FACULTY OF ENGINEERING AND TECHNOLOGY

DESIGN AND CONSTRUCTION OF A SOLID WASTE SORTING MACHINE

BY

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A final year project report submitted to the Department of water resources engineering in partial fulfillment for the award of the Bachelor of Science in water resources Engineering of Busitema University

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ABSTRACT
This report consists of the design and construction of a solid waste sorting machine which is aimed at improving on the public health and reducing environmental pollution. The machine is capable of sorting a variety of solid waste materials, such as inorganic waste like plastics, paper, metal, and organic waste. The machine is designed to be efficient and cost- effective, and its able to sort waste at a good rate. In today's society, waste detection and segregation (sorting) is an increasingly important issue due to developing technologies and rapid urbanization. There is a huge problem in waste sorting which involves manual sorting techniques which are in most cases hazardous, dangerous and effort demanding1 The machine is controlled by a computer system. The Arduino UNO is responsible for monitoring the operations of the machine by closing and opening for waste to fall of or continue to the next sensor2 . The Arduino UNO is also responsible for collecting data on the performance of the machine. The machine is a valuable asset to any waste management facility. It helps reduce the amount of solid waste that goes to the landfills and will also help conserve the environment.

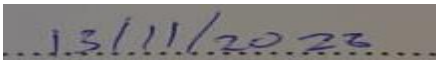
Key words: solid waste sorting, organic waste, inorganic waste, public health, environmental pollution.

DECLARATION

I NAMANYA ISAAC declare that the content in this final report is my original and has never been submitted for any award of a Degree, Certificate, or Diploma to any University or any institution of higher learning.

NAMANYA ISAAC

Signature …….

Date  …….

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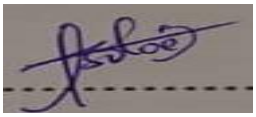
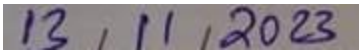
APPROVAL

This is to certify that this final project report has been done by NAMANYA ISAAC and is ready for submission with my approval.

PROJECT SUPERVISOR: MR. LUBAALE SOLOMON AZARIUS

SIGNATURE:  **……**

DATE**:**  ……

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CHAPTER ONE: INTRODUCTION

This chapter provides an introduction to the problem that this proposal aims to address. This chapter discusses the background of the problem, outlining the current state of affairs and the factors that have contributed to the problem. Then devolve into specific challenges that the problem poses and the consequences if not addressed. Finally, I objectives guiding this study are also put down setting a stage for the following chapters where suggestions to solve the problem are put.

1.1 BACKGROUND

Solid waste management has become a critical global challenge due to the rapid industrialization and urbanization, leading to a significant increase in municipal solid waste (MSW) generation. In 2016, 2.01 billion tonnes of MSW were generated globally, with projections estimating an increase to 2.59 billion tonnes by 2030 (Lu and Chen 2022). Effective waste sorting is essential for efficient MSW management, and computer vision (CV) has emerged as a promising technology for automating and improving waste sorting processes.

Rapid urbanization and industrialization are causing an unprecedented rise in the generation of municipal solid waste worldwide. Countries with relatively higher Gross domestic product tend to produce a larger quantity of municipal solid waste. Projections show the generation of municipal solid waste (Liu, Liu, and Huang 2016).

The combined solid and liquid waste from residential, commercial, and industrial sources are mentioned as public wastes and are often made up of materials created in urban areas which are unsuitable for further beneficial use, and intended to be discarded, incinerated, recycled in certain ways (Sharan and Iskander 2022). Waste arises when any person returns materials to the environment. Waste generation is part of healthy living, it becomes a threat if the systems in place are not functioning to manage it properly. In this digital world unceasing manual sorting is a tough and time-consuming process, automatic sorting and processing gives us a chance to solve this problem in different industries. Machines can complete highly monotonous tasks better than people. Automating many of the tasks in the industries may help to improve the efficiency of the manufacturing system. The purpose of this project is to design and construct a system that automatically separates biodegradable and nonbiodegradable substances.

Waste management is a serious challenge globally as population and development increase. The increased quantity of waste produced has brought up worries about environmental

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