2Η ΜΑΝDATORY WORK
IN THE COURSE "NEURAL NETWORKS - DEEP LEARNING"

Write a program in any programming language that implements a **Support Vector Machine** that will be trained to solve one of the following problems:

1. Separate 2 or all classes that exist in Cifar-10 or SVHN and are located at the following addresses:
   https://www.cs.toronto.edu/~kriz/cifar.html
   http://ufldl.stanford.edu/housenumbers/
2. or solve any multi-class categorization problem from the bases found on the following pages:

http://archive.ics.uci.edu/ml/
http://www.cs.toronto.edu/~roweis/data.html
http://www.cs.cmu.edu/~cil/v-images.html
https://www.kaggle.com/datasets

Where there is no control set, the base is randomly divided into a training set (60%) and a control set (40%) or a cross-validation technique is followed.

Exporting Features

For sample separation, the dimension of the data can, if necessary, be reduced first using PCA to keep more than 90% of the information.

Results report

A report should be written describing: the algorithm, giving typical examples of correct and incorrect categorisation and success rates at the training and testing stages, training time and success rates for different kernels, linear and non-linear, and different values of the training parameters. Compare the performance of the SVM against the 1 and 3 Nearest Neighbor and Nearest Class Centroid classifications. Comment on the results and the code.

Language models such as **ChatGPT** can be used to help with the task and in this case the code produced by the language model should be studied and described and compared with the code the student wrote or would have written. In all cases, the effort/work is graded over and above what can be found available online or can be produced with the help of a language model.

DELIVERY DATE : 23η December 2023, 24:00

For each day of late submission of the assignment and for 5 days the mark will be reduced by 10%. After submission of the paper, there will be an oral examination on the paper, which will include **AN ORAL examination of the code.**

Helpful pages

http://www.csie.ntu.edu.tw/~cjlin/libsvm/ (Software for SVM)
http://en.wikipedia.org/wiki/Support_vector_machine