



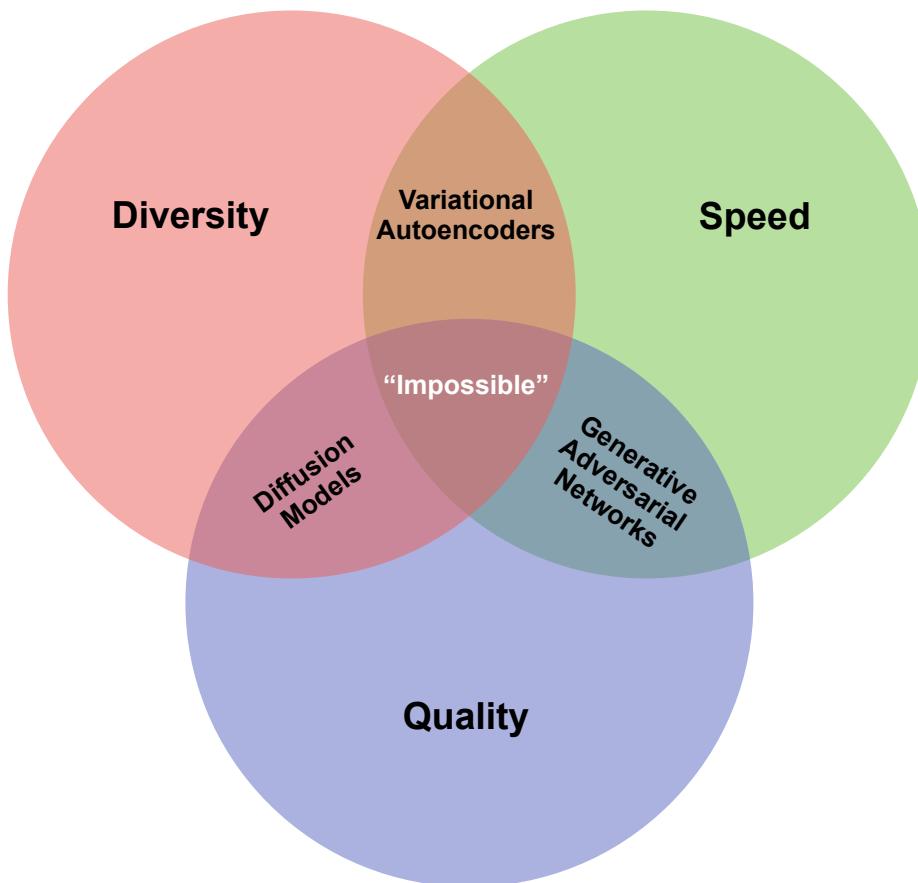
Lesson 4: Demystifying Diffusion

- 4.1 Generation as a Reversible Process
- 4.2 Sampling as Iterative Denoising
- 4.3 Diffusers and the Hugging Face Ecosystem
- 4.4 Generating Images with Diffusers Pipelines
- 4.5 Deconstructing the Diffusion Process
- 4.6 Forward Process as Encoder
- 4.7 Reverse Process as Decoder
- 4.8 Interpolating Diffusion Models
- 4.9 Image-to-Image Translation with SDEdit
- 4.10 Image Restoration and Enhancement

