Ph.D. topic 2015

Image analysis for Urine Cytology data

Supervisor

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Presentation of the Ph.D. topic

Urinary cytology is an important component in the diagnosis of urothelial cancer. We propose to develop a high-resolution intelligent imaging computational method that is cancer-specific and that would differentiate between low grade and high grade urothelial carcinoma. In addition, the automated digital image analysis will be performed to identify the cytologic changes associated with chemotherapy treatment in patients with high grade invasive bladder carcinoma. A large patient cohort grouped into different grades of cancer will be recruited and their urine cytology slides scanned into digital formats. These images will be graded by pathologist experts to generate a training database for subsequent machine learning.

Expected deliverables

The candidate will develop machine learning and image analysis techniques for urine cytology images. Ability for accurate diagnosis and grading is an important part of this project. Hence the software has to be effective in helping pathologist grade cases efficiently and accurately. To achieve this, machine learning plays a central role together with advanced computer vision techniques on cellular object detection. The candidate is expected to develop very practical software for pathologists to use. Several metric for the measurement of this software has to be developed for generating a quantitative measure for reporting purposes.

Keywords

Image analysis, 2D image segmentation, machine learning.

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Applicant profile

- Master Degree or Engineer Student (last year of studies).
- Skills in programming, preferably JAVA and C++.
- Notions in image processing and machine learning.
- Open to work with both French and Singaporean scientists.
- Availability for starting October 2015.

Gratification: Compliant to French Regulation on Ph.D. students (Contrat doctoral)

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