AutoEncoders II (DRAFT)

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Overview

Variational

AutoEncoders

Basic Idea and Applications

Variational AutoEncoders (Generative Models)
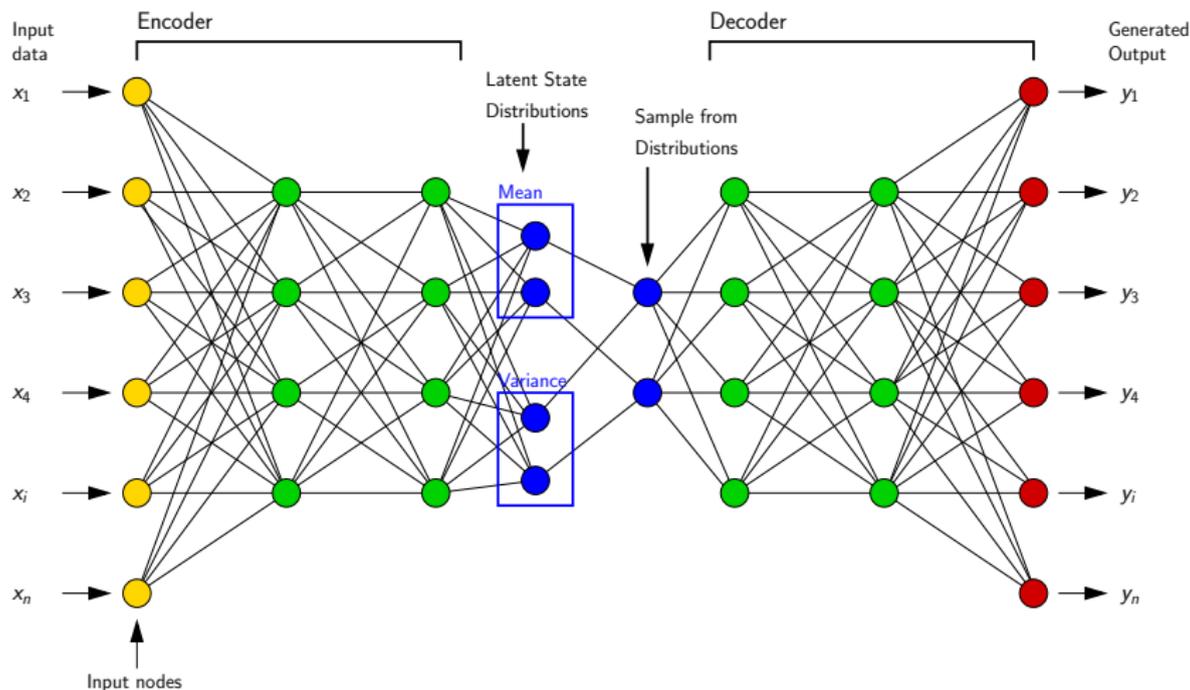
Classification of Machine Learning Problems

Standard Autoencoders vs. Variational Autoencoders:

- A standard autoencoder outputs a single value for each encoding dimension.
- Variational autoencoders provide a probability distribution for each latent attribute.

Example: Single value representations for latent attributes:

