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Solar Powered Water Trash Collecting Boat

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Abstract— *As we know the population of India is increasing day by day and due to this the pollution also increases. The garbage produced by the people is the main cause of pollution. Most of the garbage is dumped or just thrown in the lake, river or other water resources. The garbage which is thrown in the water such as lakes, rivers and other water resources due to which the water gets polluted because of which we cannot use that water for our daily use and the water will also get wasted. In many cities of India this is the major problem. To overcome this water pollution our project "Solar Powered Water Trash Collecting Boat" is very helpful by collecting the garbage which is floating on the surface of water. This project is also very efficient and works on solar energy no external power supply is required.*

Keywords— solar power, trash collecting boat, trash

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I. INTRODUCTION: -

Water pollution caused by the accumulation of trash and debris in rivers, lakes, and oceans poses a severe threat to aquatic ecosystems and human well-being. Conventional methods of waste management often fall short in effectively addressing this issue. To combat this challenge, we present an innovative project aimed at developing a solar power-based water trash collecting boat. This project combines renewable energy technology, advanced waste collection mechanisms, and sustainable practices to provide an efficient and eco-friendly solution for cleaning up our water bodies. The primary objective of this project is to design, develop, and deploy a solar power-based water trash collecting boat capable of efficiently removing floating debris from water surfaces.

II. LITERATURE REVIEW: -

Viki Tayade, Prabhat Dodmise, Sagar gawade, Shital Gawade "Solar Powered Floating Water Trash Removal Boat"[1].The projects uses solar power, which is free of cost. The boat will get charged by absorbing the solar energy and stores it into the battery. The solar energy gathered will run the complete functions of the boat to remove the trash from the water. Design & Fabrication of Automatic Drainage Cleaning System using Solar Panel. Author Mragank Sharma, Shahbaz Siddiqui have introduced this system Automatic Drainage Water Cleaning overcomes all sorts of drainage problems and promotes blockage free drains promoting continuous flow of drain water. The proposed system is then used to clean and control the drainage level using an auto mechanism technique.

Shalini, Priyanka, Prof. Neha Rai, Prof. Jayesh Rane "Design of Solar Power Water Trash Collector"[2]. In this project, the floating water waste extractor is used for removing waste debris in water bodies. System consists of mechanism for lifting waste debris from the surface of the water bodies. It consists of belt driver mechanism. This is a remotely controlled machine. The system works on solar power during daytime and during the night time it can operate on a battery.

Nurul Anis Syahira, Ili Najaa Aimi, Dalila Misman, Nurulaqilla Khamis "Development of Water Surface Mobile Garbage Collector Robot"[3] In this paper, a water garbage collector prototype was proved to be able to collect garbage on the water and partially immersed in the water's surface. After several experimental setups, water garbage collector was successfully controlled using smartphone application MIT. The navigation of the robot is controlled using wireless Bluetooth communication from a smartphone application.

Ketan H. Pakhmode, Ronit R. Dudhe, , Gangadhar.S.Waghmare,Daniyal.A.Kamble "Solar Powered Water Surface Garbage Collecting Boat"[4].In this project, The boat totally works on solar power, which is free of cost. This boat will not require any external supply of energy so it saves the money. In day time the boat will store the energy with the help of sunlight which falls directly on the solar panel and at night time the boat will start working and collect the waste.

S. Malavika, S. Meena, E. Indhumathi, M. Nandhini, S. Srinivasan "Solar Operated Water Trash Collector" [5] This paper presents a proposal for a Remote Controlled Solar Powered Water Trash Collector. As we probably are aware of all metropolitan water bodies being contaminated and are used for discharging untreated sewages and solid waste. The mobile application is connected to the google firebase through the IP address to

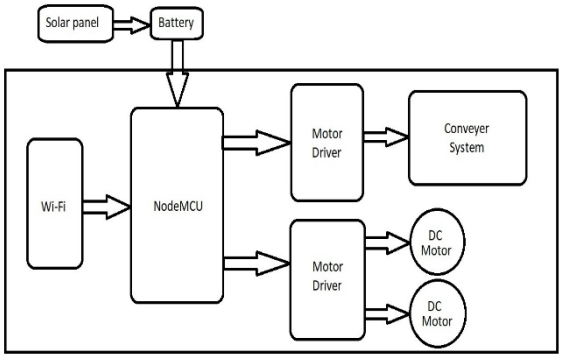
communicate the signals between the microcontroller and the mobile application. When the robot moves, the waste will be trapped within the mesh type container, when the container is filled with waste and is removed from the robot and fixed after the removal of the trash.

Amruta Khot, Shreya Kamble, Sanghamitra Gaikwad, Gauri Chavan" Solar Based River Water Garbage Collector" [6] In this project the proposed concept is to reduce the human effort in debris cleaning in water bodies by an automated system. The designed project is very economical, easy to operate and helpful for water cleaning and can be modified with more cleaning capacity and efficiency. The choice of raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem.

