FACULTY OF ENGINEERING AND

TECHNOLOGY

AN ULTRASOUND MOSQUITO REPELLENT SYSTEM TO AVOID MOSQUITO BITES

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Final Year Project Report Submitted to the Department of Computer and electrical Engineering in Partial Fulfillment of the Requirements for the Award of a Diploma in Electrical Engineering from Busitema University July 202

ABSTRACT

This Report is describing the design, construction and testing of an ultrasound mosquito repellent circuit that scares away mosquitoes. Mosquito repellents like coils, mats, liquid vaporizers, creams are often used at various places. However, they are prone to be fatal and can cause harm to human beings. For instance, mosquito repellent creams and oils can cause adverse effects on the skin like allergic reactions. Coils, mats can produce toxic fumes when heated and cause breathing trouble, whereas liquid vaporizers can also produce fumes when heated.

For efficient results without any side effects, the most optimum solution is building a simple electronic circuit with minimal components which can produce output of ultrasound wave so as to repel the mosquitoes. In plain words, this detailed report describes a simple mosquito repellent circuit. Human beings can hear sound in the range of 20 Hz to 20 kHz. Sound of any frequency above 20 kHz is termed as ultrasonic sound. Several animals like cats, dogs, insects, mosquitoes have the feature of being able to hear this ultrasonic sound. In mosquitoes, this feature is attributed to the presence of sensory structures in their antennae. Usually, ultrasound is transmitted by male mosquitoes and received by female mosquitoes. However, after breeding, female mosquitoes generally avoid the ultrasound and this fact can be used to produce ultrasound in a range similar to that produced by male mosquitoes and repel away the mosquitoes. The ultrasound produces a stress on the antennae of the mosquitoes and repels them away.

The aim of this report is describing the design which can produce ultrasound using simple components in the frequency range of 20 kHz to 38 kHz, which can scare away mosquitoes.

ACKNOWLEDGEMENT

I owe immeasurable debt of appreciation to the department of electrical engineering for the continued support, unreserved valuable guidance and commitment towards the development of this project proposal report in DEE department. I thank my colleagues of DEE class 2021/2022 Busitema University who were always helpful to us whenever I needed any assistance.

May God bless all of you abundantly.

DECLARATION

I ARIYO ELIJAH Reg. No BU/UP/2021/2920 hereby declare that this project report is my original work except where explicit citation has been made and has never been published and/or submitted for any other degree award to any other university or institution of higher learning for any academic award.

Sign: .....

Date: .....

APPROVAL

This is to certify that the project report entitled "**An ultrasound mosquito repellent system to avoid mosquito bites**" has been done under my supervision and is submitted to the board of examiners with my approval.

Lecturer's Name: …….

Sign: …….

Date: ……...…….

DEDICATION

I dedicate this report to my supervisor Engineer Butime Eric Katabarwa, myself and family, course mates, parents and relatives, friends, mentors and colleagues who have been supportive in all conditions during this academic journey.

LIST OF ACRONYMS

UMR- Ultrasound Mosquito Repellent

AC-Alternation Current

DC-Direct Current

Khz-Kilo Hertz

F-Farad

ITN -Insecticide Treated Mosquito Nets

IC – Integrated Circuit

IR- Infra-Red

NTDs-Mosquito transmitted diseases

UV-Ultra-violet

WHO- World Health Organization

F-Frequency

VCC- Voltage Common Collector

GND- Ground

PCB- Printed circuit board

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CHAPTER ONE: INTRODUCTION

1.1 **BACKGROUND**

Uganda's climate is largely tropical, Mosquito transmitted diseases as well as Neglected Tropical Diseases (NTDs) are predominant in Uganda.

According to WHO, Uganda has the world's highest malaria incidence rate of 478 cases per 1,000 populations per year. It is also the leading cause of sickness and death in Uganda and is responsible for up to 40 percent of all outpatient visits, 25 percent of hospital admissions and 14 percent of all hospital deaths.

Sleeping under an insecticide-treated mosquito net is the best way to prevent mosquito bites. Malaria is the most common fever in Uganda and is one of the biggest child killers.

1.2 PROBLEM STATEMENT

The current mechanisms put in place by the government are not convenient putting citizens and health workers at risk. The government through ministry of health protect children and family from Malaria by supplying and encouraging sleeping under insecticide treated mosquito nets (ITNs) every night. However, this has not fought completely mosquito bites which result into contraction of malaria in Uganda due some challenges. i.e., mosquitoes are everywhere and they can even bite during day yet you cannot be under the net every time. With this electric mosquito repellent system, it can be moved anywhere including in our cars, places of happiness such as bars, sports centers, classrooms, offices making it more convenient compared to the existing mechanism.

Cheap mosquito nets are generally made of thin material; which mosquitoes can easily pierce through. Because of the thin material of the net, there is a very good chance that you will accidentally tear it yourself. This is especially challenging when you're hanging up a cheap mosquito net.

Mosquito nets do reduce air flow to an extent and sleeping under a net is hotter than sleeping without one, which can be uncomfortable in tropical areas without air-conditioning.

Overall, the goal is to develop an electric mosquito repellent system that can provide the safety of humans by ensuring that there’s no mosquito bite using the most-safe-cost-effective way, easily implementable and portable system.

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