EXAM PROJECT FOR PML 2022/2023

REPORT

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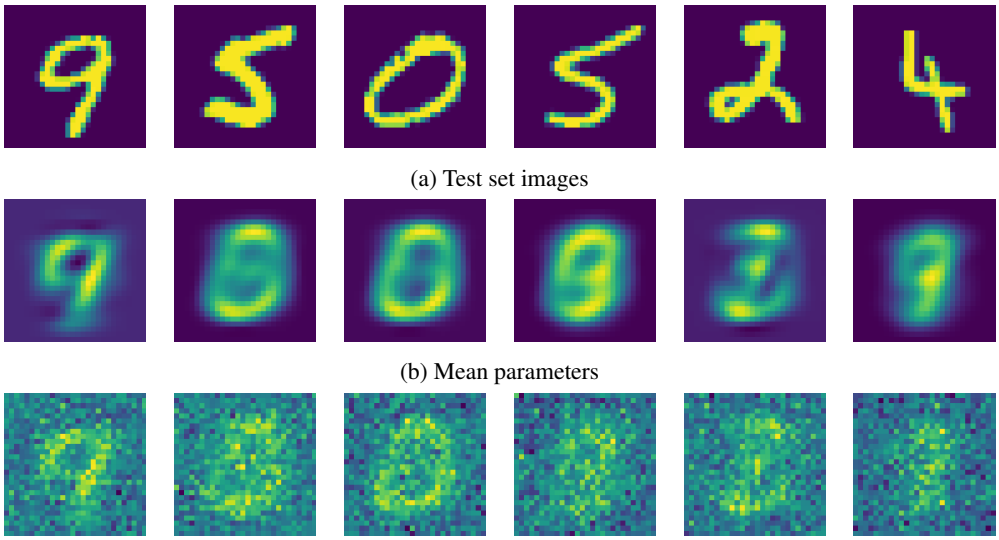
1 Density modeling

