Dimensionality Reduction

M. Falzari

January 21, 2022

How?

Linear

- LDA (Linear discriminant analysis)
- PCA (Principal component analysis)

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Linear

- LDA (Linear discriminant analysis)
- PCA (Principal component analysis)

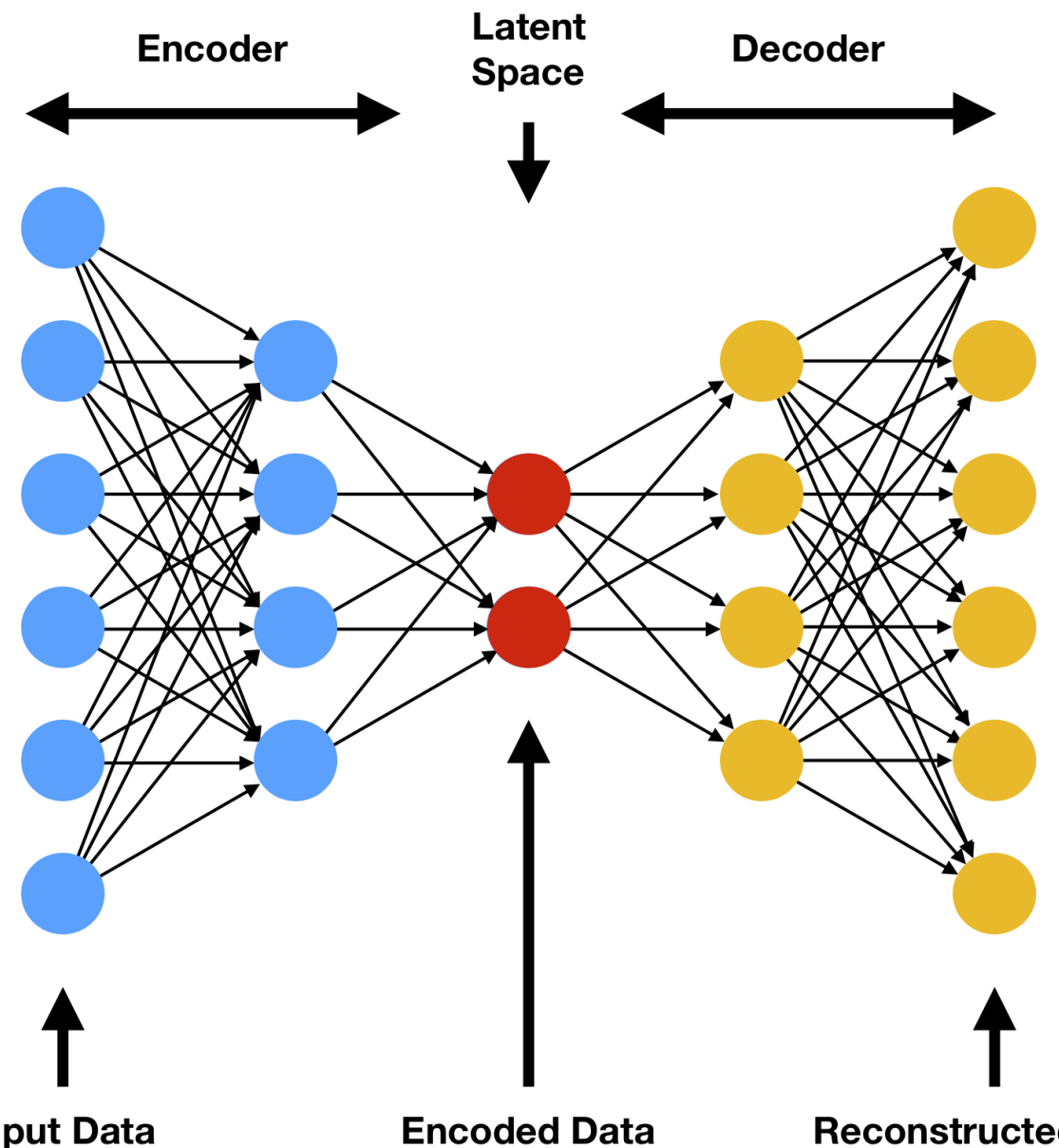
Non linear

- LLE (Locally linear embedding)
- Isomap
- Autoencoder

Why autoencoders?

