**MSO4357 Coursework**

The aim of the assignment is to demonstrate that you have understood the principles of the supervised learning algorithms, and have the skills of using the machine learning libraries on a real application task.

The task is to train classifiers with the MNIST dataset and improve their performance, in Colab using the Python programming language.

You need to:

Import the relevant libraries (e.g., Numpy, Scikit-learn).

Download the dataset MNIST.

Split the dataset to training set and testing set.

Train three classifiers (SVM, K- Neighbours, Random forest).

Use grid search with cross-validation to find good hyperparameters.

Where applicable, use the early stopping method to get the best classifier.

Try to combine these classifiers into an ensemble that outperforms them all on the validation set, using a soft and hard voting classifier.

Deliverables:

A report of not less than 1000 words. It includes your code, comments, and the results you get when running them, just like the exercises in the textbook. In the report, you can use a table to record and compare the accuracies of these classifiers with various hyperparameters.

You are also encouraged (although not required) to use drawings and figures to demonstrate and analyse the training process and performance of these classifiers.