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DEPARTMENT OF INFORMATICS AND COMPUTER ENGINEERING

FINAL YEAR PROJECT REPORT

A SMART EMERGENCY SAFETY ALERT SYSTEM FOR THE DEAF: A CASE OF UNAD VOCATIONAL RESOURCE CENTER

BY

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A FINAL YEAR PROJECT SUBMITTED TO THE DEPARTMENT OF COMPUTER AND INFORMATICS ENGINEERING IN PARTIAL FULFILLMENT FOR THE AWARD OF BACHELOR OF SCIENCE IN COMPUTER ENGINEERING OF BUSITEMA UNIVERSITY

September, 2023

DECLARATION

I, **KIGUWA DANIEL** Registration Number **BU/UG/2019/0115** hereby declare that this final year project report is original and has not been published or submitted before to any University or higher institution of learning.

Sign.....

Date.....27th/09/2023.....

APPROVAL

This final year project under the title "**A SMART EMERGENCY SAFETY ALERT SYSTEM FOR THE DEAF**" was under my guidance and is now ready for examination.

Signature.....

Date.....27/09/2023.....

PROF. OCEN GILBERT

Department of Computer Engineering and Informatics

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DEDICATION

I dedicate this report to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of my strength throughout this project and on His wings only have I soared.

I also dedicate this report to my father Mum Miss Naigaga Aidah who has encouraged me all the way and whose encouragement has made sure that I give all it takes to finish my project. God bless you.

I also thank my uncle Mr. Kawanguzi Geoffrey Kenneth for the tireless support he has been giving me since I started school.

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ABSTRACT

Emergencies pose imminent threats to individuals and communities, necessitating effective and timely communication of critical information. For the deaf and hard of hearing population, traditional emergency alert systems often fall short, relying on auditory or visual cues that are inaccessible. To address this disparity, I present A Smart Emergency Safety Alert System for the deaf, designed to bridge the communication gap during emergencies. The system has two sub-systems, the main system containing Arduino nano, smoke, sound and temperature sensors, GSM, Power supply, push button and a watch-like wearable consisting of an LCD, Peltier plate and the DC Motor for tactile and visual alerts to the user (deaf/hard hearing person).

The GSM sends a message to the user's (deaf person) caretaker alerting him/her about the condition of the person when a push button on the main system is pressed.

LIST OF ACRONYMS

GSM Global System for Mobile Communication

ADC Analog to Digital Converter

WIFI Wireless Fidelity

LCD Liquid Crystal Display

SIM Subscriber Identity Module

IDE Integrated Development Environment

SMS Short Message Service

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

The deaf are individuals who have a hearing impairment, which can range from mild to profound. Deafness is a condition where an individual experiences partial or complete hearing loss. It can be congenital or acquired and can occur at any age[1].

Deafness can be caused by a variety of factors, including genetic mutations, illness, injury, exposure to loud noise, and ototoxic medications. Genetic factors are the most common cause of deafness, followed by illness. Injury, exposure to loud noise, and ototoxic medications are fewer common causes of deafness. It is important to note that deafness can be caused by a combination of factors. If you are concerned about your hearing, it is important to see a doctor or audiologist for a comprehensive evaluation. Early diagnosis and treatment can help to prevent or slow the progression of hearing loss[2].

Emergency alerts in public places and factories are notifications that are sent to people in these locations to warn them of impending or ongoing emergency. These alerts can be sent through a variety of channels, including public-address systems, mass notification systems (text messages, email), signage, Emergency Lights (of special colours) and in-building systems. Emergency alerts are an important tool for keeping people safe in public places and factories. However, most of these forms exclude a big percentage of deaf people.

Deafness affects millions of people worldwide, including approximately 466 million people according to the World Health Organization (WHO). In Uganda, it is estimated that about 1.5 million people (or 4% of the population) have hearing loss, with a majority of them being children[3]. The high prevalence of hearing loss in Uganda can be attributed to factors such as infections, noise exposure, and genetic factors[4].

According to Red Cross Uganda, in 2020, 12 people were reported dead due to failure to respond to emergency alerts. Of these, 8 died of weather-related disasters like floods and landslides while 4 deaths were due to other emergences like fires and explosions[5].

On 25th/October/2022 according to Reuters by Abubaker Lubowa, 12 children from Salama School Foe blind and Deaf in Luga Village Ntanzi Parish in Mukono district

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