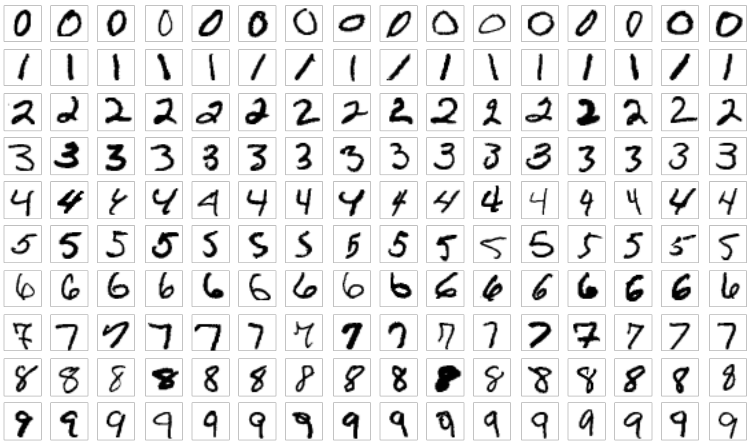
Second Mid-term Assessments

Introduction to Machine Learning CLP3102 L

Problem

The MINIST handwritten recognition problem is a classic machine learning problem that involves recognizing handwritten digits from a dataset of images. The dataset, known as the MNIST dataset, consists of 70,000 grayscale images of size 28x28 pixels. Each image represents a single handwritten digit from 0 to 9.



The goal of the problem is to train a machine learning model that can accurately classify the handwritten digits in the dataset. The model must take an image of a handwritten digit as input and output the corresponding digit label (0 to 9) that represents the digit in the image.

About Dataset

The MNIST dataset provided in a easy-to-use CSV format.

The dataset consists of two files:

- mnist_train.csv
- mnist_test.csv

The mnist_train.csv file contains the 60,000 training examples and labels. The mnist_test.csv contains 10,000 test examples and labels. Each row consists of 785 values: the first value is the label (a number from 0 to 9) and the remaining 784 values are the pixel values (a number from 0 to 255).

Requirements

- Successfully load the dataset.
- Implement one or two machine learning models such as **SVM** or **Neural Network** and compare their performance.
- If a single model is implemented, tune the hyper-parameters and analyze the performance with different settings to choose the best configuration.
- If two models are implemented, compare their performance.
- Calculate the accuracy of the training set and the test set.
- Write a 1-2 pages report explaining the analysis and work done, including
    - Explain what you have done in the assignment.
    - If one model was used, compare different settings and explain why the chosen setting produced better results.
    - If two models were used, compare their final performances.
    - Other relevant findings can also be reported.

Submission Format

You need to submit your assignment in a *2-Midterm_StuID_YourName*.zip file that includes the following files:

1. Code files.
2. A short report (a pdf file).

Deadline

Before 10.04.2023, Please send to my email: a.toleu@ kimep.kz