Proposition de recherche doctorale

Modeling of Age-related Macular Degeneration evolution using unsupervised deep learning approaches

Modélisation de la dégénérescence liée à l'âge par approches deep leaning non supervisées

Mots clés :

- Directeur de thèse : FLORENCE ROSSANT
- Co directeur de thèse : Michel PAQUES
- Co-encadrant(s) :
- Unité de recherche : Laboratoire d'Informatique Signal et Image Electronique et Télécommunication
- Ecole doctorale : École Doctorale Informatique, Télécommunications, Électronique de Paris
- Domaine scientifique principal : Sciences et technologies de l'information et de la communication

Résumé du projet de recherche (Langue 1)

Dry Age-related Macular Degeneration (dry ARMD) is an eye disease that slowly causes the atrophy of the retinal pigment epithelium causing the patients to ultimately go blind. The disease can be diagnosed and monitored using eye fundus images that are available in large quantities and have been for 20 years now. Despite active pharmaceutical research, there is no treatment for dry ARMD yet. However, due to various defects present in the images, tasks as simple as segmenting the lesions on individual images or following the lesions evolution remain difficult for image processing and artificial intelligence algorithms, and even for expert doctors. It is our goal to use the recent advances in Deep Learning, in particular applied to change detection in times series, using unsupervised methods, to be able to make a break through that may: first help to properly detect the evolution of the lesion through full series of ARMD images with little to no annotated data. Second, using these observations, proposing a model (neural network based, statistical, or otherwise) that can predict the evolution of ARMD lesions based on the first images of a series. Such a predictive model will ultimately be useful for evaluating new therapies. This project relies on an active collaboration between ISEP and the Clinical Investigation Center of the Quinze-Vingts National Ophtalmology Hospital, whose head Pr. Michel Pâques provides us with our times series and will help validate our results.

Informations complémentaires (Langue 1)

More information available in the detailed description of the project.