

# Learning Machine Learning

To support your learning, focus on the following concepts:

- Types of ML** (supervised/unsupervised)
- ML models** (decision tree, k-means, linear regression)
- Data splitting** (training, validation, testing)
- Coding** (scikit-learn, tutorial exercises)
- Data preparation** (reshape, transform)
- Neural Networks** (architecture, layers, neurons)
- NN training** (loss function, learning rate)
- Types of hyperparameters** (epoch, batch, kernels)
- Types of NN layers** (linear, convolutional, max pool)
- Types of NN** (convolutional, multilayer perceptron)
- Hyperparameter optimisation** and choice
- Data ethics** (sources, labelling, biases, privacy)

A cheat-sheet  
according to learners

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Machine learning is everywhere: from daily use (large language models, image recognition) to applications in the geosciences (weather forecasting, climate modeling). It is quickly becoming a tool that every scientist should become familiar with, and that every student will have to discover and learn about. Based on a conceptual survey collecting data along a pilot course, this cheat sheet has been generated to help learners: it presents the concepts deemed newest, most important, and difficult across a comprehensive introduction to machine learning and neural networks.

**Source:** participants of the autumn 2025 evening course *Machine Learning for Geosciences* offered at the Geophysical Institute of the University of Bergen and funded by the #CoCreatingGFI project.

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