



Thesis Project Form

Title (tentative): Semi-supervised learning applied to ultrasound image segmentation

Thesis advisor(s): Barla Annalisa

E-mail: Annalisa.Barla@unige.it

Address:

Phone: (+39) 010 353 6602

Description

Motivation and application domain

The thesis is cast in the context of medical image analysis, particularly the field of US imaging. The clinical objective is to set up a pipeline to support GEs in identifying and staging rectal tumors through the use of endorectal US.

General objectives and main activities

Semi-supervised learning methods are of particular interest for scenarios in which it is particularly expensive or time-consuming to collect a sufficiently large set of annotated examples to use as a training set. This is often true in the case of deep learning models for biomedical image segmentation, since the annotations must be performed by clinicians or experienced operators. The problem is exacerbated in the case of videos acquired by ultrasound modality, due to the increased number of images to be annotated compared to other modalities.

The subject of this thesis will be the application of semi-supervised methods to the segmentation, using deep neural networks, of tumor lesions in videos acquired by ERUS (endo-rectal US) probes in patients with suspected rectal cancer, and their evaluation in comparison with fully supervised methods.

Training Objectives (technical/analytical tools, experimental methodologies)

The candidate will study and learn Machine Learning methodologies for medical image analysis using Python language and state-of-the-art libraries for deep learning.

Place(s) where the thesis work will be carried out: Camelot Biomedical Systems s.r.l.

Additional information

Maximum number of students: 1