International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

"RIVER CLEANING ROBOT"

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ABSTRACT

This report paper deals with the idea of modification for the increasing pollution of water bodies poses a significant threat to aquatic life and human health. Manual cleaning of rivers and lakes is time-consuming, expensive, and sometimes dangerous. To address this problem, we propose a WIFI- guided river cleaning robot that can efficiently remove floating and submerged debris from water bodies. The robot is equipped with sensors and WIFI technology that enable it to navigate autonomously and locate the areas that require cleaning. The robot is designed to move in both shallow and deep waters, and its collection system can efficiently gather debris of various sizes. Our proposed solution can significantly reduce the cost and time required for cleaning water bodies while also ensuring the safety of the cleaning personnel.

KEY WORDS: Motors, Gear Motor drive, PVC Frame, conveyer belt, solar panel, etc.

INTRODUCTION

The WIFI-guided river cleaning robot is an innovative technology that uses WIFI technology to navigate and clean up waterways. It is a robotic boat that can be programmed to navigate a waterway autonomously, using WIFI to follow pre-set course and clean up any trash or debris it encounters along the way. The robot is equipped with a range of sensors and cameras that allow it to detect and identify debris, even in murky water. It can collect and store the trash it finds in its onboard storage compartment, which can be emptied and replaced as needed. The WIFI-guided river cleaning robot has several advantages over traditional methods of river cleaning. For one, it is much more efficient, as it can cover large areas of waterway quickly and easily. It also reduces the risk of injury to human workers, who would otherwise need to wade into the water to collect debris by hand. Another advantage is that the robot is environmentally friendly, as it does not emit any pollutants or chemicals into the water.

2.LITERATURE REVIEW :

Conduct a comprehensive literature review to understand the current state-of-the-art, identify gaps in knowledge, and highlight areas where your research can make a contribution.

3.FORMULAE RESEARCH :

Clearly define the objectives and goals of your research study. This helps provide direction and focus to your work.

4.METHODOLOGY:

Outline the methodology or experimental approach you will use to conduct your research Describe the materials, equipment, procedures, and data analysis techniques you will employ

Flow chart of Methodology:

- Power supply DC+5V and -12v

- DC motor driver
- PIR sensor
- Ultrasonic sensor
- Microcontroller (Anduno UNO R3 CH340G
- ATmega328
- Wheels (Boat)
- Robotic ARM
- Bluetooth model-hc05

5.DATA COLLECTION ANALYSIS :

Collect data through experiments, simulations, or other appropriate means. Analyze the data using relevant statistical or computational me
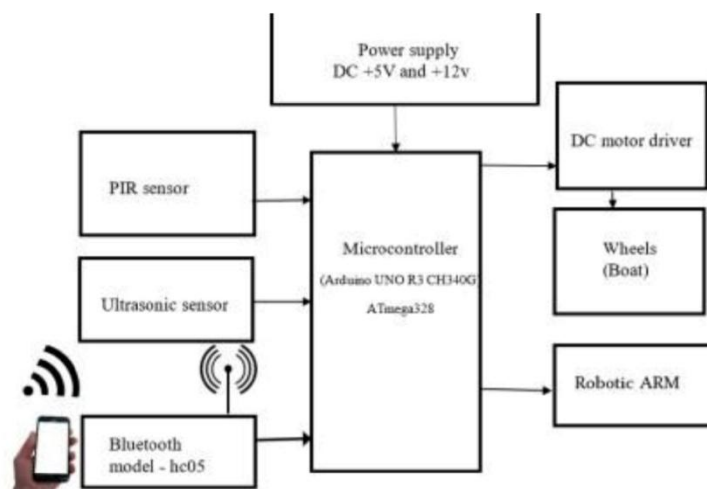
6.BLOCK DIAGRAM:

Fig. Block diagram

7.COMPONENTS :

a.BATTERY:

Battery is a device consisting of single or multiple electrochemical cells. This is used for. supplying electric power.it has two terminals: 1. Anode, which is negative terminal and 2. Cathode. which is positive terminal. The electrons travel to cathode from anode. There are two most common types of batteries: lithium-ion battery and lead acid battery.
Batteries typically come in 24V, 36V, 48V and 72V batteries. Here is another analogy: electricity is water. If it is water flowing through the wires (tubes), then higher voltage means that the water (energy) moves faster, and through a smaller tubes typical battery is 36V on most E-Bikes with some at 24V and some at 48V, the electric bike manufactures spec these because they provide a good power to cost ratio.Battery is a device consisting of single or multiple electrochemical cells. This is used for supplying

b. ROLLERS:

