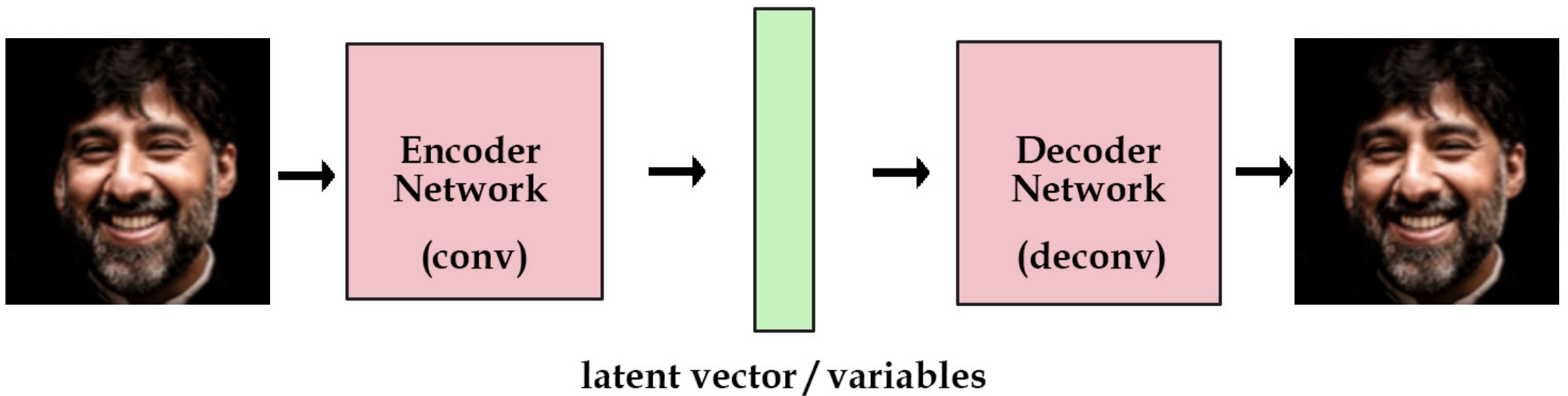


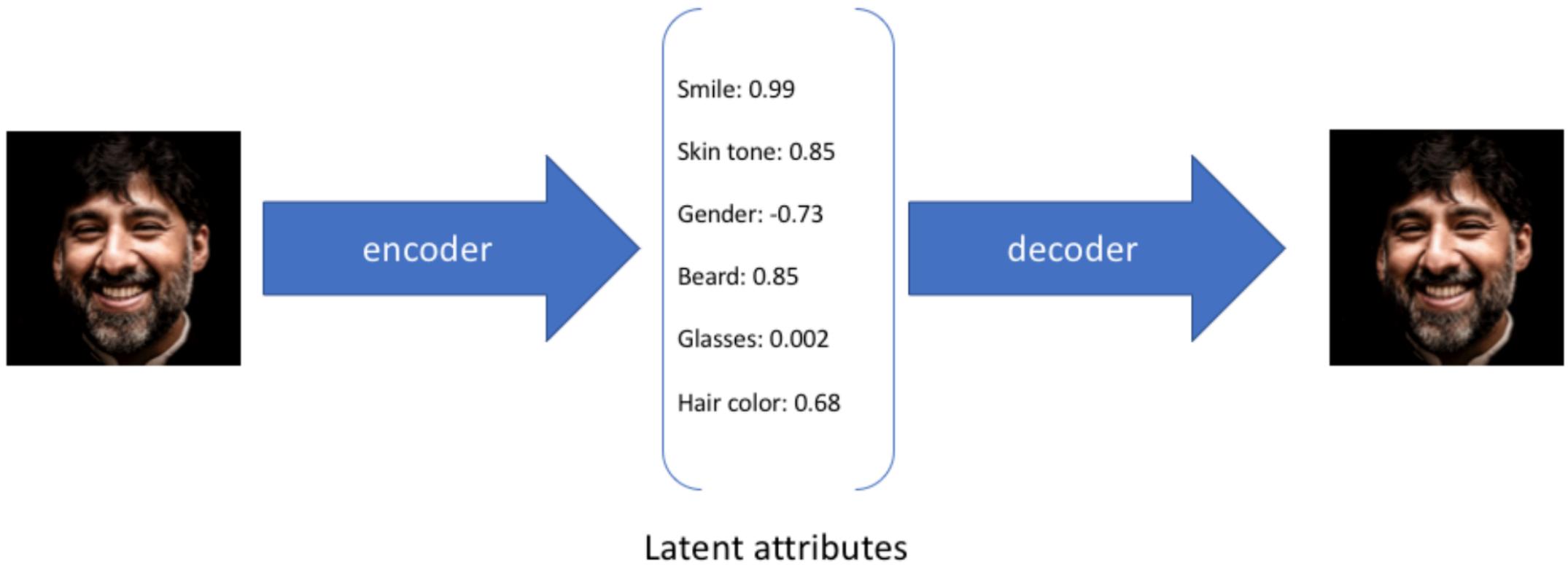
CISC6000 Deep Learning Variational Autoencoder

