MICRO-723

Deep Learning for Optical Imaging

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Cursus	Sem.	Type
Electrical and Electronical Engineering	MA2, MA4	Opt.
Photonics		Obl.

Language of teaching	English
Credits	2
Session	Summer
Semester	
Exam	Multiple
Workload	60h
Weeks	
Hours	**42 weekly**
Courses	14 weekly
Exercises	14 weekly
TP	14 weekly
Number of positions	

Frequency

Every year

Remark

Spring 2020

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

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. 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-567 Optical Wave Proagation

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:

- Choose A computational imaging model
- Structure The database for training artificial neural networks
- Implement Artifical neural networks using the TensorFlow machine learning library.

Teaching methods

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

Expected student activities

Attend lectures weekly
Attend exercise sessions
Participate in a class project
Turn in homework every two weeks

Assessment methods

Homeworks
Project report

Resources

Bibliography

Tensor flow

Notes/Handbook

Class notes will be posted on Moodle