University of Fribourg
Departement of Informatics

Lecturer: Dr. Andreas Fischer
Teaching Assistants: Linda Studer

Spring Semester

Pattern Recognition

Exercise 2c - March 28, 2022

First Team Task (CNN)

Deadline: April 11, 2022 (end of day)

In this exercise, you should train and test a basic CNN on the MNIST dataset. Use the incomplete CNN implementation that you find on ILIAS (model_task2c.py). If you want, you can also play around with the architecture.

Additionally, there is a short individual task that you have to hand in through ILIAS. You will have to perform a forward pass manually. You can find instructions for this task in the PDF *Serie_02c_individual.pdf*.

CNN on MNIST

Complete the provided CNN implementation. Use the provided training set to train the CNN. Apply the trained CNN to classify the test set. Perform validation:

- Optimize learning rate (typically in the range [0.001, 0.1]).
- Optimize number of training iterations. Plot a graph showing the accuracy on the training set and the test set, respectively, with respect to the training epochs.
- Perform the random initialization several times and choose the best network during testing.

Expected Output

- Access to your github so that we can inspect your code.
- Small report in PDF / README format on the GitHub containing:
  - Plot showing the accuracy and loss on the training and the test set with respect to the training epochs.
  - Test accuracy with the best parameters found during testing.
- Individual: Manual forward-pass handed in through ILIAS.