

ABSTRACT

The eye is one of the five senses in humans. One of the eye abnormalities is misalignment of the eyeballs, usually caused by genetic, structural or neurological disorders. The disorder caused by misalignment of the eyeballs is known as strabismus. Strabismus or squint is one of the most common eye conditions in people. It occurs when the eyes are not in their normal alignment and point in different directions. The position of one's eyeball is very important for the selection process of one of the government agencies, one of these agencies is the Indonesian National Police (POLRI) which requires health checks, one of which is an eye check. The check is carried out to see the position of the eyes of prospective students. The condition of the eyes of prospective students must be ensured in a normal state. However, currently eye checking is still done manually by visiting an ophthalmologist.

In this research, the author found an innovation that can be used as a tool in automatic early detection to determine normal eyes and strabismus. The computer vision and machine learning-based eye synchronisation observation system is one of the technological developments in the world of eye health by utilising machine learning and OpenCV which focuses on developing algorithms and techniques that allow computers to learn and make predictions or decisions based on data. With the eye detection system, the process of detecting strabismus eye disorders is relatively faster because it is optimally utilised fully by machine learning and OpenCV, so that the results of the eye detection examination can be faster with a fairly high accuracy value.

In this study, secondary datasets obtained from the Kaggle website were used for the training and testing stages of the system. The number of datasets consists of 390 strabismus eye images for the training dataset, 165 strabismus eye images for the testing dataset, 335 normal eye images for the training dataset, and 143 normal eye images for the testing dataset. From the test results, an accuracy of 90% was obtained, with a precision value for strabismus eyes of 84% and normal eyes of 99%, F1-Score for strabismus eyes of 91% and normal eyes of 88%, and recall for strabismus eyes of 99% and normal eyes 78%. These results were obtained when the optimiser parameter adam, learning rate 0.01, batch size 32 and epoch size 100 were used.

Keywords: Computer vision, machine learning, eye synchronisation, strabismus.