

# Deep Learning-Based Detection of Diabetic Retinopathy using Retina Images

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**Abstract:** *The early detection of retinal diseases, such as diabetic retinopathy, is essential to prevent irreversible vision loss. In this study, we propose an automated system for the detection of retinal diseases using deep learning techniques, specifically Convolutional Neural Networks (CNN) and pre-trained models like MobileNet and VGG16. These models are applied to retinal fundus images to identify abnormalities, such as microaneurysms and hemorrhages, that are indicative of retinal diseases. The use of CNN allows for efficient feature extraction, while MobileNet and VGG16, known for their strong performance in image classification tasks, enable accurate disease classification across different stages. The system is trained and evaluated on publicly available datasets, ensuring robust performance across diverse retinal images. The study compares the performance of both MobileNet and VGG16 models, with a focus on achieving high accuracy, sensitivity, and specificity in detecting retinal abnormalities. MobileNet, with its lightweight architecture, proves advantageous for real-time applications on mobile devices, offering fast and efficient disease detection. On the other hand, VGG16 delivers higher precision but at a greater computational cost. Experimental results demonstrate the system's potential to assist healthcare professionals by automating the diagnostic process, enabling early detection and timely treatment of retinal diseases. This approach significantly reduces the reliance on manual screening, leading to more accessible and scalable diagnostic solutions*

**Keywords:** Diabetic Retinopathy, Retina Image Analysis, Deep Learning, Convolutional Neural Networks (CNN), MobileNet, VGG16, Disease detection, Retinal diseases.