#### Journal) Vol-13, Issue-06, No.02, June : 2023 RIVER WASTE CLEANING ROBOT

SowmyaAramalla Electonics And Communication Engineering Sreenidhi Institute Of Science And Technology Hyderbad , India

P. Anvesh Assistant Professor, Electonics And Communication Engineering Sreenidhi Institute Of Science And Technology Hyderbad , India

**D.Rohit** Electonics And Communication Engineering Sreenidhi Institute Of Science And Technology Hyderbad, India

## Abstract:

The "River Waste Cleaning Robot" is the main emphasis of this project. Water pollution is a problem for rivers, ponds, and other bodies of water in India since it is getting worse every day. Impurities including waste water particles, plastics, and garbage floating on the water's surface make up the majority of this. In addition to harming human health, these contaminant salso shorten the lives of aquatic creatures. Since this project typically relies on renewable energy sources, non-renewable energy sources including oil, petroleum, electricity, and all kinds of mineral sources are used less frequently. In recent years, it has become rather popular to dump trash into local water bodies in the absence of waste disposal services, which has had detrimental long-term effects on both the biodiversity of the region as well as the neighborhood's atmosphere. Thus, non-renewable energy sources are reduced as a result. Therefore, individuals working in the government cleaning industry might begin using this bot for their cleaning tasks. Wireless technology that can monitor and control the entire process is used as part of the integrated system. The vessel was developed in response to the demand for cleaning contaminants in the conduits territory and to meet the requirement of working in locations other than the sea ward zone, providing more options for the use of cleaning trash and waste from the aquatic environment. This means that all remotely operated floating river cleaning equipment is more effective than traditional approaches, and that efficient and environmentally friendly energy sources are saved. Thus, this project contributes to lessening water pollution. The purpose of this remote-controlled river cleaning device is to clean river floating surfaces.

keywords- hazardous fumes, little subterranean, obstruction, waste

## **Introduction:**

This device uses DC motor-driven pushing arm mechanisms together and dispose of waste, trash, and plastic waste from water bodies. This also less ensthe issues that arise when debris collection is carried out. A device will transport the waste face patches from the water bodies, which could eventually affect in a reduction in water pollution and latterly reduce the mortality of submarine creature sasa result of these issues. It has a mechanical arm medium that pulls the waste from the water and gathers it in a robot-handed scrap

hand basket. This task will be used to remove water- related debris from our bodies from gutters, ponds, lakes, and other bodies of water. The term "waste water" refers to the in flow of spent water from homes, businesses, artificial operations, and other installations that's treated to the treatment process by a precisely planned and finagled network of pipes. The biggest effect of removing chemical wastes might lead to respirator yails, which is problematic for original government officers. Three different types of polluted water are categorized as water damage. Clean water, slate water, and black water are the three types. Smooth water is the result of adense valve or a defective water force line.

## Literature survey

Here is are view of some journal articles focusing on creating device store move floating garbage. Prof.N.G.Jogietal[1]

One of the most contaminated rivers is the Ganges in India, according to Prof. N.G. Jogi et al [1]. Toxins and almost 29crore litres of sewage are discharged into the Ganges. For removing trash from

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the lake, they recommend using a pedal-powered boat with a conveyor attached to it. This conveyor can be used to gather trash such as straws, paper bags, plastic bottles, food wrappers, and beverage cans (as well as marine debris). This approach doesn't use any fuel.

Mr.P.M.Sirsatetal[2]

Mr. P. M. Sirsat et al. [2] claimed that a machine is created to clean river water surface in compliance with river cleaning programmes like "Namami Gange," "Narmada Bachao," and many major and minor projects in various cities like Ahmadabad, Varanasi, etc. DC motors, an RF transmitter, a receiver, a propeller, PVC pipes, and a chain drive make up this machine, which also has a conveyor attached to it for the purpose of collecting waste from water sources. Additionally, it comprises of a collecting plate connected to chain and conveyor belt drives that are turned by a PMDC motor. Thrown on to the collecting panis the collected trash. The machine

is propelled along the river by a propeller and is powered by a PMDC motor. The machine's remote control uses an RF transmitter and receiver to operate all of the electrical components. This machine is simple to use, efficient from an economic stand point, and useful for cleansing water.

