Assignment 5: Autoencoders

COMP257 Unsupervised Learning

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# Use the training set, validation set, and test set from Assignment 3 (Hierarchical Clustering) for this Assignment. [0 points]

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# Use PCA preserving 99% of the variance to reduce the dataset’s dimensionality as in Assignment 4 (Gaussian Mixture Models) and use it to train the autoencoder [0 points]

Skipped this part.

Finding: Autoencoder with linear activation function and MSE loss functions works as PCA.

# Define an autoencoder with the following architecture:

1. Use k-fold cross validation to fine tune the model’s learning rate and hyperparameter of the regularizer. Due to the long training requirements, for the number of hidden units, try two or three different values for each hidden layer. [75 points]

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1. Discuss the rationale with respect to the activation functions and loss function used in your model. [10 points]

Generally, the activation function in autoencoders is non-linear (e.g. ReLu, sigmoid, …).

Sigmoid throws the output to the range [0, 1] (the pixel intensity of a greyscale image). The sigmoid makes a more stable performance.

# Run the best model with the test set and display the original image and the reconstructed image. [15 points]

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