

ABSTRACT

Glaucoma is an eye disease caused by continuous pressure on the optic nerve papillae of the eye. This pressure is caused by an imbalance in the aqueous humor cycle. Glaucoma causes patients to experience reduced visual fields or blindness depending on the severity. Glaucoma can be detected in various ways, namely Confocal Scanning Laser Ophthalmoscopy (CSLO), Heidelberg Retinal Tomography (HRT), and Optical Coherence Tomography (OCT). However, these methods are costly. Another alternative for early detection of glaucoma is to use digital fundus image detection, which is faster and requires lower costs. Many studies have been carried out on the detection of glaucoma with digital fundus images. However, its application still requires hardware such as a personal computer or laptop, so it is still less flexible.

In this final project, an Android application will be made that can detect glaucoma through digital fundus images so that glaucoma detection can be done flexibly and quickly. The applications that are built are combined with machine learning models using APIs. In making machine learning models, the Gray Level Co-occurrence Matrix (GLCM), Decision Tree, and Random Forest algorithms are used. The GLCM algorithm is used to perform feature extraction. Meanwhile, Decision Tree and Random Forest were used to classify fundus images into glaucoma or normal.

The purpose of this final project is to create a glaucoma detection Android application that is fast and accurate so that it can assist medical personnel in making early detection of glaucoma in people who live far from eye hospitals quickly and accurately. The accuracy of machine learning in classifying fundus images is also targeted to reach above 80%. In addition, the Android application that will be built is also expected to run smoothly on Android devices, and be user-friendly.

Keywords: *Glaucoma, fundus, GLCM, Decision Tree, Android, machine learning*