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Remote Controlled Solar Powered Water Trash Collector

B. Nazeer Ahamed[1], M. Felixnirmaldoss[2], R. Sivaperumal[3], Dr. P. Aravind[4],

UG Student, Dept. of ICE, Saranathan College of Engineering, Trichy, Tamilnadu, India[1]

UG Student, Dept. of ICE, Saranathan College of Engineering, Trichy, Tamilnadu, India[2]

UG Student, Dept. of ICE, Saranathan College of Engineering, Trichy, Tamilnadu, India[3]

Assistant Professor, Dept. of ICE, Saranathan College of Engineering, Trichy, Tamilnadu, India[4]

ABSTRACT: This paper presents a proposal for a Remote Controlled Solar Powered Water Trash Collector. As we probably are aware of all metropolitan water bodies are contaminated and they are utilized for discharging untreated sewages and solid waste. The greater part of the trash is dumped in the lake, stream of other water assets. The trash which are disposed in the water bodies like lakes, waterways, because of which the water get dirtied which we can't utilize that water for our day-by-day use and the water will likewise get squandered. To conquer this issue, we have planned a skimming robot to gather the trash which are floating on water. This task is likewise effective and work on the sun-based energy no outside power supply is required. A battery of 12v is used to store the energy which gathered by the sun-based plate, at that point this battery will utilize this put away energy to work total boat. The primary point of this idea is to decrease man power and time utilization for cleaning the stream. This paper proposes such inexpensive system. It uses personalized android application (developed using MIT app inventor), microcontroller (NodeMCU-ESP8266) and a relay board of 4 output channels, the commands are encoded by the application and it sends the control signal to the relay board through microcontroller. Finally, the system is connected to a Wi-Fi network which makes the system as Internet of Things (IoTThe machine is fundamentally a boat kind of thing which will float on the water body to collect the light and skimming trash present in the water.

KEYWORDS*:* Trash collector, Remote Controlled Robot, IoT, Sewage, android application, Node MCU ESP 8266, Solar powered bot,firebase.

I.INTRODUCTION

Clean water is an essential requirement for every living being. yet water contamination is the most genuine ecological dangers that we face today. Our lakes and stream are progressively getting polluted. Turning around the impact of water contamination is extremely troublesome and can require a very long time to eliminate all the unsafe substances from the water. Additionally, a greater number of labour and financial plan would be needed to clean the same.

Trash is a significant issue overall consideration. This issue is seen by the associations that helps to fix this issue, like Ocean Conservancy, this is a non-benefit ecological association which is situated in Washington, D.C., United States. The association gives an account in 2013, that in the course of recent years, nearly 10 million volunteers have taken out 163 million pounds of waste from in excess of 330,000 miles of coastline and streams in 153 nations and areas. They have also stated that, at present over 10 million pounds of junk along almost 20,000 miles of coastlines were collected by more than 5lakhs individuals

The creative framework that we propose offers a remarkable and robotized approach to handle water contamination by disposing of physical work accordingly expanding proficiency and decreasing the expense and time required. The fundamental point of this skimming waste project is to collect the waste which floats on water bodies accordingly keeping the water clean thus decreasing contamination. This project being remote-operated is controlled by our smart phone. we use DC motors to plan for the directions. To make the boat self-manageable we have integrated Solar boards which would charge the battery. Wire measure net is utilized for trash collection.

II.SYSTEM MODEL

The system has 3 basic blocks they are,

1.microcontroller & relay module block

2. android application & database block

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3.android application & microcontroller block
The microcontroller act as a central control unit which controls the relay module according to the commands received from the database through mobile application

