

Assignment No. 3

Submission Date: 23/1/2026

- 1) Read chapter 11: "[Implementing a Multi-layer Artificial Neural Network from Scratch](#)" of the book "[Machine Learning with PyTorch and Scikit-Learn](#)" by Raschka et al. (2022)
- 2) Given the code of chapter 11 that can be found in:

<https://github.com/rasbt/machine-learning-book/blob/main/ch11/ch11.ipynb>

your main goal is to extend the code to address two hidden layers (instead of a single hidden layer). Extend the code by creating a local copy of the ch11.ipynb, perform the revisions, and submit the GitHub link to your revised code.

- 3) Apply the code of section 2 with the two layers for classifying handwritten digits MNIST dataset using the same full ANN architecture presented in the class (see "Solution 1: A plain deep NN") and evaluate its prediction performance (macro AUC) using Train(70%)/Test(30%) validation procedure.
- 4) Compare the predictive performance of section 3 with the original (single hidden layer) code and with the fully connected ANN implemented in Keras/TensorFlow/PyTorch (choose one).

Submission should include:

One file (RAR or ZIP) should be submitted in Moodle (תרגיל 3). The file should contain:

- 1) Readme file with the links to the GitHub source codes
- 2) A PDF file for explaining your solution and results.