

IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS

J-BHI Special Issue on “Ophthalmic Image Analysis and Informatics”

Eye diseases, e.g., diabetic retinopathy, glaucoma, and age-related macular degeneration, are leading causes of vision impairment and blindness worldwide. These diseases lead to reduced quality of life for individuals and their careers, and to substantial economic loss for the society and healthcare systems. This burden can be avoided or reduced by early and reliable diagnosis and effective treatment strategies. Diagnostic and interventional eye imaging is key technology transforming eye care and treatment. Many automatic and semi-automatic image analysis methods and computer aided diagnosis and image-guided eye surgery systems have been proposed in the context of eye research and, increasingly, some have percolated into clinical ophthalmology. Increasing interest has been developed in understanding retinal vasculature and neuro-retinal architecture as a source of biomarkers for several high-prevalence conditions like dementia, cardiovascular disease, and complications of diabetes. More recently, deep learning and increasing availability of ever-larger scale databases have led to actively exploring new approaches to ocular image analysis and commercial systems, which have shown impressive performance. However, considerable challenges remain in terms of new imaging methods and systems for ophthalmology, reliability and validation of ophthalmic imaging biomarkers, cross-modal image analysis (e.g., fundus, optical coherence tomography, fluorescein angiography, and scanning laser ophthalmoscopy), cross-organ image analysis (e.g. eye-brain, eye-heart, etc.) methods for more interpretable and explainable machine learning in ophthalmic image analysis and informatics.

This special issue will overview the state-of-the-art methods and algorithms at the forefront of ocular image analysis and informatics. We are open to novelty ideas and significant results in the spirit of artificial intelligence especially deep learning from large scale data and multiple modalities. Topics of interest include, but are not limited to:

- Novel ophthalmic imaging modalities
- Machine learning for ophthalmic image analysis and informatics
- Computer-aided detection and diagnosis of eye disease
- Multi-modal ophthalmic image analysis and modelling
- Combined analysis of images of the eye and other organs
- Image-derived ophthalmic atlases and disease models
- Registration of ophthalmic images, including multi-modal
- Integration of ocular imaging and omics data
- New methods in AI, machine learning and deep learning for ophthalmology
- New benchmark datasets related to multiple eye diseases

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