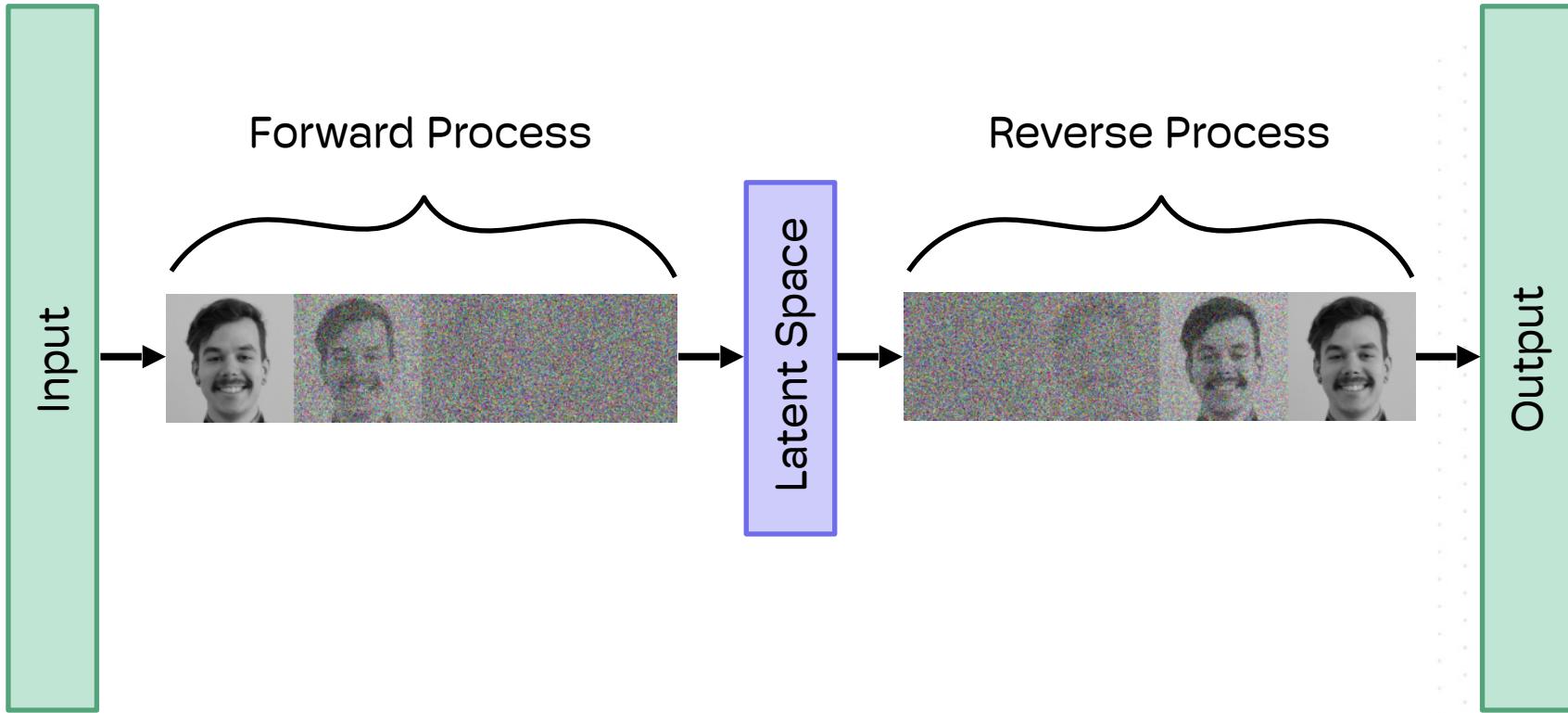
4.1

Generation as a Reversible Process

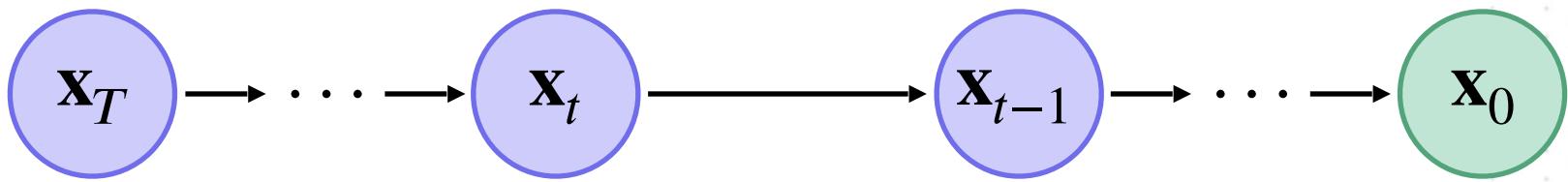
