Variational and geodesic methods for Image Analysis

ECTS : 6

Volume horaire : 24

Description du contenu de l'enseignement :

This course, after giving a short introduction to digital image processing, will present an overview of variational methods for Image segmentation. This will include deformable models, known as active contours, solved using finite differences, finite elements, level sets method, fast marching method. A large part of the course will be devoted to geodesic methods, where a contour is found as a shortest path between two points according to a relevant metric. This can be solved efficiently by fast marching methods for numerical solution of the Eikonal equation. We will present cases with metrics of different types (isotropic, anisotropic, Finsler) in different spaces. All the methods will be illustrated by various concrete applications, like in biomedical image applications.