



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798




INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 9, September 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379

 9940 572 462

 6381 907 438

 ijircce@gmail.com

 www.ijircce.com

Solar Powered Water Trash Collector

Approved by KSCST (46S_BE_4838)

Bhagya S R^[1], Bindu B A^[2], Nikhil P Tarikoppa^[3], Soumya K^[4], Savithri G R^[5]

Students, Department of Electronics and Communication Engineering, Bapuji Institute of Engineering and Technology,
Davangere, India^{[1],[2],[3],[4]}

Assistant professor, Department of Electronics and Communication Engineering, Bapuji Institute of Engineering and
Technology, Davangere, India^[5]

ABSTRACT: For the last two decades all urban water bodies in India are suffering because of pollution and they are used for disposing untreated local sewages and solid waste. Most of garbage are dumped or just thrown in lakes, river or other water bodies. By taking this into consideration this project is designed, analyzed and implemented to collect floating debris from water bodies. The main aim of this project is to reduce man power and time consumption for cleaning the river. The water trash collector is used to collect many types of wastes from water bodies and also reduces human interference.

KEYWORDS—Solar Panel, GPS, GSM, Bluetooth

I. INTRODUCTION

Water is an important natural resource vital for all forms of life on this planet. Despite being blessed with an enormous amount of water, water pollution is a major crisis in many countries. As earth's population continues to grow, people are putting ever-increasing pressure on the planet's water resources. This is the important issue for the human society that the water required for each and every motive to the human being must be safe, clean and without pollution. But the lack of the equipment and the amount of time and labour charge used to maintain and clean public water places are huge and more difficult to make river pollution free for this motive the river cleaning system is designed. Floating bottles, plastic bags and even toys have become a part of the marine environment in recent times. More than 70% of the fresh water in liquid form of our country is converted into being unfit for consumption. So that it is important to maintain the cleanliness of water. Almost every river system in India is now polluted to a considerable extent. As assessed by the scientists of the National Environmental Engineering Research Institute (NEERI) Nagpur, nearly 70% of water in India is polluted. This project helps to get rid of pollution of water bodies thereby reduces scarcity of clean water. Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids, and gases from water. 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. 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 WTC (Water Garbage Collector), it has three main components, the Hull, the Power System and the NGC (Navigation Guide and Control) system that help this collector to clean the water surface.

II. LITERATURE REVIEW

a. Solar Powered Floating Water Trash Collector.

Authors Dr. Poornima, Dr. Sathish Kumar T, Veeramani, Karuppanasamy, Rameshkumar, Jothi mani, Mahendran have implemented water trash collector which can be controlled using an RF transmitter and receiver. 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 off in easy ways.

b. Design of Solar Power Water Trash Collector

Authors Shalini Ajay Singh, Priyanka Sunil Ambre, Prof. Neha Rai, Prof. Jayesh Rane have designed an automated system for river cleaning. The outcomes of system performance were found that the conveyor belt can collect the garbage from the river for ex. glass bottles, plastic waste on the surface of the river. This work emphasis on design

and analysis of the floating waste collector machine. The system is basically a boat kind of thing which will float to various corners of the water body, and floating wastes present in the water. They are using solar power as a main power source, thus by using alternate source of energy and recycling of water this machine helps in eliminating the floating wastes present in the water.

c. Arduino Based Bluetooth Controlled Robot

Authors Subankar Roy, TashiRapden Wangchuk, Rajesh Bhatt have designed a bluetooth controlled robot where the authors have designed the latest inverted ROBOT which can be controlling using an app for android mobile and in which we use bluetooth communication to interface Arduino UNO and android. Arduino can be interfaced to the bluetooth module though UART protocol. According to commands received from android the robot motion can be controlled.

d. Surface Water Garbage Collector

Authors Sakshi Kannav, Siddharth Karambelkar, Shreyas Karanjkar, Sudaman Katti, Rashi Khabiya, Prof. Dr. Umesh Chavan have designed an automated system to tackle the problem of water waste removal. Lake cleaning robot system for removing the surface wastes is experimented in this work. In this project the authors have used solid works and Proteus software to model and build Arduino circuit for their water collector bot. It will collect the waste from the surface of water and dump it into the tub placed behind it. With the use of motors the bot and collectors will have to & fro movement.

