UE 1.1 Medical Image Analysis

Niveau d'étude
BAC +5

Composante
UFR Sciences et Techniques

En bref

- **Langue(s) d'enseignement:** Français
- **Ouvert aux étudiants en échange:** Non

Présentation

Description

Medical image acquisition & features

Methodology design in medical image analysis

Medical image segmentation

- binary vs semantic vs instance segmentation
- active contours (snake)
- evaluation metrics for medical image segmentation
- more "old school" (ie unsupervised techniques)

Deep learning in medical image segmentation

- from classification networks to segmentation networks
- pioneering networks: FCN, UNet
- various architectures
- loss functions (cross-entropy, dice)
- mitigate the need for labeled data
  - data augmentation in the training set: with geometric transformation or generative models
  - use weakly labeled or unlabeled data with weakly supervised learning, semi-supervised learning

Image registration

Characterization of images

- Characterization methods (Statistical attributes, Co-occurrence matrix, Mutlifractal analysis, Filtering, Representation of shape
- Feature extraction with auto-encoder

Multimodal medical image fusion

- Information Fusion (Fuzzy sets, Belief functions, Probability theory)
- Deep learning based fusion

Objectifs

The objective is to introduce recent tools for medical image analysis.

Pré-requis obligatoires

Basic methods in image processing.

Contrôle des connaissances

Contrôle continu

Compétences visées

Students will be able to propose methods to solve problems of outcome prediction, image classification and segmentation.

Liste des enseignements

	Nature	CM	TD	TP	Crédits
Medical Image Analysis	Matière				