

ABSTRACT

Crab farming is one of the aquaculture sectors with high economic value in Indonesia. One of the main challenges in crab cultivation is maintaining stable water temperature according to the optimal growth requirements. Fluctuations in water temperature can disrupt crab metabolism, reduce growth quality, and increase mortality rates. Therefore, an automated system is required to continuously monitor and control water temperature conditions in real-time.

This research aims to design and develop an Internet of Things (IoT)-based automated water heating system using the ESP32 microcontroller, integrated with a Dallas DS18B20 water temperature sensor. The system operates by controlling heater and chiller devices through relay modules, based on predefined temperature thresholds. Sensor readings are transmitted using the MQTT protocol and displayed on a Node-RED dashboard, allowing users to monitor and adjust system operations remotely.

Testing results indicate that the system successfully maintains water temperature within the range of 16°C to 30°C and responds according to the set control parameters. The system provides both automatic and manual control modes accessible via a dashboard interface, enabling real-time observation and system operation without direct manual adjustments.

Keywords: Automated Water Heating, Crab Farming, Internet of Things (IoT), ESP32, DS18B20 Temperature Sensor, Node-RED Dashboard.