AURORA

PYTHON COURSE

PART 2

Introduction to Machine Learning with Python

November 2022

02, 04, 07, 09 and 11 of November, from 9:00-12:00 am CET.

Teachers: Jon Garrido Aguirre - b2slab.upc.edu
Enrico Manzini - b2slab.upc.eduUniv.

In 2020, Python was the most popular programming language with more than 50% of hiring managers seeking candidates who know this language. There are plenty of reasons why Python is so popular: it is easy to learn and use, allowing programmers to easily develop a wide variety of applications, from data science to web development; from machine learning to finance services. Literally, everything you want to do, you can do it in Python.

Both teachers are top researchers at Bioinformatics and Biomedical Signals Laboratory (B2Slab, http://b2slab.upc.edu, member of http://creb.upc.edu). B2Slab is a multidisciplinary research group coordinating the projects such as xartecsalut.com, the data science behind share4rare.org and the upcoming share4pandemics, and founder of spin-off companies such as exheus.com and vincer.ai

Organizers:

UPC CREB B2S LAB UNIVERSITAT ROVIRA i VIRGILI

Co-funded by the Erasmus+ Programme of the European Union

PYTHON COURSE PART 2

Introduction to Machine Learning with Python

Register here before October 27th

0. Review of Python features (1h)

Overview and review of most important Python libraries for data analysis (Pandas, NumPy…).

1. APIs introduction (3h)

APIs introduction:
- What is an API?
- How to use an API for making a request and possible response codes

Introduction to scikit-learn, a machine learning library for Python

2. Introduction to Machine Learning (2h)

Basic definitions: what's Artificial Intelligence? What are the differences with Machine Learning? And with Deep Learning?

Learning paradigms:
- Machine Learning workflow
- Supervised learning vs Unsupervised learning
- Algorithms families: regression, classification, etc.

3. Supervised Learning with Python (6h)

Regression algorithms:
- Definition of regression
- Introduction to linear regression
- Model selection and evaluation

Classification:
- Definition of classification
- Introduction to basic algorithms fo classification: logistic regression, linear discriminant analysis, k-nearest neighbors…
- Accuracy vs Sensitivity: importance of correct metrics for evaluation

Artificial Neuron:
- History
- Perceptron basic functioning
- Introduction to Deep Learning: from a single neuron to a deep neural network

Advance methods for classification and regression:
- SVM, Random Forest, boosting…

Organizers:

UPC CREB B2S LAB UNIVERSITAT ROVIRA i VIRGILI

Co-funded by the Erasmus+ Programme of the European Union

4. Unsupervised Learning with Python (3h)

Clustering:
- Definition of clustering
- K-means algorithm for clustering
- Hierarchical clustering
- Other algorithms: spectral clustering, PCA…

Features Extraction:
- Definition of feature extraction
- Principal Component Analysis for feature extraction

This course offers **30 positions** open to Aurora staff members and Ph.D. students. Regarding the selection of candidates, we will prioritize having representation from all Aurora Universities.

Register here before October 27th

Organizers:

UNIVERSITAT ROVIRA i VIRGILI

Co-funded by the Erasmus+ Programme of the European Union