Assignment II:
Selected Topics in Distributed Multimedia Systems

Deadline: September 30, 2022 (rolling evaluation[1])

The CIFAR-10 data set[2] is a widely used benchmark data set consisting of 60,000 32×32 RGB images divided into 10 classes (6,000 images per class). For the present task, the version that has been prepared for Keras by default and is automatically loaded from R when required is used.

In this assignment, different aspects of convolutional neural networks should be evaluated. Given an executable R script (*assignment-02.r*) that calculates a simple convolutional neural network via *R*'s Keras interface. Extend this implementation (e.g., by adding further convolutional layers, pooling layers, etc.) and vary important parameters (e.g., number of fully connected layers, number of neurons per layer, number of epochs, batch size, etc.) and evaluate the resulting effects on the classification result and runtime.

The results need to be summarized and interpreted in a short report (approx. 3-4 pages). In particular, highlight the differences, the advantages and disadvantages, and describe which approach you would use in practice.

Even though the initial script is given as *R*-Code, also *Python* might be used for the implementation. The used (executable) scripts must be attached to the main document. Due to the large amount of data, it would be meaningful to reduce the number of samples for training and evaluation to speed up the experiments.

[1] The projects will be evaluated when submitted.

[2] https://www.cs.toronto.edu/ kriz/cifar.html