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SURFACE WATER GARBAGE COLLECTOR AND QUALITY MONITORING SYSTEM

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Abstract: Waste disposal in water effect the water quantity and leads to water pollution. In this article, an intelligent robotic system for water surface cleaning is developed to collect the garbage also to monitor the quality of water is proposed. The system can detect and track the floating garbage and move towards it to collect them. For collecting the garbage, a specialized arm structure is used. This work deals with, not completely cleaning an entirely polluted water resource but to prevent it from further polluted after being cleaned once. The garbage material is dumped into the tub placed behind it. Raspberry pi microprocessor is used to perform the required process. Additionally, the water quality can also be monitored in real time through web server. System movement is operated through motor driver and further controlled by propeller unit. Water environment parameters that are, Turbidity, conductivity, temperature are measured real time using turbidity sensor, Conductivity sensor temperature sensor, Respectively. And it is monitored in real time through a web server.

Keywords: Arm structure, Motor driver, Propeller unit, Turbidity sensor, Conductivity sensor, Temperature sensor, Raspberry pi, Web server.

I. INTRODUCTION

Due to the current population boom and severe flooding along several rivers, many types of trash, including foams, tree branches, and plastic scraps, are frequently discovered floating in the water in developing nations. Twigs, metal bottles, and leaves building up floating dry waste on a body of water could obstruct a city's ability to drain its water flooding is brought on by canals. Plastic waste will inevitably cause pollution. It may happen anywhere. A robot that cleans the surface of water is simple to maintain achieved if mechanical system without electronics there is automation employed. But it necessitates a lot of movement of the pedals on the washing boat. It is a large volume of waste due to its efficiency in a big area. Yet another investigation made use of conveyor systems in its waste collector layout.

In our system we propose a robotic arm structured unit for collecting the garbage from the water surface. Our system makes this project unique from other projects is that it reduces manual intervention, defines an way to cover a large area for cleaning waste in the rivers , lakes etc…

The system has the ability to locate and track floating trash, then move toward it to collect it. A specific arm construction is employed to collect the trash process. Additionally, a web server allows for real-time monitoring of the water quality. The motor driver controls system movement, which is then further managed by the propeller unit

II. LITERATURE REVIEW

Wastewater quality monitoring system utilize sensor fusion and technology acquiring skills Insights on the Sensor Fusion Technique and the Boosting-Lowest Partial Squares, a technique was being used to increase the models and make assessments of wastewater quality. Many potential uses for being able to precisely control the position of an autonomous surface vehicle (ASV) inside a nuclear storage includes pond monitoring, sensing, and removing contaminants from the pond's wall, actions that are frequently difficult or impossible due to high radiation dose rates that is unsafe or prohibitive for people. Sadly, there is yet no universal technique that allows ASVs to cross the pond at a standoff distance of a few centimeters from the wall while retaining it while sanitizing or gathering radiological data. Most of the material in this area is explains approaches for localization, mapping, and control applicable to open-water situations, operations at the boundary, where disturbances and reaction forces are, are not taken into consideration considerable, resulting in shoddy vehicle control.

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III. EXISTING SYSTEM

In 2016 a pedal operated water garbage collecting system is introduced. The garbage collector uses a pedaling mechanism. Chain transmission is used to transmit power to the propeller and conveyor. A chain joints the large sprocket wheel, fixed on the axis of pedal and the small sprocket wheel on the conveyor system. A spur gear is used for the backward movement of conveyor belt to collect the garbage. When the garbage collector moves forward, the conveyor runs backwards and collects the floating debris ahead of it when the tray is filled the operator can raise the conveyor and move the garbage collector to the bank.

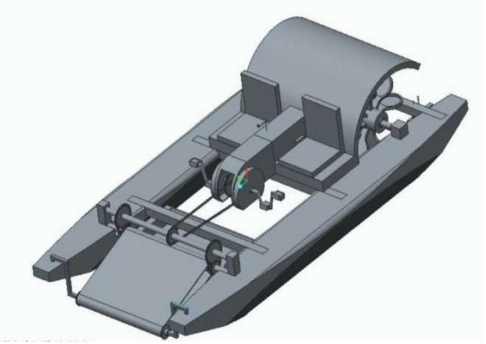

Figure III-1

An Arduino based garbage collector is a trashcan-like wireless controlled floating prototype that helps in collecting wastes in water areas. The user uses a wireless controller to control its movement on the water. With the help of the conveyor belt, it collects and lifts small floating wastes on its path and place it directly to the bin. The bin also indicates the user if it is full by sending an SMS to the user's phone.

This prototype helps in making the job of water cleaners easier by simply controlling with the joystick and wait for it to accumulate the certain amount of waste in the water rather than manually picking up the wastes one by one. This technology would make a difference in how the water areas can be cleaned without risking the health of an individual. Integrating the device's functionality with robotic capabilities that can be controlled with a slight touch of a screen or other technologies built into an Android device, allow for simple and remote control, Certain robots rely on WiFi .

Bluetooth and network connections are used to obtain the input .An instruction entered by the operator using a joystick or keyboard or the display of a phone. In this study, a movable water surface Robotic garbage collector with water propulsion feature and wireless network control

A proposed control system consists of trash collector. The purpose of the trash collector was to gather trash without the trash on the water's surface .The presentation inspection and assessment of the waste collector in terms the efficiency of manoeuvring control and garbage collection carrying capacity.

