DESIGN AND CONSTRUCTION OF AN IOT-BASED WATER QUALITY DETECTION SYSTEM FOR ORNAMENTAL FISH AQUARIUMS WITH WATER TURBIDITY AND PH PARAMETERS

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ABSTRACT

The development of Internet of Things (IoT) technology enables real-time monitoring of ornamental fish aquarium water quality. Water quality, including turbidity and pH parameters, significantly impacts fish health. This research aims to design and implement an IoT-based water quality detection system that can automatically monitor water turbidity and pH, as well as control water changes using an automatic pump and send notifications via the Telegram application. This system uses a turbidity sensor and a pH sensor connected to an Arduino UNO and NodeMCU ESP8266 microcontroller. The Arduino UNO reads sensor data and controls the water pump via a relay. The data is then sent to the NodeMCU ESP8266 for processing and sent via the MQTT protocol to the Node-RED platform as a monitoring dashboard. If the pH exceeds the threshold, a notification is immediately sent to the user via Telegram. Test results show that the system is able to distinguish between clean and turbid water conditions with good turbidity sensor accuracy. The system successfully activates the automatic pump when turbidity exceeds 1500 NTU and sends a high pH notification (>8). The Node-RED dashboard facilitates visual and real-time data monitoring. Thus, this system can improve the effectiveness of ornamental fish care and reduce the risk of mortality due to poor water quality.

Keywords*: Internet of Things (IoT), Water Quality, Turbidity Sensor, pH Sensor, Automatic Pump.*