Dr. Yijun Zhao
Fordham University

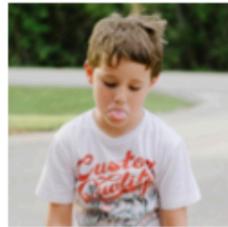
Autoencoder



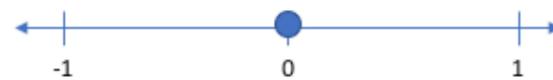
Autoencoder



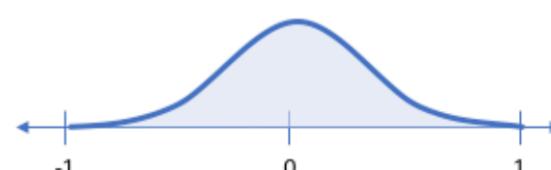
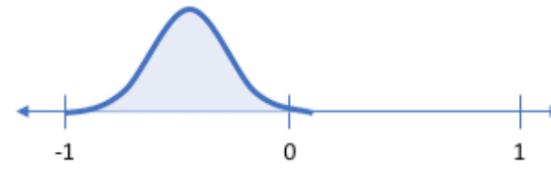
Intuition of Variational Autoencoder



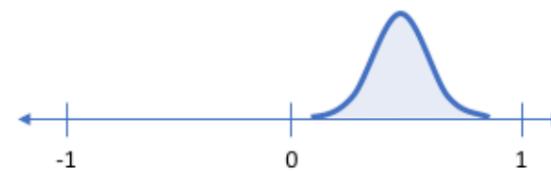
Smile (discrete value)



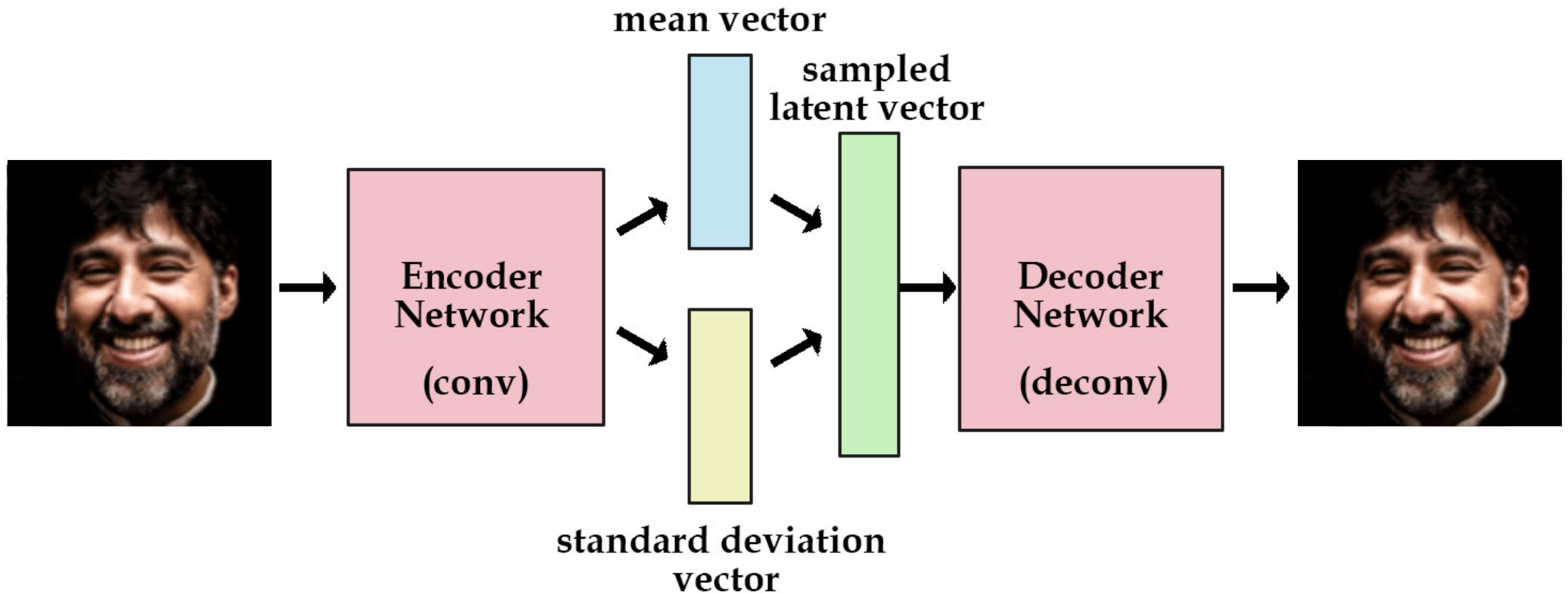
Smile (probability distribution)