Sheikh Md Shahid Md Rafique and Dr.Akash Langde[3]

The remote-controlled river cleaning device was created by Sheikh Md Shahid Md Rafique and Dr.Akash Langde[3]. The motor continuously rotates the collecting plate and chain drives. To collect the garbage from the river, the collecting plate is connected to two chain drives. With the aid of the conveyer, the collected waste is dumped onto the collecting tray. The vehicle has a propeller that it uses to go along the river. Two PMDC motors are used to power the propeller. A remote control RF transmitter and receiver pair is utilised to operate the entire electrical apparatus.

M. Mohamed Idris et al[4]

The project's goal, according to M. Mohamed Idris et al.[4], is to automate the sewage cleansing process in drainage. During the cleaning procedure, a machine that consists of a chain and sprocket and is powered by a motor is used. The chain begins to circulate when the motor turns on, which causes the lifter to rise. By using lifter teeth, the trash is raised and put into a collecting bin. The waste is physically removed from the collecting bin once it is full.

Pankaj Singh Sirohi et al[5]

A river cleaning device made by Pankaj Singh Sirohi et al[5] uses a turbine-driven alternator to generate energy. The turbine starts to turn when water from the river falls on it. The alternator produces electrical energy. Through timing chain sand sprockets, this moves the vertical conveyor belt and the horizontal convey or belt. The two convey or belts are connected to one another using spur gears.

# Hardware requirements

## Arduino nano

The Arduino Nano, which was released in 2008, is a small, complete, and bread board-friendly board based on the ATmega328P. In a more portable design, it provides the same features and connectivity as the Arduino Uno board. An ATmega328P or ATmega628 microcontroller serves as the foundation of the Nano, a small Arduino board. The con-nection is the same for the Arduino UNO board. The Nano board is a microcontroller board that is adaptive, sustainable, small, and reliable. Its size is modest when compared to the UNO board. The Arduino Nano is organize dusing the Arduino(IDE), which is accessible for many systems. This phrase alludes to an Integrated Development Environment. The tools required to get our projects operating on the Arduino Nano board are the Arduino IDE and micro USB. The Arduino IDE application needs to be installed on the aforementioned laptop or desktop. The Arduino Nano board receives the code from the PC via the tiny USB.



Fig.1.arduinonano

## L293D MOTOR Driver shield

One of the finest methods for controlling DC motor, Servo motor, and Stepper motors on a single board is the L293D Motor driver shield. Four DC motors, two Servo motors, and two Stepper motors may all have their rotational direction and speed controlled. Connecting to an Arduino UNO or MEGA is simple. This shield is very useful for Arduino projects like CNC and robots. Two L293d dual-channel H-Bridge motor driver IC sanda 74HC595 shift register IC makeup this module. This extension shield hasservo motor, two DC motor, and stepper motor driving capabilities. All you have to do is connect the shield to the Mega 2560 or Uno board. In order to drive a large-current motor, you can connect an external supply for the Motor Driver Shield and the control board. It is powered by two sources: when linked to a control board, it receives power from the output of the board. The shield has an indication LED. You may turn off the shield using the switch when it's not needed, and the control board won't be affected. 6.5V to12V is the operating voltage.



