

## Medical Image Understanding

### Semantic Tools for Computer-Aided Diagnosis of Cancer

Supervisor

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#### Keywords

Discrete Structures; Logical Reasoning Engine; Semantic Modeling; Content-Based Retrieval; Very Large Images; Histopathology

#### Scope of work

Histopathology (the microscopic study of tissues under microscope) is the gold standard for the diagnosis of many malignant cancers. For certain decision implying heavy therapeutic consequences, the law requires the gathering of opinions from at least two different pathologists. Currently, the observation of the tissue sample is done under an optical microscope without any remaining visual records, a potentially error-prone procedure considering the extremely large size and high complexity of histopathology images.

The FLexMIm project aims at improving the quality of healthcare by introducing computer-aided teleradiologic technologies into the practice. Involving a consortium of industries, research laboratories and 27 partner hospitals, the goal is to replace the traditional use of microscope with virtual technologies. Visual annotations placed into a virtual slide by the doctors are the basis for automated validation tools based on semantic modeling and logical reasoners.

This internship is directly contributing to the core technical work package of the project which is the semantic interpretation of images. Welcome contributions can take place into three different categories:

- Mathematical models of medical domain-knowledge representation
- Logical reasoning engines for the automatic matching of several diagnosis on the same case
- Retrieval method from the case database using visual and semantic similarity

#### Required profile

- Engineer degree or master degree student (final year)
- Strong background in discrete mathematics
- Experience with Python and C++

Duration 6 months

Gratification Approx. 800 € / 1,400 SGD per month



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