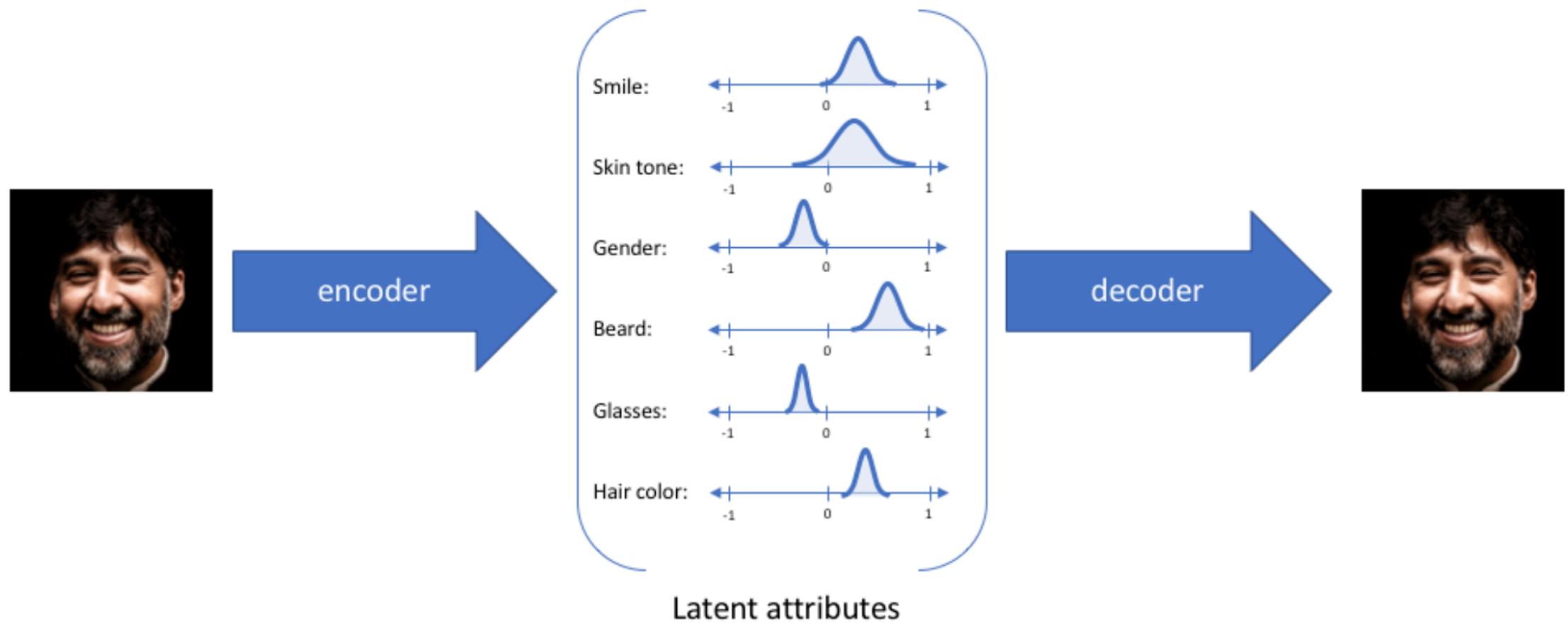
vs.