Generative Modeling Trilemma



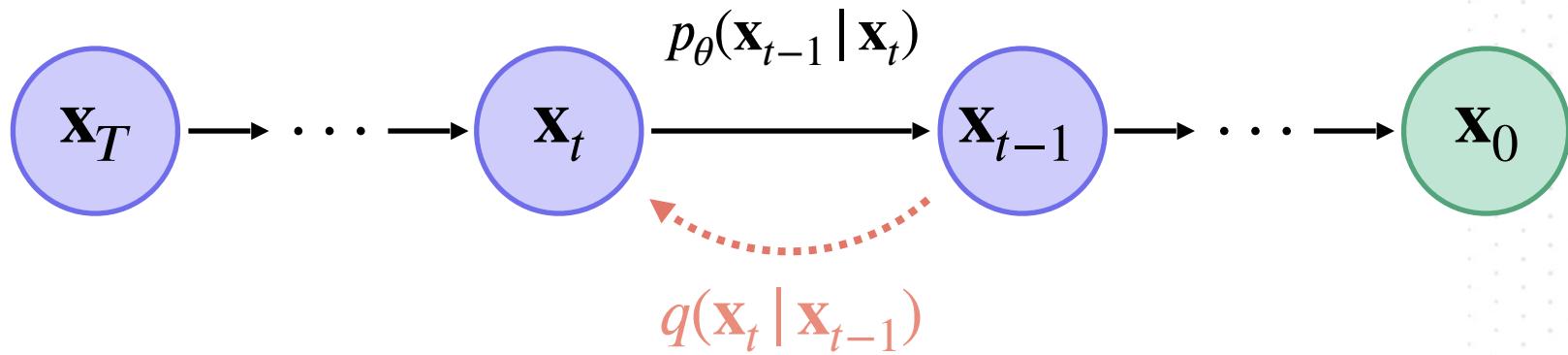
Diffusion Model



