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Decision support solution for water quality management in shrimp aquaculture.

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Declaration

I declare that this dissertation is my own work and has not been submitted in any form for another degree or diploma at any university or other institute of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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30/04/16

Date:

Dedication

To my family

With love and gratitude

Acknowledgement

I am heartily thankful to my supervisor, Mr. Chaman Wijesiriwardana for his supervision, advice and guidance from very early stage of this work till the last level as well as providing encouragements and support in various ways which enabled me to develop an understanding of this project.

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M.V.P Karunaratne

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Abstract

Aquaculture industry is one of the booming industries in today's world. Since there is an appropriate environmental condition high amount of natural resources availability, positive socio economic impact and due to the great potentials for the development of aquaculture it popular in Sri Lanka also. Still expected target is far beyond due to various reasons such as failure of the harvest, high mortality, less growth and uncertainty of the production. Researchers have found that one of the major reason for the above mentioned problems are lack of management practices in the industry.

This project focuses on water quality management one of the key area in intensive shrimp farming. As an initial step this project is dedicated to introduce automated tool for proper data collection and timely accurate decision support for non-expert users. Permanent, stable data storage to store data for future decision making process is another advantage of the project.

Given solution contains two main sections. Smart phone application and decision making module. Around 2000 past records containing water quality parameters, observations and decisions and recommendations given by expert is analyzed to identify any past pattern. K-means clustering mechanism is used to group similar cases together and merged those groups with relevant decision and recommendation. When the new case comes system uses past experience to identify the new situation and help quick decision making process. Field workers input water quality parameters and observations using mobile interface. Collected data from different ponds transfer to central database through web server. Trained system process data to produce current pond status and recommendations as an output. This will help non expert users to get immediate attention over ponds. Use cross validation for the evaluation of an algorithm .system testing is done using 500 records of current culture to test the system.

Reliable fast remote data collection and decision support system for non-expert users have been implemented and at the same time implementation contributes to bridge the Information technology gap in the field of shrimp farming



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Abbreviations	
NAQDA	National aquaculture development authority
BMP	Best management practices
CIFSRF	Canadian International Food Security Research Fund
ICT	Information communication technology
DSS	Decision support system