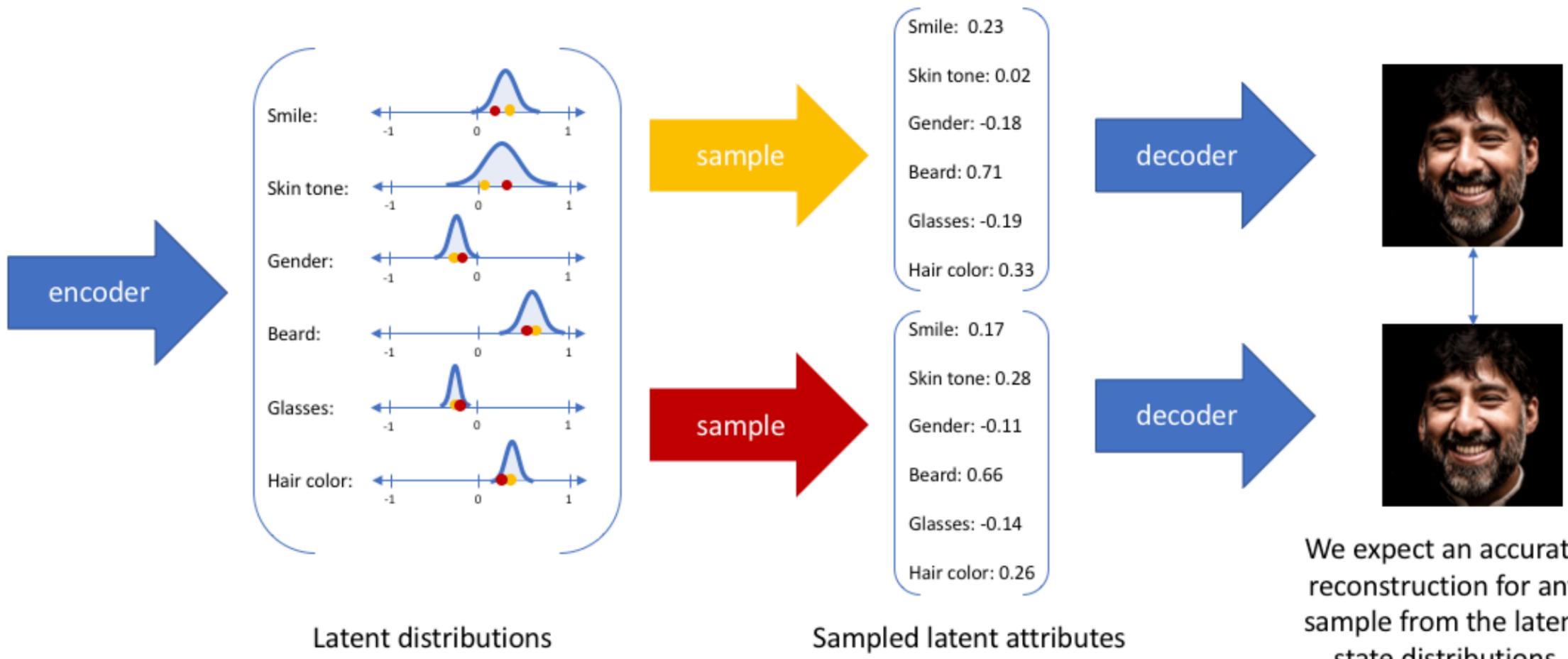
Intuition of Variational Autoencoder



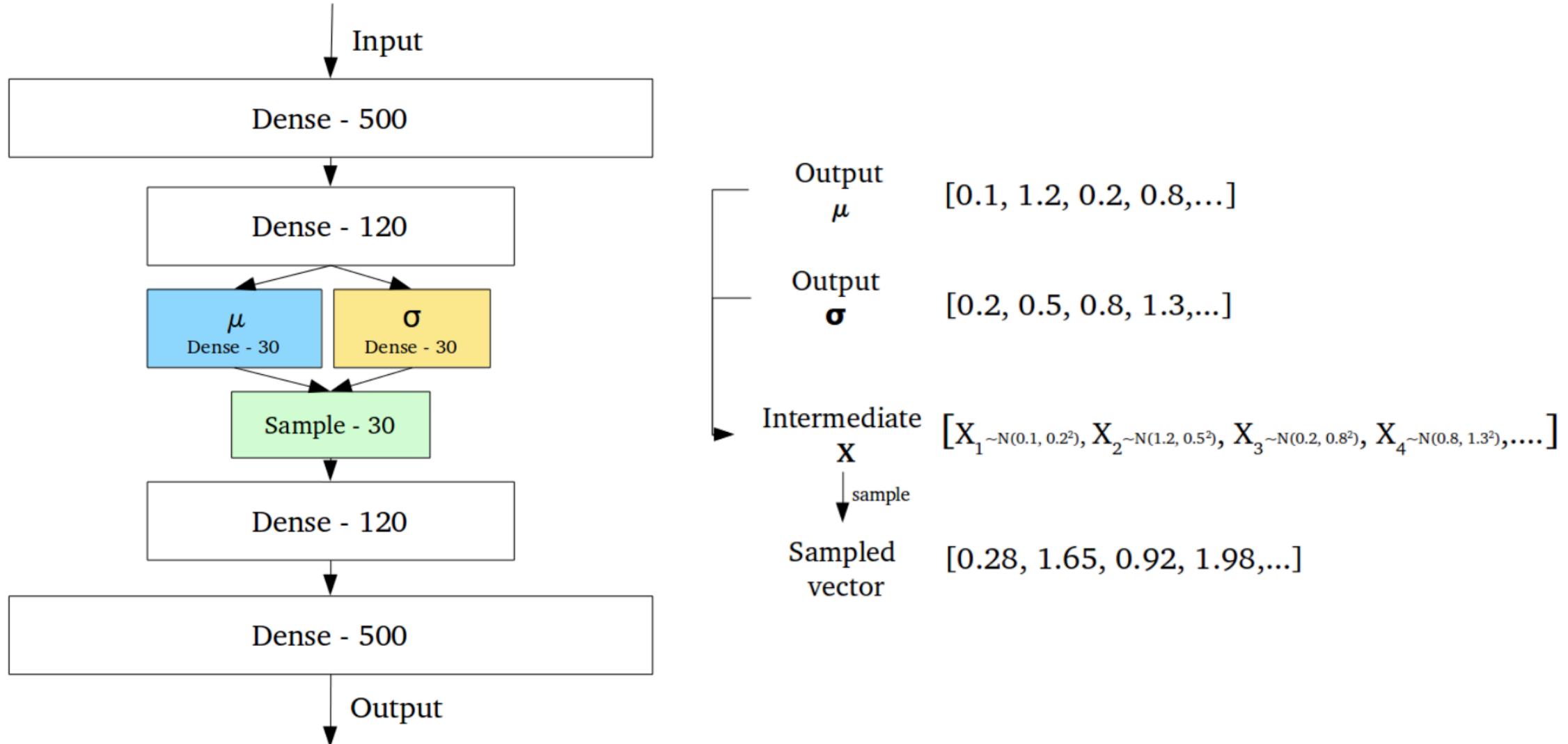
Intuition of Variational Autoencoder



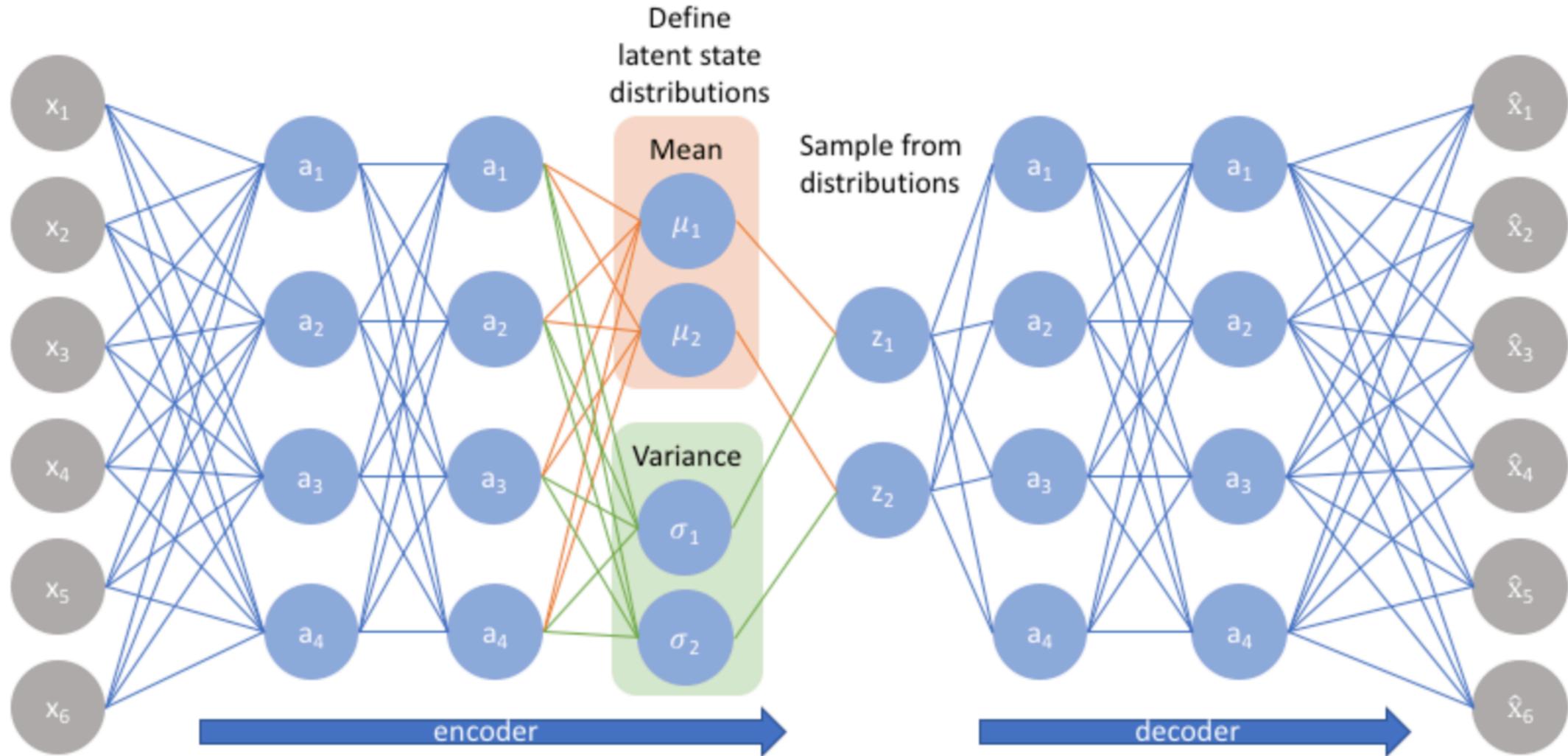
Intuition of Variational Autoencoder



