

Automatic detection of inflammation in optical coherence tomography images of the retina



Research Line: Eye Image Analysis Group Rotterdam
Project type: Master Project
Approx. duration: 6 to 9 months

Background. Myopia is a public health concern on the rise, with projections estimating that approximately 50% of the global population will be affected by 2050. Myopia, or near-sightedness, is a refractive error of the eye where the axial length of the eyeball is too long, causing the light to focus in front of the retina. It is associated with a wide range of sight-threatening complications that can significantly impair visual function. One of these complications is myopic choroidal neovascularization (mCNV), a vision-threatening condition characterized by the growth of abnormal vascular structures beneath or within the retina that develops in approximately 10% of individuals with pathological myopia.

Problem statement. Approximately 11% of myopic eyes show signs of inflammation on retinal imaging. Because myopia-related lesions and other inflammatory lesions may require different treatment options, correct differentiation between them is essential. Optical coherence tomography (OCT) is a non-invasive imaging technique that provides high-resolution cross-sectional images of the retina based on light interference patterns. On OCT imaging, inflammatory lesions have a distinct appearance. Clinicians at the Rotterdam Eye Hospital have collected a database of more than 4400 OCT scans and have annotated which scans show inflammation due to myopia or otherwise. The goal of the project is to train a deep learning model that detects these inflammatory lesions automatically on OCT imaging, highlighting the regions of the OCT scan that are affected.

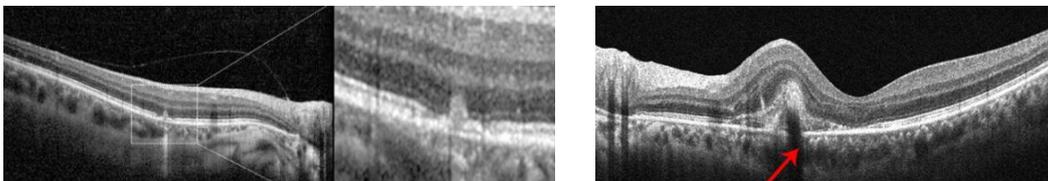


Figure 1. Example of a retina with an inflammatory lesion (left) and with a mCNV lesion (right), disrupting the normal retinal anatomy.

References

- [1] Singh H, Singh H, Latief U, Tung GK, Shahtaghi NR, Sahajpal NS, Kaur I, Jain SK. Myopia, its prevalence, current therapeutic strategy and recent developments: A Review. *Indian J Ophthalmol.* 2022 Aug;70(8):2788-2799.
- [2] Gallego-Pinazo R, Hernández S and Dolz-Marco R (2022) Key Multimodal Fundus Imaging Findings to Recognize Multifocal Choroiditis in Patients With Pathological Myopia. *Front. Med.* 8:831764.
- [3] Langlo CS, Amin A, Park SS. Optical coherence tomography retinal imaging: narrative review of technological advancements and clinical applications. *Ann Transl Med.* 2025 Apr 30;13(2):17.



Interested in this project?

Supervisor(s): Luisa Sánchez Brea, Margot van Genderen, Mirjam van Velthoven

Email: m.sanchezbrea@erasmusmc.nl