

Internship in real-time medical images processing

ICube laboratory (UMR UDS - CNRS 7357) is looking for an intern at the master level for working on OCT images processing for robotic applications

Context

Optical coherence tomography (OCT) offers unique capabilities for diagnosing diseases at the histological level and is particularly well suited for biomedical imaging. However, in its current forms OCT is limited to the imaging of small, easily accessible organs with a simple geometry.

In flexible endoscopes, the bending of the tip (and thus its position) is controlled with two cable pairs. In robotic flexible endoscopes, the cables are driven from the proximal side by two motors mounted on the endoscope handle. In the standard mode of operation the operator navigates the endoscope with a joystick and commands are directly mapped to the motor system.

To enable the use of OCT in larger organs such as the colon, we propose to combine OCT with a robotic flexible endoscope, which could automatically position the OCT probe for correct imaging of tissues.

Internship work

For computing the positioning error from OCT images, image processing is necessary to estimate the current configuration. An initial aim is to estimate the center of the lumen in reconstructed B-mode images (Fig. 1). To achieve high accuracy in real time, an optimized algorithm is required in terms of robustness to noise and of computational efficiency.

The work of internship will consist in:

- Developing image processing techniques for estimating the center of lumen in OCT images
- Testing the methods off-line on in vivo images
- Implementing the techniques for real-time on-line processing
- Testing the techniques on a real OCT system

Fig.1. Positioning error from OCT images

Working environment

The intern will work at the medical robotic platform of the ICube laboratory, located at the IRCAD, close to downtown Strasbourg.

Searched skills

Student at the master level with major in real-time image processing, computer vision and / or robotics
Coding in Matlab / C / C++ / OpenCV / Qt
Looking for both experimental work and theoretical developments.
Looking for medical applications

Dates

5 or 6 months from March 2017 to August 2017

Contact

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For applying send CV and cover letter