MAI

Deep Learning

Autonomous lab

FNN & CNN

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Rules

- Work is done individually

- Evaluation is based on a 10 pages max report

- Report should not include state-of-the-art or theory discussed in class.

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.

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.

Report

- In the report, you will have to explain the experiments conducted.

- Add 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!

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