

MARINE POLLUTION CLEANING BOT

AADIL SYEDABDUL AZEEZ

Electrical and Electronics
Engineering
Panimalar Engineering College
Chennai, India

PRASATH.E

Electrical and Electronics
Engineering
Panimalar Engineering College
Chennai, India

ARFATHULLAH.

Electrical and Electronics
Engineering
Panimalar Engineering College
Chennai, India

SIVA SANKAR.S.P

Electrical and Electronics
Engineering
Panimalar Engineering College
Chennai, India

Mrs.G.MERLINSUBA

Electrical and Electronics
Engineering
Panimalar Engineering College
Chennai, India

Abstract:

The global issue of marine pollution has grown significantly. Because a portion of it washes ashore along the coast and the remainder is swept offshore, it severely harms the coastal and marine habitat. As a result, the debris sinks and remains in the sediment for years. The necessity to address the negative effects on the marine ecology, including killing marine life and destroying the environment's aesthetic value, gave rise to the need for this initiative. The creation of a semi-automatic marine cleaning robot is demonstrated in this project, which is utilized to separate beach trash from the marine environment. For functionality, we have additionally utilized the Blue- tooth.

Keywords:DC motor, motor driver, Bluetooth module,Ardiuno *UNO.*

1.Introduction

One of the biggest dangers to aquatic ecosystems globally is the abundance of marine garbage. Marine life is now subject to harmful impacts such the injection of polymers, eating trash as food, becoming tangled in ropes, plastic can holders, nets, and other garbage, and so on. Due to the fact that plastic takes a lot longer to decompose than other materials, plastic deposition is another significant issue in addition to land and water pollution. The productivity of the beach sand is thus decreased. We are unable to fully utilize beaches for economic, recreational, and aesthetic reasons due to environmental contamination along the shore. The special beach is progressively deteriorated and destroyed.This machine has a cleaning mechanism that collects and removes waste and trash from water bodies. This also lessens

the challenges we have when collecting garbage. A machine will remove the waste surface material from the water bodies, which will ultimately

minimize water pollution and, as a consequence, the death rate of aquatic animals as a result of these issues.

A belt drive system is used to raise the trash out of the water. This technology will be used in rivers, ponds, lakes, and other bodies of water to remove surface water detritus. Similar issues with water pollution plague the Godavari River in Nasik and have a negative impact on the river's acoustics, human population, and aesthetic appeal. Waste Cleaning chemical wastes may have the main impact of causing respiratory diseases, which presents a challenging issue for municipal officials. Water damage is categorized into three types of contaminated water. Clear, grey, and black water are the three varieties. Clean water originates from a broken water supply pipe or a leaky tap. If this water is not cleansed often, it may turn into grey or black water depending on the length of time, temperature, and contact with adjacent contaminants.

Sadly, there is a chance that someone will pass away periodically while attempting to unclog drainage systems, which are utilized to dispose of sewage. The municipal staff's main responsibility is to determine if the sewage is clean or not

2. HardWareComponents:

Battery, Motor, Square Tube, PVC pipe
Spur gear Chain and Sprockets Freewheel
Dust Collecting Net Propeller

3. EmbeddedComponents

*Ardiuno
*BluetoothModule
* 2Channel relay

4. Proposed System

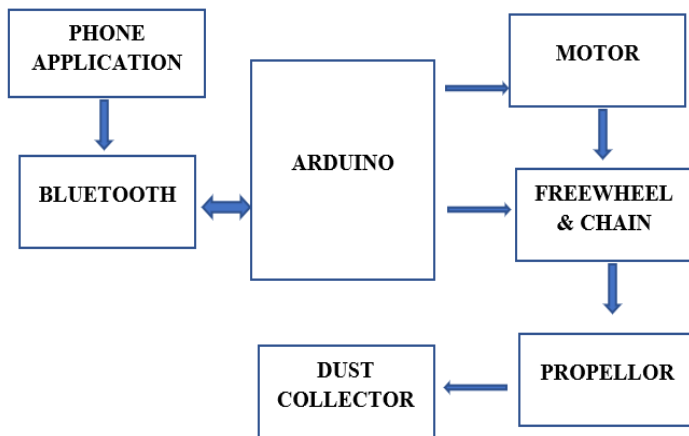


Fig-block diagram

The project is powered by a water wheel that is motorized. It contains four 12V, 7.6 Ampere DC motors. The project's driving mechanism is a chain drive linked with a collecting plate. The project comprises of two primary shafts that balance and lift the chain driving sprocket. The project's primary body is made up of the components that rest on the frame. To run the project on the water's surface.

