ABSTRACT

Cataract is a major cause of preventable blindness, but early detection requires technological support to overcome limitations in medical personnel and access to health services. Artificial intelligence-based fundus image classification is a potential solution. This study explores the performance of two Convolutional Neural Network (CNN) models, namely VGG16 and MobileNet, for binary classification between cataract and normal eye fundus images. The fundus image dataset was obtained from a public repository that has cataract and normal classes. The preprocessing stage includes image resizing, normalization and using Contrast Limited Adaptive Histogram Equalization (CLAHE) technique to enhance image contrast. The dataset is divided into 80% training data and 20% testing data. The training and evaluation process is supported by TensorFlow and Keras libraries, while the visualization of the results is presented using Matplotlib. Each model was implemented through a transfer learning approach with weights from ImageNet, and evaluated based on accuracy, precision, recall, and F1-Score metrics. The analysis was performed not only on standard data, but also under various scenarios such as the use of balanced data, without CLAHE preprocessing and a combination of both models (ensemble). Results show that the MobileNet model excels in computational efficiency and performance on balanced data, while the VGG16 model provides more accurate results on more complex datasets.

Keywords: *Cataract, Classification, VGG16, MobileNet, CLAHE*