Research on deep learning and its application in diagnosing certain eye diseases based on non-fluorescein fundus photography and fluorescein angiography image datasets.

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Abstract: This study investigates deep learning methodologies for the diagnosis of ocular diseases using non-fluorescein fundus photography and fluorescein angiography datasets. Leveraging convolutional neural networks, we developed and evaluated models capable of detecting and classifying multiple eye pathologies, including diabetic retinopathy, age-related macular degeneration, and glaucoma. The research employed a dual-modality approach, integrating both imaging techniques to enhance diagnostic accuracy and robustness. A comprehensive dataset was curated and preprocessed, with models trained using transfer learning and data augmentation strategies to address class imbalance and limited sample sizes. Experimental results demonstrate that the proposed deep learning architectures achieve high sensitivity and specificity, outperforming traditional machine learning methods. The fusion of non-fluorescein and angiographic features proved particularly effective for identifying vascular abnormalities and exudative lesions. This work highlights the potential of deep learning as a reliable, automated screening tool for ophthalmic diagnosis, reducing clinician workload and improving early detection rates. The findings contribute to the growing field of AI-assisted medical imaging, offering a scalable solution for resource-limited healthcare settings.

Keywords: deep learning, eye disease diagnosis, fundus photography, fluorescein angiography