MP10: Deep Learning for Image Analysis
Course Introduction

E. Decencière, Thomas Walter, Santiago Velasco-Forero

MINES ParisTech
PSL Research University

About the lecturers

Thomas Walter

http://members.cbio.mines-paristech.fr/~twalter

- Researcher on bioimage informatics
- Main application fields: High Content Screening (HCS), as a method to systematically study biological processes by analyzing cellular phenotypes

Santiago Velasco-Forero

http://cmm.mines-paristech.fr/~velasco

- Researcher on image processing, pattern recognition, multivariate statistics, graph-based data/image analysis
- Main application fields: Remote Sensing, cosmetology, astronomy, hyperspectral imaging.

Etienne Decencière

http://cmm.mines-paristech.fr/~decenciere

- Researcher on mathematical morphology and image processing
- Main application fields: Ophthalmology, dermatology, cosmetology, astronomy

Course Team

Instructors

- Etienne Decencière
- Thomas Walter
- Santiago Velasco-Forero
- Bogdan Stanciulescu

Practical sessions software

- José-Marcio Martins da Cruz

Teaching assistants

- Monday: Joseph Boyd, Kaiwen Cheng
- Tuesday: Leonardo Gigli
- Wednesday: Peter Naylor, Robin Alais
- Thursday: Bogdan Stanciulescu
- Friday: Bruno Fligliuzzi

Program

Lectures: 9h-12h30 (except on Monday: 9h30-12h30)
including invited speakers (11h30-12h30)
Practical sessions: 14h-17h30.

Day	Lecture	Invited speaker
Monday	Machine learning Artificial neural networks	
Tuesday	Introduction to Convolutional Neural Networks Application to image classification	Pierre Fillard Terapixel
Wednesday	Image transformations and semantic segmentation Optimisation	Marc Huertas-Company Paris Observatory
Thursday	Practical considerations Applications in robotics	Bogdan Stanciulescu MINES ParisTech
Friday	Advanced techniques	Pauline Luc Facebook Research

Grading

- Continuous evaluation of practical work
- Exam (2h, Friday afternoon)

Main notations

i, j, n, p, q	Integer scalars
x, y, z	Real scalars
$\mathbf{x}, \mathbf{y}$	Real vectors
$\mathbf{X}, \mathbf{W}$	Matrices
f, g	Functions
$\boldsymbol{\theta}$	Set of parameters