FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

WEB BASED LANDSLIDE DETECTION AND ALERT SYSTEM

By

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DECLARATION

I **LANGHO CHARLES** (BU/UP/2014/311), hereby declare that this project entitled **web based landslide detection and alert system** is entirely my own original work, except where acknowledged, and that it has not been submitted before to any other university or institution of higher learning for any academic award. I therefore take the entire responsibility of this piece of work.

Sign: …… **Date:** ……

APPROVAL

This project has been supervised and approved ready for submission by my supervisor as undersigned,

Signature: …….. DATE…….

MR. ODONGTOO GODFREY

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LIST OF ACRONYMS

GSM: Global System for Mobile communication

SMS: Short Message Service

LCD: Liquid Crystal Display

DFD: Data Flow Diagram

TX: Transmitter

RX: Receiver

WSN: Wireless Sensor Network

IT: Information Technology

SQL: Structured Query Language

PHP: Hypertext Preprocessor

ABSTRACT

This project report clearly depicts the major objective and breaks it down into specific objectives. It states how, systematically, the different objectives have been achieved. In other words, the procedures of developing the **Web based landslide detection and alert system**, explaining each from scratch.

It has reviewed the relevant literature for the project that is well referenced and the different methods that were employed in order to come up with the system. All the requirements and data collection techniques that were used are part of the report together with how the system was tested and evaluated. It contains an analysis for the system, how the system was designed, diagrammatic representations of the system such as flow chart and other important diagrams that explain how the system works and how users can use it.

The challenges that were met during this project have been clearly stated and recommendations where necessary have been made.

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1 CHAPTER ONE: INTRODUCTION

1.1 Background of study

Landslides are the gravitational movements of soil, rock down slopes that can cause several damage to the environment[1]. It is one of the most common occurring natural phenomena worldwide. Every year there is a great loss of life and property as a result of landslide[2]. Landslide occurs when the balance between a hill's weight and the countering resistance forces is tipped in favor of gravity,[3] because the force of gravity which acts to move material downhill is usually counteracted by two things that is the internal strength of the material, and the friction of the material on the slope[4], any change to the earth's surface that reduce friction increases the likelihood of landslide. The factors causing landslide include geometrical changes such as surface erosion, slope angle, geological conditions such as nature of materials(soils/rocks),surface and ground water, temperature variations, earthquakes, human causes such as deforestation, vibrations, accumulated rainfall, moisture, and pore pressure saturation in the soil, or a steep slope angle,[5] among others. The most destructive landslide in Uganda occurred on March 1, 2010 in the eastern district of Bududa which is believed to have been triggered by heavy rains[6] that the area experienced that day. When such events occur, they do not only pose a serious threat to human life and society, but also often lead to significant economic losses.

Landslide hazard prediction and management in Uganda is essentially a responsibility of minister of relief and disaster preparedness under the directorate of disaster preparedness, management and refugees[7].They use manual inspection to predict whether landslide is to occur or not which is prone to human errors. It is also clear from operations of the ministry that most of the effort in landslide hazard management as well as other disasters are mainly focusing on post disaster management rather than early warning[8].

To observe the behavior of slopes, monitoring systems have been installed or manual inspections by human experts have been conducted[5] but the limitation with manual inspections is that they are not accurate, it is time consuming and it is costly in terms of facilitating the human experts to go and observe conditions in areas which are prone to landslides.

It is therefore essential to develop systems that are able to monitor landslide hazards to reduce such disaster[9] and the early warning activities require a multi-parameter continuous monitoring Moreover, the development of such systems may also help to enhance understanding of landslide behavior[10]. Technology has to be developed to capture the

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