**University of Ghana**

**Department of Computer Science**

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**Mobile Application for Personal Diabetes Management  
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**Declaration**

This project is in the name of the Computer Science Department – University of Ghana, in partial fulfillment for the award of Bachelor of Science degree in Information Technology, supervised by Dr. Jamal Abdulai-Deen.

I hereby declare with the exception of the reference cited, that no prior publication of parts or the whole of this dissertation has been neither made nor presented elsewhere for any award.

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**Acknowledgement**

**Abstract**

The introduction of tele-health and mobile health technologies in the delivery of health services have drastically reduced the inconveniences associated with seeking health care. With mobile devices becoming influential aspects of our lives and the internet becoming more and more ubiquitous, it is only right to leverage on the numerous advantages it can bring to the health sector. The proposed project seeks to build a mobile application that allows diabetic patients monitor their progress with well explained charts, notifications, specialist interactions and other implementations that makes the life of a diabetic patient comfortable. Normally, diabetic patients have log books in which they record their glucose levels, blood pressures, weight and other related records. Apart from the error-prone and inconvenient nature of this approach, no effective analysis and guidance mechanisms are provided in the monitoring of patients’ progress. Also, many individuals feel reluctant to going to hospitals and medical centers due to the long hours of waiting for medical assistance and the costs involved. With the advent of mobile health, diabetic patients can seek healthcare at the comfort of their homes, schools and offices through the use of web and mobile applications that allows patients to monitor their progress and also interact with healthcare professionals.

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# Chapter One - Introduction

This chapter introduces the proposed project in terms of its background, problem statement, aims, objectives, scope as well as its limitations.

## Background

Diabetes is one of the most common diseases that claims many lives worldwide every day. According to the World Health organization (WHO), between 1980 and 2014, the number of individuals with diabetes had risen from 108 million to 422 million with its prevalence rising more rapidly in middle- and low-income countries. In 2016 alone, an estimated 1.6 million deaths were directly caused by diabetes, making it the seventh leading cause of death in 2016.

Diabetes is a chronic disease that occurs as a result of the inability of the human body to produce enough insulin, a hormone that regulates blood sugar level or the insulin produced is more than what can be fully exhausted by the body. Since it is directly linked to the sugar content of our meals, it is very easy to acquire diabetes and unlikely to be noticed in its early stages through its symptoms. According to the American Diabetes Association, 7.2 million individuals in the US out of the 30.3 million individuals with diabetes were undiagnosed. Diabetes mellitus can be treated or its outcome delayed if found earlier. It can also be very devastating because it can affect vital organs like the kidney, heart, etc.

### Type 1

This is when the body’s pancreas that is responsible for producing insulin is not able to do so. Also known as childhood-onset, juvenile and insulin-dependent, it is mostly diagnosed in young people. However, Adults are not exempted from its reach. Continuous yearn to urinate, excessive thirst, hunger, unexpected weight loss, blurred vision, etc. are some common symptoms characterizing type 1 diabetes. People having type 1 diabetes are mostly required to take insulin every day to stay alive.

### Type 2

Normally referred to as non-insulin dependent or adult onset diabetes, type 2 diabetes is the commonest and usually occurs in adults. With type 2, the insulin produced by the body’s pancreas cannot be fully exhausted by the body due to aged cells, physical inactivity and excess weight. It has similar symptoms as type 1, but it takes time for them to show making it difficult to be easily diagnosed in the early stages.

### Gestational

Gestational diabetes occur in some women during their pregnancy. This occurrence does not mean that they had the disease earlier on or they will have it after delivery. Nonetheless, it is advisable to be constantly checked by a practitioner because both the child and mother can acquire type 2 diabetes after gestational diabetes. It is directly linked to high levels of sugar above the normal sugar level of the body.

Other forms of diabetes include monogenic and pre-diabetes which occurs as a result of inheritance and conditions in which an individual moves between normality and diabetes.

### Aftermath of Diabetes

Diabetes can affect almost all the vital organs of the body and extend to other parts when its diagnoses and treatment is prolonged. Amputation of the limb is mostly associated with diabetic patients due to nerve damage in the foot. Gradual blurring of vision leading to blindness, stroke, heart problems and making the body susceptible to other forms of diseases.

### Treatment and Diagnosis

Early diagnosis can help treat or prolong the negative aftermath of diabetes. Inexpensive methods of treatment such as blood lipid control, foot care, diabetes-related kidney disease screening, blood glucose control, regular exercises and healthy diets.

Diabetes Mellitus is a deadly disease. However, early diagnosis, intake of healthy diets, regular exercises and checkup can help reduce its prevalence.

## Problem Statement

Imagine how tiring it will be for diabetic patients to manually write down all their recordings in terms of blood sugar, blood pressure, weight etc in notebooks, the calculations they would have to do in order to determine their diabetes progress overtime, the errors they are susceptible to making, the inconsistencies that may arise when they forget to record vital information, the cost and stress involved in transportation to the hospital for appointments, prescriptions and medical checkups and not forgetting the queues they would have to endure at the hospital. Diabetes is a chronic disease which can live with an individual his or her whole life. Therefore, its treatment must be done with motivation, guidance and convenience. The proposed system seeks to provide a system which allows patients to easily and consistently log their medical records information, use interactive and self-explanatory charts to present patients’ diabetes progress and ensure a convenient interaction between a patient a diabetic specialist.

## Aims

The Proposed System aims to help diabetic patients:

* Easily log medical records
* Easily monitor diabetes progress
* Connect to diabetes Specialists
* Maintain good quality and healthy life

## Objectives

* Use simple and user friendly interfaces to help patients log, update and delete their medical records easily.
* Use self-explanatory and flexible chart types like bar, lines and splines to display patients’ medical records (blood sugar level, blood pressure, weight etc.) and also ensure interactivity by allowing patients to display their records in terms of days, weeks, months and years.
* Use push notifications to prompt patients and their specialists when patient’s conditions are above maximum or below minimum levels.
* Connect patients to diabetes specialists through voice communication and chat messaging
* Allows for prescriptions and appointment schedules to be made between patients and their connected specialists.
* Provide up to date information and knowledge on appropriate lifestyle, eating habits and guidance tips on diabetes management from accredited organizations like the American Diabetes Association

**Scope**

The system focuses on the comfort, convenience and professional support than can be provided for diabetic patients in terms of managing their progress. It allows for specialists with great knowledge and expertise to contribute their quota in the diabetes management process.

**Limitations**

Irrespective of the numerous advantages of the proposed system, there are some limitations it faces.

* The proposed system is a mobile application, thereby alienating patients with desktop computers and most importantly, patients outside the tech world.
* Internet connectivity is a vital component that will make the use of the system very convenient.
* The proposed system does not allow for direct connection between measuring devices and the mobile application. Thus, patients manually log their records using the mobile application.

# Chapter Two – Literature Review

**References**

WHO : <https://www.who.int/news-room/fact-sheets/detail/diabetes>