

Implementation of Diabetic Retinopathy Severity Detection using Deep Learning

Gavhane Kiran, Dhobe Onkar, Modhe Gaurav, Chapolikar Shubham

Department of Computer Engineering
Adsul Technical Campus, Chas, Ahmednagar, India

Abstract: *Diabetic Retinopathy (DR) remains a leading cause of vision impairment among diabetic patients worldwide. The early detection of DR is critical for preventing irreversible blindness; however, traditional diagnostic approaches rely heavily on manual examination by ophthalmologists, making the process time-consuming and susceptible to human error. In this research, we propose an advanced deep learning framework for the automated classification of DR severity, leveraging Convolutional Neural Networks (CNNs) and state-of-the-art ResNet-50 architecture. The proposed model is trained on a large dataset of retinal fundus images subjected to preprocessing techniques such as image normalization and augmentation to enhance classification accuracy and reduce overfitting. By integrating transfer learning and feature extraction methods, the system efficiently distinguishes between different severity levels of DR, namely No DR, Mild, and Severe cases. The model undergoes rigorous evaluation using metrics such as accuracy, precision, recall, and F1-score, demonstrating superior performance compared to conventional machine learning approaches. This research not only enhances diagnostic reliability but also introduces a scalable and computationally efficient solution for real-world deployment in clinical settings. The findings underscore the potential of deep learning in revolutionizing ophthalmic disease detection, thereby reducing the global burden of diabetic retinopathy-related blindness.*

Keywords: Diabetic Retinopathy.