III. PROPOSED SCHEME

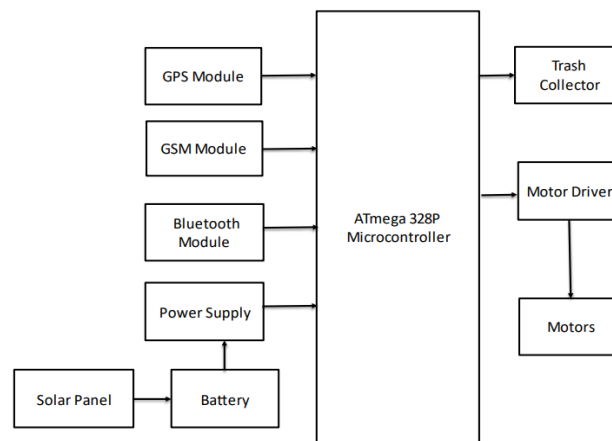


Fig 1. Block Diagram

The collector is controlled by the ATmega 328p microcontroller (Arduino). GPS module is used to know the location of the collector whenever required. GSM module is used for wireless control and used to send and receive SMS messages. The water trash collector movement is controlled through bluetooth app. Bluetooth module is used for communication between the collector and mobile device. The power supply provided to the water trash collector is via battery, and solar panels are used to charge the battery. The motor driver is used to drive dc motors in desired direction. The floating water debris is collected through the net attached at end of the collector.

IV. METHODOLOGY

Trash collector as shown in Fig 1 is a solar powered device which can be charged through the solar panels and battery is also provided as alternative source of energy. The code provided is for the equipment that is equipped with GPS and GSM modules to track its location and send the location information via SMS to a specific mobile number. Additionally, the collector can be controlled via serial commands sent through the Arduino Serial Monitor or any other serial communication software. The equipment is powered by an Arduino board and is connected to two DC motors (EN1 and EN2) that control its movement, and four input pins (IN1, IN2, IN3, and IN4) that determine the direction of the motors. The equipment speed is controlled by a variable called "speed". The GPS module used is the NEO-6M,

which is connected to the Arduino board through a software serial port. The location information obtained from the GPS module is stored in the variables "lat" and "lng". The GSM module used is connected to the Arduino board through a software serial port and is used to send SMS messages. The mobile number to which the SMS message is sent is specified in the function "Send Message ()". The equipment can be controlled using the following serial commands: A: This command sends an SMS message to the specified mobile number with the collector's location. F: This command moves the collector forward. L: This command turns the collector left. R: This command turns the collector right. B: This command moves the collector backward. The collector is also equipped with two input switches: Switch1 and Switch2. Switch1 is a shock button that can be used to trigger an emergency alarm, and Switch2 is an emergency button that can be used to stop the collector movement immediately. When the shock button is pressed, the collector stops and sends an SMS message to the specified mobile number with the collector's location information. When the emergency button is pressed, the collector's motors are stopped immediately, and the collector can only be restarted by sending a serial command to move the collector in any direction. In summary, trash collector is a GPS and GSM enabled device that can be controlled via serial commands, and it can also send location information via SMS in case of an emergency.

