DESIGNING AND DEVELOPING IOT-BASED WATER QUALITY MONITORING AND AUTOMATIC FEEDING SYSTEM FOR NILE TILAPIA SEED PONDS

Putu Bram Adi Sanjaya
Electrical Engineering Study Program, Faculty of Science and Technology
University of Technology Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail: bramadi547@gmail.com

ABSTRACT

Nile tilapia (Oreochromis niloticus) aquaculture is a crucial sector in Indonesia's fisheries industry. The success of cultivation significantly depends on the pond's environmental quality. Fish farmers often face challenges in maintaining optimal water quality and ensuring a consistent feed supply. This study aims to design and develop an IoT-based system to monitor water conditions and provide scheduled automatic feeding for tilapia seed ponds. The system monitors parameters such as temperature, pH, feed distance, and turbidity using DS18B20, pH, ultrasonic, and turbidity sensors. An ESP32 microcontroller functions as the control center, transmitting data via the MQTT protocol to the MQTT Panel IoT platform. Automatic feeding is managed by a servo motor based on time synchronized with an NTP server, complemented by a buzzer to indicate high temperatures and an automatic pump for draining turbid water. Test results show that the system can read and transmit sensor data with over 90% accuracy, including 98.62% accuracy for the pH sensor. Through 10 test scenarios, both the hardware and software demonstrated 100% reliability.

Keywords: IoT, water quality monitoring, automatic feeding, ESP32, MQTT.