Fig.2.L293D MOTOR Driver Shield

## **18650 Batteries**

Alithiumion rechargeable battery is an 18650. "18650 cell" is the correct term for them. The 18650 cell has a 3.7v voltage and a milliamp-hour capacity of between 1800 and 3500. The nominal voltage of a normal 18650 is 3.7volts, while some18650s may have a voltage range of 2.5 volts to 4.2 volts or a charging voltage of 4.2 volts. Protected and un protected are the two categories. Absolutely, we advise 18650 protected cell batteries. Protected cells have a protective circuit that prevents over charging of the cell. Without appropriate circuitry to protect the battery, unprotected cells can be overloaded, explode, and perhaps start a fire. Use the well-known LG HG2,INR, Samsung 25r, and 35e batteries only in equipment made to accommodate unprotected 18650 cells as they are UNPRO-TECTED. Additionally, we advise sticking with 18650s from premium brands. Replicas may exaggerate their large mAh(capacity). The typical charging time for 18650 batteries is 4hours. The battery type, charger voltage, and amperage can all affect how long it takes to charge a battery.

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Fig.3. 18650 battery

## **Bo motor**

DC geared motor that is BO(Battery Operated) and is light weight and efficient at lower voltages. When powered by a single Li-Ion battery, this motor can rotate at a speed of about 150 RPM. Excellent for battery-powered light robots. Battery Operated (BO) motors are a particular class of DC geared motors that may be powered by batteries. The majority of its uses are light-weight ones. available in various torque and RPM ranges Features:4.5 to 9volts in input range;

0.07 amps in current rating (maximum on load) Speed: 100RPM plus 10The BO Motor by Ansoz is used in engineering projects, science projects, robotics, Arduino programming, project design, internet of things (IoT), science exhibition, do it-yourself(DIY), embedded systems, training, experiments, and robot building. Projects for diplomas, scientific models, Raspberry Pi, apps for augmented reality and virtual reality, and other functional models. The BO Motor may also be utilized for academic, domestic, laboratory, collegiate, or other vocational courses. Light weight DC geared motor called a "Bo motor" (battery operated) that produces good torque and rpm at lower voltages. You may get bo motors with different rated speeds here. When powered by a single Li-Ion battery, this motor can rotate at a speed of around 200 rpm. Fig.3. BO MOTOR Battery-operated DC motor. Electrical energy is transformed in to mechanical energy by a dc motor. Why is a robot's motor control circuit using a DC gear motor. Gear

reduction is a DC MOTOR idea in which the vehicle's speed is decreased while its torque is increased. A DC motor is constructed using several age ararrangement. RPM stands for revolutions per minute, which is how motor speed is measured. RPM is short for revolutions per minute. The set-up assembly aids in boosting torque while lowering motor speed. This sort of DC motor may be utilised with any robot that is microcontroller based.



Fig.4.BO MOTOR

## **Bluetooth module**

A Bluetooth module called the HC-05 was created for wireless communication. This module can be setup as either a master or a slave. All devices that are periodical-capable can connect wirelessly to one another thanks to Bluetooth period-ical modules. Leg1hassix legs in total and isused to turn on the Bluetooth module for AT instructions. The module will operate in command mode if the Key/EN leg is high. In the absence of that, it is in data mode from neglect. In command mode, the HC-05's standard baudrate is 38400bps, where as in data mode, it is 9600bps. Two modes existint he HC-05 module. Data mode 1: Device-to-device communication. Command mode 2 uses AT commands to Page | 145

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(UGC Care Group I Listed Journal) Vol-13, Issue-06, No.02, June : 2023 change the HC-05'ssettings. The periodic (USART) harborage of the module is used to convey these instructions. 3. VCC Connect this leg using 3.3 or 5volts. 4.GND The module's bottom leg.5. TXD Periodic data entered wirelessly by the Bluetooth module and transmitted on the TXD leg is known as transmit periodic data. 5 RXD Accept regular data (the Bluetooth module will transmit the data wirelessly). 6. State It indicates whether or not the module is connected. Details about the HC-05 module Whether Bluetooth is active or inactive, the HC-05's red LED indicates the connection status. Before being linked to the HC-05 module, this red LED blinks continuously and desultorily. When it is with in Bluetooth range of any other device, it blinks for two seconds. This module runs on 3.3V. Since the module already has a built-in 5 to 3.3 V controller, we are also allowed to connect a 5V power supply. Since the HC-05 Bluetooth module provides a 3.3V position for RX/TX and the microcontroller can detect that value, there is no need to change the transmit position. Nevertheless, we need to switch

the transmit voltage setting on the microcontroller to the RX of the HC-05 module.



