EPFL

MICRO-573 | **Deep learning for optical imaging**

Psaltis Demetri

Cursus	Sem.	Type
Electrical and Electronical Engineering	MA2, MA4	Opt.
Microtechnics	MA2, MA4	Opt.
Minor in Imaging	E	Opt.
Photonics		Opt.
Robotics	MA2, MA4	Opt.

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	**3 weekly**
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Summary

This course will focus on the practical implementation of artificial neural networks (ANN) using the open-source TensorFlow machine learning library developed by Google for Python.

Content

After a brief introduction to deep neural networks, the course will focus on the use and functionality of TensorFlow, and how it can be used to build models of different complexity for different types of optical imaging applications. Models will range from simple linear regression to convolutional neural networks (CNN) for image classification and mapping. The course will be assessed through coursework and group projects where the students will apply TensorFlow to specific machine learning applications.

Keywords

Deep learning, TensorFlow, Artificial neural networks, Imaging

Learning Prerequisites

Required courses

Proficiency in Python, basic optics

Recommended courses

MICRO-421 Imaging Optics

Important concepts to start the course

Python familiarity, linear systems, basic optics

Learning Outcomes

By the end of the course, the student must be able to:
- Implement
- Choose
- Demonstrate

- Apply

Teaching methods

2 hours/week lecture
1 hour/week interactive artificial neural network develoment for selected problems

Resources

Websites

- http://Tensor Flow

Moodle Link

- https://go.epfl.ch/MICRO-573