

***“Water Quality Monitoring and Automatic Fish Feeding System  
Based on IoT Integrated with Mobile Application”***

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***ABSTRACT***

*Conventional freshwater aquaculture often faces challenges such as inconsistent feeding schedules and delayed water quality detection. This study aims to design and test an IoT-based automated water quality monitoring (temperature, pH, turbidity) and fish feeding system integrated with a mobile application. The system utilizes the ESP32 microcontroller as the hardware control hub, along with Firebase Realtime Database and MIT App Inventor for its software architecture, complemented by Telegram notifications as an early warning system.*

*Experimental results demonstrated high sensor accuracy with minimal errors of 0.01 for the pH sensor, 0.13°C for the temperature sensor, and zero for the turbidity sensor. The average data transmission latency was 9.47 seconds via Wi-Fi and 10.00 seconds via cellular data, while the response times for manual feeding control and automated scheduling averaged 6.06 seconds and 8.18 seconds, respectively. In conclusion, this system proves to be reliable and stable in assisting farmers to monitor and automate pond management remotely, effectively preventing the risk of mass fish mortality.*

**Keywords:** *IoT, ESP32, MIT App Inventor, Water Quality, Automatic Fish Feeder.*