

Marked exercises, lecture 2

This is the first set of marked exercises, which are a part of the Submission 1. In this assignment, you will get familiar with several loss and activation functions. Detailed instructions and explanations are provided in the accompanying Jupyter notebook. In total you can get 6 points out of 60 points for Submission1 for completing all exercises related to lecture 2.

Activation functions

1.2.1 Implement Sigmoid [1 point] and Leaky ReLU [1 point] functions and their first derivatives.

Loss functions

1.2.2 Implement Mean Squared Error (L2-metric) [1 point], Categorical Cross-Entropy Loss [1.5 points] and Contrastive Loss [1.5 points].

Implement the functions mentioned above from scratch, using only mathematical operations (+, -, /, *) and numpy functions such as np.exp, np.matmul, np.log, np.size, np.resize, np.mean, np.sum, np.maximum, np.minimum, np/max, np.min, np.square, np.sqrt, np.clip, np.clamp, np.array, np.arange, np.ones, np.zeros, np.transpose, np.linalg.norm, and similar functions from numpy library.

You ARE NOT ALLOWED to USE torch, sklearn or any other libraries or toolboxes that automatically solve the main tasks of the assignment, such as (but not limited to) nn.MSELoss, nn.Sigmoid, sklearn.metrics.mean_squared_error, etc.