COURSE SYLLABUS

Introduction to Deep Learning for Physicists

2122-86R-IntroDeepLAL

Title

Introduction to Deep Learning for Physicists

Teacher(s)

dott. Cristiano De Nobili

Language

English

Short description

Deep Learning Intro (8 hours)

1. Information Theory Background for Machine Learning

2. Neural Networks Theory, non-linearity, learning through backpropagation and gradient descend

3. PyTorch Introduction

4. Building a feed-forward network from scratch with PyTorch

5. Overfitting and Underfitting a Neural Network for universal approximation. Dropout and regularizations.

An Advanced Example (6 hours)

1. Convolutional Neural Networks

2. Variational Auto-Encoder for image denoising

3. (OR in alternatively) Generative Adversarial Networks

Sustainable AI: an example (4 hours)

1. Motivation for energy efficient deep learning

2. Pruning Neural Networks and Lottery Ticket Hypothesis

CFU / Hours

18 hours / 2CFU

Teaching period

January 2022