JMA-756

Identification and Classification of Glaucoma using Deep Learning based AI Model

Aayush Srivastava*, Amit Rawat, Ananya Singh, Nayanpath Jhunjhunwala

Department of Computer Science and Engineering, Amity University, Uttar Pradesh, India

*Corresponding author's e-mail: aayush.srivastava@s.amity.edu

ABSTRACT

Glaucoma, an omnipresent ocular affliction with profound implications leading to irreversible blindness on a global scale, necessitates the imperative of early and precise detection for efficacious treatment and the preservation of visual integrity. Recent advancements in the realm of deep learning-based artificial intelligence (AI) have evinced tremendous promise within the medical domain, particularly in the discernment and stratification of glaucoma. This investigative study delves into avant-garde techniques that harness deep learning-based AI models for the meticulous identification and classification of glaucoma, simultaneously addressing inherent challenges and illuminating prospective pathways for further exploration. The methodological foundation of this study is rooted in the meticulous curation of an expansive dataset, comprising retinal images and clinical data gleaned from an array of sophisticated imaging techniques, including optical coherence tomography (OCT) and fundus photography. The refinement of acquired data through intricate preprocessing procedures serves as a linchpin in fortifying the resilience and generalization capacity of the AI model. The architectural nuances of the deep learning model are intricately tailored to glean salient features from preprocessed retinal images, effectively categorizing them into either glaucoma or non-glaucoma classifications. Employing convolutional neural networks (CNNs) for their adeptness in capturing spatial relationships within images, the study explores transfer learning methodologies wherein pre-trained models, cultivated on extensive image datasets, are fine-tuned to optimize glaucoma classification. The ensuing training phase refines the model's parameters through judicious application of apt loss functions and optimization algorithms.

Assessment of the model's efficacy hinges upon a spectrum of evaluation metrics, including accuracy, sensitivity, specificity, and the area under the receiver operating characteristic curve (AUC-ROC), elucidating the model's precision in the identification and classification of glaucoma cases. The resultant outcomes are subjected to meticulous scrutiny, drawing comparative analyses with existing paradigms to delineate the model's strengths, limitations, potential error sources, and areas ripe for refinement.

Keywords: Glaucoma; Deep Learning; Image Classification

How to Cite

A. Srivastava, A. Rawat, A. Singh, N. Jhunjhunwala, "Identification and Classification of Glaucoma using Deep Learning based AI Model", *AIJR Abstracts*, pp. 43–43, Feb. 2024.

DOI: 10.21467/abstracts.165 ISBN: 978-81-965621-7-5 (eBook), 978-81-965621-4-4 (Paperback)