

Deep Learning - MAI

Guided lab - CNNs

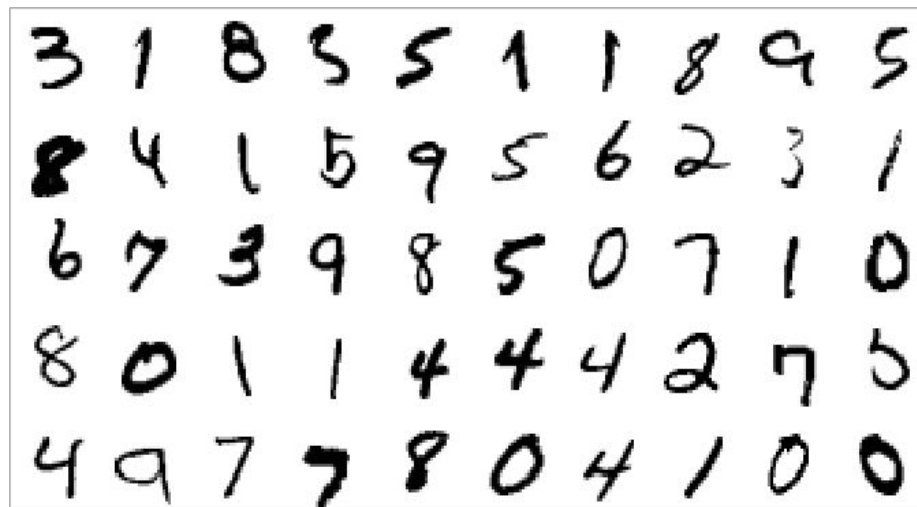
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Outline

1. **Fully connected** networks applied to **MNIST**
2. **CNNs** applied to **MNIST**
3. **CNNs** applied to **CIFAR10**

MNIST

- ❖ MNIST is a *black and white* handwritten digit recognition dataset
- ❖ First testing ground for new AI techniques
- ❖ See how far you can get using a fully connected network



CIFAR10

- ❖ CIFAR is a classification problem of low-resolution images (32x32)
- ❖ Version with 10 and 100 classes
- ❖ <https://www.cs.toronto.edu/~kriz/cifar.html>

airplane



automobile



bird



cat



deer



dog



frog



horse



ship



truck



Let's look at the code

Get used to handling and loading data. It's a big part of any DL experiment.

Look into "*flow_from_directory*" from keras to avoid memory issues, when loading large datasets.

Experiment 1 (FC & MNIST)

❖ Code

- https://raw.githubusercontent.com/UPC-MAI-DL/UPC-MAI-DL.github.io/master/_codes/1.FNN-CNN/mnist_fnn_example.py

❖ Launcher

- https://raw.githubusercontent.com/UPC-MAI-DL/UPC-MAI-DL.github.io/master/_codes/1.FNN-CNN/launcher.sh

❖ Data

- <https://s3.amazonaws.com/img-datasets/mnist.npz>
- Within P9, store in ~/.keras/datasets

“wget” to download from internet to your pc
“scp” to upload from your pc to P9

Experiment 2 (CNN & MNIST)

❖ Code

- `https://raw.githubusercontent.com/UPC-MAI-DL/UPC-MAI-DL.github.io/master/_codes/1.FNN-CNN/mnist_cnn_example.py`

❖ Launcher

- Adapt the launcher for experiment 1

Experiment 3 (CNN & CIFAR10)

❖ Code

- Adapt the code from experiment 2
- Notice data dimensions

❖ Launcher

- Adapt the launcher for experiment 1

❖ Data

- <https://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz>
- Rename to `cifar-10-batches-py.tar.gz` and store in `~/.keras/datasets`

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