



***FINAL YEAR PROJECT REPORT
FOR THE AWARD OF A DIPLOMA IN ELECTRONICS AND ELECTRICAL
ENGINEERING***

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SOUND CONTROLLED LIGHTING SYSTEM

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A Final Project Report submitted to Busitema University in partial fulfillment of the
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DECLARATION

No portion of the work in this document has been submitted in support of an application for any other diploma or qualification of this or any other university or institution of learning. Except where specially acknowledged, it is the work of the author.

We have abided by the Busitema University academic integrity policy on this assignment.

Signed..........

Date...11/07/2023.....

APPROVAL

This report has been submitted for examination with the approval of my supervisors.

Signed.....*Wahid*.....

Date.....*1/09/2023*.....

Dedication

I dedicate this report to my mum and dad and my entire family members as well as the entire fraternity of the Department of Electrical and Computer Engineering of Busitema University.

Acknowledgments

First of all, I would like to thank the almighty God, for keeping me and my colleague healthy and helping us to start and finish our final year project successfully.

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Abstract

The sound-controlled lighting system is a cutting-edge technology that aims to revolutionize the way lighting is managed in various environments. The system leverages advances in audio processing and control algorithms to create an interactive and energy-efficient lighting experience.

The proposed system comprises three main components, sound input, audio processing unit, and lighting control module. Sound input is obtained through microphones, which capture ambient audio signals. These signals are then transmitted to the audio processing unit, where sophisticated algorithms extract relevant features, such as pitch, intensity, and frequency, from the audio data.

Using extracted audio features, the lighting control module dynamically adjusts the illumination levels, color temperature, and even lighting patterns to match the surrounding auditory environment. The system's real-time responsiveness ensures that the soundscape fosters an immersive and captivating experience for users.

Furthermore, the sound-controlled lighting system prioritizes energy efficiency. By analyzing the audio input, it can discern between ambient noise and intentional sound signals, ensuring that the lighting changes are genuinely reflective of user intent.

During periods of silence or low audio activity, the system intelligently reduces lighting output, thus conserving energy without compromising user comfort.

The versatility of the sound-controlled lighting system extends to a wide range of applications, including entertainment venues, public spaces, smart homes, and workplaces. In entertainment settings, such as concerts or theaters, the system can elevate the audience experience by harmonizing the lighting with live performances. In smart homes and workplaces, it offers enhanced convenience and energy saving by providing hands-free and context-aware lighting control.

In conclusion, the sound-controlled lighting system represents a remarkable advancement in lighting technology. Its ability to interact seamlessly with the surrounding soundscape and prioritize energy efficiency sets it apart as a transformative solution for modern lighting applications. As this technology continues to evolve, it holds the potential to redefine the way we perceive and interact with lighting in diverse environments, enhancing both comfort and sustainability.

List of abbreviations

VCC	Voltage charger
GND	Ground
BAT	Battery
DOUT	Digital output pin
AOUT	Analogy output pin
SS	Sound sensor
SoC	State of charge
V	Volts
RX	Receiver
PCB	Printed circuit board
IoT	Internet of things
SSE	Sound sensing element
PA	Pre amplifier
SCLS	sound-controlled lighting system
GPIO	General Purpose Input – output

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CHAPTER ONE

1. INTRODUCTION.

This section presents the project background, problem statement, objectives, and report structure.

1.1 History and context/background.

Security has been improved in homes, schools, buildings, and other places as a result of the always-changing and expanding technology. Among these are security cameras, motion detectors, heat sensors, and sound sensors. The sensors' components used in these devices are employed in this project. The researchers considered developing a sound-activated bulb that turns on when it detects a specific volume or abrupt shift in frequency in addition to the current security systems. This is comparable to a motion sensor light, which turns on when it detects motion within a certain distance. Similar to that, the project has restrictions and only functions under specific circumstances that will be covered in the other chapters of this essay. The project also makes use of a sound-activated circuit that functions as a switch for both lamps and other AC devices. The project becomes flexible and useful as a result.

Background.

Throughout the 20th century, home automation systems were a pipe dream for both architects and system designers. The 1970s see the start of the first home automation system testing. The automation sector has been directly impacted by the embedded systems' rapid advancement. Like smartphones, it is anticipated that home automation systems will be widely used. Home automation is the practice of enhancing the experience of residents by employing a system of sensors and actuators to monitor the environment and manage house appliances automatically. However, the idea of home automation can be seen as having a broader scope because it involves more than just following instructions; it also involves continued self-learning.

1.2 Problem statement

The situation of people with physical disabilities is the issue. Most people are unable to move independently. The user needs some effort, knowledge, and support to use these technologies. These products do not fall under the plug-and-play category. The cost of these devices is the biggest worry as well. 15% of the world's population is thought to live with a disability, according to WHO reports. The majority of them suffer from physical impairments, which limit their day-to-day activities due to a lack of physical functioning, mobility, and stamina.

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