5. Working:

This machine's primary function in this project is Pressurized air. The waste is stored in the constructed Project the two –channel relay linked to the arduino Controls the motor To lift waste particles from the water surface and place it in the tray. In this picture, we are building a remote-controlled river cleaning machine. The motor continually rotates the collecting plate and chain drives. To collect the garbage from the river, the collecting plate is connected to two chain drives.

6. Machine assemblage:

1. The first stage is to put together the project's base structure utilizing hand cutting and electric welding equipment to support the model and its.
2. L-sections and nuts and bolts are used to assemble hollow pipe at the base frame. It is constructed from tin sheet utilizing rolling and tapping techniques. This pipe's function is to float over water while supporting the weight of the project. When compressed air is introduced into the pipe, a different pressure head is created that makes the machine float.
3. The base frame, which is used to hold the hollow pipe, has L-sections that are welded onto it.

With the use of a conveyer, the collected wastes are placed on a collecting tray. The machine in our project is propelled on the river by a propeller. The dc motor is used to power the propeller. The arduino, which is used to remotely operate the machine, is used to control the entire Electrical apparatus functioning. M.S. angle is used to make the basic frame

4. To support the bearing and shaft, an inclined section is welded to the base frame.
5. Welding is used to attach the T-section to the base frame. Through the employment of a bearing and shaft, it supports a greater chain drive.
6. The torque from the motor to the chain drive is

transferred through a shaft. In the machine, there are two shafts assembled. Shafts 1 and 2 are attached

using inclined selection and T-sections, respectively, to the front chain drive and rear chain drive of the machine.

7. The electric motor that powers our project's gear train, water wheel, and collection mechanism has a voltage of 12 volts and a current of 7.6 amps is utilized here.

8. The gear drive is attached to the shaft by welding it to a T-section and connecting link. When a load has to be carried or it's desirable to fulfill the project's goal, power is transferred from the motor to the chain drive using a gear drive.

9. The project uses 8 sprockets, 1, 2, 3, and 4 of which are placed on the carrying belt's shaft using a chain and are all the same size. The water wheel, which is used to float the machine on water, is powered by the remaining 5, 6, 7, and 8...

7. Experimental Setup:

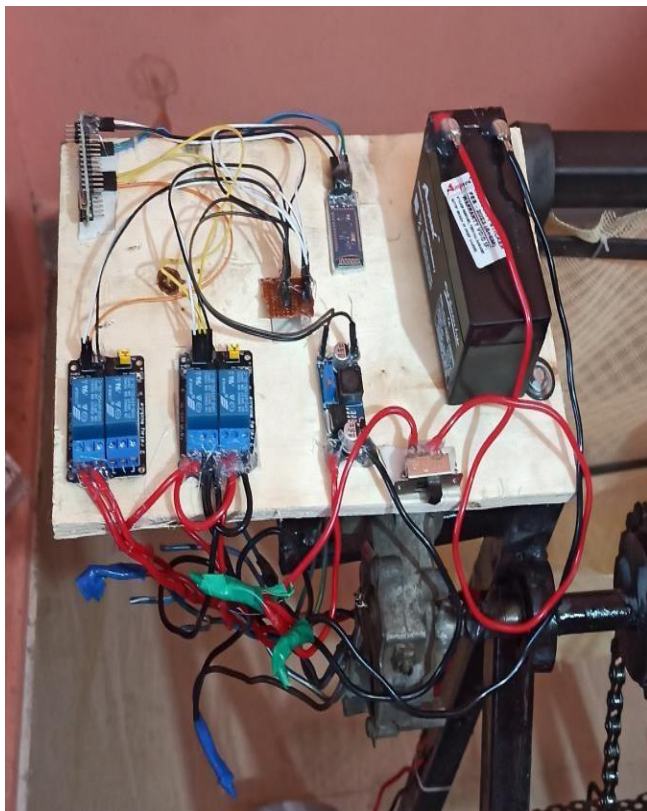


Fig-2 control circuit

This picture represents the control circuit of the machine; the control circuit consists of the relay, Adriano and the Blue tooth module, battery and finally the connecting wires.



