

The Identification of *Oreochromis niloticus* Feeding Behaviour through the Integration of Photoelectric Sensor and Logistic Regression Classifier

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Abstract.

Oreochromis niloticus or tilapia is the second major freshwater aquaculture bred after catfish in Malaysia. By understanding the feeding behaviour, fish farmers will be able to identify the best feeding routine. In the present investigation, photoelectric sensors are used to identify the movement, speed and position of the fish. The signals acquired from the sensors are converted into binary data. The hunger behaviour classes are determined through k-means clustering algorithm, i.e., satiated and unsatiated. The Logistic Regression (LR) classifier was employed to classify the aforesaid hunger state. The model was trained by means of 5-fold cross-validation technique. It was shown that the LR model is able to yield a classification accuracy for tested data during the day at three different time windows (4 hours each) is 100%, 88.7% and 100%, respectively, whilst the for-night data it was shown to demonstrate 100% classification accuracy.

Keywords: Photoelectric sensor; Logistic Regression; *Oreochromis niloticus*; fish hunger behaviour