

Solar Powered Floating Water Trash Collector

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Abstract - The population of India was increased day by day and due to this the pollution is also getting increased. The garbage which is being produced by the people is the main cause for pollution. Most of the garbage are dumped or just thrown in lake, river or other water resources. The garbage that is being thrown in the water bodies leads to water pollution and most of the water become unused due to pollution. In most of the cities in India this water pollution is the major problem. By taking this into consideration, this project Solar Operated Water Trash Collector is to remove garbage, debris and solid waste from water bodies and make it clean. The water trash collector concept is to reduce manpower and time consumption for cleaning the river. The water trash collector is to collect many types of wastes from water bodies and also reduces the human interference. It collects a wide variety of wastes from water bodies and reduces human interference. Waste collected from equipment is disposed of in easy ways. Solar based water garbage collector is eco-friendly in nature and it is safe for the user.

Index Terms - Solar panel, Waste removal, pollution, Garbage.

I.INTRODUCTION

Disposal of household waste in rivers or lakes leads to declining water quality and ultimately to a more significant impact on water pollution. Although the problem of waste disposal occurs frequently, it has not yet been solved despite various alternative measures being taken in different places. Many countries have spent a lot of money to control this problem, such as protecting greenery and polluted rivers. On the other hand, the creation of an automated vehicle is one of the community's efforts to collect garbage that has not accumulated in water reservoirs. Commonly referred to as the Water Garbage Collector WTC, it has three main components, the Hull, the Power System and the

NGC (Navigation Guide and Control) system that help this collector clean the water surface.

II.LITERATURE SURVEY

a. Design and prototype development of portable trash collector

Author Abdullah, MohdAzizudin and Endut introduced the trash collector boats are often designed in large size to cater to the high trash loading for surface water cleaning purpose. For small streams and drainage, the manual cleaning method is often used.

b. Theory of materials for solar energy conversion
Martsinovich implemented this solution to these materials for solar energy conversion. Solar energy is one such renewable resource, and nature uses it through the process of photosynthesis. The project is aimed at purifying the environment, especially swimming pools, using renewable energy to make the sun a more efficient source of energy.

c. Automatic Trash Removal System in Water Bodies

Parakash and Markose proposed a disposal of household waste in rivers or lakes can lead to a decline in water quality and ultimately a significant impact on water pollution.

III.BLOCK DIAGRAM AND SYSTEM ANALYSIS

The block diagram describes the power supply is directly connected to the keypad; The Keypads are widely used input devices being used in various electronics and embedded projects. The keypad in the system consists of four switches used for controlling the direction of the floating machine.

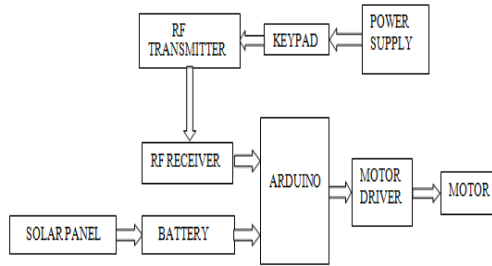


Figure 1: Block diagram of system

Switch 1 is used to move forward. Switch 2 is used for reverse movement. For moving in left and right directions switch 3 and switch 4 is used. The whole remote system is working with the help of 5V battery power supply. The RF transmitter sends signals to the RF receiver. The RF transmitter and receiver pair are used for wireless communication. The wireless data transmission is done using Radio Frequency signals that are modulated using Amplitude Shift Keying (ASK) Modulation technique.

