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FACULTY OF ENGINEERING
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HOME LASER SECURITY SYSTEM

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DECLARATION

We, Wamandu Rogers and Ssekyewa Tonny hereby declare that this report is as result of our own effort except for quotes as cited in the references.

Signature:

Wamandu Rogers: Date:

Ssekyewa Tonny: Date:

APPROVAL

This is to certify that this final year project report under the title “Home laser security system” has been done under my supervision and is now ready for examination.

Signature

Date:

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DEDICATION

We dedicate our report to our Supervisor and our classmates for their continued moral and academic support.

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LIST OF ABBREVIATIONS

GSM	Global Systems for Mobile communication
LED	Light Emitting Diode
LDR	Light Dependent Resistor
PIR	Passive Infrared
IC	Integrated Circuit
DAC	Digital to Analogue Converter
ADC	Analogue to Digital Converter
IDE	Integrated Development Environment
SMS	Short Message System
ECV	Enhanced Call Verification
PSTN	Public Switched Telephone Network
ARC	Alarm receiving center
VoIP	Voice over IP

ABSTRACT

Most homes in Uganda and the World at large suffer great losses due to theft and unauthorized access to the premises. Attempts have been made to curb the situation but the problem has remained a concern to the general communities. Despite attempts by the existing systems to solve the prevailing home security issues, intrusion in homes has remained a menace. The home laser security system has been developed to alert the home owner remotely via GSM module in case intrusion is detected. In addition, an alarm has also been implemented to signal home intrusion. An LDR sensor, GSM modem and buzzer have been interfaced with Arduino microcontroller using a C++ code written in Arduino 1.6.3. This system when deployed will help in alerting the home owner once unauthorized persons are detected within the home premises.

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CHAPTER ONE: INTRODUCTION

1.0. BACK GROUND

A security alarm is a system designed to detect intrusion –unauthorized entry into a building or area. Security alarms are used in residential, commercial, industrial, and military properties for protection against burglary (theft) or property damage, as well as personal protection against intruders. Car alarms likewise protect vehicles and their contents. Prisons also use security systems for control of inmates. Some alarm systems serve a single purpose of burglary protection; combination systems provide both fire and intrusion protection. Intrusion alarm systems may also be combined with closed-circuit television surveillance systems to automatically record the activities of intruders, and may interface to access control systems for electrically locked doors [1]. Systems range from small, self-contained noisemakers, to complicated, multi-area systems with computer monitoring and control [1].

In our world today security has become a major concern. With the threat of terrorism and the talk of war being able to secure an area has become priority. With this threat coming any time it is impossible to supply the needed manpower to perform this kind of security. Using technology, we must be capable of securing any needed space and while preventing access to various areas is preferred, the knowledge of a breach has become a must. There are three essential components to a laser security system: a laser, a detector and sensing electronics. The laser is a concentrated light source that puts out a straight line "pencil beam" of light of a single colour. The detector is sensitive to light and puts out a voltage when the laser light hits it. The detector is connected to the sensing electronics [2]. When the laser beam is interrupted and can't reach the detector, its voltage output changes, and the electronics sense the change and put out a warning signal [2].

Depending upon the zone triggered, number and sequence of zones, time of day, and other factors, the alarm monitoring centre may automatically initiate various actions. Central station operators might be instructed to call emergency services immediately, or to first call the protected premises or property manager to try to determine if the alarm is genuine. Operators could also start calling a list of phone numbers provided by the customer to contact someone to go check on the protected premises. Some zones may trigger a call to the owner with details of which room may be getting trespassed into. Some alarm systems are tied to

video surveillance systems so that current video of the intrusion area can be instantly displayed on a remote monitor, not to mention recorded.

Some alarm systems use real-time audio and video monitoring technology to verify the legitimacy of an alarm. In some municipalities around the United States, this type of alarm verification allows the property it is protecting to be placed on a "verified response" list, allowing for quicker and safer police responses.

The first video home security system was patented on December 2, 1969 to inventor Marie Brown. The system used television surveillance [3].

Monitored alarms and speaker phones allow for the central station to speak with the homeowner or intruder. This may be beneficial to the owner for medical emergencies. For actual break-ins, the speaker phones allow the central station to urge the intruder to cease and desist as response units have been dispatched. Listen-in alarm monitoring is also known as Immediate Audio-Response monitoring or Speaking Alarm Systems in the UK [4].

1.1. PROBLEM STATEMENT

This project was aimed at developing a system that can detect the intruders and alert the owner by a sound alarm and notifying the owner with a message on a mobile phone.

1.2. OBJECTIVES

1.2.1. Main objective

The main objective was to develop a home laser security alarm system that helps the home owner to know if there is an intrusion in his or her home hence avoiding theft cases and other crime related cases in homes.

1.2.2. Specific objectives

- I. To analyse and determine the requirements of the system which include functional and non-functional.
- II. To design and develop the system through new micro controller programming new ideas.
- III. To implement the system by testing whether it is correctly developed to perform its desired purpose.
- IV. To test and validate the proposed system through testing it on real world environment.

1.3. JUSTIFICATION

The rate of theft increases with time in Uganda, a lot of theft cases are reported and investigated in houses, shops, schools. Therefore, there was need for a security system that helps the owner know when there is an on-going intrusion by the system making a sound alarm and sending him or her message on a mobile phone.

Having implemented the laser security system, once deployed the owner will be notified by a sound alarm or a message signal on a mobile phone if far away from home in case of an intrusion hence counteraction can be made in view of ensuring security and safety in the place as nearby professional security services are contacted to investigate the area after the owner confirming if the security signal is not a false one hence easing the enforcement security in a home efficiently.

1.4. PROJECT SCOPE

1.4.1. Technical scope

This project is of an active laser sensor security system for a house to be activated specifically when the doors and windows of a home have been closed with or without locking. Enhanced call verification (ECV) helps reduce false dispatches 25–50% while still protecting citizens, ECV requires central station personnel to attempt to verify the alarm activation by making a minimum of two phone calls to two different responsible party telephone numbers before dispatching law enforcement to the scene. The whole project, consists of two major systems which are the security system and the electrical structure. The concept of security system is on the detection of presence of a person intruding using active laser detector connected to micro controller which interprets the receiving states from the detector to trigger an alarm through a buzzer and sending a message signal to a mobile phone through the GSM kit in case the laser beam transmission is interrupted is. The electrical structure consists of two sub systems which are the active laser transmitting circuit and the laser detector.

1.4.2. Geographical scope

The system works in a limited area of a given radius of about 50 meters and is developed for doors, windows and gates only.

1.4.3. Time scope

The entire process of project development took 5 months from November 2015 to April 2016.

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