

The Identification of Hunger Behaviour of *Lates Calcarifer* Using k -Nearest Neighbour



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Abstract Fish Hunger behaviour is essential in determining the fish feeding routine, particularly for fish farmers. The inability to provide accurate feeding routines (under-feeding or over-feeding) may lead to the death of the fish and consequently inhibits the quantity of the fish produced. Moreover, the excessive food that is not consumed by the fish will be dissolved in the water and accordingly reduce the water quality through the reduction of oxygen quantity. This problem also leads to the death of the fish or even spur fish diseases. In the present study, a correlation of Barramundi fish-school behaviour with hunger condition through the hybrid data integration of image processing technique is established. The behaviour is clustered with respect to the position of the school size as well as the school density of the fish before feeding, during feeding and after feeding. The clustered fish behaviour is then classified through k -Nearest Neighbour (k -NN) learning algorithm. Three different variations of the algorithm namely, fine, medium and coarse are assessed on its ability to classify the aforementioned fish hunger behaviour. It was found from the study that the fine k -NN variation provides the best classification with an accuracy of 88%. Therefore, it could be concluded that the proposed integration technique may assist fish farmers in ascertaining fish feeding routine.

Keywords Fish feeding behaviour · k -Nearest neighbour · *Lates Calcarifer*

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