

Machine Learning

Machine learning methods are nowadays used in a wide variety of scientific domains. For example,

- Unsupervised machine learning methods may be used as tools for data exploration and visualisation (dimension reduction and clustering),
- Supervised machine learning methods may be used as tools to make predictions: given an input data point, predict the output (classification or regression).

At the DCSR, we can help you with the following aspects of machine learning.

Formation

We can help you to understand how a particular machine learning method works and how it may be used in your research. Note that the DCSR gives a few short courses on machine learning; see

<https://www.unil.ch/ci/dcsr-en>

Methodology

We can help you to choose and apply the appropriate machine learning methods in your research. This may involve a pilote phase during which we develop together codes and run them on your laptop or on the UNIL clusters. Later on, we can also help you with the production phase.

More specifically, we can help you to find existing machine learning programs that would fit the aim of your analysis, install and run them on your laptop or on the UNIL clusters, and explain the meaning of their underlying option parameters. If no satisfactory machine learning program exists, we can help you to develop new algorithms and write codes that would fit the aim of your analysis.

Infrastructure

We can help you to implement efficiently your machine learning pipeline on the UNIL clusters. More specifically, we can help you to install your codes on the UNIL clusters and to profile them in order to find the optimal setting (in terms of RAM, number of nodes and CPU/GPU).

Foster UNIL collaborations

We can help you to find appropriate experts at the UNIL to discuss with you about specific machine learning related problems. Note that the DCSR organises a ML Café every 4 months during which two researchers give short presentations on how they use machine learning in their work, followed by discussions. The presentations should be accessible to a broad audience and will show you how machine learning tools are being used in various field of research. If you are interested in

participating to this meeting, please send an email to helpdesk@unil.ch with subject: DCSR ML Café.

A few examples:

1. An experimental scientist would like to learn how to analyse his/her data on his/her laptop or on the UNIL clusters by using machine learning methods. We can help this researcher to find appropriate machine learning tools, to understand how they work and to use them on his/her laptop or on the UNIL clusters.
2. A data scientist would like to implement a machine learning pipeline (on his/her laptop or on the UNIL clusters) but he/she is not sure how to do it properly. We can help this researcher to find and apply appropriate machine learning methods.
3. A data scientist has implemented a machine learning pipeline (on his/her laptop or on the UNIL clusters) and would like to discuss about the methodology he/she used. We can help this researcher to check whether his/her approach is correct and we can also suggest alternative approaches.
4. A data scientist has implemented a machine learning pipeline on his/her laptop and would like to run it on the UNIL clusters (going from laptop to cluster). We can help this researcher to implement efficiently his/her pipeline on the UNIL clusters. This may involve the installation of softwares and the profiling of codes.

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