Fig-3 front view of the machine

Its maintenance cost is low. And the main advantage of this is it does not need much human intervention.

8. Conclusion:

This project is created based on the literature and research from many journals and papers that are pertinently available and created in accordance to provide for operational flexibility. This idea is simple, affordable, and offers plenty of potential for economic growth. It is hoped that the "Remote Operated River Cleaning Machine" would be extremely cost-effective and beneficial for cleaning rivers and ponds. It is relatively affordable and extremely useful for society based on its design, cost estimation, and availability. The results of calculations and experiments are quite favourable. Given motor has an output of 80 watts with 7 amps per hour, while supplying battery has an output of 85 watts with 7.6 ampere/hour,

According to estimates, the project can operate at full capacity for up to 1 hour and 10 minutes, however in actual use; it has been observed that the project can operate for up to 45 minutes before the battery has to be recharged once more. Using a high power battery will make this flaw easy to solve. According to the time ratio, the project is operating at a rate of 64.28% of its design criteria, which may be tolerated because further study can be conducted in the future to address these issues.

9. FUTURESCOPE:

The robot can be used in water quality monitoring and other applications like water sampling, testing & chemical treatment

The can be fit with camera and Transmitter and Receiver like Fly sky CT6B & FS-R6B so as to enable it to be controlled from long distance.

Solar panel can be used as a means to charge the battery being used so as to avoid the hassle of charging battery after some time.

Machine can effectively collect floating solid waste

The machine is light in weight around 50kg as compared to present river cleaning machine available in market

Operated by a single operator hence less man power required

The risk to the worker is eliminated as there is no risk involved in operating this machine

Man power is reduced due to automated self-service. It is a non conventional and eco friendly system. Since it is easy in operation skilled workers are not required.

The machine works on battery so it is environment friendly as opposed to diesel operated conventional machines

The machine is also cost effective as compared to conventional river cleaning machines

