Université catholique de Louvain
UCL
SECTEUR DES SCIENCES ET TECHNOLOGIES
INFORMATION AND COMMUNICATION TECHNOLOGIES, ELECTRONICS AND APPLIED MATHEMATICS

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences de l'Ingénieur

Monsieur Sébastien COPPE

Ingénieur civil en mathématiques appliquées

Experimental and theoretical approaches to predictive pursuit eye movements.

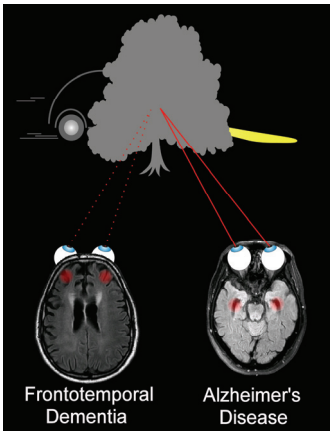
Vendredi 26 octobre à 15h00
BARB 92
Place Sainte Barbe
1348 Louvain-la-Neuve

Vision is probably our most important sense. It allows us to interact in a dynamic environment where we are surrounded by moving objects. To sum up, any eye movement is the consequence of neuronal activity somewhere in the brain, which transforms visual information into accurate motor commands for the eyes.

In order to compensate for the sensory delays inherent to the oculomotor system, the brain uses different strategies. One strategy is prediction. For instance, if you expect an object to quickly move to your right at a specific time, you will probably anticipate its movement by initiating a predictive eye movement in the expected direction. The predictive mechanisms are also crucial when the visual inputs are absent (e.g. when tracking a bird flying in the sky and briefly disappearing behind a big tree).

This thesis focuses on the pursuit eye movements, which are required to track a moving object, and in particular on predictive pursuit eye movements. Two different approaches are used to better understand their mechanisms. First, a theoretical approach consists in modeling the pursuit system, by simulating experimental data and by making hypotheses on the oculomotor behavior. This approach is then combined with experimental studies, which were performed on normal subjects but also on patients with some type of dementia, showing the importance of the frontal lobes for the predictive eye movements.

The thesis illustrates the fact that both theoretical and experimental approaches are complementary and that each of them gives valuable information to the other.



Membres du jury :

Prof. Philippe LEFÈVRE (UCL), Promoteur
Prof. Paul VAN DOOREN (UCL), Président
Prof. Marcus MISSAL (UCL), Secrétaire
Prof. Karl VERFAILLIE (KUL)
Prof. Guillaume MASSON (CNRS et Université Aix-Marseille, France)
Dr Jean-Jacques ORBAN de XIVRY (UCL)