- Autoencoder != other methods
- Potentially detect repetitive structures
- ?? ??

Autoencoder

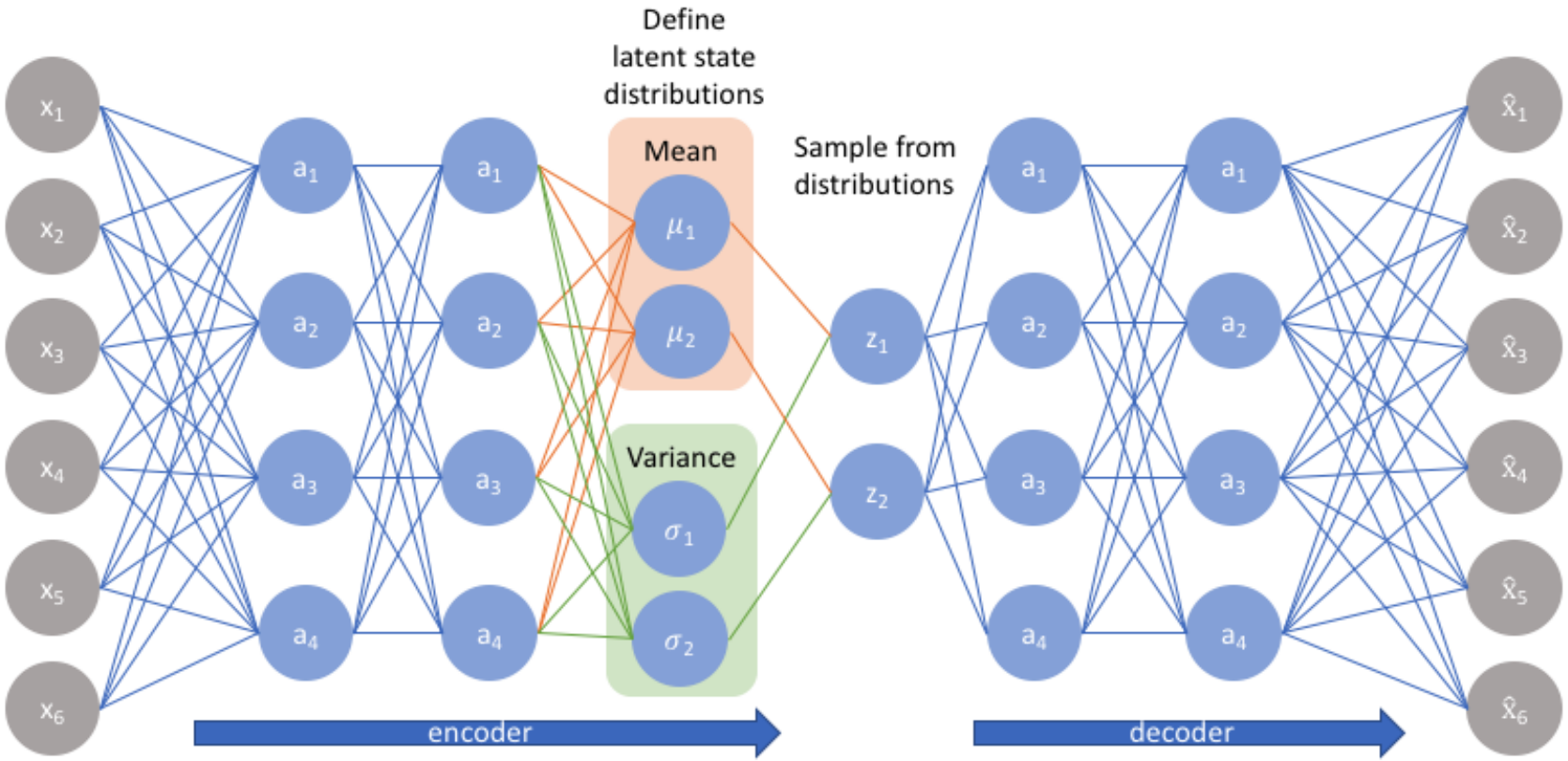


Variational inference

Bayesian and Variational inference

- find a posterior p(Z|X) such that X = observation and Z latent variables.
- (many times) intractable since p(X) is unknown
- Variational inference try to find a surrogate posterior given a family of distributions
- Usually KL(Kullback-Leibler) divergence is used to define how "close" the surrogate is to the desired posterior.