Fig.5.Bluetooth Module

## Dual Full Bridge Driver L298D

The15-lead Multi watt and Power SO 20 packages contain a massive integrated circuit called the L298. It is a high voltage, high current twin full-bridge driver made to drive inductive loads including relays, solenoids, DC motors, and stepping motors at standard TTL (Transistor-Transistor Logic)levels. To enable or disable the device independently of the input signals, there are two enable inputs available. A circuit known as an H -Bridge may drive current in either direction and is pulse width modulated. (PWM). Using pulse width modulation, one may manage.1) High working voltage, which Fig. 4. DUAL FULL BRIDGE DRIVER may reach 40volts; 2) Large output current, with a maximum instantaneous current of 3 A; 3) Rated at 25 W; 4) Two built-in H-bridge, complete bridge drivers with high voltage, huge current, an dare able to drive DC motors, stepper motors, relay coils, and other inductive loads. 5) Controlling via a common logic levelsignal.6)Capable of driving two-phase DC motors as well as four- or two-phase stepper motors. 7) Use a free wheeling diode and a high-capacity filter capacitor to prevent circuit components from being harmed by an inductive load's reverse current, increasing dependability. 8) The module may draw 5volts from the battery using the integrated stabile tube 78M05 power source. However, when the drive voltage is higher than 12volts, an additional 5 volt logic supply should be utilized to prevent damage to the 78M05 chip. 9) Logic voltage: 5V; drive voltage: 5-35 V 10) 4.2x4.2cm PCB size.

Fig.6.Dual Full Bridge Driver L298D



## Hylem sheet

Where mechanical strength, wear resistance, and resilience are more crucial than electrical insulation, hylem sheets are utilised. Typically, fabric laminates are used in gears, textiles, shuttles, bearings, Page | 146 Copyright @ 2023 Author

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pickers, bushes, and marine applications. Different grades are available to suit different purposes. Hylem sheets are utilised where mechanical strength, wear resistance, and resilience are more critical than electrical insulation. Phenolic Resin Bonded Cotton Fabric Laminates (SRBP) or cotton fabric reinforced phenoli care made of a

Continuous cotton woven fabric that has been impregnated with phenolicresin binder. They are natural in colour (light tanto brown). In addition to these names, BAKELITE sheet is sometimes referred to as Hylem sheet, Tufnol sheet, Norplex sheet, Micarta sheet, Phenolic sheet, Fabric sheet, Laminated sheet, and Synthetic Resin Bonded Fabric foundation sheet.(SRBF).



Fig.7.hylem sheet

## **Caster wheel**

Castor Wheel Designed to be mounted to the base of a larger object and used to move it, casters are non-powered wheels. Shopping carts, office chairs, hospital beds, and material handling equipment all use caster wheels. Caster wheel variants come in a broad variety and vary significantly depending on the needs of the application. With qualities like strength, corrosion resistance, water resistance, and weather resistance, it is an excellent mobility aid. Caster wheel applications require accurate size based on the surface they will be operated on and the weight they are intended to support. In order to distribute weight uniformly, larger, heavier objects may require additional wheels or casters with thicker wheels. Original caster wheel suppliers are made by skilled designers and in ventors using reliable internal manufacturing processes. We are India's most reputable and prominent caster wheel manufacturer. Our businesses value the durability, dependability, toughness, and well designed of our casters both in India and beyond. For the production of premium Caster Wheels, we consistently use high-quality raw materials.



