Cognitive vision: towards ontology-driven medical image processing

Résumé du projet de recherche (Langue 1)
Ontology at the helm: In close collaboration with AGFA Healthcare and La Pitié Salpêtrière Hospital, Paris, France, IPAL’s MICO (COgnitive virtual MIcroscopy) platform aims at developing a cognition-driven visual explorer for histopathology, particularly for breast cancer grading, supported by dynamic semantic annotation and medical ontology. The analysis capabilities and results are made available to the pathologist through a platform combining virtual microscopy and cognitive reasoning. This allows the medical staff to interact with the platform at the appropriate level of abstraction. The current platform combines multi-modal histopathological images, multi-scale whole slide image (WSI) exploration & analysis, and medical knowledge representation & inference using ontologies. Our idea for this PhD study is to contribute to the cognition-driven aspect of the platform. Indeed, until now, ontologies and semantic tools have been used to exploit image processing results in order to infer medical knowledge crucial to the pathologist. Our vision also integrates the driving of image exploration & analysis using semantic tools. Providing a semantic profile for each algorithm, gathering knowledge about the WSI to analyze and matching this with medical knowledge, we can infer an adapted analysis process in order to get better/faster results.

Informations complémentaires (Langue 1)
The PhD thesis will be mainly hosted at the IPAL international joint lab of UPMC based in Singapore, with consistent periods of collaboration with AGFA Healthcare (Antwerp, Belgium) and the Department of Anatomopathology, La Pitié Salpêtrière Hospital, Paris, France. IPAL’s URL : http://ipal.cnrs.fr/project/mico

Informations complémentaires (Langue 2)
Besides the scientific deliverables, this project will lead to a demonstrator of a semantically driven medical image analysis platform based on the existing platform, which will be deployed and validated. This platform will provide the opportunity to validate research concepts, like the cognitive computer vision described above, within an integrated system in order to allow a move forward at the application level. Keywords: Image Processing, Semantic Web, Ontologies, Semantic Reasoning