BUSITEMA UNIVERSITY
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

FOREST MONITORING AND NOTIFICATION SYSTEM

BY

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DECLARATION

I Turyahebwa Victor declare that this project report has not been submitted for any award to any university or higher institution of learning.

Turyahebwa Victor

Sign .....

Date 23/01/2021

APPROVAL

The final year project report titled "Forest Monitoring and Notification System" has been submitted for examination with the approval of;

Mr. Odongtoo Godfrey

Department of computer engineering.

Signature .....

Date .....

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LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Central Forest Reserves
CO	Carbon monoxide
CO_2	Carbon dioxide
CSS	Cascading Style Sheets
DSP	Digital signal processing
EPPU	Environment Protection Police Unit
ETSI	European Telecommunications Standards Institute
FLEGT	Forest Law Enforcement Governance and Trade
GIS	Geographic Information Systems
GSM	Global System for Mobile Communications
HTML	Hypertext Markup Language
I/O	Input Output
IDE	Integrated Development Environment
IoT	Internet of Things
MWE	Ministry of Water and Environment
NDP	National Development Plan
NFA	National Forestry Authority
NFP	National Forest Plan
PHP	Hypertext Preprocessor
ppm	parts per million
UML	Unified Modelling Language

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ABSTRACT

One of the National Development Priorities is to protect and enhance forest biological diversity to provide a range of environmental, social, and economic benefits for present and future generations. Various initiatives and systems like NFA plantation development, Geographic Information System is being employed. Nonetheless, forests are being lost to widespread illegal logging, unsustainable charcoal burning and this is attributed to inefficient systems for monitoring forests.

This research has focused on developing a forest monitoring system to address the existing gaps. This system monitors the forest background noise, smoke, and carbon dioxide respectively and comprises multiple sensor nodes to form a wireless sensor network that covers the forest with a server to store the recordings and a web-based application to provide a user interface.

This system uses low-power sensors, a web application that makes it easy to monitor in real-time the forest conditions without any physical effort.

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CHAPTER 1: INTRODUCTION

This chapter presents the background, problem statement, general objective, specific objectives, justification, and project scope.

1.1 Background

A forest refers to a type of vegetation dominated by trees whose maturity is more than 5 meters tall and establishes a minimum tree canopy cover of 30%. It includes all alpine, tropical high and medium altitude forests, woodlands, wetland, and riparian forests, plantations, and trees [1].

Generations depend on forests for survival, from the air we breathe to the fuel we use. Besides providing habitats for animals and livelihoods for humans, forests also offer watershed protection, prevent soil erosion, and mitigate climate change. Uganda's forests are an important and treasured asset contributing 8.7% to the economy [2]. They provide a range of wood and non-wood products which include; charcoal, fuelwood, timber, poles, and other derivatives. These products are important in supplying the energy needs, domestic comfort, health, security, and development to people. Forests have great potential to deliver on climate mitigation goals while providing benefits to soils, air, water, biodiversity, and development [3].

In 1990, Uganda's forest cover was 4.9 million hectares (31.7% of the total land) this has reduced to 1.8 million hectares (15.2% of the total land) in 2015 translating into a loss of 3.1 million hectares (16.5% of the forest cover) in 25 years or an average annual forest loss of about 122,000 hectares. The biggest average annual forest loss was about 256,000 hectares between 2005 and 2010 during which 1,286,753 hectares were lost in just 5 years. From 2010 to 2015, a total of about 463,000 hectares were lost. This translates into an average annual loss of about 92,600 hectares per year. On the other hand, on average, only about 7,000 hectares of planted forests are established yearly in the last 15 years [2].

One of the National Development Priorities per Sustainable forest management is to protect and enhance forest biological diversity to continue providing a range of environmental, social, and economic benefits for all generations. With the Ministry of Water and Environment and the National Forestry Authority taking the lead, strides have been made in various initiatives and systems like NFA plantations development, Geographic Information Systems [4].

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