

Internship location: TIMC-IMAG, Grenoble.

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Collaboration: LATIM Integrated Project on Advanced Brachytherapy

Starting date: 2016 (4 to 6 months)

Keywords: image segmentation, ultrasound

1. The CAMI context

Medical Interventions (surgery, interventional radiology, radiotherapy) can provide a significant boost for progress in terms of patient-specific optimal planning and performance. To fulfill patient's demand for Quality, Senior Operators demand to see beyond the immediately visible, to be assisted in their real-time vital decisions and to accede to enhanced dexterity, while junior operators request to "learn to fly" before being left alone, and Public Health Authorities and companies require demonstration of the Medical Benefit of innovations.

The Computer Assisted Medical Interventions LABEX (CAMI LABEX) strategic vision is that an integrated approach of medical interventions will result in a breakthrough in terms of quality of medical interventions, demonstrated in terms of medical benefits and degree of penetration of CAMI technology in routine clinical practice.

Among the different actions undertaken in the scope of the CAMI LABEX, about 10 internships are to be financed yearly. The following internship proposal deals with themes within LABEX's scientific field.

2. Background

In the context of some treatments (for instance for cancer), needles can be inserted in the human body to deliver radioactive seeds (that look like small rice grains). Most often ultrasound imaging is used by a human operator to control the needle insertion or seed delivery. In this project we aim at assisting the human operator by developing automatic segmentation tools in the context of three dimensional ultrasound. Because the objects to be detected are metallic, they produce artifacts in the images. This makes this detection particularly difficult. We would like to explore new possibilities offered by a very recent and innovative ultrasound machine providing new modalities.

3. Detailed subject

The objectives are to develop and to test new robust segmentation approaches in the framework of the Camltk open software environment.

4. Required knowledge

Object programming experience is requested. Good skills in C++ are recommended.