V. FLOW CHART

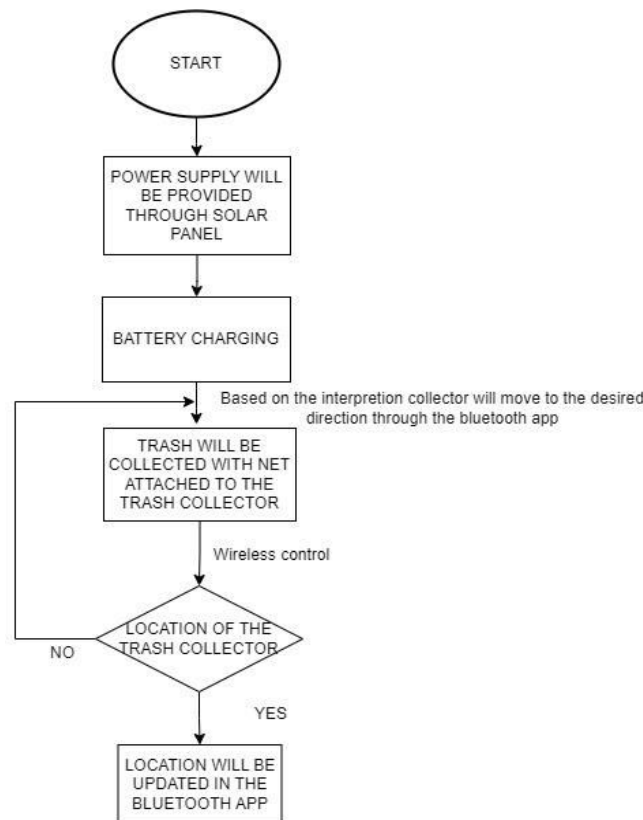


Fig 2. Flowchart

The above Fig 2 shows the flow chart of the working of the solar powered water trash collector. The Solar panels will convert solar energy into electrical energy by using photovoltaic cells, the energy generated is used to charge up the battery. Bluetooth app is used to provide the direction to the trash collector and it is also used to know the location of the collector whenever required. Based on the interpretation the collector will move to the desired location and the trash will be collected in the net attached to it. Through the Bluetooth app the location of the collector can be know if required.

VI. RESULTS



Fig 3. Solar Panel



Fig 4. GSM Module

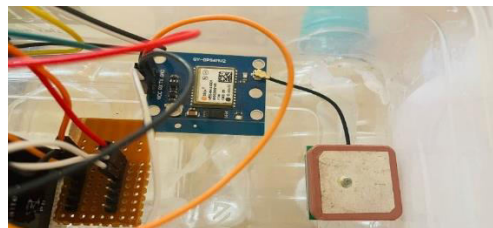


Fig 5. GPS Module

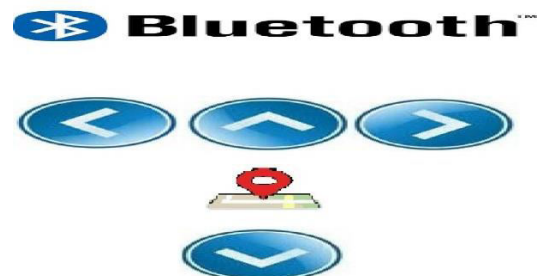


Fig 6. Screenshot of bluetooth app (wheel4).

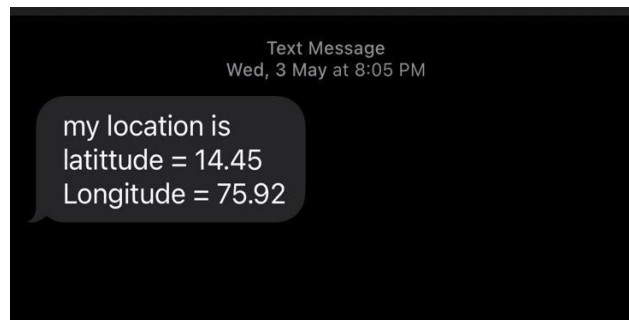


Fig 7. Screenshot of received message.

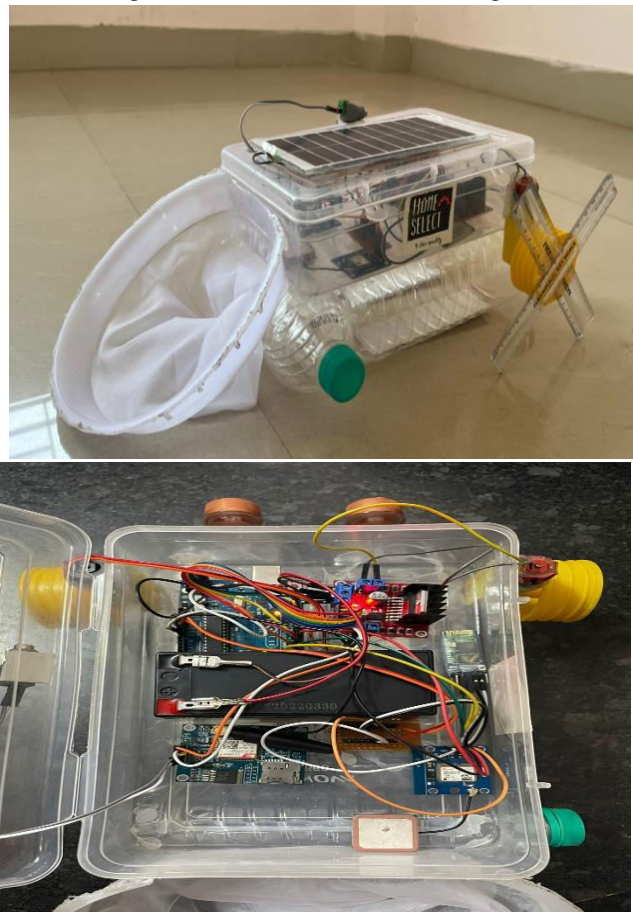


Fig 8. Overview of project and circuit model.

