

DEEPAFIELD

DEEP

LEARNING

IN

FIELD

ROBOTICS:

FROM

CONCEPTUALIZATION

TOWARDS

IMPLEMENTATION

Deep Learning for Image Classification and Segmentation

Where: Online

When: from 09/07/2021 to 30/07/2021 from 10:00 to 17:00 Italian time

Who: Matteo Matteucci & Francesco Lattari

1. Course Program

The following is the course program with tentative topics. It might be adapted based on class advancement. As the course is in co-sharing between DEEPFIELD and TREA on two different time zones (Portugal + Italy) please check that times are in the Italian time zone while the Portuguese time should be 1 hour ahead (i.e., 10:00 in Italy is 09:00 in Portugal).

09/07/2021 Intro to Deep Learning and Neural Networks

- 10:00 - 13:00 CEST [Theory] (Matteo Matteucci)
Course Intro, Deep Learning Intro, Neural Network Intro
- 14:00 - 17:00 CEST [Practice] (Francesco Lattari)
Building a Feedforward Neural Networks in Keras / Tensorflow 2.0

16/07/2021: Training Feedforward Neural Networks

- 10:00 - 13:00 CEST [Theory] (Matteo Matteucci)
Dealing with overfitting and training tips & tricks
- 14:00 - 17:00 CEST [Practice] (Francesco Lattari)
Training a neural network in Keras / Tensorflow 2.0 (and monitoring it)

23/07/2021: Convolutional Neural Networks

- 10:00 - 13:00 CEST [Theory] (Matteo Matteucci)
Convolutional Neural Networks for Image Classification & Segmentation
- 14:00 - 17:00 CEST [Practice] (Francesco Lattari)
Writing a CNN in Keras / Tensorflow 2.0 for Image Classification & Transfer Learning

30/07/2021

- 10:00 - 13:00 CEST [Theory] (Matteo Matteucci)
Dealing with sequential data, LSTM, Word Embedding, Seq2Seq
- 14:00 - 17:00 CEST [Practice] (Francesco Lattari)
Writing Recurrent Neural Networks in Keras / Tensorflow 2.0 (Part 1)
Writing Recurrent Neural Networks in Keras / Tensorflow 2.0 (Part 2)

2. Course Logistics and Material

Lectures will be online via webex, you should connect to the classroom of the teacher who will let you in as soon as you connect.

- Matteo Matteucci <http://politecnicomilano.webex.com/meet/matteo.matteucci>
- Francesco Lattari <http://politecnicomilano.webex.com/meet/francesco.lattari>

Slides and notebooks will be made available as well as recordings of the lectures (TBC) accessing this folder

- https://drive.google.com/drive/folders/1Er9GhnWaOVwTXGTSIMd10Uf4dqPcf_cD?usp=sharing

For the practicals we suggest you install TensorFlow 2 on your machine so you can follow the coding examples step by step. Here what you should do:

- Install Anaconda according to your distro (Windows/Linux), python 3.7 (<https://www.anaconda.com/distribution>)
- From terminal (Anaconda Prompt in Windows):
 - `conda create -n tf_env python=3.7 tensorflow-gpu`
 - `conda activate tf_env`
 - `pip install --upgrade pip`
 - `pip install jupyter`
 - `pip install pillow`
- Test your Tensorflow install
 - Run python from terminal (Anaconda Prompt in Windows) with «python»
 - `import tensorflow`
 - `print(tensorflow.__version__)` -> you should get version 2.1.0 or higher
- Test your Jupiter install
- From terminal (Anaconda Prompt in Windows) use the command `jupyter notebook` -> a Jupiter tab should appear in your browser
- On top right click on «New» and select «Python 3» from the menu -> a Jupiter Notebook should appear in a new tab
- Write code 3b and 3c in cell "In []:" and execute clicking on «Run».

You can also use colab <https://colab.research.google.com/> in case you do not have the possibility to properly configure your computer.

3. Course Feedback

Provide feedback here: <https://forms.gle/96e6SijNkKt27y1A7>