Fig.8.caster wheel

## Software requirements Arduino ide

The Arduino software (IDE) formit smooth to record regu-laations and transfer data from a server to the board offline. We approve it for druggies accompanying weak or no cyber space networks.



Fig.9.arduino ide

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#### **Bluetooth rc controller application**

Bluetooth controller are wireless controller that connect to your Android smart phone using the Bluetooth wireless standard. Since Bluetooth is a standard feature on the majority of Android devices, Bluetooth controller may be the easiest way to improve your gaming experience on these devices. To control your new Bluetooth car, download and install this android application First enable Bluetooth and establish con-nection with BT module. Use "Help and info" button if you can not understand how it is working. Accelelometer function is under developing, use with attention.



Fig.10. Bluetooth rc controller

#### Working

A robot was employed in this design as a demonstrative tool. We've chosen a moving robot for this case. Two DC motors are located on the front and back sides of this robot. Robot direction is handed by the frontal side motor, which turns the robot to the left or right( important like a auto's steering point).The robot is driven forward and back ward by a motor on the backside. An Arduino UNO is used to control the entire system, and a Bluetooth module is utilized to accept commands from an Android phone. When the robot is turned on, a rolling distance that we mounted on it starts rolling continually. With this prototype, we can now submerge the robot in water where the rolling distance will collect the trash and push it along way to the collecting plate. As this is a non stop stir, we can use our phones to control the robot's movement and pick up rubbish at the same time as it rolls. controlled by Bluetooth The android Bluetooth smart phone app's buttons are used to control the robot's movement. We must first download the Bluetooth app from the Google Play Store in order to conduct this design. Any Bluetooth operation that supports or may communicate data may be used. Then are some names of apps that may serve duly. After installing the app, you must first open it, search for the applicable Bluetooth device, and also choose it. Also setup the keys. We utilised a Bluetooth regulator app for this design. Install Bluetooth Controller after downloading it. • Actuated mobile Bluetooth. •Launch the Bluetooth regulator programme now. •elect the asked Bluetooth device by pressing checkup Pressing the set buttons on the screen will now set the keys. To set keys, hit the" set button" and place the keys as shown in the following image •After setting the keys, click" ok. " When the forward button on the Bluetooth regulator app is touched, the robot begins to move ahead and keeps moving until the coming order is entered. When the backward button on the Bluetooth regulator app is touched, the robot begins to move in the other direction and keeps going backwards until the coming command. When we press the left wing button on the Bluetooth regulator app, the robot moves to the left and stays there till the coming command is given. In this script, the frontal motor drives the frontal bus in a left direction, while the hinder motor propels the vehicle ahead. When we press the right button on the Bluetooth regulator app, the robot begins to move in the right direction and keeps moving until the coming command is entered. In this situation, the frontal motor drives the frontal bus in the right direction while the hinder motor propels the vehicle forward. And we can halt the robot by pressing the stop button. Our prototype's bus and specifically placed floating accoutrements allow it to move easily on the water. The Android controlled robot design uses Bluetooth technology to operate a robot using an Android phone. This is a straight forward microcontroller-grounded robotics design. The robot being developed is Bluetooth-controlled. The proprietor of an Android smart phone must install an app to negotiate this. The stoner must also enable Bluetooth on their mobile device. Bluetooth technology is the wireless connection system utilised to control the robot. The stoner has access to a

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number of commands, including forward, backward, stop, move left, and move right. These instructions are transmitted to the Bluetooth receiver from the Android mobile device. The Bluetooth receiver unit on the Android-grounded robot receives the commands and transmits them to the microcontroller circuit, which controls the motors. The motor motorist ICs admit the signal from the microcontroller and use it to drive the motors.

