
Computer Project 2

Goal: To design, train and test a Convolutional Neural Network (CNN) for a multi-class classification problem.

Instructions:

- The starting code for this project uses the keras package of Python in a jupyter notebook, however, it is allowed to use tensorflow, pytorch, or any other deep learning package or programming language.
- Submit a report in PDF format limited to no more than 10 pages (not including the computer code), and the code as an appendix.

Dataset:

We are going to use the MNIST handwritten digit database with additive correlated noise.

The images and class labels are contained in the file 'MNIST_CorrNoise.npz'. Place the data file in the same folder as the 'Project_#2.ipynb' (e.g. "/My Drive/Colab Notebooks" or edit the directory path in the code).

Task:

- Follow the instructions in the notebook 'Project 2.ipynb' to design and train a convolutional neural network that classifies a noisy handwritten digit into one of the 10 possible classes (0, 1, 2, 3, 4, 5, 6, 7, 8 or 9)
- Explore different layer combinations and training settings to find the best model in terms of classification accuracy. Be careful not to overfit the training data!
- Draw the scheme of your best model; report training, validation and test accuracies as well as loss vs epochs and accuracy vs epochs plots.
- Comment on the results, the total training time and the logic behind your choices.

Grading:

Your report will be graded based on the following:

- Correctness, clarity and conciseness of the work (see guideline on how to write a good report).
- Understanding of the model, correct scheme drawing.
- Model performance: high accuracy in test set, well trained and not overfitted model.