Nombre de Tutor del proyecto
Massimiliano Zanin

Nombre del Grupo de investigación asociado a AIHUB
Complex Systems

Ubicación del centro donde se disfrutará la beca
IFISC (CSIC-UIB), Palma de Mallorca, Spain

Título del proyecto
Modular deep learning architectures for the classification of time series

Descripción del proyecto (máximo dos párrafos)
Within the larger field of Deep Learning, many models have been proposed to tackle the problem of classifying time series – e.g. to be able to detect the health condition of a patient given a time series representing some bodily observable. These are usually adapted from other problems, mostly image classification, and some of the most popular and effective solutions include Fully Convolutional Neural Network (FCN), Multi-Channel Deep Convolutional Neural Networks (MCDCNN) or Residual network (ResNet). Notably, these models are based on different configurations of a small set of basic computational elements, e.g. convolutional or pooling layers.
In this project we will develop a modular software library, able to train and evaluate different neural network topological structures, with the aim of 1) evaluate to what degree the performance of the model depends on the topology, and 2) whether the best topology is a function of the data under analysis. The evaluation will leverage on multiple data sets, coming from biological (brain dynamics), social (financial markets) and technological (air transport) systems. Finally, the student will have the possibility of working and getting proficient with industry-standard software libraries (TensorFlow and Keras for Python) and hardware infrastructure (in-house cluster of Nvidia GPUs).