Bicycle rollers are a type of bicycle trainer that make it feasible to ride a bicycle indoors without moving forward. However, dissimilar to other types of bicycle trainers, rollers do not confine to the bicycle frame, and the rider must balance him or herself on the rollers while training. Bicycle rollers normally comprise of three cylinders, drums, or "rollers" (two for the rear wheel and one for the front wheel), on top of which the bicycle runs. A belt joins one of the rear rollers to the front roller. causing the front wheel of the bicycle to spin when the bicycle is pedaled. The spacing of bicycle rollers can normally be adjusted to match the bicycle's wheelbase. Generally, the front roller is adapted to be slightly ahead of the hub of the front wheel.

c. EARS:

Gears are commonly used to transmit rotational motion between machinery shafts. When gears of different types and sizes are combined, they can change the rate of rotation, the direction of the axis of rotation, and change rotary motion to linear motion.

d. SOLAR PANELS:-

A 12V solar cell is a solid state electric device that converts the energy of light directly into electricity by photo voltaic effect. Assemblies of cells used to make solar modules which are used to capture energy from sunlight are known as solar panels.Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity.A solar panel is actually a collection of solar (or photovoltaic) cells, which can he used to generate electricity through photovoltaic effect. These cells are arrangin a grid-like patternon the surface of solar panels.

e. SOLAR PANELS:

solar panels can be used for a wide variety of applications including remote power systems forcabins, telecommunications equipment, remote sensing, and of course for the production of electricity by residential and commercial solar electric systems.Solar panels increase the energy produced per module at the cost of mechanical complexity and increased need for maintenance. They sense the direction of the Sun and tilt or rotate the modules as needed for maximum exposure to the light.Alternatively, fixed racks can hold modules stationary throughout the day at a given tilt (zenithangle) and facing a given direction (azimuth angle). Tilt angles equivalent to an installation's latitude are common. Some systems may also adjust the tilt angle based on the time of year. On the other hand, east and west-facing arrays (covering an east-west facing roof, for example) are commonly deployed. Even though such installations will not produce the maximum possible average power from the individual solar panels, the cost of the panels is now usually cheaper than the tracking mechanism and they can provided more economically valuable power during morning and evening peak demands than north or south facing systems.

f. SOLAR CHARGE CONTROLLER:-

A solar charge controller is used to charge the battery from power generated bysolar panels and prevent the battery from overcharging. It is also known as a voltage or current controller as it directs the voltage and current from the solar
panels to the battery and also stops the reverse flowat night.Fig:Solar Charge Controller.
A charge controller or charge regulator is basically a voltage and/or current regulator to keep batteries from overcharging. It regulates the voltage and current coming from the solar panelsgoing to the battery. Most "12 volt" panels put out about 16 to 20 volts, so if there is no regulation the batteries will be damaged from overcharging. Most batteries need around 14 to 14.5 volts to get fully charged.

g. GEAR MOTOR:-

A device must be authorized to enable the engine crankshaft to revolve at a relatively higher speed, while the wheels turn at a slower speed. This is surrounded by a metal box called a gearbox. The Gearbox is the process of transmitting energy in a mechanical engine to increase the output torqueor to change the speed of a motor. A gearbox consists of gears of varying sizes, because of the different demands in times of the torque needed at the wheels depending upon the road. load, and terrain, for example; climbing vehicles require higher torque than driving on a straight road A motor shaft is attached to one end of the gearbox and through the internal gearbox configuration, empowers an output torque and the speed determined by the given ratio.

h. PVC FRAMES:

PVC window frames are a more modern option that is becoming increasingly popular. PVC is a man-made material that is highly durable and weather-resistant. It is also low maintenance and does not require painting or staining.

i.SWITCHES:

