

Remote Controlled Unmanned River Cleaning Bot

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Abstract- This project focuses more on “Remote Controlled Unmanned River Cleaning Bot”. In India water pollution is increasing day by day so this is often becoming a significant issue for rivers, ponds etc. This mainly consists of impurities like wastewater debris, plastics, garbage on floating water surfaces. These impurities mainly affect the health of people and also affect the life of aquatic animals. Normally this project is based on renewable energy sources, so there's reduction in use of non renewable energy sources like oil, petroleum, electricity and all types of mineral sources. So by this non renewable energy sources are saved. So this project helps to reduce the water pollution on floating bodies.

Keywords - Water debris, aquatic animals, pollution, garbage

I. INTRODUCTION

Generally, conventional method based on manual basis and it's used for collection of water debris, trash, plastic and all other sorts of impurities which is floating on water bodies or by collecting this impurity by means of boat, trash skimmer etc. And removed this impurity near the river shore and disposed of it. But this conventional method requires more manpower; hence this is often a risky, costly and time consuming method. By considering this all remote operated floating river cleaning machines are more efficient than conventional methods and also this is effective and eco-friendly.



Fig 1 : Water Pollution

This machine is remote operated so manpower isn't required at all. So this machine is really advantageous for reducing the pollution on Ganga river which is caused by

'Kumbh Mela' And also Government of India has taken charge to wash river and pond thanks to increasing water pollution, then that they invest huge capital for several river cleaning projects like 'Namami Ganga', 'Narmada Bachao'. And also developed many projects in various cities like Ahmedabad, Varanasi etc. By taking into consideration, this Remote operated river cleaning machine has been designed to clean river floating surfaces.

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II. MOTIVATION

As India is developing in terms of technology very rapidly, it is quite important that the devices which are introduced need to be updated on a regular basis. Nowadays, all the devices are more dependent on digital technology rather than analog technology. So, people in the government cleaning sector can start using this bot in their cleaning activities.

III. PROBLEM DEFINITION

In the absence of garbage disposal facilities, the practice of dumping garbage into nearby water bodies has become quite common in recent years and has posed long-term negative impacts both on biodiversity of the area and as well as on the local environment.

IV. SYSTEM DESCRIPTION

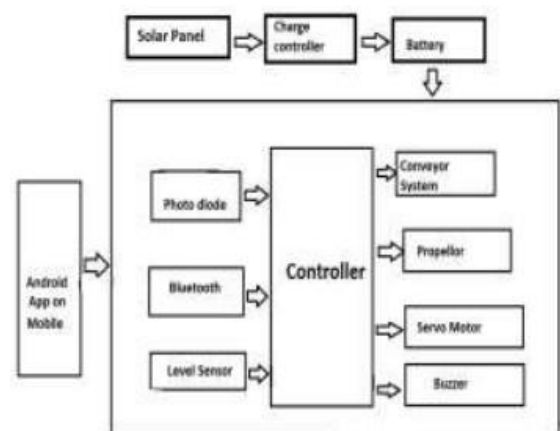


Fig 2 : Block Diagram

We know that solar panels convert light energy into electrical energy which is DC in nature. Solar panel output energy is given to the charge controller that controls DC output of solar which is pulsating in nature and fed pure DC to charge the battery. As we know that battery is used to store the energy. This stored energy is given to all this circuitry for overall operation. This circuitry consists of a controller, level sensor, photodiodes, Bluetooth, conveyor system, propeller, buzzer, and servo motor. In this system controller is a main part it's having input like photodiode, Bluetooth, level sensor and output consist of conveyor system, propeller, buzzer, and servo motor. Android app is used for overall remote controlling purposes.

V. WORKING

In this project the foremost aim of this machine is to lift waste debris from the water surface and dispose of it within the tray. It consists of an arrangement of conveyor which is placed on the shaft of the motor. Due rotation of motor conveyor rotated. Because the conveyor is moved, it collects water debris, waste garbage and plastics from water bodies. because the machine is placed within the water the waste debris in water will get lifted and it moves in an upward direction. because the waste debris reaches the upper extreme position it'll get dropped within the tray. Hence this will end in cleaning of water surfaces and safe collection of waste debris from water. Propeller is used to drive the machine on the river and run with the help of a PMDC motor. The total electrical devices are controlled by an RF transmitter and receiver which are used to manage the machine remotely.

Collecting Mechanism is employed in our project to beat real time issues as thanks to water tension garbage is difficult to collect. By using this four bar mechanism, it rotated at a particular angle intended to gather the rubbish for the model. it's two windows open and shut as the user wishes using remote to ON and OFF the mechanism. Water wheel is bolted on a shaft which is placed aboard the frame. The aim of a water wheel (propeller) is to maneuver the machine forward or backward on water. Motor is used to rotate the water wheel with the assistance of a chain drive mechanism. In this project tracking system is additionally implemented which is helpful to regulate angle of solar array with reference to sunrays. So that we get more solar output.

VI. COMPONENTS USED

1) Arduino Board: Arduino Uno board is based on the ATmega328P. It consists of 14 digital input/output pins in which 6 can be used as PWM outputs, 6 analog inputs, 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

2) L293D Motor Driver Board: The 293D is used to provide bidirectional drive current up to 600mA and voltage from 5V to 36V. L293D consist of the output clamping diodes for protection.

3) HC 05 Bluetooth module: This Bluetooth module is designed for transparent wireless serial connection. This can be used in a Master or Slave configuration; it makes a good solution for wireless communication.

