

Improving Fish Cultivation in the Minakepis Farmers Group by Utilizing an Automatic Fish Feed System Based on Embedded Technology and the Internet of Things (IoT) with ESP32

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ABSTRACT

This study explores the improvement of fish farming in the Minakepis Farmers Group through the use of an automated fish feeding system based on embedded technology and the Internet of Things (IoT) with the ESP32. The background of this research is the problem of manual fish feeding, which is inefficient and can lead to a decline in fish quality. The objective of this study is to design and implement an automated fish feeding system that can be controlled remotely using the ESP32 to improve tilapia farming yields.

The research methods used include field observation, literature review, system design, and system testing and analysis. This system combines an ESP32 microcontroller, ultrasonic sensors, servo motors, a Real-Time Clock (RTC), a buzzer, and an I2C LCD. Data communication is carried out using the MQTT protocol, with notifications sent via Telegram.

The results show that this automated fish feeding system functions well. The system can be scheduled for feeding through the MQTT client application. The RTC sensor has a time difference from actual time with an average error of 5.00% and an accuracy of 95.00%. The MQTT communication protocol successfully monitored and controlled the system remotely through the MQTT client application. Notifications via Telegram provided real-time information. Ultrasonic sensor readings detected 18.93% of the feed quantity from all data, with an average accuracy of 81.96%. Both automatic and manual feeding tests were successful.

Keywords: *ESP32, IoT, MQTT, Automatic Fish Feed, Tilapia Cultivation.*