

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Today's technological advances have become famous for their accuracy in making decisions, and it is very influential in all aspects, including industry and health. Some aspects of health really require quick. Glaucoma has been known for a long time, but not many people know about the dangers of this disease. If late or not treated properly, glaucoma sufferers become permanently blind. Accuracy in predicting glaucoma is very important.

Glaucoma is the leading cause of irreversible blindness worldwide and affects the optic nerve progressively (Oh et al., 2021). It is diagnosed currently via four examinations: (1) detection of elevated intraocular pressure (IOP), (2) assessment of damage to the optic disc by calculating the cup-to-disc ratio (CDR), (3) identifying decreased retinal nerve fiber layer (RNFL) thickness, and (4) detection of characteristic visual field defects. (Oh et al., 2021)

This project focuses on making a glaucoma risk prediction system accurately and reliably. The global incidence of glaucoma is estimated to reach 76 million in 2020 and 111.8 million in 2040 (Tham et al., 2014). A total of 2.78% of visual impairment in the world is caused by glaucoma. In the case of blindness, glaucoma is the second leading cause, after cataracts, in the world (Cook & Foster, 2012).

## 1.2 Problem Statement

Machine learning has recently become one of the core technologies in the fields of science and technology, including life science and medicine. Classification is a major technology used in medical applications because it can be applied to prediction (diagnosis). The machine learning approach is also useful for predicting glaucoma. In the near future, machine learning will be an essential tool for predicting and treating glaucoma (Oh et al., 2021).

Glaucoma prediction is very important to prevent a person from developing glaucoma as early as possible. Predictions can be made in a person's daily life, starting from what they eat, work, interactions with tools or objects, and so on. For example, there are 2 people with different daily lives, one is living a healthy life by diligently exercising and eating healthy food, while the other is living an unhealthy life, never exercising and eating junk food. After doing research, someone with an unhealthy lifestyle is very susceptible to contracting the disease (Zeki et al., 2018).

Some of the issues that related in this system are:

1. Low accuracy, efficiency, and effectivity of glaucoma prediction from an ophthalmologist, miscommunication always occurs between ophthalmologists with each other regarding the diagnosis is very common.
2. Many people are afraid to come to the ophthalmologist when their eyes hurt, most of them consider eye pain normal and choose to hide the pain in their eyes, if it is too late to find out what the

disease actually is, it can lead to permanent blindness.

3. Lack of education about glaucoma and low healthy lifestyle is one of the causes of glaucoma being the second leading cause of blindness, after cataracts, in the world (Cook & Foster, 2012).

### **1.3 Objectives**

The project has the following objectives:

1. To develop specific eye care diseases mobile application to replace the traditional method of glaucoma prediction.
2. To make it easier for everyone to maintain eye health by accessing applications from cellphones anywhere and anytime
3. To provide education and advice on how to live a healthy life and prevent glaucoma

### **1.4 Scope**

The developed system is a mobile application that anyone may use. Users can enter data into the system and view the prediction results. The system that will be developed attempts to forecast glaucoma using essential health data from patients, after which the system will deliver predicted results and recommendations for what the user should do.

### **1.5 Assumption and Limitation**

### 1.5.1 Assumption

1. With this system, it makes the prediction risk of glaucoma faster and easy to do, every time and everywhere can check independently without having to come to the hospital.
2. With this system, provide education and advice on health, especially the prevention and control of glaucoma.
3. With this system in place, it is believed that everyone will be more willing to try new things in order to live a better lifestyle.

### 1.5.2 Limitation

This project focuses are limited to this.

1. This mobile application can only use in android OS
2. This application only predicts glaucoma disease from vital health data, there is no additional equipment such as sensors to diagnose glaucoma
3. This application cannot ensure that the answer from the user is honest or not, because data entry is done individually and is not accompanied by an ophthalmologist

## 1.6 Significance

The relevance of this project includes a mobile application that can forecast a person's risk of glaucoma. The user can use the mobile application by following the instructions provided. A smartphone application that is extremely beneficial to a large number of individuals, particularly in the health care field.