4) DC motor: In this machine two PMDC motors are used and these motors are used to control the direction of the propeller. Another BO (battery operated) DC motor used to control the conveyor belt and also a DC servomotor used for tracking systems.

5) Battery: This is a lead acid rechargeable battery. This machine consists of four batteries which gives output such as 2A, 8V for operation of setup.

6) Relay Module: This module provides the protection to the microcontroller from the higher load current.

7) Solar Panel: A solar panel consists of photovoltaic cells, which can be used to generate electricity through photovoltaic effect. This energy used to charge the batteries. Solar output is given to the DC Regulators.

8) Conveyor Belt: In this machine we used the polyvinyl Conveyor Belt. This is controlled by the arduino uno system using a motor driver circuit. This collects all floating waste from the water surface and discharges it into the dustbin.

9) Blucontrol [android application]: This android application is installed in mobile phones to control the setup automatically which can be downloaded from the android app market for free of cost.

VII. DESIGN CALCULATIONS

Battery-

8V/2Am

pPanel-

12V/3wa

tt

Current (I) = P/V

$I = 3/12I =$

0.25Amp

Charging Voltage = 9V/250mA

Charging Time = (Battery Watt/Panel Watt)*2 =
 $(16/2.25)*2$

= 14.22hrs

Discharge Time = (Battery Amp Hr/Total current
Consumed)

= 2000mA/1270

= 1.57hrs

VIII. OBJECTIVES

- To reduce man power
- Reduce time consumption.
- Reduce pollution.
- Increase efficiency.
- Cost effectiveness.
- Increase reliability.
- Increase life of aquatic animals.
- Reduce use of non renewable energy sources.

- Reduce the pollution of Godavari river.
- Maintain a clean and healthy environment.

IX. ADVANTAGES

- This cleaning system is easy to operate and flexible.
- This system is Eco-friendly.
- This requires less manpower.
- This required more use of renewable energy Sources.
- This system is Cost effective (Initial and Maintenance cost is low).
- This is efficient method

X. APPLICATIONS

- Useful to reduce the water pollution in river
- It is applicable to reduce water debris, impurities, and all types of impurities which are floating on the water surface in swimming pools.
- It is useful to remove the environmental marine pollution at Godavari River.
- It is useful in fishery plants to collect dead fishes.

XI. DISADVANTAGES

- Waste collecting capacity is limited.
- Only useful to collect waste which is floating on river surface

XII. CONCLUSION

This project emphasizes supply flexibility in operation. This is often easy to operate and the price of maintenance is low. Hence this project "Remote Controlled Unmanned Floating River Cleaning Machine" is usually designed to form a system considerably economical and helpful to get rid of water impurities like plastics, trashes, water debris which is floating on river and pond surface. This is mainly very useful maintaining human health and for increasing the lifetime of aquatic animals.

XIII. FUTURE SCOPE

Now day by day the world is facing the biggest problem of floating garbage. And it's increasing in tremendous amounts so it's very difficult to wash all this floating garbage due to more requirement of manpower. so, in future this remote operated floating river cleaning machine has more scope to remove large capacity of garbage automatically as fast as possible. And by making modifications during this machine, this is used for automatically removing the garbage from beaches also.

XIV. REFERENCES

- [1] Project Reference no. 40s_BE_1897 (MR.CHANDRESHWAR M. GADKARI, MR.SHIVA N. BHATKANDE), "Design And Manufacturing Of Electrically Operated Waste Collecting Machine From Stagnant Water Bodies/Ponds Etc."
- [2] M. Mohamed Idhris, M.Elamparthi, C. Manoj Kumar, Dr.N.Nithyavathi, Mr. K. Suganeswaran, Mr. S.Arunkumar, "Design and fabrication of remote controlled sewage cleaning Machine", IJETT – Volume 45 Number 2 -March 2017
- [3] Mr.Abhijeet.M. Ballade, Mr. Vishal.S. Garde, Mr.Akash.S. Lahane and Mr.Pranav.V.Boob, "Design & fabrication of river cleaning system", IJMTER Volume 04, Issue 2, [February–2017] ISSN (Online):2349–9745.
- [4] Mr. P. M. Sirsat, Dr. I. A. Khan, Mr. P. V. Jadhav, Mr. P. T. Date, "Design and fabrication of River Waste Cleaning Machine", IJCMES 2017 Special Issue-1 ISSN: 2455-5304
- [5] Pankaj Singh Sirohi, Rahul Dev, Shubham Gautam, Vinay Kumar Singh, Saroj Kumar, "Review on Advance River Cleaner", IJIR Vol-3, Issue-4, 2017 ISSN: 2454-1362.
- [6] Kashinath Munde, Madhavi N.Wagh, "Design And Analysis Of River Water Skimmer."
- [7] Osiany Nurlansa, Dewi Anisa Istiqomah, and Mahendra Astu Sanggha Pawitra, "AGATOR (Automatic Garbage Collector) as Automatic Garbage Collector Robot Model" International Journal of Future Computer and Communication, Vol. 3, No. 5, October 2014.
- [8] Rajendra Patil, Rahul Itnare, Sagar Ahirrao, Amol Jadhav, Ajay Dhumal, 1,2,3,4B.E. Scholar BVCOE&RI Nashik (Pune University), Assistant Professor BVCOE&RI Nashik, "Study Of River Harvesting & Trash Cleaning Machine.