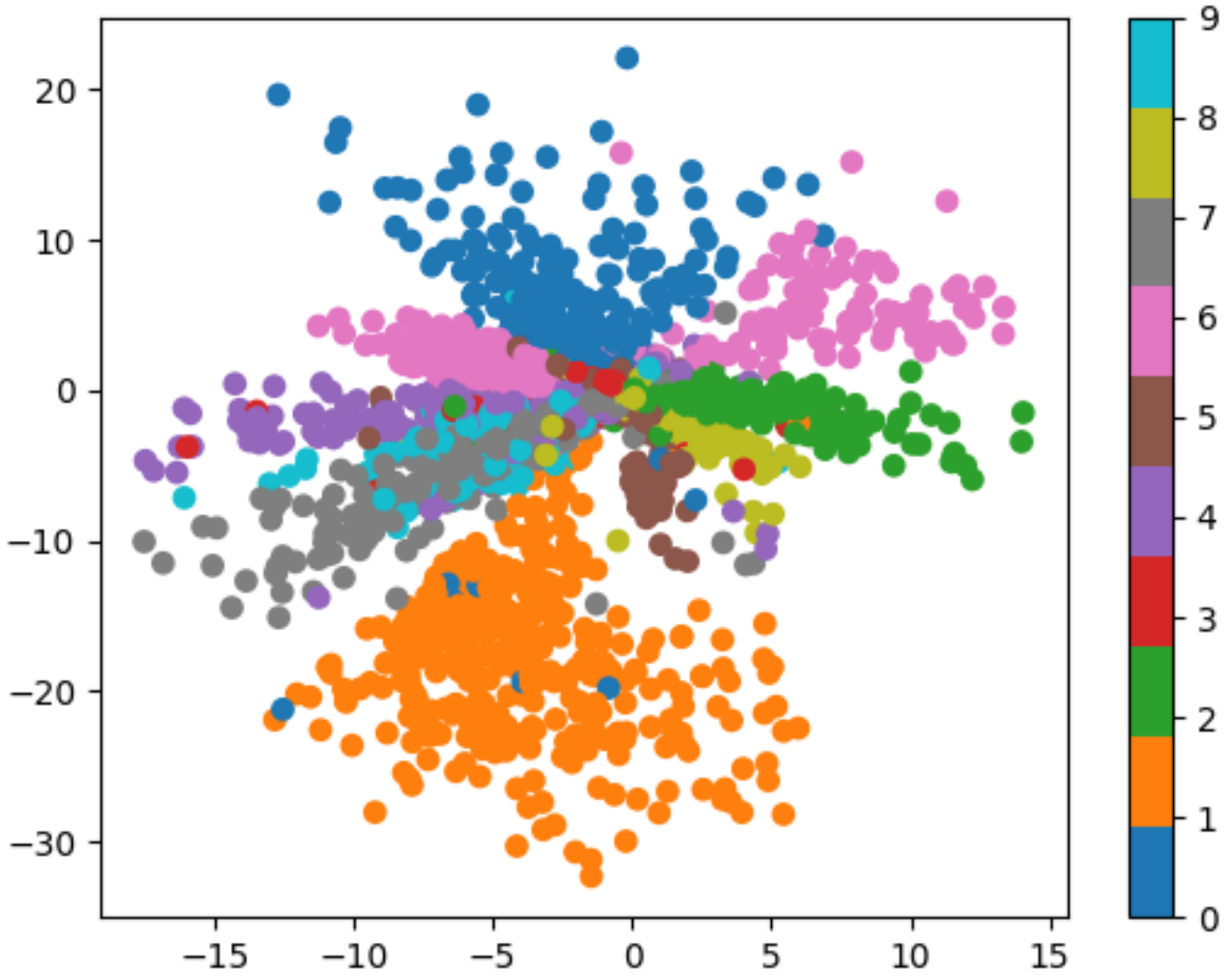
Variational Autoencoder



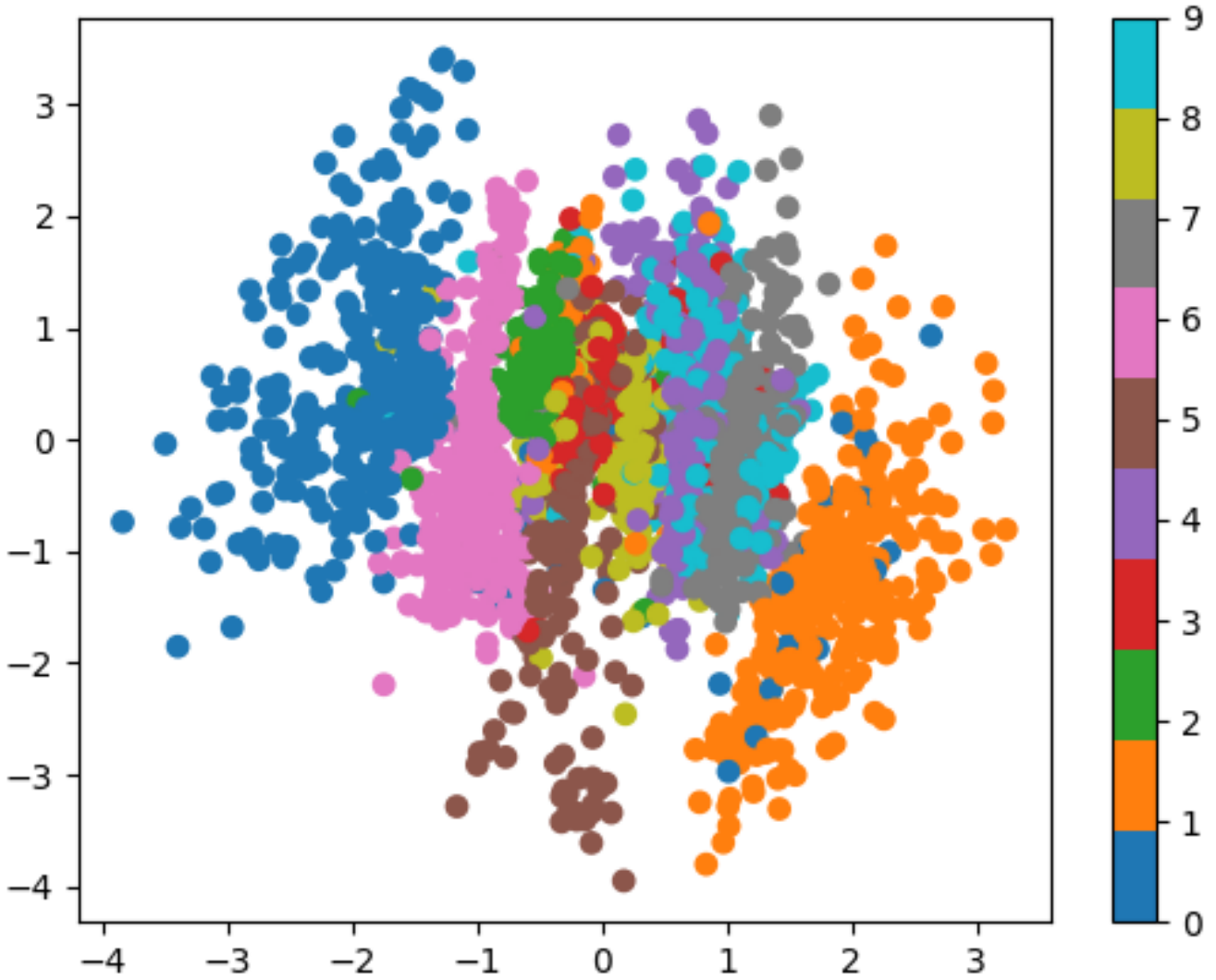
Adversarial Variational Bayes

- fully implicit latent distribution
- problematic because $\mathrm{KL}_{\mathrm{div}}$ is intractable
- use a discriminator in an adversarial manner to approximate the prior

