Deep Learning: Project 1

Project plan

Team members: Dora Doljanin & Filip Pavičić

Project topic

Image classification with convolutional neural networks

Description of the problem

We want to solve the problem of identifying the subject of each image. We will use the CIFAR-10 dataset, which consists of 60,000 labelled images, to classify images in one of 10 object classes.

Project goals

The purpose of this project is to solve the problem of image classification using deep learning and convolutional neural networks. The goal is to test and compare the performances of different network architectures by conducting various experiments.

Expected results

- Project plan
- Report
- Application code
- PowerPoint Presentation

Tasks

1. Explore technical literature, theoretical background, pre-trained models, and related work
2. Choose the technologies and network architectures to use
3. Split the original training dataset on training and validation datasets
4. For each architecture:
    - Explore and define different hyper-parameters relevant to the architecture
    - Define the model
    - Investigate the influence of the hyper-parameter change on obtained results by training the model on the training dataset for all/some combinations of hyper-parameters and validate them on the validation dataset

- Choose the best combination of hyper-parameters and then train the model on the training + validation dataset
- Test the model on the test dataset

5. Repeat the step 4 using different data augmentation techniques
6. Analyse and compare the results
7. Draw a conclusion
8. Present the obtained results in a report and a PowerPoint presentation

Requirements

- At least 2 hyper-parameters should be related to the training process and 2 related to the regularization.
- Investigate the influence of at least:
  - 3 data augmentation techniques (for standard operations)
  - 1 data augmentation technique (for more advanced data techniques, such as mix-up, cut-mix, cut-out etc.)

Deadline

The deadline to accomplish all project goals is 5th of April 2022.