Smile: 0.99

Skin tone: 0.85

Gender: -0.73

Beard: 0.85

Glasses: 0.002

Hair color: 0.68
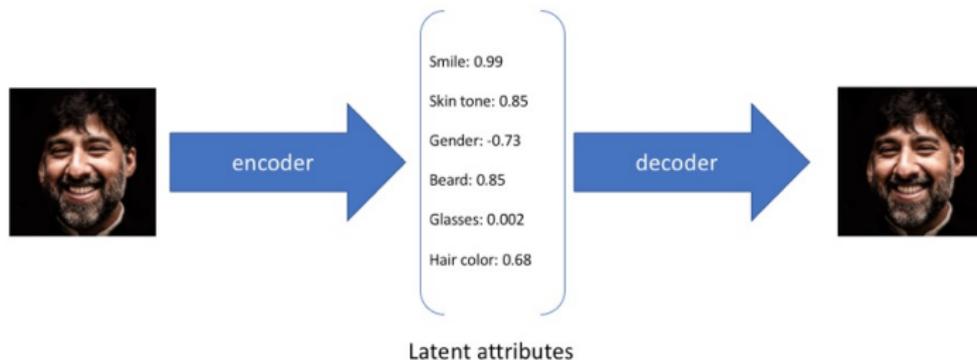
Latent attributes

Classification of Machine Learning Problems

Discrete Value and Probability Distribution: Representations for smile latent attribute:
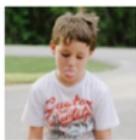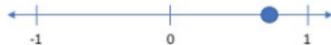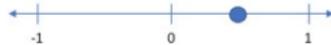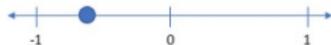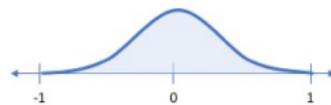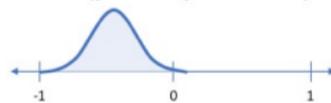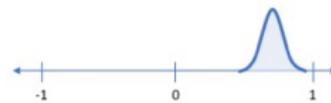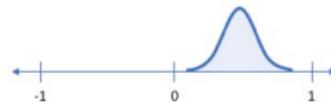
## Classification of Machine Learning Problems

Image Reconstruction: sampled from latent distributions ...
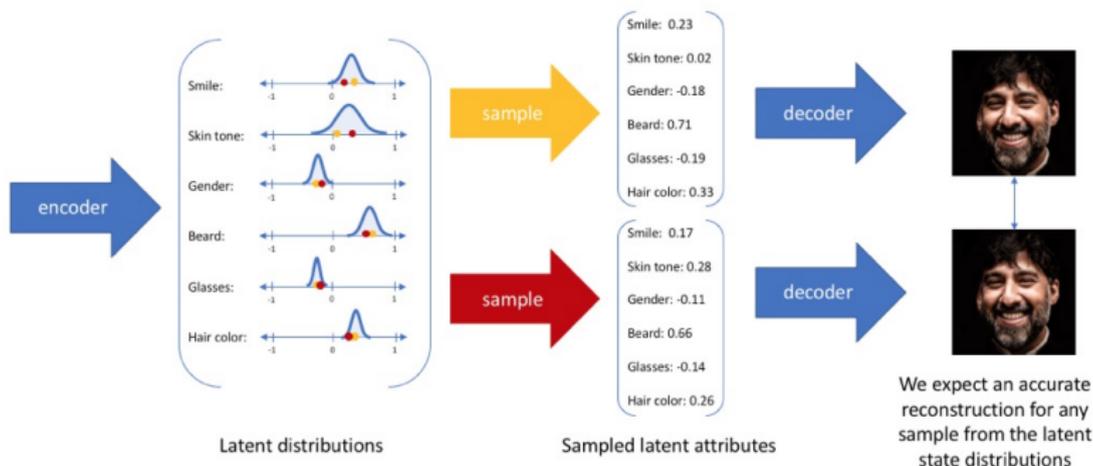
Source: Jordan J., Variational Autoencoders, Data Science, March 2018.

Examples

Example 1: Simplest Example

Problem Setup ....

Example 2: Variational Auto Encoder

Example 2: Variational Auto Encoder

... insert pic ...

References

- Nugroho H., Susanty M., Irawan A., Koyimatu M., and Yunita A., Fully Convolutional Variational Autoencoder for Feature Extraction of Fire Detection System, Journal of Computer Science and Engineering, Vol. 13, No. 1, 2020.

- Watt J., Borhani R., Katsaggelos A.K., Machine Learning Refined, Second Edition, Cambridge University Press, 2020.

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