- Fig 3 shows the solar panel through which power supply will be provided to the collector.
- Fig 4 shows the GSM module to which sim will be inserted and to send the message of GPS location of a collector using GPS module as shown in fig 5.
- Fig 6 shows screenshot of Bluetooth app through which collector's locomotion can be controlled.
- Fig 7 shows screenshot of received message about the location of the collector requested through Bluetooth app.
- Fig 8 shows the complete project and circuit model of the collector which collects the floating waste through the net attached at the front of collector when the collector moves in the desired direction.

VII. APPLICATIONS

- It can be used to reduce the sewage waste.
- It can be used in swimming pools.
- It used in fisheries to collect the dead fishes.
- It can be used on land for garbage cleaning by removing the scales attached to the wheels.

VIII. ADVANTAGES

- It is a non-conventional trash cleaning system.
- This requires less manpower.
- Skilled worker not required to drive the system.
- Environmental friendly system.
- Easy in operation.

IX. CONCLUSION

This project is an eco-friendly approach to maintain the cleanliness of the water bodies. This is often easy to operate and the price of maintenance is low. Hence this project is designed such that it is considerably economical and helpful to get rid of water impurities like plastics, trashes, water debris which will be floating on the surface of water bodies. This project is very useful in maintaining human health and lifetime of aquatic animals.

REFERENCES

- [1]. Dr. Poornima, Dr. Sathish Kumar T, Veeramani, Karuppanasamy, Rameshkumar, Jothimani, Mahendran, “Solar Powered Floating Water Trash Collector”, International Journal of Innovative Research in Technology (IJIRT), Volume 8, Issue 8, ISSN: 2349-6002, January 2022.
- [2]. Shalini Ajay Singh, Priyanka Sunil Ambre, Prof. Neha Rai, Prof. Jayesh Rane, “Design of Solar Power Water Trash Collector”, International Journal of Research in Engineering and Science (IJRES), Volume 10, Issue 06, ISSN: 2320-9356, pp. 454-459, 2022.
- [3]. Subankar Roy, TashiRapden Wangchuk, Rajesh Bhatt, “Arduino Based Bluetooth Controlled Robot”, International Journal of Engineering Trends and Technology (IJETT), Volume 32, Number 5, ISSN: 2231-5381, February 2016.
- [4]. Sakshi Kannav, Siddharth Karambelkar, Shreyas Karanjkar, Sudaman Katti, Rashi Khabiya, Prof. Dr. Umesh Chavan, “Surface Water Garbage Collector”, International Research Journal of Engineering and Technology (IRJET), Volume08 Issue08, e-ISSN: 2395-0056, p-ISSN: 2395- 0072, August 2021.
- [5]. S. Malavika, S. Meena, E. Indhumathi, M. Nandhini, S. Srinivasan, “Solar Operated Water Trash Collector”, International Journal of Research in Engineering, Science and Management (IJRESM), Volume 03, Issue 04, ISSN (Online): 2581-5792, April2020.
- [6]. Ms. D. Venkata Lakshmi, B. Ekthaamulya, G. Sindhu, V.S.S.S. Jayanth, “Solar Powered Water Trash Collector”, International Journal of Creative Research Thoughts (IJCRT)Volume 11, Issue 2, February 2023 ISSN: 2320-2882
- [7]. Miss. Amruta Khot, Miss. Shreya Kamble, Miss. Sanghamitra Gaikwad, Miss. Komal Chougale, Miss. Gauri Chavan, Prof. R.M. Malkar, “Solar Based River Water Garbage Collector”, International Advanced Research Journal in Science, Engineering and Technology Vol. 9, Issue 3, March 2022 | ISSN (O) 2393-8021, ISSN (P) 2394-1588
- [8]. Raja Lakshmi R. S, Roniya R, Albin Yesudasan, Rahul T, Vinitha B. Elza, “Solar Powered Floating Trash Collector with Water Purifier”, International Journal of Advance Research, Ideas and Innovations in Technology (IJARIIT) Volume 7, Issue 3 - V7I3-1515, 2021 ISSN: 2454- 132X



INNO  **SPACE**
SJIF Scientific Journal Impact Factor
Impact Factor: 8.379



ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 **9940 572 462**  **6381 907 438**  **ijircce@gmail.com**



www.ijircce.com

Scan to save the contact details