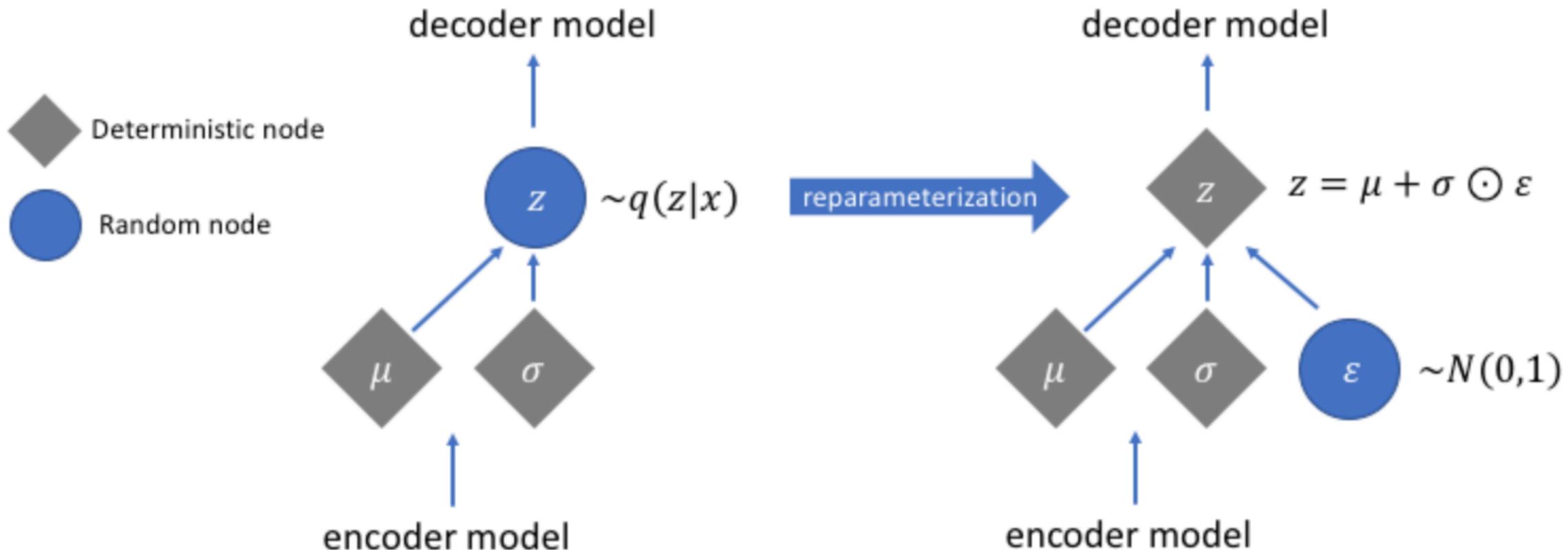
Variational Autoencoder



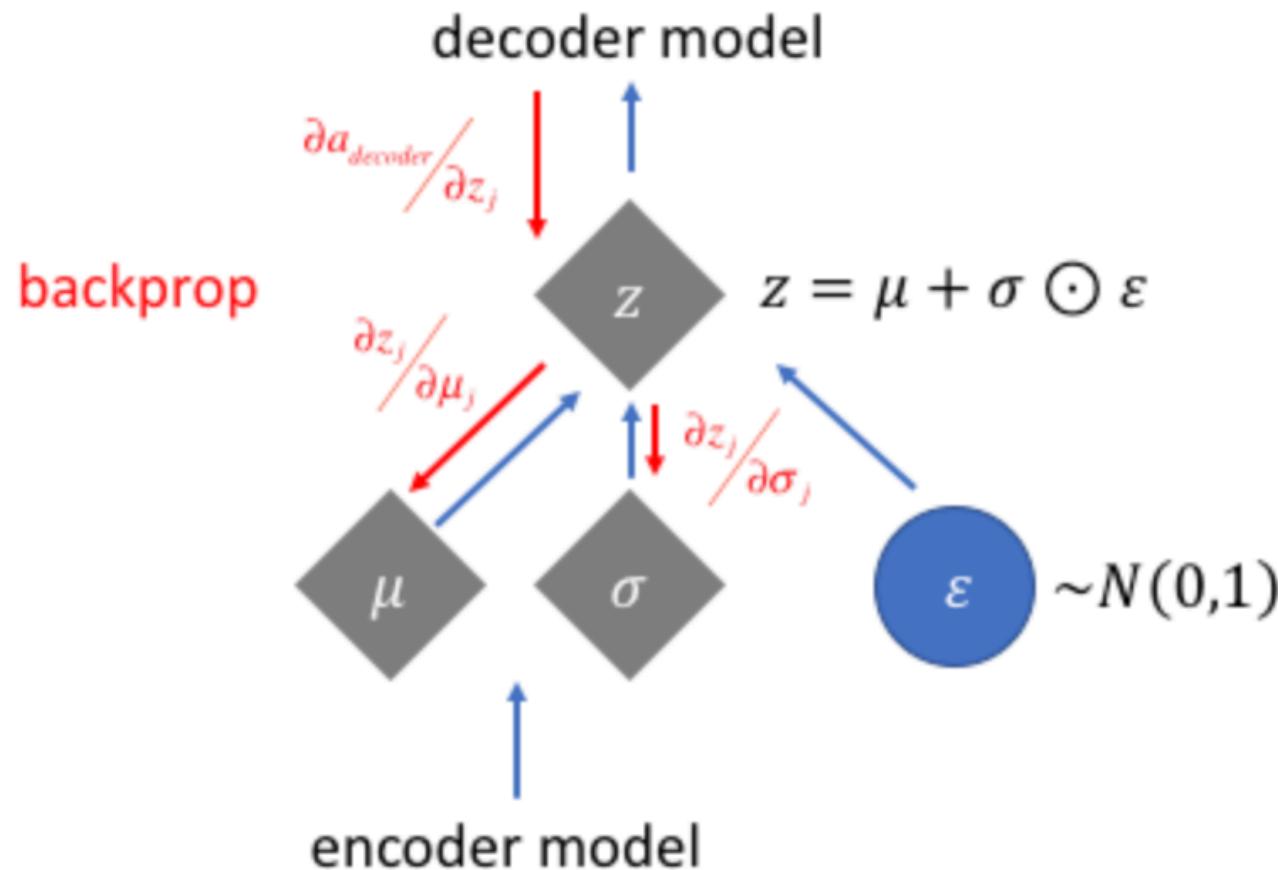
VAE Implementation



VAE Implementation



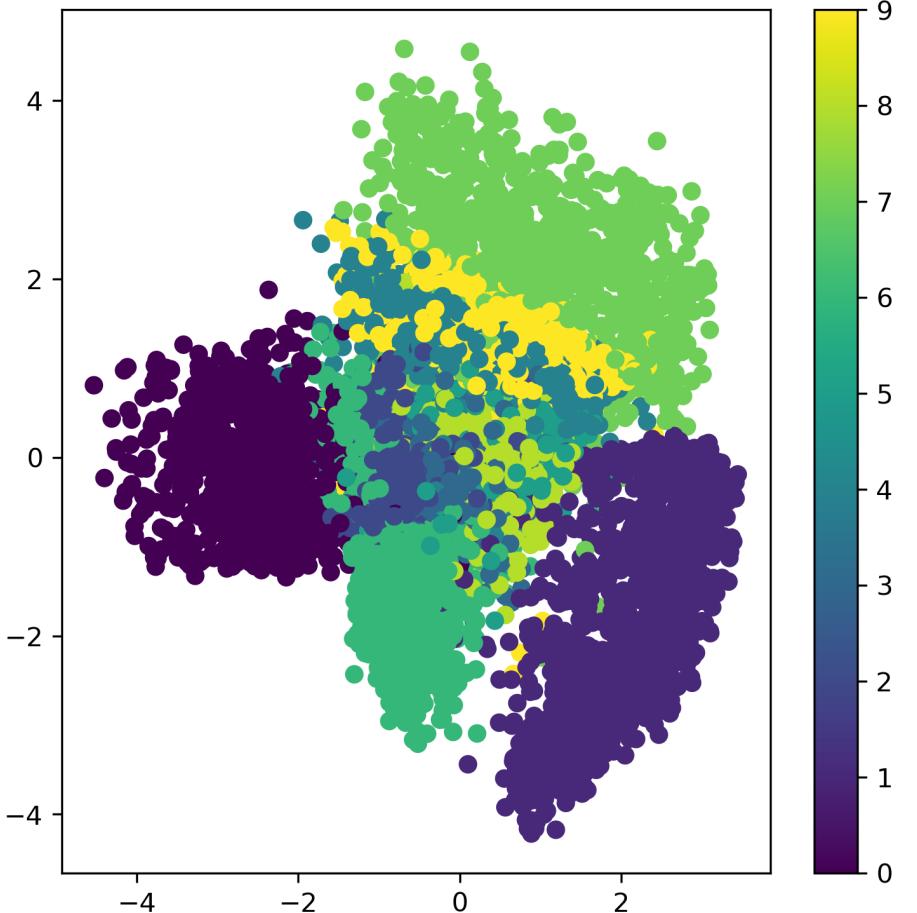
VAE Reparameterize