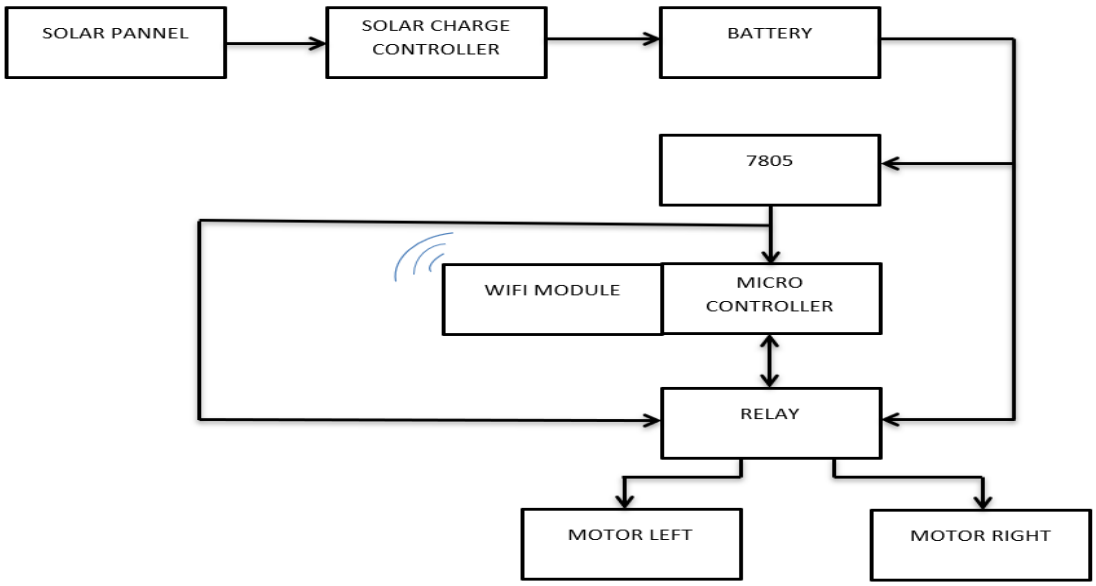

Fig.1.system block diagram

III. COMPONENTS DESCRIPTION

A. Power source:
Lithium-ion batteries are normal rechargeable batteries that are fundamentally utilized for convenient hardware, with a high energy thickness, no memory impact. The 12V 3AH Lithium-particle battery highlights with an implicit battery creation framework that keeps the battery running at peak performance and protects the cells for thousands of cycles.

B. DC Motor:
A DC motor is a class of turning electrical engines that converts direct flow electrical energy into mechanical energy. The most well-known sorts depend on the powers created by attractive fields. Practically a wide range of DC engines have some inward system, either electromechanical or electronic, to occasionally alter the course of current in piece of the engine. A 100RPM 9-volt DC motor is used in our project.

C. Voltage Regulator:
A voltage controller is a framework intended to keep a consistent voltage. A voltage controller may utilize a basic feed-forward plan or may incorporate negative feedback. It might utilize an electromechanical instrument, or electronic parts. depending upon the plan, it might be utilized to control AC or DC voltages. voltage7805 is a three terminal voltage regulator, first pin is used to give input, second pin is used for grounding purpose and third pin is used to take 5V constant output.

D. Microcontroller:
The NodeMCU (Node Microcontroller Unit) is an open-source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266 is designed and manufactured by Express, contains all crucial elements of the modern computer: CPU, RAM, networking (wi-fi), and even a modern operating system.

E. Wi-Fi module:
The ESP8266 is the name of a micro controller designed by Expressive Systems. The ESP8266 itself is a self-contained Wi-Fi networking solution offering as a bridge from existing micro controller to Wi-Fi and is also capable of running self-contained applications. This module comes with a built in USB connector and a rich assortment of pin-outs. With a

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micro-USB cable, you can connect NodeMCU devkit to your laptop and flash it without any trouble, just like Arduino. It is also immediately breadboard friendly.

IV. SOFTWARE

A. ANDROID APPLICATION

The android application is developed by using the open-source platform called MIT App Inventor.
MIT App inventor is a web application integrated development environment, initially gave by Google, and now kept up by the Massachusetts Institute of Technology (MIT). It permits newcomers to PC programming to make application software(apps) for two operating system (OS): Android (working system) |Android, and iOS, it is free and open-source programming discharged under Multi-authorizing
It utilizes a graphical UI (GUI) fundamentally the same as the programming language Scratch (programming language) and the Star Logo, which permits clients to relocate visual articles to make an application that can run on cell phones. In making App Inventor, Google drew upon critical earlier research in instructive processing, and work done inside Google on online improvement conditions.

Fig2. Application interface.

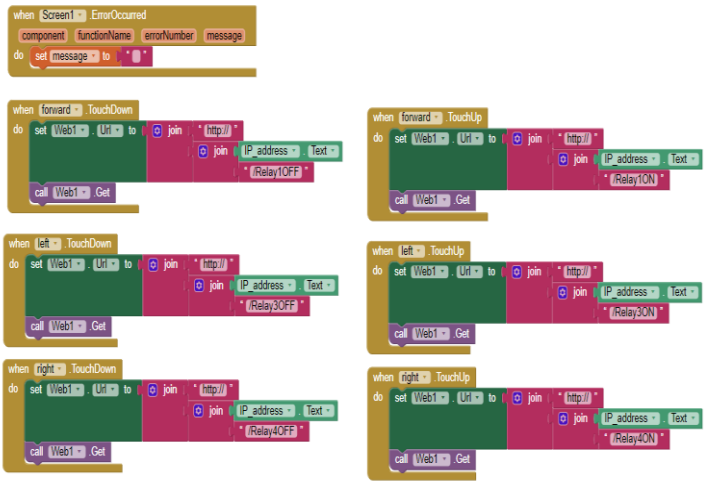

Fig3.work flow of the application.

