Machine Learning

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About me

- PhD in Machine Learning in 2020
- Lecturer at CentraleSupélec/Paris Saclay for 6 years now
- I own a (very small) AI consulting company
  - Some of my current or former clients:

SAMSUNG   SAINT-GOBAIN   L'ORÉAL   orano   AXA

LVMH   Pernod Ricard   GLS

- Also co-founded 2 startups

Contact

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- Personal email address: yannicklecacheux@gmail.com
  - For urgent matters
  - Or to keep in touch after the course

About the class

- 8 sessions, ∼3 hours each
  - divided into lecture - break - lab

Lab sessions

Please bring your laptop for the lab session

Course evaluation (subject to change):

- ∼30% of the final grade is the labs
  - Labs are due one week after they are issued (so Friday at ∼midnight)
- ∼70% is the final project
  - Grade for final project is ∼50% score, ∼50% report

Project

More info about project coming soon

Course prerequisites

I am assuming you are at least somehow familiar with:

- **Math**:
  - ▶ probability & statistics (bayes theorem, maximum likelihood...)
  - ▶ linear algebra (matrix multiplication, eigenvalues, eigenvectors...)
  - ▶ calculus (derivatives, gradients, gradient descent...)
- **Programming**: ideally Python

I can recommend readings if necessary.

We will briefly cover some (potentially) new material such as:

- Matrix calculus
- Constrained optimization (i.e. Lagrange multipliers)

Refresher material

Recommended: doing exercises in 1st part of (optional) homework 1 as a refresher on e.g. maximum likelihood and practice for new concepts e.g. matrix calculus.

Optional work and readings

Further readings:

- *Pattern Recognition and Machine Learning*, by Christopher Bishop
- *Mathematics for Machine Learning*, by Marc Peter Deisenroth et al.
- *Deep Learning*, by Ian Goodfellow et al.

Practice exercises:

- Homeworks 1 and 2
- Other useful exercises: https://www.deep-ml.com/

Additional material

Some useful resources and exercises may be found on my blog (WIP):
https://manifold.fr/blog

Set up for labs

Setting up a Python Environment with Conda:

1. Download and install Miniconda:
   https://docs.anaconda.com/miniconda/

2. Create a new Conda environment:
   conda create -n mlclass python=3.10

3. Activate the environment:
   conda activate mlclass

4. Install necessary packages using pip:
   pip install scikit-learn jupyter matplotlib

5. Launch Jupyter Notebook:
   jupyter notebook

Alternatively, you may use Google Collab, Visual Studio Code, or any other method that lets you read, modify and run iPython Notebooks.

Other

Course materials

Pending full access to Edunao, course materials will be available here:
`https://github.com/yannick-lc/mlclass2025`

- Please do not share the slides publicly (I don't have the rights to all the images I used in the slides)
- Also, please also don't share the solutions to labs and homework assignments

- Most content is on slides, but not all. I will sometimes explain things orally/on the board. You may want to take notes.
- If at any point something is not clear or you want further information, **please do ask questions**.