Individual project

Neural Networks
2023 autumn

The aim of the individual project is to develop skills necessary to successfully build and train a neural networks algorithm in classification or prediction task.

Results of the individual project should be:

1. Described in a Jupyter Notebook format (.ipynb), GoogleColab link or files uploaded to the Moodle system at least 1 day before presentation.
2. Presented commenting the code during the last lecture / seminar of the course.

The report should consist of the following chapters:

1. Dataset description
2. Goals and objectives
3. Data preparation (fix missing values, remove outliers and etc.), exploratory data analysis (histograms, scatter plots, correlation coefficients).
4. *Machine learning (except neural networks, e.g. decision tree, k-NN) algorithm (choose 1 method) for your data analysis.
5. Neural networks for your data analysis (choose 2 methods):
    a. Multilayer perceptron
    b. Convolutional Neural Network
    c. Recurrent Neural Network
    d. Long-short term memory network
    e. Autoencoder
    f. Generative adversarial neural network
    g. Transformer
    h. .....
6. Estimation of the classification or prediction accuracy on the training and test set errors.
7. Analyse the parameters of the machine learning methods on the classification accuracy (follow the description of the relevant practicals).
8. Comparison of ML methods for classification or prediction with the best parameters selected.
9. Conclusions.

Presented project should include all the chapters in the short form.

Data repositories:

- http://homepages.inf.ed.ac.uk/rbf/IAPR/researchers/MLPAGES/mldat.htm
- http://archive.ics.uci.edu/ml/index.php
- http://www.kdnuggets.com/datasets/index.html
- http://genomics-pubs.princeton.edu/oncology/affydata/index.html

* - optional.