BUSITEMA UNIVERSITY
Pursuing Excellence

P.O. Box 236, Tororo, Uganda
Gen: +256 - 45 444 8838
Fax: +256 - 45 4436517
Email: info@adm.busitema.ac.ug

www.busitema.ac.ug

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT REPORT

TITLE: DESIGN OF SMART DUSTBIN.

By

BATEGEKA DANIEL (0761634215)

BU/UP/2021/0676

SUPERVISOR:

ENGINEER: ERIC KATABALWA BUTIME

Final Year Project report Submitted to the Department of Electrical and electronics Engineering as a Partial Fulfillment of the Requirements for the Award of a Diploma in electrical and electronics engineering.

ABSTRACT

Garbage in Uganda is a very serious problem and becomes a social, economic, and cultural. Almost all cities in Uganda experience problems in waste management. The highest focus is the accumulation of plastic waste. Every individual would want everything that looks clean and beautiful, one of which is environmental cleanliness. There are still many individuals who tend to be less aware of the cleanliness of their environment. This is reflected in a large amount of garbage scattered on the streets and in city parks. This situation certainly creates unrest for public facility users. Dustbins that have been provided by the sanitation department are only a mute decoration on roads that are not maintained, are not attractive and are very dirty. Maybe this is also factor that causes people not to throw garbage in the right place and the level of laziness to throw garbage is getting higher. Feeling lazy arises because the existing dustbins still use a simple method, namely by opening the lid and the dustbins are still manual. This will cause the hands to be very susceptible to bacteria from the trash. Where there is still a lot of garbage scattered about, students tend to litter, this is also caused by the waste that is very minimal, unattractive, traditional, dirty, and poorly maintained. Then for lecturers/educational staff also tends to be lazy in throwing garbage into the right place, because the location is very far from reach. In raising awareness of our concern for environmental cleanliness, we assume that there needs to be a unique way so that everyone is interested and is not lazy to throw garbage in the right place. The unique way is to design and implement a smart dustbin. This is a smart dustbin for dry trash, the lid can be opened automatically and when the trash is added, it closes automatically. The smart dustbins that we recommend are of two types, namely a mini-size smart dustbin that will be used on every work desk for lecturers/campus employees and a super-size smart dustbin for use in every room. Our research is started and applied in a small area first as a reference to support smart campuses and smart environments in welcoming the industrial revolution with a variety of information technology and machine intelligence that continues to evolve.

ACKNOWLEDGEMENT

I thank GOD for the life He has given us and for this far He has brought us in our academic journey.

I e also thank our guardians for the financial, moral and spiritual support that they have always offered to us in our academic journey.

My gratitude to supervisor Eng. Butime Eric and other lecturers for their time and efforts they have invested in guiding me throughout the process of project preparation.

DECLARATION

I BATEGEKA DANIEL of REG No. BU/U/2021/0676 declare to the best of my knowledge that this design of smart bin proposal is as result of my research efforts.

Bategeka Daniel.....

Date.....

DEDICATION.

I dedicate this project to all the individuals who strive for a cleaner and more sustainable future.

To the environmentalists and activists who tirelessly work to protect our planet, this project is dedicated to your unwavering commitment to preserving our natural resources and creating a better world for future generations

To the innovators and researchers who push the boundaries of technology and develop solutions that address environmental challenges, this project is dedicated to your groundbreaking work and visionary thinking.

To the community members who actively participate in waste management and recycling initiatives, this project is dedicated to your dedication and efforts in reducing waste and promoting sustainable practices in our daily lives.

Lastly, to our families and friends who have always supported and encouraged us, this project is dedicated to you. Your belief in our abilities and constant encouragement have been the driving force behind our success.

May this project serve as a small contribution to the collective efforts towards a greener, cleaner, and more sustainable world.

APPROVAL

I am presenting this report which has been done, read and produced under my efforts to the Department of Electrical and electronics engineering with approval from the following supervisor.

Eng. Eric Butime.....