BUTTON PRESSED	DIRECTION OF THE ROBOT
Forward button	Moves forward
Left button	Moves left
Right button	Moves right
Backward button	Moves back
No button pressed	Stop / stand still

B. Realtime database (Firebase)

A real-time database is one that stores data and brings data from it quickly. A Realtime Database is a cloud-encouraged informational index. Data is taken care of as JSON plan and synchronized continually to each connected client. Exactly when you create cross-stage applications with IOS, Android, and JavaScript SDKs, the greater part of your customers' advantage relies upon one Realtime Database case and hence getting updates with the most current data. The authentication feature in firebase let the authorised user to access their application. Firebase gives login through Gmail, GitHub, Twitter, Facebook and moreover permits the specialist to make custom approval. Database in firebase is a cloud-based informational collection and needn't waste time with SQL-based inquiries to store and get data. The data

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base is significantly reliable because it keeps the data even the connection is lost.When the buttons in application is pressed, the States of S1, S2, S3, S4 will get Changed and these signals will be Communicated with the microcontroller to act upon it.

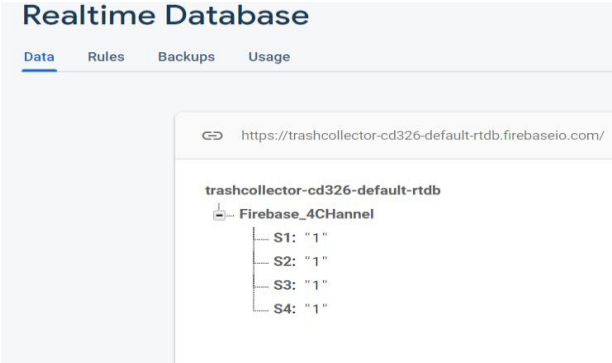

Fig 4. Realtime database console.

V. METHOLOGY

The sun ray's incident on solar panels and it converts light energy to electrical energy. This generated energy is stored into the battery, the supply is taken from battery to all electronics and electrical devices. The microcontroller is programmed to give commands to change the motion of the boat, rotation of conveyor belt etc. This boat will totally work by solar energy so no external power supply is required. The Wi-Fi module is connected to the microcontroller and can be operated by using a User Defined mobile app i.e., Wi-Fi controller app. The four motors will operate as it receives the command from Microcontroller. The Wifi is used to operate in a wide range up to 50m. A Float is used to balance the kit. This kit is also designed to clean oil spill in water for that water and oil separator is used to separate oil from water. The ultrasonic sensors will detect the obstacles using transmitting and receiving signals which send this signal to Microcontroller. Microcontroller gives command to motors and then to conveyor and propeller. Then the conveyor will start rotating which will collect the garbage through water. The conveyor belt will transfer the garbage to the garbage container. The container also consists of an ultrasonic sensor which will sense the level of garbage. As the garbage increases beyond the level it will give a signal to Microcontroller which will give command to motors to stop collecting the garbage by conveyor belt. The standby time of the battery is 2-3 hours at night. We can increase the working hours as per our requirement by increasing the size of battery.

VI. WORKING

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 forward button is pressed the state of the relay1 and relay2 will be changed to high and the robot will move forward. if the forward button is released the state of the relay1&relay2 will be changed to low, due to this the robot will stop moving. fig. 5 Realtime image of the robot. When the left button is pressed the state of the relay1 will be changed to high and the state of the relay2 will be changed to low, due to this the robot will turn towards left. When the right button is pressed the state of the relay1 will be changed to low and the state of the relay2 will be changed to high, due to this the robot will turn towards right. A mesh type container is fixed in front of the robot. When the robot moves the trash will be trapped within the mesh type container, when the container is filled with trash it can be removed from the robot and fixed again after the removal of that trash.

VII. LITERATURE REVIEW

[1]Tharini M et al(2020) proposed a paper on iot based garbage system powered with solar cell. they have utilized the Arduino and Wi-Fi module to transfer the data. solar panel is the power source of the system .one battery was used and that battery was powered by solar panel. and three ultrasonic sensors was used its used to indicate the level of the garbage. 3 steps of indication were there 25%,50%, 75%.and the information transmitted .one led was connected uses of night time visibility.

[2] C.Z Eugene et al(2019) proposed a paper on Battery powered rc boats. In this rc boat three types of motor were used (hydroplanes, monoplanes, multi-hulled) and these three are different shapes and uses in the different purposes. outrigger hydroplanes in this type were better stability in straight line it is fastest boat and calm water surface it goes in

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maximum speed. catamaran it moves all direction. Similar to hydroplane. Some components are use in the system dc motor was used to move the boat two was there (brushed and brushless) was used rubber was used to steering device. propeller was used to it's a combination of diameter, rotation speed, number of blades, pitch diameter ratio. electronic speed controller is used to connect motor and power source two type was used brushed and brushless. power source was given to the chargeable battery.

