

## COURSE 4

### Introduction to Machine Learning / Deep Learning

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**Organiser:** Fundacion Publica Gallega Centro Tecnologico de Supercomputacion de Galicia (CESGA), Spain

**Dates:** 12.09.2022 - 16.09.2022



#### Course description:

##### General information

The course is oriented to give an overview of the Machine Learning basic algorithms and its usefulness in topics related to SINFONIA project. During SINFONIA project several AI algorithms will be developed. This course will give an overview to machine learning and will help the project partners to increase their skills in the development of AI and deep learning algorithms.

*Prior knowledge of Python programming language is welcome. **Participants should bring their own laptops.***

##### Financial information

The courses may be based on the financial support provided to the beneficiaries by SINFONIA or include a participation fee but only for non-SINFONIA participants. Note that if participation fees are charged, this will be an income of the project and must be declared by the beneficiary during financial reporting. SINFONIA participants cover their own costs associated with travel and lodging.

##### Logistics

The course will take place at CESGA, Avenida de Vigo, s/n 15705 Santiago de Compostela, A Coruña, Spain. CESGA has no lodging facilities; participants should find their own accommodation in the nearby hotels.

#### Application

Please register at the following link:

<https://www.cesga.es/en/workshop-sinfonia/>

For further details, please contact **José Carlos Mouriño Gallego** at [josecarlos.mourino.gallego@cesga.gal](mailto:josecarlos.mourino.gallego@cesga.gal).

The **deadline for applications is July 29<sup>th</sup>, 2022**. Confirmation of participation will be sent by August 12<sup>th</sup>, 2022.

**The number of participants is limited to 50.**

**Programme:****Monday, September 12** - Introduction to neuronal networks (5h).

- Basic concepts.
- Methodology of Machine Learning projects
- Classification and regression.
- Supervised training.
- More frequent APIs.

**Tuesday, September 13** - Deep Learning (5h).

- Convolutional networks and deep networks.
- Networks for temporal analysis: RNN / LSTM. / GRU
- Transfer Learning
- Autoencoders

**Wednesday, September 14** - Other algorithms (5h).

- Support Vector Machines
- Decision trees
- Ensembles
- Random Forest
- AdaBoost / XGBoost
- Naive Bayes
- Reinforced learning

**Thursday, September 15**

- Clustering (2h).
  - Basic concepts
  - Unsupervised training
  - K-means / K-Modes / K-Prototypes
- Advanced computational techniques (3h).
  - Parallel training
  - Best architecture and parametric search

**Friday, September 16** - ML and exposure to ionizing radiation from medical imaging procedures (5h).

- ML in X-ray imaging
- ML on NM

