



FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES ENGINEERING

**REDESIGN AND CONSTRUCTION OF AN AUTOMATED COIN
SORTING AND CHANGE DISPENSING SYSTEM FOR A SELF-
POWERED COIN BASED PUBLIC STAND POST.**

BY

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a partial fulfilment of the requirements for the award of a Bachelor of Science in Water
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ABSTRACT

Previous research developed a coin-operated public tap system to provide a convenient and cost-effective solution for dispensing water in public spaces, thereby promoting efficient water resource management. However, a key limitation of the existing system was its inability to return change to users, necessitating the constant presence of an operator to manually dispense change. This project aimed to address this limitation by developing an automated system capable of sorting coins and dispensing change without human intervention.

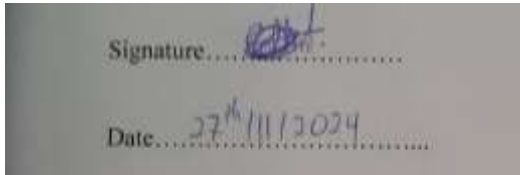
The system was designed to sort coins based on their thickness, as Ugandan shilling coins 100, 200, and 500 Ugx vary in thickness. Using a vernier caliper, the thickness of each coin was measured, and a 3D coin-sorting mechanism was designed using SolidWorks. The design was then transferred to CURA to generate G-code files for 3D printing with PLA material. The resulting coin-sorting system measured 164.1 mm in length, 7 mm in width, and 30 mm in height, with an incline of 26.6° to ensure the smooth sliding of coins after overcoming surface friction.

To facilitate the sorting process, chambers measuring 120 mm in height, and 30 mm in both length and width, were designed to receive the sorted coins. These chambers were inclined at an angle of 10° , allowing the coins to rest horizontally. The system was capable of holding up to 70 coins per chamber. The sorting efficiency was tested using a confusion matrix, and results showed that all coins were correctly sorted into their respective chambers, yielding a 100% efficiency rate.

In addition, pushing rods connected to servo motors were implemented to automatically dispense coins as change, based on the specific denomination required. The accurate dimensions used in designing both the sorting mechanism and the coin chambers were crucial in achieving the system's 100% efficiency in sorting and dispensing coins. As a result, it is recommended that precise measurements be maintained in future designs to ensure optimal performance and reliability in automated coin-sorting systems.

DECLARATION

I, NSUBUGA COLLIN MUWANGA hereby declare that all the work material portrayed in this final year project is my original work except where explicit citation has been made and it has not been presented to any Institution of higher learning for any academic award.

A photograph of a form with handwritten text. The word "Signature" is followed by a blue ink signature. Below it, the word "Date" is followed by the handwritten date "27/11/2024".

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APPROVAL

This final year project report has been submitted to the Department of Water Resources Engineering under my supervision.

for Mr. MASERUKA BENDICTO

Sign: 

Date: 25.10.2024

ACKNOWLEDGMENT

I would like to begin by expressing my deepest gratitude to the Almighty God, whose grace and provision have guided me throughout this academic journey. His strength, wisdom, and protection have enabled me to reach this significant milestone. I am forever thankful for the countless blessings He has bestowed upon me, providing all that was needed to complete this project successfully.

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LIST OF ACRONYMS

GSM	Global System Management
HT	Hyperbolic Trilateration
LCD	Liquid Crystal Display
LDR	Light Dependent Resistor
NRW	Non-Revenue Water
RFID	Radio Frequency Identification
SDG	Sustainable Development Goals
SLD	Smart liquid dispenser
WMS	Water Management System

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