

## **ABSTRACT**

*The issues in the Nile tilapia fish cultivation pond can be resolved by designing a water quality monitoring and filtration control system. With the existing system, there are limitations in Nile tilapia farming, notably in time and labor efficiency. The system will be enhanced by incorporating the concept of using an aerator for Self-Maintenance. Water quality detection will be carried out by DS18B20, SEN0189, and pH-4502C, with pH and turbidity triggering the self-maintenance process. The calibration methods used for the detection components include verification method for the DS18B20 sensor, linear calibration method for the pH-4502C sensor, and classification method for the SEN0189 sensor. The hardware sub-system has been successfully operated with components functioning in accordance with the provided commands. Data transmission to the database has also been executed effectively, allowing data to be displayed in the application. This indicates the effective operation of the application sub-system. pH and turbidity levels improve after filtration and automated self-maintenance, although the frequency of self-maintenance varies depending on sensor readings. Overall, the testing results indicate that the automation system operates well and effectively, as evidenced by graphs depicting the gradual improvement of pH and turbidity levels after the system is activated.*

*Keywords: pH, Self-Maintenance, Turbidity, Water Quality.*