Prof Ketan, Mr. Abhijeet. M. Ballade, Mr. Vishal S. Garde, Mr. Akash. S. Lahane and Mr. Pranav. Boob "Design and fabrication of the river cleaning system" [8] In his paper, it was discussed that the river clean-up machine removes the waste debris from the water surface and safely disposes it. It works on hydropower to extract wastewater debris, plastics, and garbage from the Godavari River at Nashik. The main objective of the project was to cut manpower, and time required for cleaning the stream. Energy stored within the battery is used for the assistance of a motor and conveyor arrangement.

Aishwarya N A, Arpitha M, Chaithra K, Chira Shankar, Navyashree D, 'Detection and Removal of Floating Wastes on Water Bodies' [9] With the increase in population, the scenario of cleanliness concerning waste management is degrading tremendously. This project aims at detecting floating wastes in water efficiently using infrared sensors and cleaning. The information of every action taken is sent to the corresponding authority through GSM. The project is implemented for flowing and stagnant water. The main advantage of the project is that the people of the control station need not have to go to every nook and corner to clean garbage, instead they can monitor it from one end easily. Finally, the water bodies will be free of all floating wastes, and the sanity of the river, and its dependent living beings will be safeguarded.

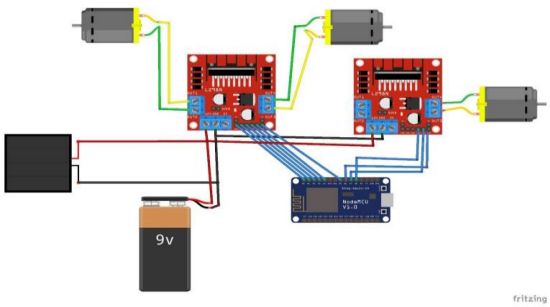
III. BLOCK DIAGRAM: -



IV. BLOCK DIAGRAM DESCRIPTION: -

The sun light incident on solar panels convert light energy to electrical energy. This generated energy is stored into the battery, the supply is taken from the battery to all electronics and electrical devices. The NodeMCU is the microcontroller programmed to give commands to change the motion of the boat, rotation of conveyor belt etc. At first set up Wi-Fi availability between Android Application and the Wi-Fi module. Then once the device gets connected to the android application we can control the boat. We will connect NodeMCU to the motor drivers. After connecting with the help of a motor driver we can move the system(boat) in forward and backward direction with the help of dc motors. When the waste is detected in front of the boat we can switch on a conveyor belt which will be connected with a motor and it will help to collect waste from the water surface.

V. CIRCUIT DIAGRAM AND WORKING: -



The main aim is to introduce the use of renewable energy sources (solar) to run the garbage collection equipment. At first set up Wi-Fi availability between Android Application and the Wi-Fi module. Connect the Wi-Fi module to our mobile and then move to the app. At this point put the directions on a specified android application which is installed on a mobile. Open the android application and give the instructions which we have given in the program.Then once the device gets connected to the android application we can control the boat. After connecting with the help of a motor driver we can move the system(boat) in forward and backward direction. Then once the system is ready, switch on a conveyor belt which will be connected with a motor and it will help to collect water waste from the water surface. Our system takes the waste by belt conveyor mechanism and throws it in a net situated at the back.

VI. ADVANTAGES: -

- It is a non-conventional river cleaning system.
- It's initial & maintenance cost is low.
- Skill Worker not required to drive the system.
- Environment friendly system.
- Easy in operation.
- Utilization of renewable energy sources.

VII. APPLICATION: -

- It is applicable to reduce water pollution in rivers and ponds.
- It is useful to remove the sediments present in the water bodies to keep it clean.

VIII. FUTURE SCOPE: -

- Capacity of the machine can be increased for cleaning big rivers and lakes.
- Now the world is facing the biggest problem of floating garbage. And it is increasing in tremendous amounts so it is very difficult to clean all this floating garbage because of more manpower. so, in future this remote operated floating river cleaning machine has more scope to remove large amounts of garbage automatically as fast as possible. And by making modifications in this machine, this is used for automatically removing garbage from beaches also.
- The waste segregation can also be done

IX. CONCLUSION: -

A simple and cost-effective water cleaning Mechanism and is generally intended to support water trash cleaning and eliminating water contaminations like plastics, wastes, water trash which is coasting on stream and surface of water bodies like lakes, rivers, seas, etc. It is done to keep up human wellbeing and expand the existence of sea-going living beings. Solar based trash removal systems will successfully replace manual drainage cleaning ways. So, it is economical and efficient using solar energy. This type of system is designed and fabricated successfully it works satisfactorily. The water trash Collector concept can prove to be a helping hand in controlling the increasing problem of water pollution. It will also greatly reduce the problems caused by floating waste.

X. REFERENCES

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