBLEM STATEMENT

The water flowing in drainage have various impurities which having plastic bottles, polythene, dirt and other solid waste. Due to blocking of drainage system we may face several problems in rainy seasons as well as normal days.

Due to blocking of drainage, we see that the wastes get overflow on the roads which are a big problem mostly in rainy season.

So by introducing the Automatic drainage cleaning system, we can eliminate the several problems as well as we can replace the human labor who clean these drainages and they having high risk of catching infections.

V. METHODOLOGY

Block diagram consists of HC-05 Bluetooth module, atmega 328 smd controller, l298n driver, relay, motor, and battery. System is controlled using HC05 Bluetooth module. Battery is charged using solar panel. Command to on the relay the system is given using bluetooth module. After receiving command relay will get on, and conveyer will scroll down and picks up trash and then it will get collected in bin.

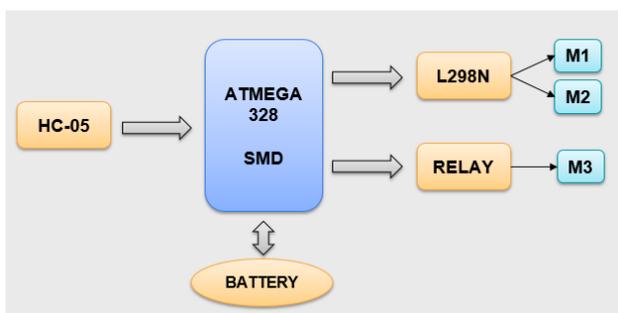


Figure 2: Block Diagram

In this project, the main aim of this machine is to lift the waste debris from the water surface and dispose them in the tray. It consists arrangement of the conveyor which is placed on the shaft & bearings support; the shaft is coupled to the pedestal bearing and bearing is mounted on the M.S angle frame, the frame is welded and resembles the shape of slope facing machine part. Due to hydropower waterwheels are rotate; this power is transmitted to conveyer system by means of belt drives. As the conveyer is move, it collects the water debris, waste garbage & plastics from water bodies.

VI. RESULT

In this project the main aim of this machine is to lift the waste debris from the water surface and dispose them in the tray. It consists arrangement of the conveyor which is placed on the shaft & bearings support; the shaft is coupled to the pedestal bearing and bearing is mounted on the M.S angle frame, the frame is welded and resembles the shape of slope facing machine part. Due to hydropower waterwheels are rotate; this power is transmitted to conveyer system by means of belt drives. As the conveyer is move, it collects the water debris, waste garbage & plastics from water bodies.

As the machine is placed in the water the waste debris in water will get lifted and it moves in upward direction. As the waste debris reaches the upper extreme position it will get dropped in the tray. Hence this will result in cleaning of water surface and safe collection of waste debris from water. After collection of all wastage debris the second conveyer is convey it out of the river. The River Cleanup Machine utilizes long floating barriers which is being at an angle capture the plastic, making mechanical extraction possible. Below Figure shows the Hardware Setup of river cleanup system.



Figure 3: Hardware Setup

VII. CONCLUSION

This project may be developed with the full utilization of men, machines, and materials and money. Also we have followed thoroughly the study of time motion and made our project economical and efficient with the available resources.

This system is designed, fabricated successfully and also tested. It works satisfactorily. We hope that this will be done among the most versatile and interchangeable one even in future. Thus we can able to obtain following through Automated Drainage Cleaning system.

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