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BY

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Thesis submitted to the [Department of Candidate] of the [Faculty/School of Candidate], University of Cape Coast, in partial fulfillment of the requirements for the award of Doctor of Philosophy degree in [discipline of candidate]

MONTH, YEAR

# DECLARATION

**Candidate’s Declaration**

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate’s Signature:.................................................... Date:...........................

Name: e.g. Michael AyikweiQuarshie

**Supervisors’ Declaration**

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor’s Signature:.................................... Date:.........................

Name: e.g. Prof. Edward MarfoYiadom

Co-Supervisor’s Signature: ........................................... Date:.........................

Name: e.g. Dr. FrimpongSiaw

# ABSTRACT

In modern daily life, people need to move, whether in business or leisure, sightseeing or addressing a meeting. Often this is done in familiar environments, but in some cases, we need to find ourselves in unfamiliar scenarios. Imagine for example, being blind-folded and navigating your way in a campus environment. Although visual impairment is a factor that greatly reduces mobility, yet blind people travel independently on a daily basis.

To facilitate safe and efficient navigation, blind people must acquire skills and use sources of nonvisual environmental information that is rarely considered by their sighted peers. How do you avoid running into a low-hanging branch over the sidewalk or avoid falling into the open gutter?

Currently the most widespread and used means by the visually impaired people is the white stick. However, this presents some limitations. With the recent advances in inclusive technology, it is possible to extend the support given to people who fall into this category during their mobility.

In this context, we propose a system name Vision-Aid, whose global objective is to give blind users the ability to move around in unfamiliar environments, whether indoors or out there in the open, through a user-friendly system that is fed by geographic information system (GIS).

In this paper, we propose the development of an electronic wearable that helps moving around, providing a contextualized geographic information, while relying on the individual’s mobile device for auditory input and output. The proposed solution is smart device like raspberry Pi, which can be smartly programmed to provide the best guidance. This is a very safe and robust guidance system which helps many blind travelers with no worry about any obstacles on their moving path so that it is easy for them to travel and move independently to any unfamiliar environments. This setup combines the distance measurement capabilities of ultrasonic sensors. This assistance device may help independent navigation and be more self-sufficient for impaired and blind people.

# ACKNOWLEDGMENTS

This is your acknowledgments page. Here is where you thank the people who helped you write this work. They may include your supervisors, librarians, your best friends, your spouse etc. It is a maximum of one page.

# DEDICATION

Dedications are brief statements; they should be very short, as in “**To my family** or **In memory of my father”.** It should not be longer than two lines.

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# LIST OF ABBREVIATIONS

UCC University of Cape Coast

ISO International Standards Organization

MoFA Ministry of Food and Agriculture

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# CHAPTER ONE

# INTRODUCTION

## Background to the Study

People with visual impairment face enormous limitations in terms of their mobility and in today’s world there is a lack of infrastructure to make it easier. The task of moving from one place to another is a difficult challenge that involves obstacle avoidance, staying on street walks, finding doors, knowing the current location, analyzing environment characteristics like footstep sounds or echoes, and keeping on track through the memorized course until the destination is reached. A system that assists navigation and orientation in real-time would be of great benefit to achieve this demanding task.

The World Health Organization estimates that there are 285 million visually impaired people worldwide, mainly in developing countries. Of this number, 39 million are totally blind. Africa accounts for 15% (i.e. 5.9 million) of this number. Visually impaired persons are defined as those with reduced visual capacity. They can be blind or partially sighted people. These conditions often limit people’s capabilities to perform common tasks and affect their quality of life. Blind people have signiﬁcant constraints in their everyday life, mainly with regard to their mobility. Though they are often able to learn speciﬁc routes (e.g., how to get to the nearest shop or station), this ability

is far from the desirable independence in navigation. Mobility has been deﬁned by Foulke as: “*The ability to travel safely, comfortably, gracefully and independently through the environment*” (Foulke, 1997). This concept, when applied to blind travelers or the visually impaired person, implies that they must be able to detect the obstacles which are located on their walking path, to avoid them and to succeed in following their route.

All these goals could be achieved by relying on accessory devices which facilitate the navigation, known as Electronic Travel Aids (ETAs). ETAs include electronic intelligent devices whose main objective is to overcome human constraints, perceiving the surrounding environment and presenting it to the blind user through tactile, vibrations, speech or acoustic senses.

Currently, there is several visual information that helps visually enabled people to move in a right way (e.g. takes a right direction, avoid obstacles, choose the shortest path to a destination). Text information and arrow indications are frequently used; however, this information is inaccessible to visually impaired people. Often blind people are unintended withdrawn from the society with the lack of an alternative path for information. Based on this real context we focused our work on developing assisting technologies that may help blind people by bringing them back to the society.

In order to improve the quality of life for visual impaired people, in this work we focused on new technologies to help those persons in the access of public buildings (i.e. lecture halls, halls of residence, offices, etc.), roads and paths and public amenities available on campus. Therefore, this work intends to play a special role in this field by providing as much visual information as possible for visually impaired people, allowing them to take a comfortable navigation (e.g. short paths, turns, etc).

To build a prototype focused on users and their interests, we are developing this study in close partnership with the association of blind and partially sighted people on campus while focusing on ease of use and deployment.

Table 1: My First Table

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Figure 2: My second figure

**NOTE:**

The number of chapters of a thesisdepends upon the subject and type of the research, and discipline. Add other chapters as you may require.The traditional five-chapter format at UCC include: Chapter One – Introduction; Chapter Two – Literature Review; Chapter Three – Research Methodology; Chapter Four – Results and Discussion; and Chapter Five – Summary, Conclusions and Recommendations.

# REFERENCES

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# APPENDICES

*[This is where your appendix goes. You can have as many appendices as you wish.]*