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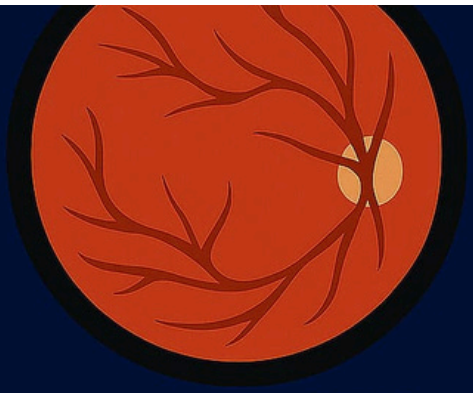
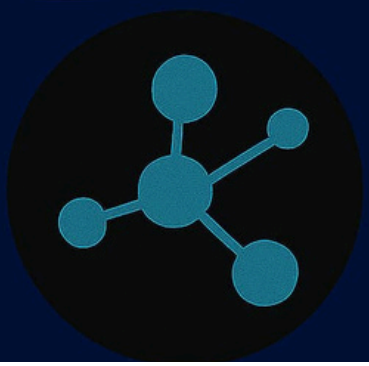
Eye-AD: A Trustworthy AI Platform for Early Dementia Detection Through Retinal Imaging





Overview

The Eye-AD project aims to revolutionize early dementia detection by developing a novel AI platform that analyzes retinal microvasculature using Optical Coherence Tomography Angiography (OCTA). This solution addresses the critical limitations of current dementia diagnostics expensive, invasive procedures like MRI and spinal taps by providing a rapid, non-invasive, and affordable screening method. Our multilevel graph-based deep learning model achieves exceptional accuracy in detecting Early-Onset Alzheimer's Disease (EOAD) and Mild Cognitive Impairment (MCI), with AUC scores of 0.9355 and 0.8630 respectively.

Solution & Implementation

Our proposed solution is based on Eye-AD, an interpretable graph-based deep learning framework that analyzes intra- and inter-instance relationships across multiple retinal layers (SVC, DVC, CC) from OCTA images.

Significance

- Provides the first large-scale OCTA based AI solution for early dementia detection
- Offers more affordable alternative to traditional dementia diagnostics
- Enables rapid screening in primary care settings and community health centers
- Delivers interpretable results that align with clinical biomarkers

Expected Outcomes

- A deployed AI screening platform integrated with OCTA devices in clinical settings
- Successful regulatory approval (FDA/CE marking) for medical use
- Validation across diverse populations and healthcare systems worldwide
- Establishment of retinal biomarkers as standard for early dementia detection
- Reduction in dementia diagnosis costs, improvement in early intervention rates
- Partnerships with healthcare providers, insurance companies, and research institutions