## Diagrams



Fig.11.block diagram



Fig.12.circuit connection

## Result

Any form of drainage system may be sent by this robot. (small,medium,large). This floating rubbish may be readily gathered. This robot can keep the drain clear and un-blocked. Mosquito population growth can be slowed. Plastic waste pollution may also be eliminated. The problem off loating rubbish is especially prevalent in metropolitan areas. Due to the rubbish clogging up the region, there would likely be an overflow of drainage water in that location. Further more, the stagnant water will breed more mosquito larvae. These drainage waters will have a significant negative impact on people's health. These trash must thus be eliminated from the area for these crucial reasons. A Context: This has a boat-like mechanical mechanism with a bin to collect the rubbish. The garbage from the river is collected using hylem sheets.

B. Electrical system Here, the complete system is powered by a single DC battery. A solar panel is also included. Is employed as a back up battery. C. The system has the following benefits: It is simple to use. This system is affordable, and it's simple to rectify any issues and replace it. There is less labourin volved in this, and many lives of labourers would be saved. This machine will be portable and light, and it will useless electricity. Large amounts of trash will be gathered and supplied to recycling here. D. Usefulness: Any form of drainage system may be sent by this robot. (small, medium, large). This floating rubbish may be readily gathered. This robot can keep the drain clear and unblocked. Mosquito population growth can be slowed. Plastic waste pollution may also be eliminated.



Fig.13.outpuT

## Advantages

1. The proposed system cleans the scrap present in small and big lake and minimizes the use of energy operated scrap collector. 2. It also saves the life of submarine be a stand reduces mortal sweats needed to clean the lake. Man power is reduced due to automated tone-service. 3. It's anon conventional and eco friendly system. 4. Since it's easy in operation professed workers aren't needed. 5. Its conservation cost is low. And the main advantage of this is it doesn't need important mortal intervention. 6. The bias are 100 scalable.

Depending on the size of the swash, the strength of the current and other eventualities, it's possible to study the correct sizing for the stylish possible performance. 7. Its constant and ceaseless functionality allows it to block waste in full effectiveness and safety. 8. It's useful to remove the sediments present in swimming pool to keep it clean.

## Futurescope

The globe is currently dealing with the biggest issue, floating waste. And since there is so much of it, cleaning up all of this floating trash is quite challenging due to the increased labour demand. Therefore, in the future, this remotely controlled floating river cleaning device has more potential to quickly and autonomously remove vast amounts of rubbish. Additionally, by altering this device, it is utilized to automatically clean up trash from beaches.

## Conclusion

We can draw the conclusion that it's a creative system for reducing primer stress and latterly extremely dependably stabilizing inside the swash. The design that was carried out by us produced an emotional task for environmental purposes and it's largely salutary for small- scale systems. Indeed so, this technology is able of collecting trash from the lake with mortal backing. The design's ideal was successfully met. The purpose of the swash sanctification robotic is to clean the water patches that are floating on the lake. With the aid of our robot, we're suitable to fluently collect numerous floating wastes, including plastic bottles, bags, shops, and other debris, without the need for mortal intervention. also, our product makes a positive donation to the reduction of water pollution. The main benefit of espousing our device is the protection it offers, since it means that only one person is needed to control the robot, so that there's no threat to the stoner's life while they're drawing the lake. The product is both economically feasible and socially profitable for the workers who clean the lake. The issue of water logging brought on by plastic, paper, and essence encourages the proliferation of pests and makes conditions like malaria and typhoid more current. This poses a trouble to mortal life. The suggested approach reduces the need for energy- operated scrap collectors while drawing the trash set up in both small and large lakes. also, it helps submarine creatures live longer live sand requires smaller mortal sweats to keep the lake clean. This offer for the design and manufacture of as wash water cleaning device was inspired by literature and exploration from numerous journals and papers that are applicable to the request and are in agreement, so it'll give inflexibility in use. This fabrication design is meant to be extremely cost-effective and salutary for drawing ponds and gutters. This invention is simple, affordable, and flexible in numerous ways. It also has a good profitable value. On the base of its design, assessing value, and usability, it's veritably affordable and greatly salutary to society.

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