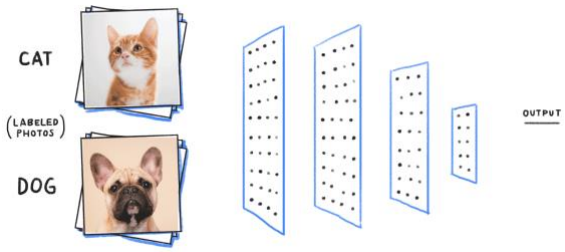
OLA 1: DEEP LEARNING WITH ANN

Objective

The objective of this assignment is to enable you to build knowledge and train skills in applying artificial neural networks (ANN) for deep learning and pattern recognition.



Tasks

The project work involves solving the following tasks:

1. Obtaining, importing, and pre-processing of data, appropriate for supervised machine learning - classification of images. You can use datasets, available at https://github.com/datsoftlyngby/soft2024spring-ai/tree/main/Data/CNN, https://www.kaggle.com/c/dogs-vs-cats-redux-kernels-edition/data, or https://www.cs.toronto.edu/~kriz/cifar.html
2. Building and training a model of convolutional neural network (CNN) for recognition of patterns and classification of images based on these patterns.
3. Validating and testing the model with both labelled and not labelled images.
4. Assessing the quality of the model by means of proper measures and criteria.
5. Discussing the process and the product of the project by answering the questions:
    a. Based on your experience, how would you define ANN and CNN?
    b. Which hyper-parameters of the CNN architecture have you fine-tuned?
    c. Which is the role of the activation functions in ANN? Which of them you have implemented? Illustrate them.
    d. Can you see any advantages and disadvantages of ANN and CNN used for classification in comparison to the other classification algorithms you are familiar with? Give some examples.

Notes

It is a teamwork task.

The commented solutions should be stored in team's Github repo, the link to which is to be submitted in Moodle. Some of the teams will be invited to present their solutions to the class.

The successfully completed solutions give 20 study points to the team members.

P.S. Feel free to use your natural creativity. The solution doesn't have to be perfect, what matters most is learning maximum on the way of developing it.