Classify the Handwritten digits!

In the week7 course, we used one of the most interesting data sets and that is the MNIST handwritten data set. You can find the data set following the notebook or you can directly get it from here. Also, you do not have to use the whole dataset if there is a computation limit.

The task here is to classify the digits into their own category.

Find all the 9s!

In this section you should build up a classifier that can distinguish number 9 from every other numbers. (reusing code and libraries are ok as long as you explain what is going on)

For each section below you need to measure your performance. So, make sure to run the performance check at every part.

1. Find the 9s using K-Nearest neighbours for Minkowski metric of order (1, 2, 3).

2. Find the 9s using Decision tree.
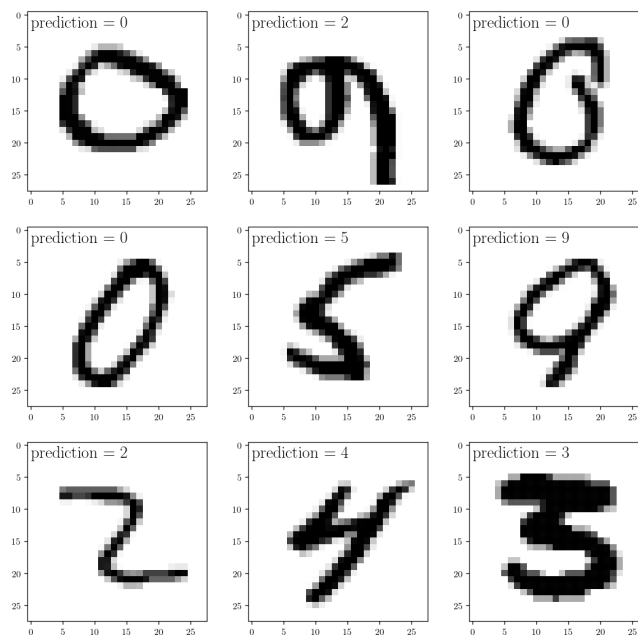
3. Find the 9s using Random Forests.

Figure 1: Our SVM implementation prediction vs the digit

Find every single digits!

1. First forget about the labels and run the k-means algorithm to find whether there is an underlying patterns. So, first find the k clusters (here is obviously 10 clusters). Then look at their labels and find the accuracy. By doing this you are turning a supervised learning into an unsupervised learning!

2. Find the digits using K-Nearest neighbours for Minkowski metric of order (1, 2, 3).

3. Find the digits using Decision tree.

4. Find the digits using Random Forests.

5. Comment on any significant difference between your results for the **binary classifier** vs **multi-class classifier**s.