Date and signature 31/7/2023

Contents

ABSTRACT i
ACKNOWLEDGEMENT ii
DECLARATION iii
DEDICATION. iv
APPROVAL v
CHAPTER ONE. 1
Introduction 1
Problem Statement 1
OBJECTIVES 1
Main objective. 1
Specific objectives. 1
JUSTIFICATIONS 2
SCOPE. 2
Conceptual scope 2
Geographical scope 2
Time scope. 2
CHAPTER TWO 3
LITERATURE REVIEW. 3
Existing systems. 3
Sensors used. 3
Benefits of using the smart bin project. 3
Challenges. 3
Limitations. 3
Related systems 4
CHAPTER THREE 5
Methodology. 5
Components used 5
Arduino board. 5
Arduino Cable 6
Servo Motor. 6
Description 7
Advantages of Servo Motors 7

Buzzer 8
Key specifications of buzzers 8
Led. 9
Disadvantages 9
Applications of Light Emitting Diode. 10
Resistors. 10
Color Coding 11
Resistor Color Coding 11
Battery (9v). 13
Jumper wires. 13
Types of Jumper Wires 14
Alligator clips 15
How to choose a jumper wire? 15
How to Use Jumper Wires 15
Dustbin. 16
Advantages of a dustbin. 16
Ultra-sonic sensor (2). 16
Sensor 1. 17
Sensor 2 17
Bread Board. 17
Advantages of using a breadboard. 18
Limitations of breadboards. 18
Workability 18
Software. 18
Hardware Software Selection 18
Connections. 18
Step 1 UltraSonic Sensor-1 to Arduino 18
Step 2 Ultra Sonic Sensor-2 to Arduino 19
Step 3 Servo Motor To Arduino 19
Step 4 Buzzer To Arduino 19
Step 5 Led To Arduino 19
Block Diagram 19

CHAPTER FOUR..... 20
SYSTEM IMPLEMENTATION 20
Overview of the project 20
Choice of programming language 20
System control program steps 20
Programme (Code used). 21
CHAPTER FIVE. 25
Expected results. 25
Work plan 25
Bill of Quantities. 26
References; 26

TABLE OF FIGURES.

Figure 1 Adruino Board 5
Figure 2 Adruino Cable 6
Figure 3 servo motor 7
Figure 4 Buzzer 8
Figure 5 Led Red 10
Figure 6 Resistor 11
Figure 7 color coded resistor 11
Figure 8 Band code 12
Figure 9 9v battery 13
Figure 10 female jumper wire 13
Figure 11 male female jumper wire 14
Figure 12 Durable dustbin 16
Figure 13 Ultra sonic sensor 17
Figure 14 Bread board 17
Figure 15 Block diagram 19
Figure 16 working dustbin 25
Figure 17 Work plan 25

TABLE OF TABLES

Table 1 color code 12
Table 2 Budget 26

CHAPTER ONE.

Introduction

As our world becomes increasingly urbanized, the issue of waste management has become more pressing than ever before. Traditional waste management methods are often inefficient and can lead to negative environmental impacts. Smart bins, which utilize the Internet of things technology, have emerged as a promising solution to this problem. Smart bins are equipped with sensors that can detect when they are full, and can alert the waste management when they need to be emptied. In this project, we will explore the potential of smart bins to revolutionize waste management and create a more sustainable future.

Problem Statement

The traditional method of disposing off waste involves using bins that are often overflowing causing littering and unhygienic conditions. The inefficient and unorganized waste disposal system has resulted in the pollution of the environment including air, water and soil.

The existing dustbins are not user-friendly because they can only be used by normal people and not for the person with disabilities. It is also observed that most of the people do not use dustbin for littering because they are not interested to come near the dustbin. In the conventional system of the dustbin, most of the time people don't want to touch the lid of the dustbin because of its unhygienic nature.

OBJECTIVES

Main objective.

The objective of this project is to build a touch free dustbin.

Specific objectives.

- To construct the different parts of the dustbin.
- To test and calibrate the performance of the dustbin.
- To carry out the economic evaluation of the dustbin.