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Abstract

Diabetic retinopathy (DR), the most common cause of vision loss, is caused by damage to the small blood vessels in the retina. If untreated, it may result in varying degrees of vision loss and even blindness. Since DR is a silent disease that may cause no symptoms or only mild vision problems, annual eye exams are crucial for early detection to improve chances of effective treatment where fundus cameras are used to capture retinal image. However, fundus cameras are too big and heavy to be transported easily and too costly to be purchased by every health clinic, so fundus cameras are an inconvenient tool for widespread screening. Recent technological developments have enabled to use of smartphones in designing small-sized, low-power, and affordable retinal imaging systems to perform DR screening and automated DR detection using CNN classification models. In this paper, we investigate the smartphone-based portable retinal imaging systems available on the market and compare their image quality. Our motivation in this paper is to develop an automatic DR detection model for smartphone-based retinal images using the deep learning approach with the CNN's. So, we investigate the smartphone-based portable retinal imaging systems and compare their image quality and the automatic DR detection accuracy using a deep learning framework. Smartphone-based retina imaging systems plays an important role in determining the automatic DR detection accuracy.