12. References

- [1] H.Ebrahim,W.Sheikh,A.Saeed,“Designand analysisofsustainablebeachcleaner”,3CTechnology. GlossesofinnovationappliedtoSMEs, Special Edition, and ISSN: 2254-4143,https://doi.org/10.17993/3ctecno.2022.speci alissue9.167-179,14Feb2022.
- [2] N.Bolong,I.Saad,M.AmranMadlan,“Manufacturingof Beach CleaningMachineatUniversityMalaysiaSabah(U MS)PrototypeDesignandAnalysis”,Transactionso nScience AndTechnology,Volume:08,No.3-2,281 -289, 02Nov2021.
- [3] Prof.J.Shelke,B.Bhakare,K.Lute,A.Pateshwari, H. Khodiyar, “Beach cleaning systemand surface cleaning system”, International Research Journal of Modernization in EngineeringTechnology and Science, Volume:02, Issue:06, e-ISSN:2582-5208,June2020.
- [4] V. Mepani, H. Patel, Vataliya Mohil, Prof. R.Sahu,“DesignandFabricationofBeachSandCleaning Machine”, International Research Journal of Engineering and Technology, Volume: 07,Issue:02,e-ISSN:2395-0056,p-ISSN:2395-0072,Feb2020.
- [5] V. Dhole, O. Doke, A. Kakade, S. Teradale,Prof. R. Patil, “Design and fabrication of beachcleaning machine”, International Research Journal of Engineering and Technology (IRJET), e-ISSN:2395-0056,Volume:06Issue:04,Apr2019.
- [6] P.Kaladharan,K.Vijayakumaran,V.V.Singh, D.Prema,P.S.Asha,BinduSulochanan, P.Hemasankari,L.LovesonEdward,SheltonPadua, S.Veena,A.AnasukoyaH.M.Bhint,“Prevalenceof marinelitteralongtheIndianbeaches: A preliminary account on its status andcomposition”, Journal of Marine Biological As-association of India, Volume: 59, No 1, June 30,2017.
- [7] C.Balasuthagar,D.Shanmugam,K.Vigneshwaran, “Design and fabrication of beachcleaning machine”, IOP Conf. Series: MaterialsScience and Engineering 912 (2020) 022048 IOPPublishing doi: 10.1088/1757-899X/912/2/022048,2020.
- [8] Prathamesh Jangam,Snehajangam,Rutujakadu,MubbashirKazi ,Prof.SanobarShaikh,“Beach Cleaning Robot”, International ResearchJournal of Engineering and Technology (IRJET),ISSN:2349-6002,Volume:6Issue:12,May2020
- [9] Ramamoorthi R,RamachandranN,NikilesPD, Jayasurya R, Natheesh MD, Nithin K Biju,“Design andfabrication of beach cleaningma-chine”, International Journal of Innovative Tech-nology and Exploring Engineering,ISSN:2278-3075,Volume:08,Issue:12,Oct2019.
- [10] D. Vaishnavi, Sabeesh Kumar.S, “Swachhyantramanav:Amultipurposecleaningrobot”,InternationalJournalofInnovativeScienceand ResearchTechnology,ISSN: 2456-2165,Vol-ume: 02,Issue: 05,May2017.
- [11] M.Bhavani,S.Kalaiselvan,S.Jagan,S.Gopinath,“Semi-AutomatedWirelessBeachCleaning Robot Vehicle”, International Journal ofRecentTechnologyandEngineering(IJRTE),ISS N:2277-3878,Volume: 8Issue: 1S2,May2019.
- [12] Dr. F B Sayyad, Dr. Md. Imran Ansari, Dr. SF Sayyad, “Design and Developmentof BeachCleaningMachine”,InternationalJournalforR esearchinAppliedScience&EngineeringTechnolog y,ISSN:2321-9653,Volume: 07,Is-sue: 06,June2019.
- [13] T.SubbaReddy,P.SatyaPriyanka,L.Himaja,K .Sravani,N.Mounika,“Design andFabrication of Beach Dust Collector”, ResearchandDevelopmentinMachineDesign,Vol- ume:03, Issue:03, DOI:http://doi.org/10.5281/zenodo.4043052, Oct2020.
- [14] R Praveen, L Prabhu, P Premjith, Adarsh. K.Mohan,Ajayraj,“DesignexperimentalofRFcontr olledbeachcleanerroboticvehicle”,IOPConf. Series: Materials Science and Engineering993(2020)012030IOPPublishingdoi: 10.1088/1757-899X/993/1/012030,2020.

- [15] S.Das,P. Jha,A.Chatterjee,“AssessingMarine Plastic Pollution in India”, IEG WorkingPaperNo.389,Apr2020.
- [16] ZhaiYuyi,ZhouYu,LuoHuanxin,LiuYunjia , Liu Liang, “Control System Design for aSurface Cleaning Robot” International Journal ofAdvancedRoboticSystems,Volume:10,Feb2013.
- [17] Ankita Paste, Prerna Pisal, Ameya Shinde,TanviUpaskar,Dr.BabanURindhe,“Smart Beach Cleaner Vehicle”, ISSN: 2581- 4419, Volume:1Issue:1
- [18] Amit Kumar Yadav, Animesh Singh, M. A.Murtaza,AjendraKumarSingh,“EcoBeachCleaner”,InternationalJournalofEngineeringandManagementResearch,ISSN(ONLINE):2250-0758,ISSN(PRINT):2394-6962,Volume:08,Issue:03,June2018
- [19] Francisco Cuellar et al., “IEEE Open Category: Beach cleaner”, Team PUCP – Team Descriptionpaper,LARC2013.
- [20] Kusun Prakobkarna, Banyat Saitthitib, SakdaIntaravichib,“ Design and Construction of BeachCleaningTrailerbyFiniteElementMethod”,International Transaction Journal of Engineering,Management, & Applied Sciences & Technologies,ISSN: 2228-9860,eISSN: 1906-9642,Volume: 03,No.02,2012.