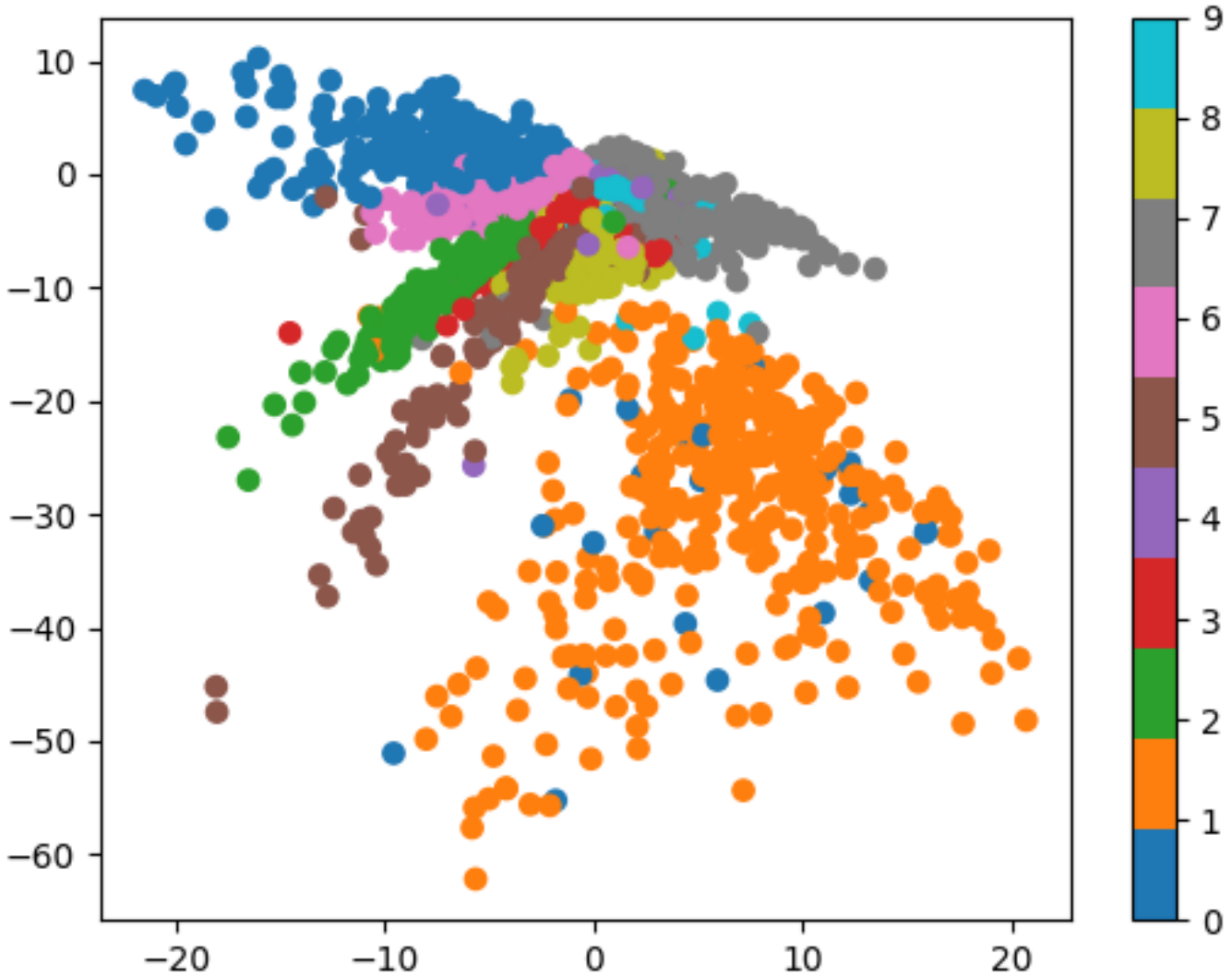
MNIST Example AE



MNIST Example VAE



MNIST Example AVB



Training

- ?? and others, propose to perform a separate phase for training the AE "offline"
- Online

Reference

./refs.bib