

**BUSITEMA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
FINAL YEAR PROJECT REPORT**

TOPIC:

**AUTOMATIC FISH TANK SOLID WASTE ACCUMULATION DETECTION
AND REMOVAL SYSTEM**

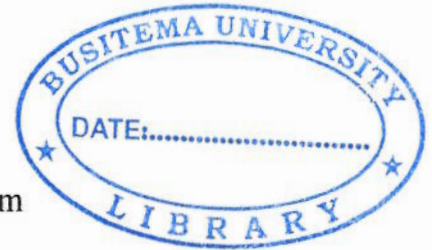
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**A project report submitted to the department of computer engineering in the
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computer engineering of Busitema University**

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DECLARATION

I NABIRIBWA ALAISAN BU/UP/2014/320 declare that this project proposal report is original and has not been published or submitted before to any university or higher institution of learning.

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APPROVAL

This Dissertation Report has been submitted with the approval of the following supervisor.

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DEDICATION

I dedicate this project report to my beloved parents Mr. Bulesa Siraje and Mrs. Kyeru Ronner for the love and support they have provided to me throughout this project period, my uncle Kafero James, brother Munyete Budala and best friend Isaac Thaabit Sempagamo for the advice and financial support they rendered to me during the research period MAY the almighty ALLAH BLESS them.

I also dedicate it to my project supervisor Mr. **Bwire Felix** for his tremendous effort and guidance in relation to my project report, the courage, and the moral & support he offered to me during my research period MAY the almighty ALLAH BLESS him.

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Special thanks to my family for their never ending financial and advisory support. May Allah reward them abundantly.

LIST OF ABBREVIATIONS

AI Artificial intelligence

FAO Food and Agriculture Organization of the United Nations

IR infra-red

LDR light dependent resistor

RAS A recirculation aquaculture system

RFID Radio Frequency Identification

WSN Wireless Sensor Networks

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ABSTRACT

Fish tank is a container which is used by fish farmers to rear fish. It can be either a plastic, metallic container or constructed with concrete. Aquaculture in Uganda is increasing due to its great benefits in terms of its products namely fish which is source of food and it being highly profitable which increases the country's economy as compared to other Agricultural practices like poultry keeping among others. However, aquaculture is normally done in places near water bodies like wetlands, lakes, rivers among others. This restrict interested farmers who live in places without water bodies to carry out this activity therefore some farmers started carrying out aquaculture in tanks to act as water body. With this method, these farmers face a challenge of solid waste accumulation which is as a result of uneaten fish feeds, dead animals in the tank and the solid particles in water. currently farmer they don't have any method they use to detect solid waste accumulation and its removal in these tanks. When solid waste accumulates it decompose and consume the oxygen which is needed by the fish which leads to death of the fish. It decomposition also produces gases which are harmful to fish. Thus death of the fish in the fish tank. This led to decrease in the country's economy and losses to the fish farmers. Therefore, am introducing an automatic fish tank which will detect the presence of solid waste accumulation and its removal automatically in order to help fish farmers to solve this problem. In this system, the Light Dependent Resistor sensor is used to detect solid waste accumulation, servo motors are used to control the open and closing of the two taps one for disposing dirt water and another to introduce clean water in the fish tank after disposing dirt water. Servo motors also controls the opening and closing of the exit from one fish tank and entrance to another fish tank, bulbs are used to provide light in the two tanks, ultrasonic sensor used to measure water level in the tank and buzzer to produce predator sound. This system will reduce the increasing losses in Agriculture mainly from the aquaculture sector.

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CHAPTER ONE: INTRODUCTION

1.0 Introduction

Aquaculture is the science, art and business of farming or cultivating fish under controlled conditions. For statistical reasons, FAO defines aquaculture as “the farming of aquatic organisms, including fish, crustaceans, mollusks and aquatic plants[1]. Aquaculture represents fish farming, one system where commercial fishes are reared in containers, ponds or tanks[2].

1.1 Background of the study

The global farming of fish and shellfish has been the fastest growing food producing sector in the last few decades and has become an important industry in many countries[3]. Introduced over the past 50 years or so, aquaculture in Africa has gone through different levels of growth. In the last two decades, dramatic growth in aquaculture production has boosted average consumption of fish and fishery products at the global level. The shift towards relatively greater consumption of farmed species compared with wild fish reached a milestone in 2014, when the farmed sector’s contribution to the supply of fish for human consumption surpassed that of wild caught fish for the first time. Aquaculture now provides half of all fish for human consumption. Fish continues to be one of the most-traded food commodities worldwide with more than half of fish exports by value originating in developing countries[4]. World aquaculture production continued to grow in 2013, reaching 97.2 million tonnes’ (live weight) with an estimated value of USD157 billion. A total of 575 aquatic species and species groups grown in freshwater, seawater and brackish water have been registered in the FAO Global Aquaculture Production statistics database. The production of farmed food fish (finfish, crustaceans, mollusks and other aquatic animals) was 70.2 million tons in 2013, up by 5.6 percent from 66.5 million tons in 2012. The production of 27 million tons of farmed aquatic plants was a 13.4 percent jump on the 23.8million tones of 2012.

Globally, inland finfish aquaculture has been the most important driver for total increase in annual output. This subsector contributed 64.9 percent to the 2003–2013 increase in world farmed food fish production [5].

The aquaculture sector in Uganda has started to grow very rapidly during recent years with the commercialization approach taken by the government. Aquaculture is now seen not only as

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