Exam project for PML 2022/2023

REPORT

Christian Dybdahl Troelsen
Department of Computer Science
University of Copenhagen
Universitetsparken 1
DK-2100 Copenhagen Ø
tfp233@alumni.ku.dk

Jens Sørensen
Department of Computer Science
University of Copenhagen
Universitetsparken 1
DK-2100 Copenhagen Ø
qrw992@alumni.ku.dk

Mathias Rasmussen
Department of Computer Science
University of Copenhagen
Universitetsparken 1
DK-2100 Copenhagen Ø
tjc725@alumni.ku.dk

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1 Density modeling

1.1 Implement a convolutional VAE

1.2 Alternative models
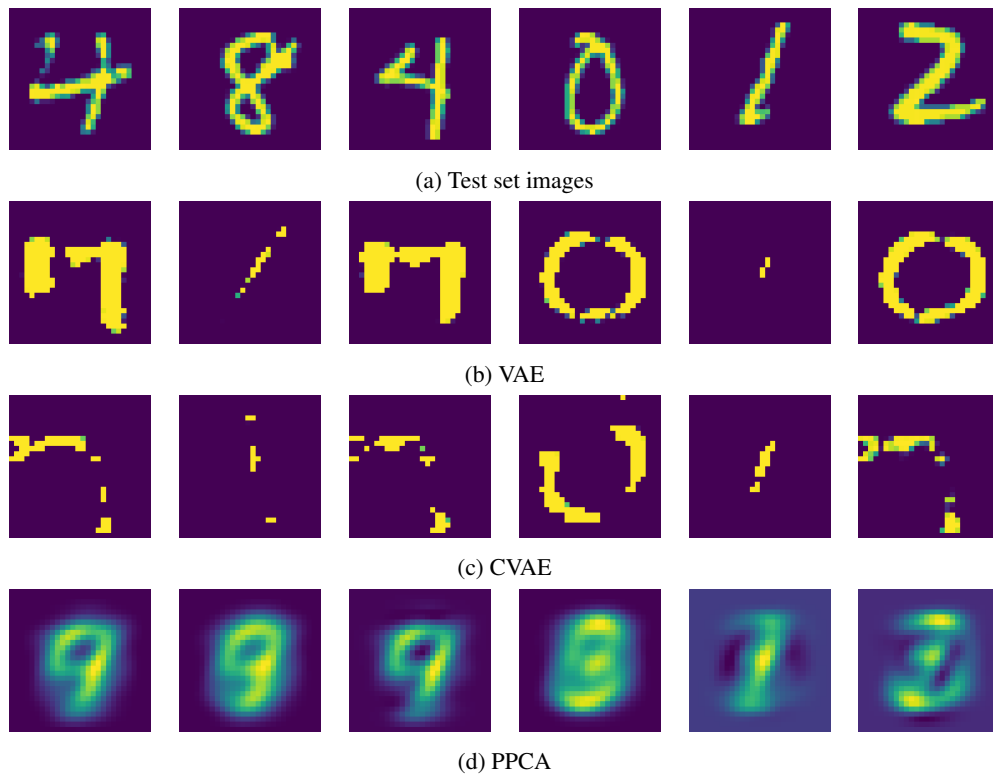

(a) Test set images

(b) VAE

(c) CVAE

(d) PPCA

Figure 1: Comparison of MNIST test set images and corresponding mean parameters generated by density models