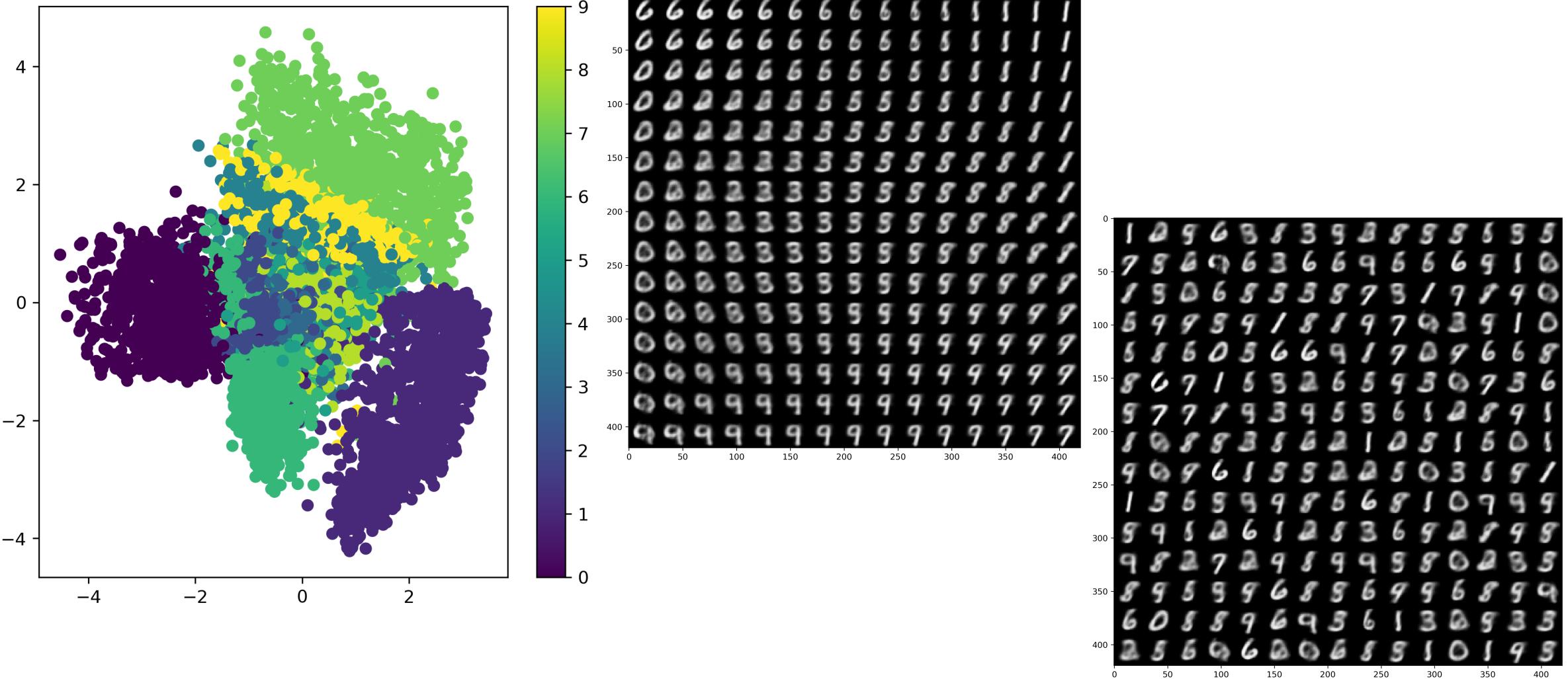
VAE Implementation

VAE_demonstration.py: code posted in BB

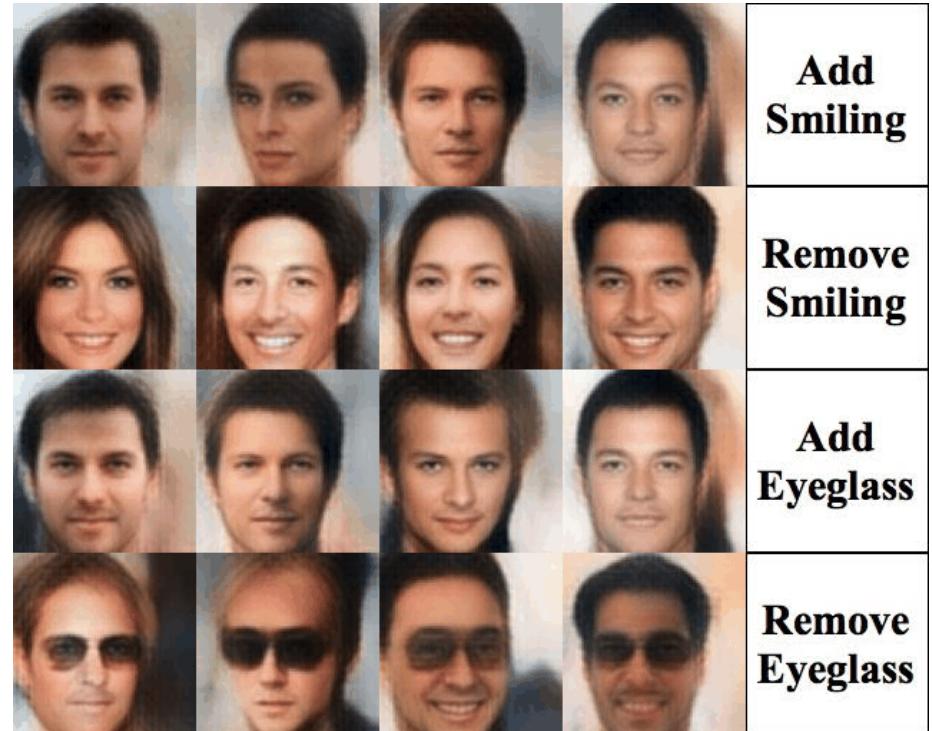
Intuition of Variational Autoencoder



Intuition of Variational Autoencoder



Intuition of Variational Autoencoder



<https://houxianxu.github.io/assets/project/dfcvae>

Why it is called “Variational Autoencoder”?

- It has to do with the generative model framework and Variational Inference technique.
- **VAE is a fascinating development in unsupervised machine learning that marries Variational Inference with deep learning.**
- Latest development

<https://syncedreview.com/2019/06/06/going-beyond-gan-new-deepmind-vae-model-generates-high-fidelity-human-faces/>