IV.COMPONENTS

1. **Arduino Board:** The Atmega328 is a very popular microcontroller chip produced by Atmel. It is an 8-bit microcontroller that has 32K of flash memory, 1K of EEPROM, and 2K of internal SRAM.
2. **Battery:** A battery is a device in which chemical energy is directly converted to electrical energy. It consists of one or more voltaic cells, each of which is composed of two half cells connected in series by the conductive electrolyte. It consists of one or more voltaic cells in series.
3. **Motor Driver Board:** The L293D is a common motor drive or motor driver IC that allows the DC motor to run in any direction. The L293D is a 16-pin IC that can control the assembly of two DC motors simultaneously in any direction.
4. **DC Motor:** A DC motor is an electric motor that converts electrical energy into mechanical energy. In a DC motor, the input electrical energy is the direct current that is converted into mechanical rotation.
5. **RF Transmitter:** Whenever a high output pulse is applied to the base of transistor BF 494, the transistor conducts, so the tank circuit oscillates. The tank circuit consists of L2 and C4 which generate 433 MHz carrier signal.

6. **RF Receiver:** The RF receiver is used to receive encrypted data transmitted by the RF transmitter. The data obtained is then fed to a transistor that acts as an amplifier.
7. **Solar Panel:** A solar panel consists of several photovoltaic cells that cannot generate electricity by photovoltaic effect. This energy is used to charge the batteries. Solar output is provided for DC regulators.

V.WORKING PRINCIPLES

The main aim is to introduce the use of non-conventional energy source (solar) to run the garbage collection equipment. Our system takes the waste by using filter mechanism and throws it in a chamber situated at the back. The water wheel is bolted onto the shaft, which is placed on the base frame. The purpose of the water wheel is to move the machine forward or backward in the water. The motor is used to rotate the water wheel with the help of a chain drive mechanism. This motor also powers the collecting waste by using the filter. Finally, the floating waste is collected by the bin which is placed inside the boat.

VI.HARDWARE SETUP

Therefore, the implementation of Solar Water Trash Collector is designed for the purpose of minimizing manpower and for the convenience of the people.

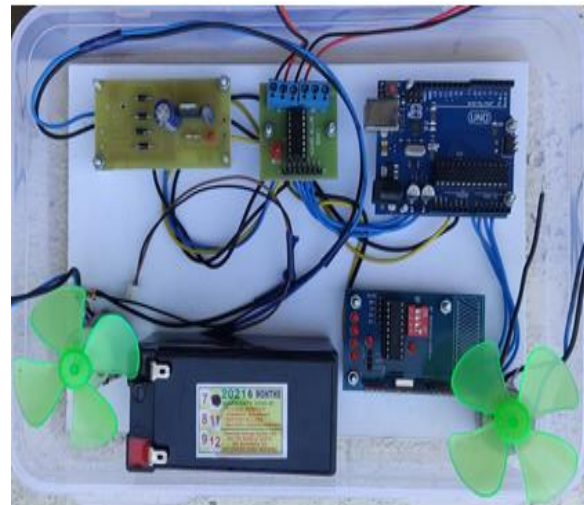


Figure 2: Hardware setup diagram for water trash collector

VII.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.

VIII.APPLICATIONS

- This applies to water pollution in rivers and ponds.
- To keep the water bodies clean, it is useful to remove any sediments that may be present.
- In this Pandemic situation, it's much better to avoid contact with patients, so we can modify and use this system in hospitals as well to collect medical waste.
- These are often used for correct treatment of sewage also on avoid blockage of drains.

IX.CONCLUSION

This project design and analysis of river water treatment plant was based on research in literature and various journals and papers and was fabricated accordingly, so it will provide flexibility in operation. This invention is easy and has a lot of space to grow at low cost and high economy. The project is a "solar powered floating water garbage collector" designed in the hope that it will be more economical and help clean the river and pond. It is very cheap and very useful to the society in terms of designing it and estimating cost and availability.

X.FUTURE SCOPE

Currently the world is facing a huge problem of garbage accumulation. Also, it is growing at a tremendous rate, so it is very difficult to clean up all of this floating debris because it requires a lot of people. Therefore, in the future this remote powered floating river cleaning machine is more likely to automatically remove large amounts of debris as quickly as possible. It is also used to automatically remove debris from beaches by making changes to the machine.

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