
Abstract

In an aquaponic system, fish as a producer of nutrients for plants must be healthy at all times. One of the important aspects affecting fish health is water temperature. Therefore, a lot of research have tried to make a control system that can stabilize the water temperature according to the conditions needed by the fish. In certain climatic conditions, extreme water temperature changes will endanger the fish health, and many control systems from the research that have been done are not responsive to extreme water temperature changes. Decision Tree Regression (DTR) forecasting can optimize temperature control, but overfitting can be occurred. The purpose of this paper is to maximize the function of the water temperature control system by implementing the Adaptive Boosting (AdaBoost) algorithm. AdaBoost algorithm can reduce overfitting in the DTR model during the learning process. To test the performance of the proposed algorithm, an IoT-based aquaculture system was built. Based on the implementation of the water temperature control system that has been done, it can be concluded that the DTR model using the AdaBoost algorithm has better performance with a mean squared error (MSE) value of 0.00454 and an R-Squared value of 0.92847, compared to a DTR model without the AdaBoost algorithm with an MSE value of 0.01211 and an R-Squared value of 0.80920, at the same max depth that is 8.

Keywords : aquaponic, water temperature forecasting, adaptive boosting, decision tree regression, internet of things
