Image analysis and pattern recognition
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Summary
This course gives an introduction to the main methods of image analysis and pattern recognition.

Content
Introduction
Digital image acquisition and properties.
Pre-processing: geometric transforms, linear filtering, image restoration.
Introduction to Mathematical Morphology
Examples and applications
Segmentation and object extraction
Thresholding, edge detection, region detection.
Segmentation by active contours. Applications in medical image segmentation.
Shape representation and description
Contour-based representation, region-based representation. Morphological skeletons
Shape recognition
Statistical shape recognition, Bayesian classification, linear and non-linear classifiers, perceptrons, neural networks and unsupervised classifiers.
Applications.
Practical works on computers

Learning Prerequisites
Recommended courses
Introduction to signal processing, Image processing

Learning Outcomes
• Use Image Pre-processing methods
• Use Image segmentation methods
• Choose shape description methods appropriate to a problem
• Use classification methods appropriate to a problem

Transversal skills
• Assess one's own level of skill acquisition, and plan their on-going learning goals.
• Use a work methodology appropriate to the task.
• Identify the different roles that are involved in well-functioning teams and assume different roles, including leadership roles.
• Make an oral presentation.
• Summarize an article or a technical report.

Teaching methods
Ex cathedra and practical work and oral presentation by the students

Assessment methods
Continuous control

Resources
Bibliography
Reconnaissance des formes et analyse de scènes / Kunt
Image processing, Analysis and Machine Vision / Sonka

Ressources en bibliothèque
• Reconnaissance des formes et analyse de scènes / Kunt
• Image processing, Analysis and Machine Vision / Sonka

Prerequisite for
Semester project, Master project, doctoral thesis