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Automated Diabetic Retinopathy detection and severity Assessment

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Abstract: *This article demonstrates a revolutionary deep- learning approach for automated diabetic retinopathy (DR) detection using convolutional neural networks (CNNs). With the help of datasets from the Diabetic Retinopathy Detection 2015 and APTOS 2019 Blindness Detection competitions, our model attempts to accurately classify retinal images into two categories: No DR and Proliferative DR, based on the severity of macular degeneration. We enhance the quality of the dataset and the robustness of the model by carefully preprocessing and augmenting it using various approaches like rotation, flipping, shearing, rescaling, translation, brightness correction, and normalization. We train two models: a regression model and a deep learning model. With an 88% validation accuracy, we demonstrated that our deep learning technique performs better than the regression model. In order to properly determine and classify DR severity levels, this study presents a robust and noise-tolerant system that evolves the field of automated DR detection. Our approach enables early detection and intervention by combining cutting-edge CNN architectures with sophisticated preprocessing techniques, which may lessen the strain of DR- related blindness on healthcare systems. We also demonstrate out drawbacks and suggest areas for additional investigation, such as analyzing ensemble learning and using a variety of datasets to improve the generalizability of the model. As we wrap up, our study emphasizes the potential of deep learning techniques to transform DR diagnosis and treatment, with the goal of enhancing the quality of care for diabetics globally.*

Keywords: diabetic retinopathy, deep learning, convolutional neural networks, image classification, data preprocessing, data augmentation, model training, model evaluation, validation accuracy, ensemble learning, dataset integration, healthcare outcomes, early detection, intervention, automated diagnosis, machine learning, image analysis, retinal images, model performance, future research

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[2]. keywords: {Diabetes;Retinopathy;Deep learning ;Lesions ; Convolutional neural networks ; Blindness ; Retina ; Biomedical imaging processing ; diabetic retinopathy; fundus photograph ; convolutional neural network ; deep learning ; Siamese-like network}.

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