(a) Test set images
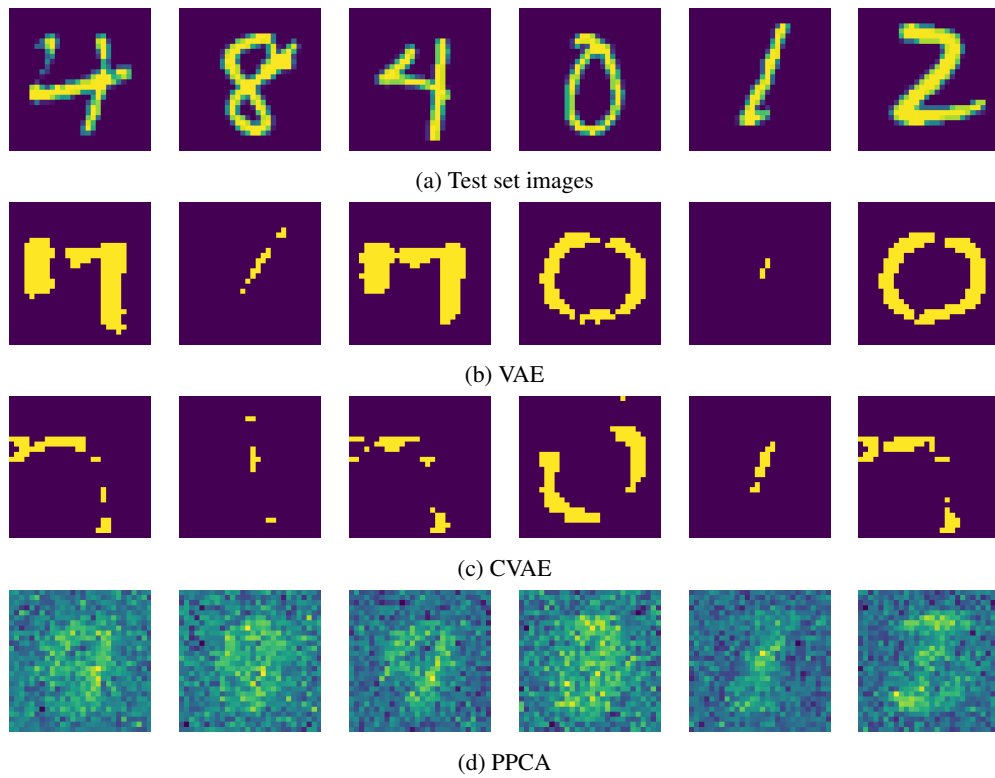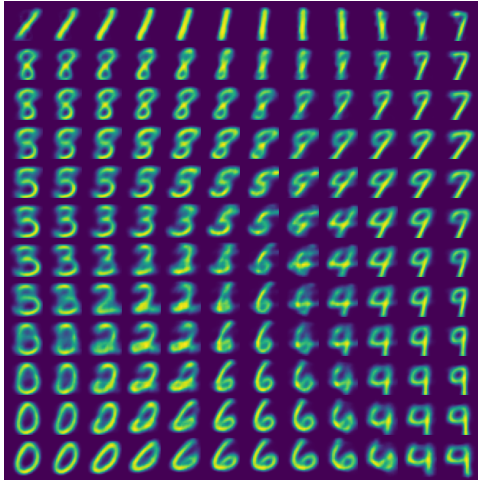
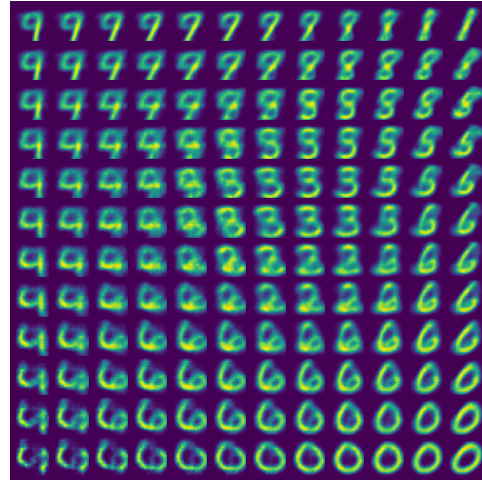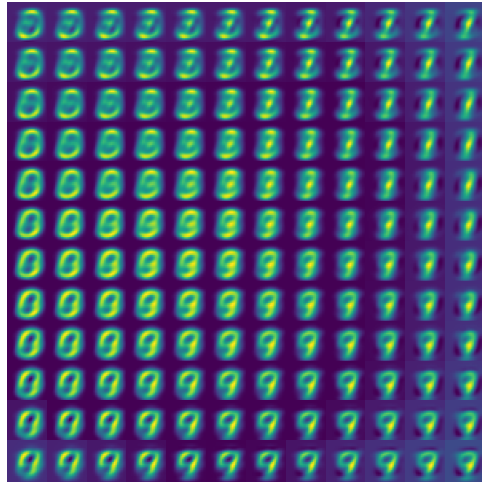