1.1 Implement a convolutional VAE

1.2 Alternative models

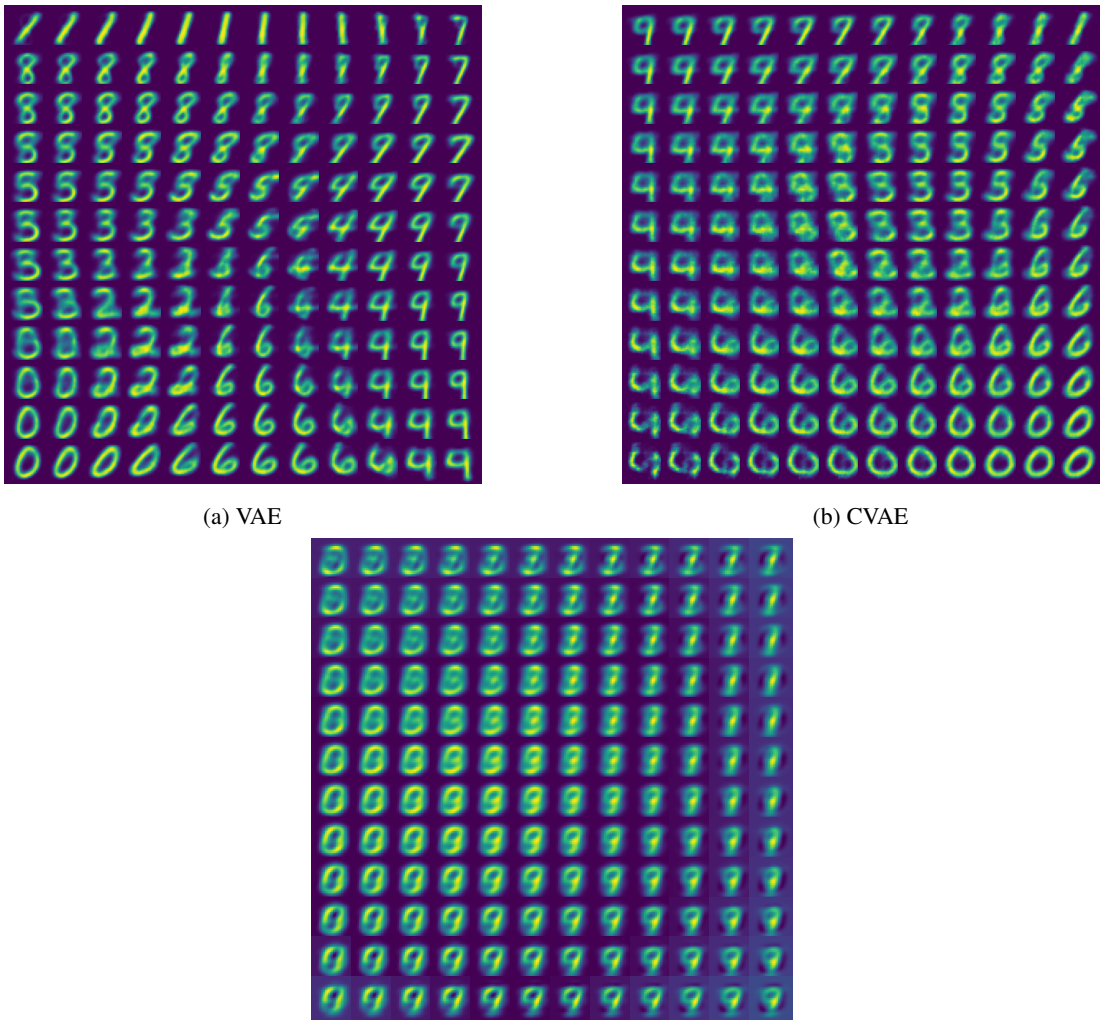


(a) Test set images

(b) Mean parameters

(c) Samples

Figure 1: Comparison of MNIST test set images and corresponding mean parameters and sampled reconstructed generated by trained PPCA model.



(a) VAE

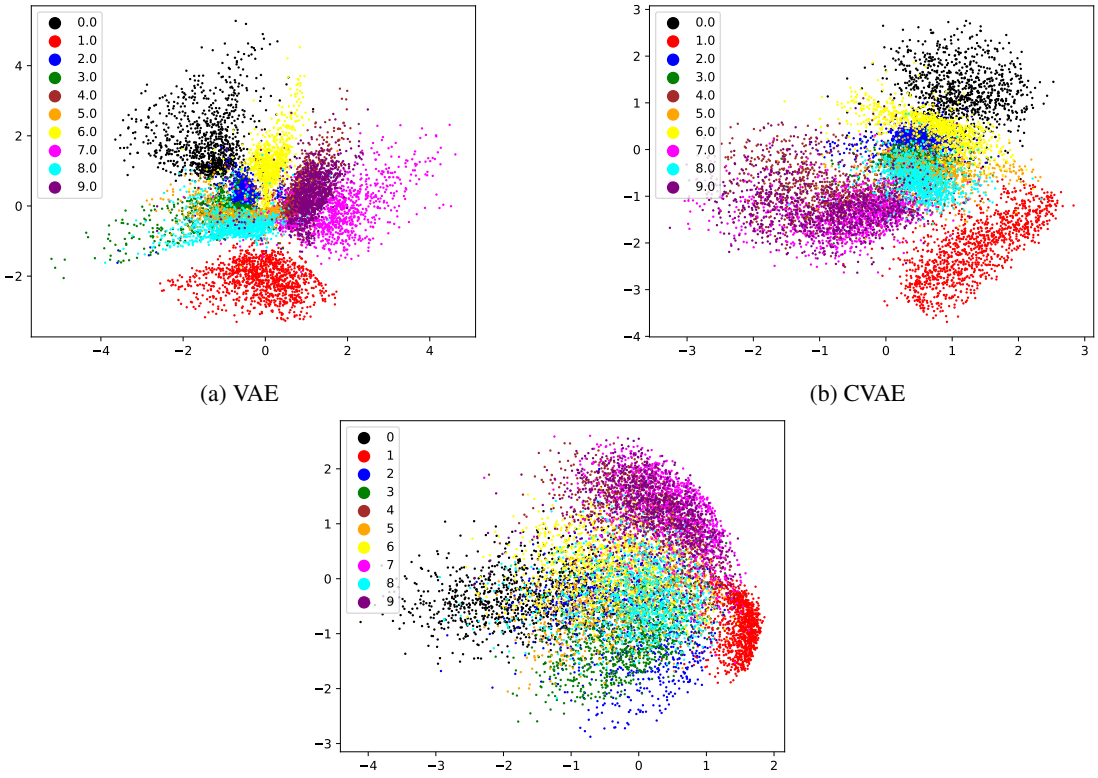
(b) CVAE

(c) PPCA

Figure 2: Interpolating images from latent space variables using trained density models.

	Log-Likelihood/ELBO	MSE
VAE	-145.122048	0.000305
CVAE	-157.241749	0.000352
PPCA	-4329.655559	3620.035365

Table 1: Model performance metrics



(a) VAE

(b) CVAE

(c) PPCA

Figure 3: Clustering on MNIST test (projection to latent space) using trained density models.

[1] [Bishop and Nasrabadi, 2006]

2 Bibliography

Christopher M Bishop and Nasser M Nasrabadi. *Pattern recognition and machine learning*, volume 4. Springer, 2006.

[1] A test