Empirical comparison between autoencoders and traditional dimensionality reduction methods

Supplementary material

This supplementary material extends the analysis to tabular data and different classifiers that were not included in the paper due to page constraints. More specifically, the same analysis has been applied to UJIIndoorLoc dataset[1] which is composed of 19937 training samples and 1111 testing samples. Samples are comprised of 520 real valued WiFi intensities which we standardised. Labels are one of the seven possible recording device's location. Then, for all four datasets, the k-NN classifier has been replaced by a logistic regression and a quadratic discriminant analysis (QDA).

Figure 1 reports k-NN accuracy on UJIIndoorLoc. Figures 2 and 3 report the logistic regression accuracy and the QDA accuracy respectively. Figure 4 shows samples from each image dataset's classes.

The results presented in this supplementary material are consistent with the trend observed in the paper.

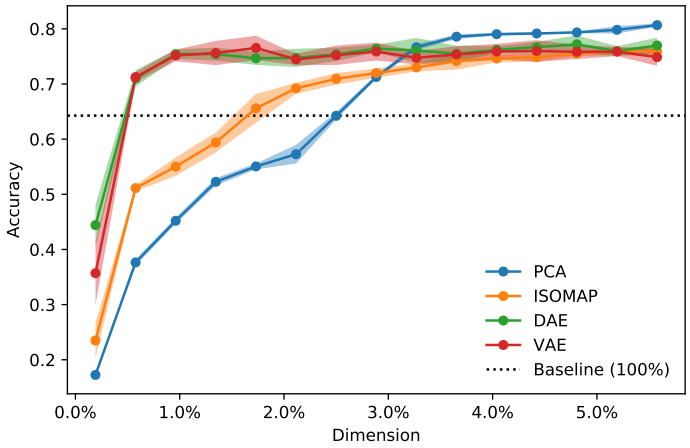
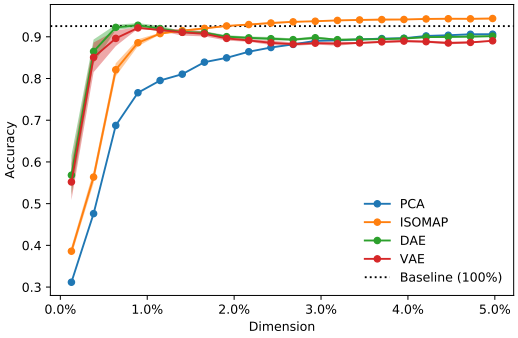
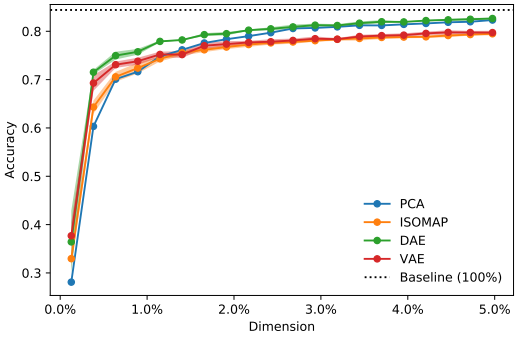


Figure 1: k-NN accuracy on UJIIndoorLoc.

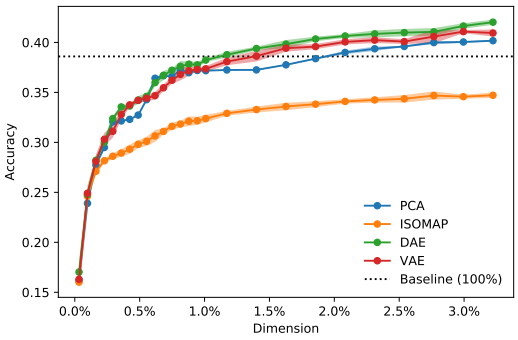
[1] `https://archive.ics.uci.edu/ml/datasets/UJIIndoorLoc`



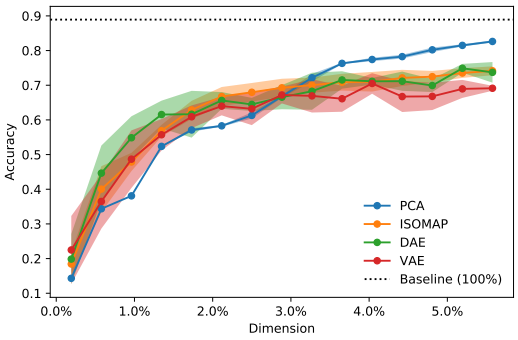
(a) MNIST projection.



