Master Internship 2014

Modeling spatial information in 2D biomedical images

Supervisors

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The Cognitive Microscope (MICO) Project

MICO is a 3.5 years project supported by ANR, TecSan 2010 programme.

The MICO project deals with analysis of histopathological images of breast cancer. A useful information for pathologists is the spatial organization of cells, or intra-nuclear compartments. However this information is difficult to formalize in terms of numerical parameters.

This internship has the objective to propose a model of spatial organization of objects, at a local scale and global scale. The local scale of spatial organization will be based on mereo-topology model (1), and the global scale on α-shapes (2) and spatial statistics (3). The model will then be used to simulate virtual structures presented to the pathologists.

Profile Required for the Applicant

- Master Degree in Computer Science or Engineer Student (last year of studies)
- Knowledge of Java

Duration of the internship: 5 to 6 months, starting on the first semester of 2014. Gratification about 800€ net per month

Bibliography

(1) D. A. Randell, *et al.*, “Discrete Mereotopology for Spatial Reasoning in Automated Histological Image Analysis.,” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, pp. 1–1, 2012.

(2) N. Loménie and D. Racoceanu, “Point set morphological filtering and semantic spatial configuration modeling: Application to microscopic image and bio-structure analysis,” *Pattern Recognition*, vol. 45, no. 8, pp. 2894–2911, august 2012.

(3) P. Andrey *et al.*, “Statistical analysis of 3D images detects regular spatial distributions of centromeres and chromocenters in animal and plant nuclei” *PLoS Comput Biol.* 2010 Jul 8;6(7).

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