UTILIZATION OF ESP32-WROOM IN A WEB SERVER-BASED REMOTE CONTROL SYSTEM FOR A RIVER CLEANING ROBOT BOAT

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ABSTRACT

River pollution caused by plastic waste has become one of the environmental problems that requires an effective solution to support river cleaning efforts. This study aims to design a web server-based remote control system for a river-cleaning robot boat using ESP32-WROOM as the main microcontroller and ESP32-CAM for real-time monitoring. The system is controlled through a smartphone via a WiFi network, allowing users to remotely control and monitor the robot boat. The research method includes system design, prototype development, testing, and data analysis. The test results show that the system operates effectively within a range of 1–15 meters, achieving a connection success rate of 94% and an average delay ranging from 0.19 to 0.34 seconds. In addition, increasing the PWM value was proven to increase the RPM of the DC 775 motor, which affected the movement of the robot boat. Based on the results, ESP32-WROOM and ESP32-CAM are capable of supporting an effective remote control and monitoring system, enabling the robot boat to assist in river waste cleaning more efficiently.

Keywords: *ESP32-WROOM, ESP32-CAM, Web Server, Remote Control, Robot Boat.*