PHYS/4036 Workshop 5

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January 2020

Question 1:

For the "fashion" MNIST dataset (`tf.keras.datasets.fashion.mnist`) how many PCA components are required to explain 95% of the variance of the data?

Question 2:

In lectures, we flattened 2D input data and used dense layers in an autoencoder. For regular MNIST data, build a convolutional encoder and decoder, and compare the reconstruction loss against the models discussed in lectures.

Try to build CNNs with similar encoding 'capacity' to the dense model, i.e. a similar number of features at the bottleneck of the autoencoder.

Question 3:

Derive (4.1.23) in the lecture notes.

Question 4:

For the RBM example given in lectures, experiment with additional contrastive divergence Gibbs steps and check whether they give improved generated samples.