MAI

Deep Learning

Autonomous lab

FNN & CNN

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Rules

- Work is done in pairs. Find it yourselves.
- Pairs can be changed for the rest of assignments
- Evaluation is based on a 40 min. live interview, and its individual
- Both students can be asked about any aspect of their work, and are expected to answer
- You can split the work, but be sure to understand everything done so that you can explain it and defend it in the interview

HIGH PERFORMANCE ARTIFICIAL INTELLIGENCE

The work

1. Choose a dataset
2. Approve the dataset with the lecturer
    1. No repeated datasets!
3. Train a CNN to solve the problem with the highest possible accuracy
    1. Include all phases, from data preprocessing to results analysis
    2. Consider all the tools mentioned in theory, and use them (or not) wisely
    3. Train from scratch. No transfer learning (yet)
    4. Design from scratch. No reusing deep architectures.

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The tips

The goal is to find a CNN architecture that works for your problem. Converge towards the solution. One way of doing it:

1. Start from a shallow model, and test different configurations (#layers, #neurons) until you outperform the random classifier -> Underfit
2. Increase model capacity until train gets close to ideal performance -> Overfit
3. Close the gap with validation set (regularization, data augmentation) -> Fit?
4. Tune hyperparameters. Check if underfit or overfit, and act in consequence.

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Interview

- During the interview, you will have to explain the experiments conducted.
- Bring support tables and figures, for example:
  - Dataset info: Size, splits, class distributions, dataset samples, technical properties
  - Training results: Loss and accuracy curves
  - Performance reports: Accuracies, confusion matrices
- Which of these are relevant will depend on your experiments!

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Evaluation

- You will be evaluated based on your understanding of DL methods
- On the **coherency of their use** in your work
- On the **correct assessment of the results**, and on the **decisions made** as a result

- You have to deliver your trained models through Raco
  - h5 file (trained weights)
  - json file (architecture)
  - txt file
    - Data set short description and location (URL?)
    - Train/Val/Test split percentatges
    - Val/Test loss & accuracy

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Doodle

- To be published in Raco
- Choose a slot for the interview.
- One per pair.
- Specify both names
- Interviews to take place at Omega-207
- Bring a laptop to show the support material

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