

Diabetes, or more accurately, Diabetes Mellitus (DM), is a metabolic disease that results from elevated blood sugar levels. Diabetes eventually results in diabetic retinopathy (DR), an eye condition that significantly impairs vision. One of the most serious retinal disorders that can cause blindness is diabetic retinopathy. Thus, getting a timely diagnosis of the illness is essential. Early detection of diabetic retinopathy mostly relies on screening. This research introduces an advanced system for categorizing diabetic retinopathy (DR) by utilizing deep learning (DL) techniques, including convolutional neural networks (CNN) and other related methodologies in deep learning. The suggested system can help ophthalmologists reach a preliminary decision by classifying patients as having no DR, mild DR, moderate DR, severe DR, or proliferative DR. To determine the degree of diabetic retinopathy severity, we have employed deep learning classification algorithms, Convolutional Neural Network (CNN), and ResNet50 using transfer learning. Our model, which we trained using many retinal images taken using fundus photography from the Kaggle dataset, achieves 96.93% training accuracy and 93.59% test accuracy. The results of this extensive study are intended to provide a substantial contribution to the field of diabetic retinopathy diagnosis by providing a reliable, scalable, and automated approach. The use of deep learning methodologies into retinal image processing has promise for transforming the initial identification and categorization of diabetic retinopathy. This would enable prompt intervention and avert irreversible visual impairment in individuals with diabetes.