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Intelligent Fish Feeding Regime System using Vibration Analysis

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Abstract

Aquaculture represents an important food production system with high quality protein for human consumption. The contributions of aquaculture to the world's total fish production cannot be over emphasized, however, however, feeding is the major challenges facing in aquaculture system. Thus, to address this, development of intelligent fish feeding regime system based on vibration analysis is proposed in this paper. This was accomplished with the use of a novel 8-directional Chain Code generator algorithm developed for the extraction of signals from accelerometer for the escape and feeding activities. For the escape activity, x- and z-coordinate were selected, while x- and y- coordinate were chosen for the feeding behavioural activity. The choice of coordinate selects is based on the fact that escape activity exists more between x- and z- coordinate, while feeding activity more exists between x- and y- coordinate. The set of sequence features obtained was further processed using Discrete Fourier Transform in analysing the movement boundary. The results obtained shows that developed classifier using Fourier Descriptors obtained from Chain Code is more sufficient for the recognition of different movement patterns than Fourier Descriptors obtained from movement boundary.

Keywords: *Accelerometer, Aquaculture, Chain code, Feeding, Fish*

1. Introduction

Demand for aquaculture products is increases worldwide [1]. Despite the continuous increase in demand for fish consumption, the rate of fish supply to meet up with demand remain a serious challenge[2]. A sizeable fish cultivation that can meet up with the demand is expected through the vertical and horizontal extension of the aquaculture practice. This would largely depend on the fish farm management and proper aquaculture development [3]. The phenomenon of overfeeding has become predominant in aquaculture sector owning to the inefficient management of feed [4]. One of the causes of this challenge is attributed to the inefficiency handling of feeding system [5]. Feed management that can meet up with fish demand is very important for abundant income intensification. The cost of feeding fish amount to 40-50% of

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