

## ABSTRACT

Glaucoma is the second most common cause of blindness in the world. Glaucoma is caused by the cycle of producing and removing fluid from the eyeball, also known as the aqueous humor which is not balanced that results in pressure on the eyeball. Early detection of glaucoma is very necessary because many cases of glaucoma are detected when the condition is severe. The most popular way to detect glaucoma is to measure the cup to disc ratio (CDR). However, at this time to measure the cup to disc ratio (CDR) mostly still use the manual method. Then it is necessary to classify glaucoma automatically.

In this final project, a glaucoma classification designing a system using the Convolutional Neural Network (CNN) method using the GoogLeNet architecture. The classification in this system uses 1000 digital fundus image data that will be divided into 75% for training data and 25% for validation data. The first digital fundus image data will go through a preprocessing process for testing the training data and testing the test data. Furthermore, the Convolutional Neural Network (CNN) method functions to classify digital fundus image data.

The results of this design system can classify glaucoma into five classes, namely, deep, early, moderate, normal, and ocular hypertension (OHT). This system aims to facilitate the classification of glaucoma. The best performance parameter used in this system is a pixel size of 128x128 pixel, for the preprocessing stage using the Adam optimizer, learning rate 0.0001, epoch 50 and batch size 32. The results from system testing provide an accuracy of 95.40%, precision of 95%, recall of 94 %, f1-score 94%, and a loss value of 1.9163.

**Keywords :** Glaucoma, Convolutional Neural Network (CNN), GoogLeNet.