

Neural Networks

Reti Neurali (MFN0824)

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Books

- ***Hands-on Machine Learning with Scikit-Learn, Keras and TensorFlow** (A. Géron)
Theory (ML and DL) + Keras/TensorFlow
- **Deep Learning with Python** (F. Chollet)
Little Theory, Keras/TensorFlow
- **Deep Learning with Pytorch** (Stevens, Antiga, Viehmann)
Little Theory, Pytorch

Courses / Online learning resources

- deeplearning.ai
Pointers to free courses on Coursera (Andrew Ng + others)
- **Deep Learning DS-GA 1008** (LeCun, Canziani - NYU)
<https://atcold.github.io/pytorch-Deep-Learning/>
- **Deep Learning** (Fleuret - UNIGE/EPFL)
<https://fleuret.org/dlc/>
- **Machine Learning Road** (Shengjia Yan)
<https://github.com/yanshengjia/ml-road>
Collection of pointers to great courses and books on ML and DL

Datasets / Code

- **Keras Datasets** (keras.io/api/datasets)
Very simple and famous datasets, useful for playing and testing
- **UCI Machine Learning Repository** (archive.ics.uci.edu/ml/datasets.php)
A lot of non-standard datasets, with manageable dimensions
- **Kaggle Datasets** (kaggle.com/datasets)
Datasets from Kaggle competitions, many with code snippets by other users
- **Papers with Code** (paperswithcode.com)
Latest research papers with links to code and data
- **Machine Learning for Art** (ml4a.net)
Art-related projects with implementations and data
- **OpenDataMonitor** (opendatamonitor.eu)
- **Google Dataset Search** (datasetsearch.research.google.com)

Other interesting stuff

- **TensorFlow Playground** (playground.tensorflow.org)
Train simple neural networks in the browser, on simple synthetic datasets
- **Why AI is Harder Than We Think** (arxiv.org/abs/2104.12871)
Good non-technical starting point for critical thinking about our understanding of AI
- **Deep Learning** (<https://www.cs.toronto.edu/~hinton/absps/NatureDeepReview.pdf>)
(Old-ish) review on the SOTA of deep learning, by three of its most famous founding fathers.
- **Connected Papers** (connectedpapers.com)
Visually explore papers related to the one you provide, kind of a “recommender system” for papers (works with any field, not only ML)

Simple project inspirations

- **StatMech-related:**
 - Hopfield Networks
 - Restricted Boltzmann Machines (RBMs)
 - Deep Belief Nets (DBNs)
 - Self-Organizing Maps (SOMs)
- **Unsupervised ANNs:**
 - Autoencoders (stacked/convolutional)
 - Variational Autoencoders (VAEs)
 - Sparse Autoencoders
 - Generative Adversarial Networks (*more tricky*)
- **Sequential Data:**
 - Recurrent Neural Networks (RNNs)
 - LSTM/GRU (*more tricky*)
- **Synthetic Datasets !!!**