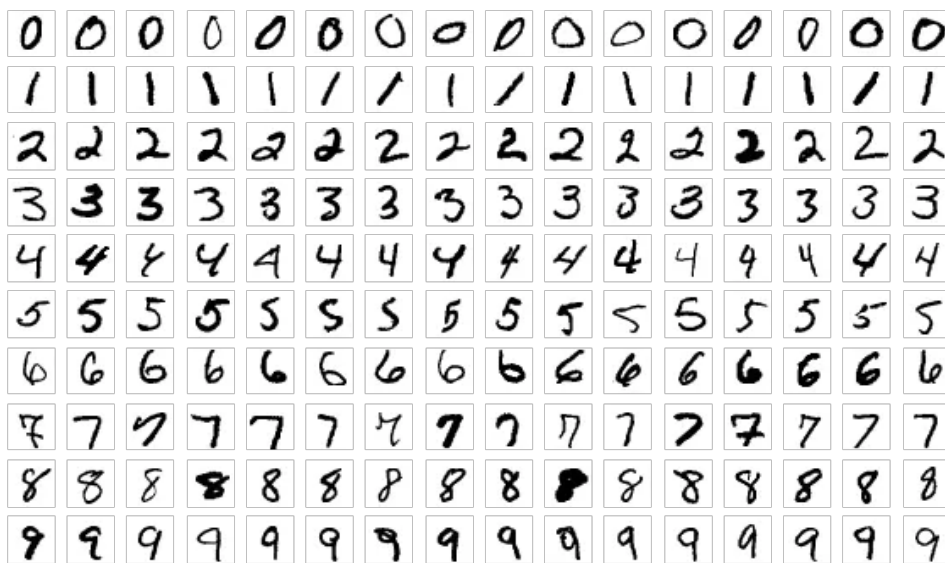


Machine Learning

Practical Project 4 Deep Unsupervised Learning

1. Consider the “MNIST” dataset, available at the course web page.



Create a “Python + Keras” script at “Google Collab” that implements the well known “DCN – Deep Clustering Network”, by:

- a) Create an “auto-encoder” (AE) network, exclusively with “Dense” layers. The layer at the center of this network should provide the compact representation of the input elements (latent code).
- b) Perform joint optimization between the AE network and the K-Means clustering procedure.
 - a. Obtain initial latent representations (i.e., AE without learning)
 - b. Optimize K-Means, using latent representations from a)
 - c. Perform one AE learning iteration, using centroids from b)
 - d. Repeat steps a-c, until no changes in cluster assignments occur between consecutive epochs.



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- c) Report the variations in performance with respect:
 - a. The dimensionality of the latent representation.
 - b. Different weights for the “reconstruction” and “clustering” losses.