

ABSTRACT

The survival of freshwater ornamental fish is highly dependent on stable water quality, especially dissolved oxygen levels and water temperature. Poor water quality resulting from low oxygen levels and temperature fluctuations can cause stress, decreased metabolism, and even death in fish. This research aims to design an automatic monitoring and control system for dissolved oxygen levels and water temperature in an aquarium, based on the Internet of Things (IoT). The system uses the ESP32 microcontroller, a Gravity Analog Dissolved Oxygen Sensor (SKU SEN0237), a DS18B20 temperature sensor, and fuzzy logic as the basis for decision-making.

The system is designed to monitor water quality in real-time and automatically control the pump and heater devices according to the detected conditions. Monitoring data is sent to the Blynk application so that users can remotely monitor the aquarium's condition. Test results show that the DO sensor has an average error of 2.08%, while the temperature sensor has an average error of 0.3%. The system is capable of automatically controlling the pump to increase DO and regulating the heater to maintain a stable temperature. With this system, users can minimize the risk of stress on the fish and increase the efficiency of aquarium maintenance. The system is proven effective in maintaining water quality parameters within optimal limits, especially concerning dissolved oxygen and temperature.

Keywords: Aquarium, Blynk, Dissolved Oxygen, ESP32, Fuzzy Logic, IoT, Temperature.