A switch is an electrical component that can disconnect or connect the conducting path in an electrical circuit, interrupting the electric current or diverting it from one conductor to another. The most common type of switch is an electromechanical device consisting of one or more sets of movable electrical contacts connected to external circuits. When a pair of contacts is touching current can pass between them, while when the contacts are separated no current can flow Switches are made in many different configurations; they may have multiple sets of contacts controlled by the same knob or actuator, and the contacts may operate simultaneously, sequentially, or alternately. A switch may be operated manually, for example, a light switch or a keyboard button, or may function as a sensing element to sense the position of a machine part, liquid level, pressure, or temperature, such as a thermostat. Many specialized forms exist, such as the toggle switch, rotary switch, mercury switch, push- button switch.

j. CONNECTING WIRES:

The above shows the connecting wires which is used to give the connections to the motor, battery. throttle. controller. Etc

8. FUTURE SCOPE:

The future scope of river cleaning robots is promising. With advancements in technology, these robots can become more efficient and autonomous, capable of navigating through various water conditions and removing different types of pollutants. They can also be integrated with sensors and AI to analyze water quality in real-time, providing valuable data for environmental monitoring and management. Additionally, collaboration with government agencies and environmental organizations could lead to widespread adoption and deployment of these robots, making a significant impact on river ecosystems worldwide.

The future scope of river cleaning robots encompasses several key aspects:

Technological Advancements: Future river cleaning robots will likely benefit from advancements in robotics, artificial intelligence, and materials science. This includes more efficient propulsion systems, lightweight and durable materials for construction, and sophisticated AI algorithms for navigation and pollutant detection.

Autonomy and Navigation: These robots will become increasingly autonomous, capable of navigating rivers and water bodies with greater precision and efficiency. They may utilize advanced sensors, such as LiDAR and sonar, to map their surroundings and avoid obstacles, ensuring safe and effective operation.

Pollutant Detection and Removal: Future river cleaning robots will be equipped with advanced sensors for detecting various types of pollutants, including plastics, chemicals, and organic waste. They may employ robotic arms, suction devices, or other specialized tools for removing pollutants from the water and riverbed.

Real-Time Monitoring and Analysis: Integration with AI and cloud computing technologies will enable river cleaning robots to analyze water quality data in real-time. This information can be transmitted to relevant authorities and environmental organizations, facilitating prompt action to address pollution hotspots and mitigate environmental damage.

Collaborative Efforts: Collaboration between governments, environmental organizations, and private sector stakeholders will be crucial for the widespread adoption and deployment of river cleaning robots. This includes funding support, regulatory frameworks, and partnerships for research and development.

Environmental Impact: River cleaning robots have the potential to significantly improve the health and resilience of river ecosystems. By removing pollutants and restoring water quality, they can support biodiversity, enhance recreational opportunities, and safeguard vital ecosystem services provided by rivers.

Overall, the future of river cleaning robots holds great promise for addressing the growing challenge of water pollution and promoting sustainable management of freshwater resources.

9.RESULT AND DISCUSSION:

Present your findings in a clear and concise manner. Discuss the significance of your results, their   implications, and how they contribute to the existing body of knowledge.

10. EXPERIMENTAL RESULT :

The output for a river cleaning robot typically includes data on the amount of waste collected, the efficiency of the cleaning process (e.g., time taken to clean a certain area), any obstacles encountered, and possibly data on the water quality before and after cleaning. Additionally, the robot's navigation and performance metrics may also be included, such as distance traveled, battery usage, and any technical issues encountered during operation.

11.CONCLUSIONS:

conclusion, the WIFI-guided River cleaning system is an innovative and effective solution for cleaning water bodies. The system's use of WIFI technology, sensors, and collection systems enables it to navigate autonomously and detect and gather debris efficiently. The system has numerous applications in various industries and settings, including environmental clean-up, flood management, industrial applications, recreational areas, and research and monitoring. The use of the system can significantly reduce the cost and time required for cleaning water bodies while also ensuring the safety of cleaning personnel. The WIFI guided river cleaning system is a valuable tool for preserving aquatic ecosystems and maintaining the cleanliness of water bodies, contributing to a healthier and safer environment for all. The WIFI-guided River cleaning system is an innovative solution that addresses the issue of water pollution in a safe, efficient, and cost-effective manner. The use of WIFI technology, sensors, and collection systems enables the system to detect and remove debris from water bodies autonomously, reducing the need for human intervention and ensuring the safety of cleaning personnel. The system has a wide range of applications in environmental clean-up, flood management, industrial applications, recreational areas, and research and monitoring

12.REFERENCES:

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