(b) Fashion-MNIST projection.

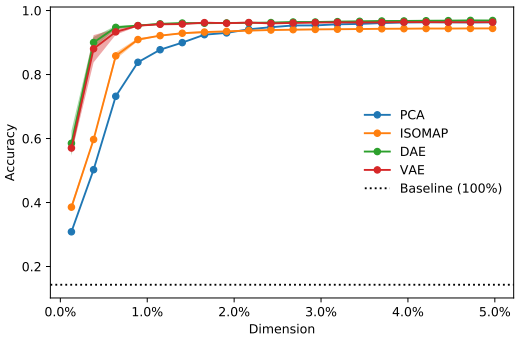


(c) Cifar-10 projection.

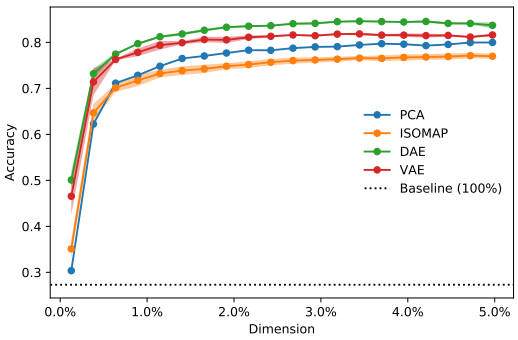


(d) UJIIndoorLoc projection. Note the high standard deviation for both neural network projections.

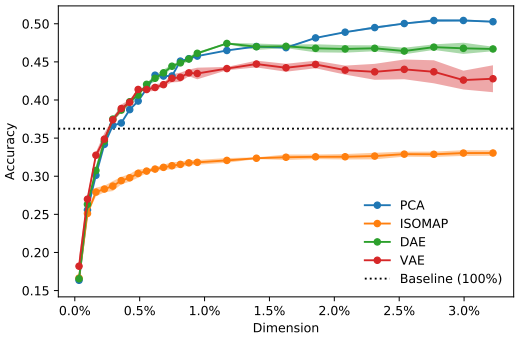
Figure 2: Logistic regression accuracy on each dataset projection as a function of the dimension.



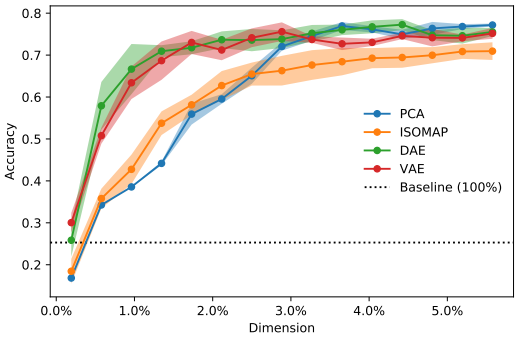
(a) MNIST projection.



(b) Fashion-MNIST projection.



(c) Cifar-10 projection.



(d) UJIIndoorLoc projection

Figure 3: QDA accuracy on each dataset projection as a function of the dimension. Note the improvement over the baseline (*ie.* the original dimension).

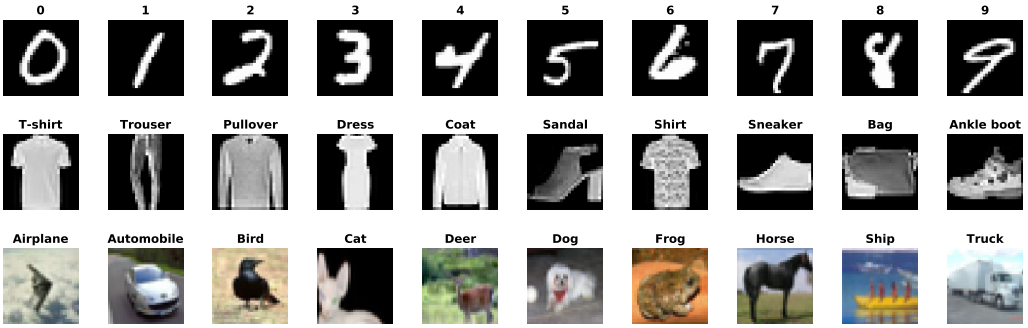


Figure 4: Examples of each class randomly sampled from the test set of each image dataset.