

Remote Controlled River Surface Cleaning Robot

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Abstract: *With the rapid increase in water pollution due to urbanization and industrial activities, maintaining the cleanliness of rivers and other water bodies has become a critical environmental challenge. Traditional manual cleaning methods are labor-intensive, inefficient, and often hazardous for workers. This paper presents the design and development of a remote-controlled river surface cleaning robot aimed at providing an effective, safe, and cost-efficient solution for the removal of floating debris. The system utilizes an ESP32 Wi-Fi microcontroller for wireless control, interfaced with motor drivers to manage propulsion and conveyor belt operations, while a 12V Li-ion battery powers the entire system. The robot's debris collection mechanism consists of a conveyor belt that efficiently gathers floating waste into a storage bin as the robot navigates the water surface. Users can control and monitor the robot's operations in real-time through a mobile application using Wi-Fi communication, offering flexibility and safety during deployment. The proposed system not only enhances operational efficiency but also aligns with global sustainability goals by contributing to environmental conservation and reducing the flow of pollutants into larger marine ecosystems. Extensive testing validates the robot's functionality under various operational conditions, demonstrating its potential as a scalable solution for water pollution management.*

Keywords: River cleaning robot, water pollution, ESP32, remote control, debris collection