VIII. CONCLUSION

The robot proposed in this paper if effective in time-wise and cost-wise and it is Simple to deal with, and easy to understand the working basics of the robot. It doesn't need powers like petroleum or diesel to work, pollution factor is additionally diminished. The venture is planned with the view that it should be a lot of affordable, effective and supportive to waterway and lake cleaning.

The issues were recognized and concentrated with the help of the information gathered during the investigation and applying the essential information on designing for conquering the issue. At last, we have come up with a robot with a coordinated straightforward component. It is a non-conventional trash cleaning robot.by using this robot the contaminated water bodies can be cleaned with minimal amount of man as well as financial power. To make our project eco-friendly there is no utilization of fuels like petroleum and diesel can be saved due to battery worked

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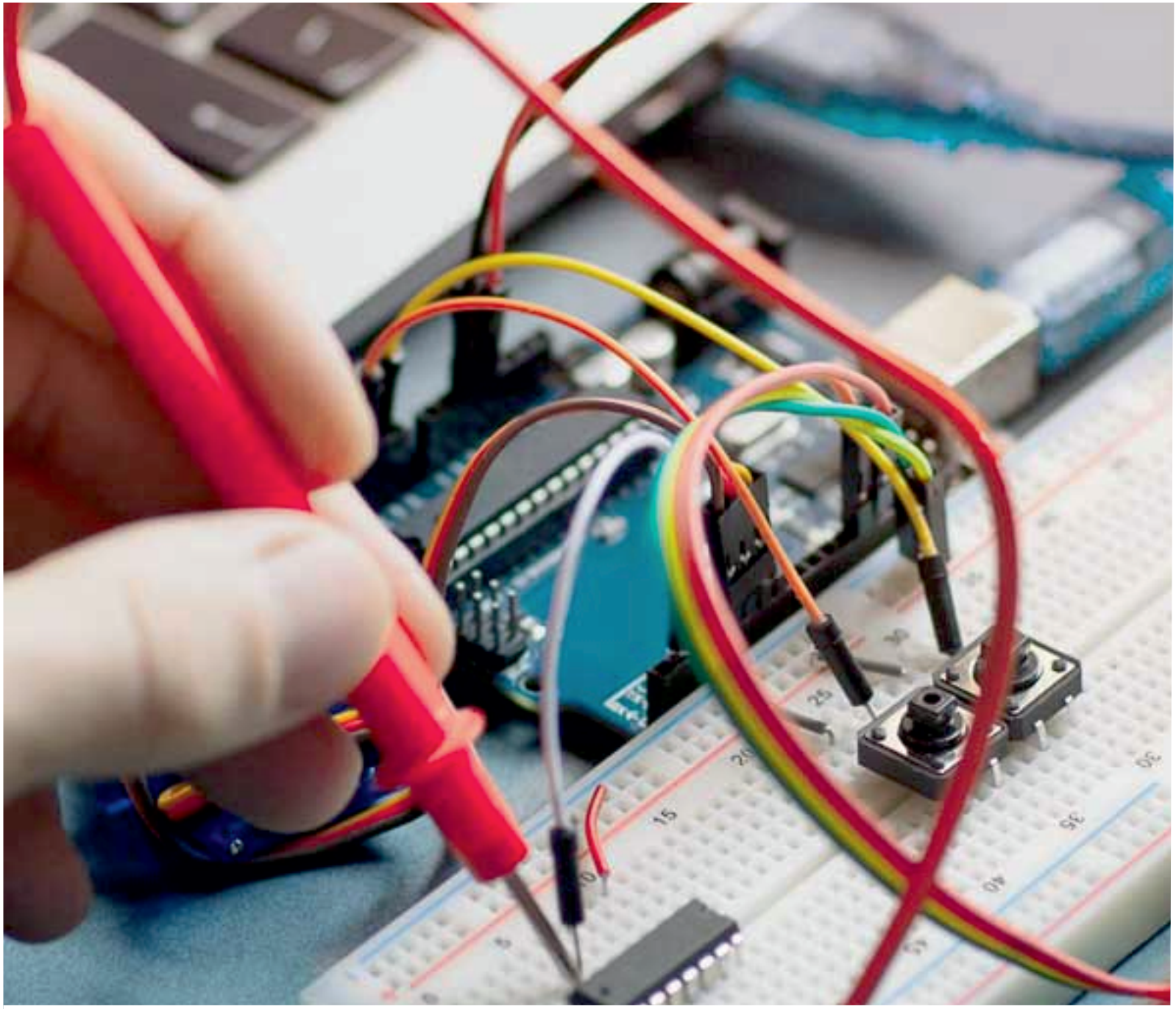

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