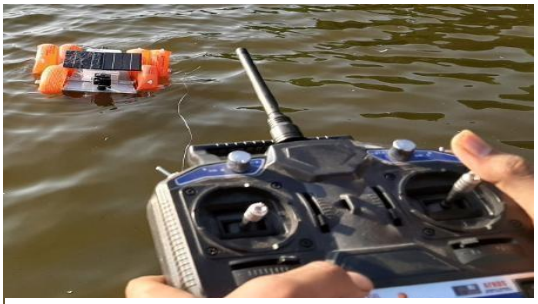

Figure III-2

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IV. PROPOSED SYSTEM

In this proposed system we developed new mechanism for collecting the garbage along with real time monitoring of the water quality.

System movement is operated through propeller unit controlled by DC motors which are driven by motor driver module .Garbage are tracked by using camera module and autonomously collecting the garbage using the robotic arm. Once the collecting chamber is filled with garbage, the corresponding information can be passed to the operator through Android application. Ultrasonic sensor is provided for the object avoiding purpose as well as to detect whether collecting chamber is filled with garbage.

Also Water environment parameters that are Turbidity, conductivity, and temperature are measured real time using turbidity sensor, Conductivity sensor and temperature sensor respectively. And it is monitored as real time through web server. All the process are controlled by the raspberry pi microprocessor.
The Raspberry Pi is a tiny computer about the size of a deck of cards. It uses what's called a system on a chip, which integrates the CPU and GPU in a single integrated circuit, with the RAM, USB ports, and other components soldered onto the board for an all-in-one package .The Raspberry Pi 4 took Pi to another level, with performance that's good enough to use in a pinch as a desktop PC, plus the ability to output 4K video at 60 Hz or power dual monitors. More recently , the Raspberry Pi 4 (8GB) model came out , offering enough RAM for serious desktop computing, productivity and database hosting.

CIRCUIT DIAGRAM

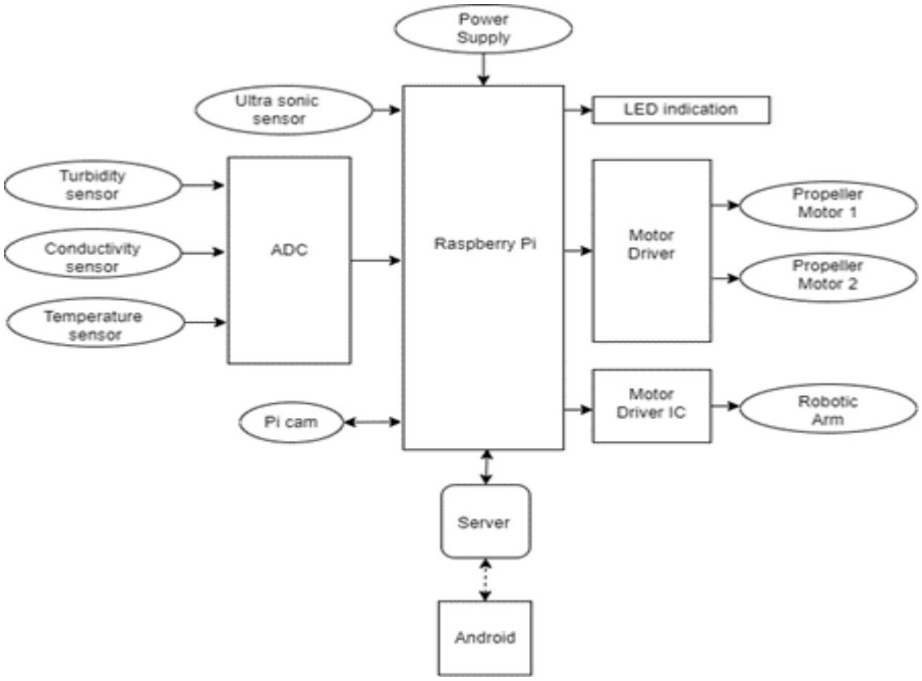

Figure VI-1

System movement is operated through propeller unit controlled by DC motors which are driven by motor driver module .Pi cam is an raspberry pi integrated cam used for the real time monitoring and video capturing which helps to observe the surface water. Water environment parameters that are Turbidity, conductivity, and temperature are measured real time using PH sensor, turbidity sensor, Conductivity sensor and temperature sensor respectively. And it is monitored as real time through web server. A specialized robotic arm structure is used here which similar to a pick and place robotic arm. Garbage are collected to the chamber through pick and place robotic arm which is controlled by servo control. Garbage are tracked by using camera module and autonomously collected using the robotic arm. Once the collecting chamber is filled with garbage, the corresponding information can be passed to the operator through Android application. Ultrasonic sensor is provided for the object avoiding purpose as well as to detect whether collecting chamber is filled with garbage.

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V. PROS AND CONS

The main pros of this system, There is no need to be manually operated. No need to filter out water content using pores. System can do continuous monitoring. Conservation and preservation of environment.
The main cons of the system is that to be recharged periodically

VI. CONCLUSION

This paper summarized the major points about SWGC especially for maintaining the Quality of the surface water. Since it is an automated system the work reduces the manpower, also project extensively focus on reducing the elemental waste in water bodies. By using this we can also monitor the quality of water using different sensors such as turbidity sensor , conductivity sensor, and temperature sensor.

VII. ACKNOWLEGEMENT

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