(b) VAE

(c) CVAE

(d) PPCA

Figure 2: Comparison of MNIST test set images and corresponding reconstructions sampled from density models

(a) VAE

(b) CVAE

(c) PPCA

Figure 3: 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	3629.212532

Table 1: Model performance metrics

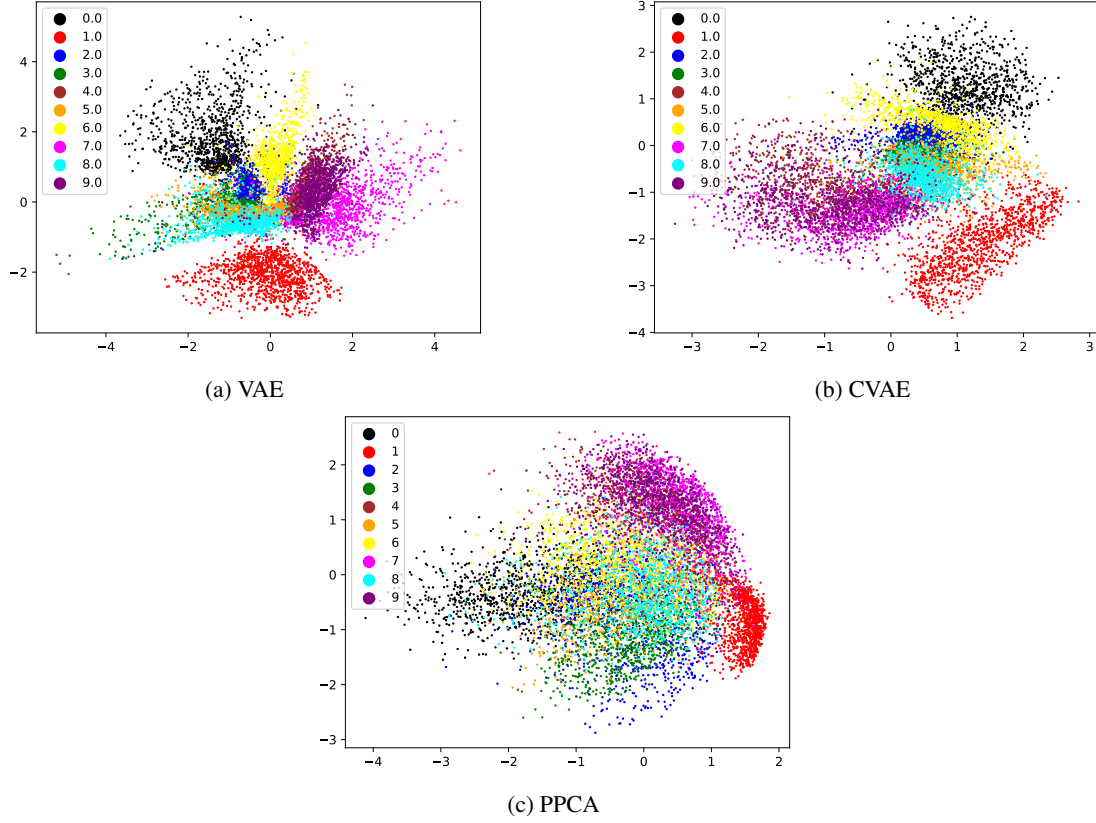

(a) VAE

(b) CVAE

(c) PPCA

Figure 4: Clustering on MNIST test (projection to latent space) using trained density models.

2 Function fitting

2.1 Fitting a GP with Pyro

2.2 Bayesian Optimization

3 Bibliography