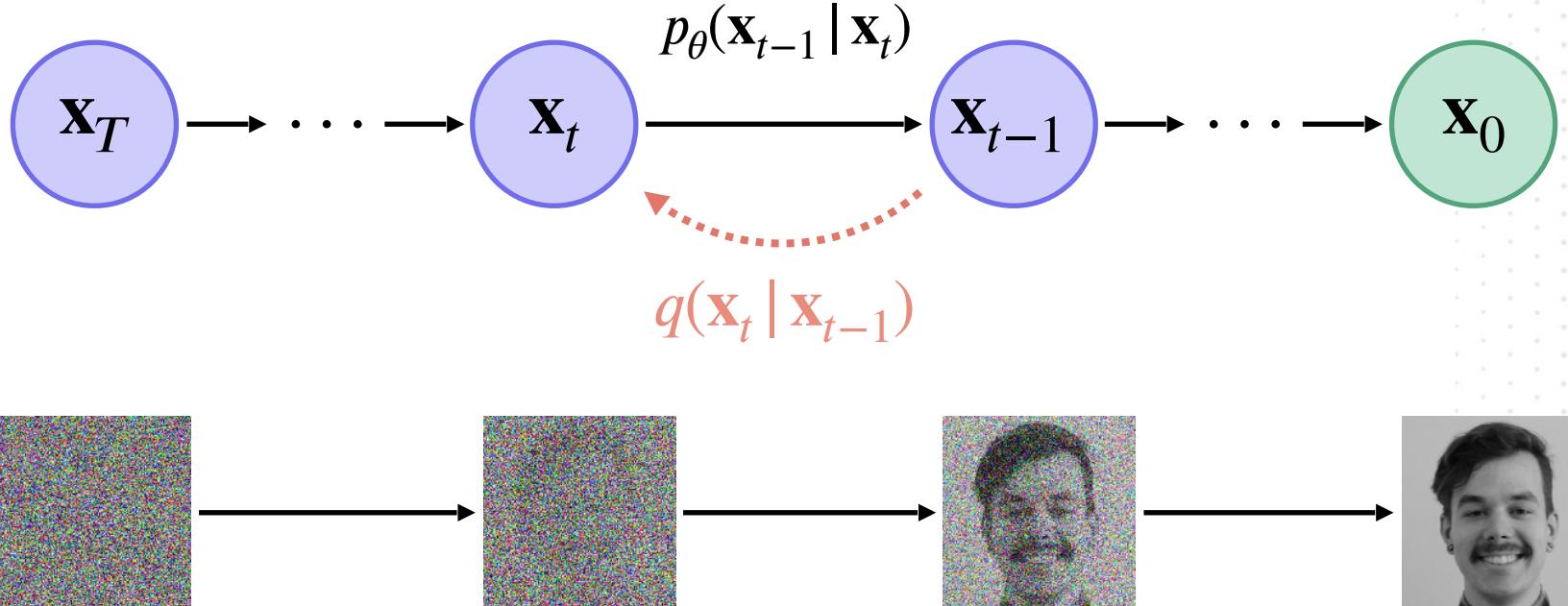
Diffusion Model



Diffusion Model

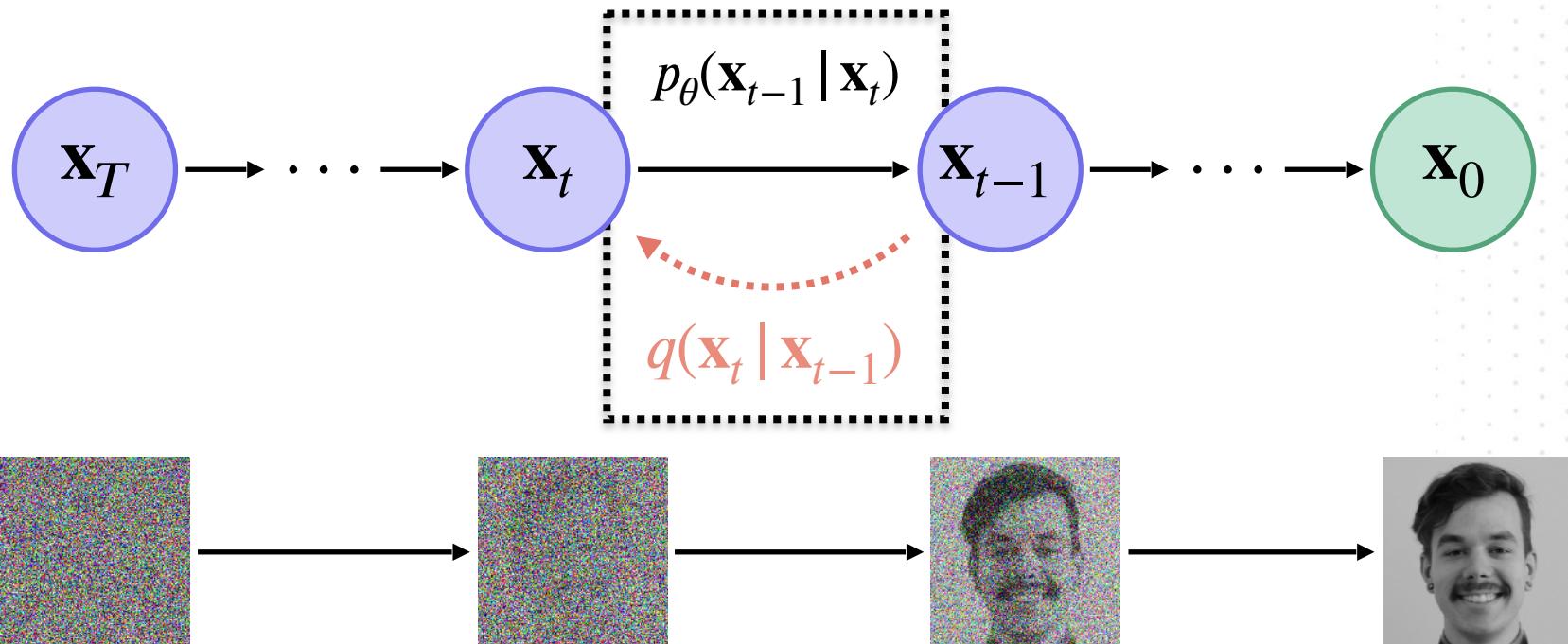


Diffusion Model

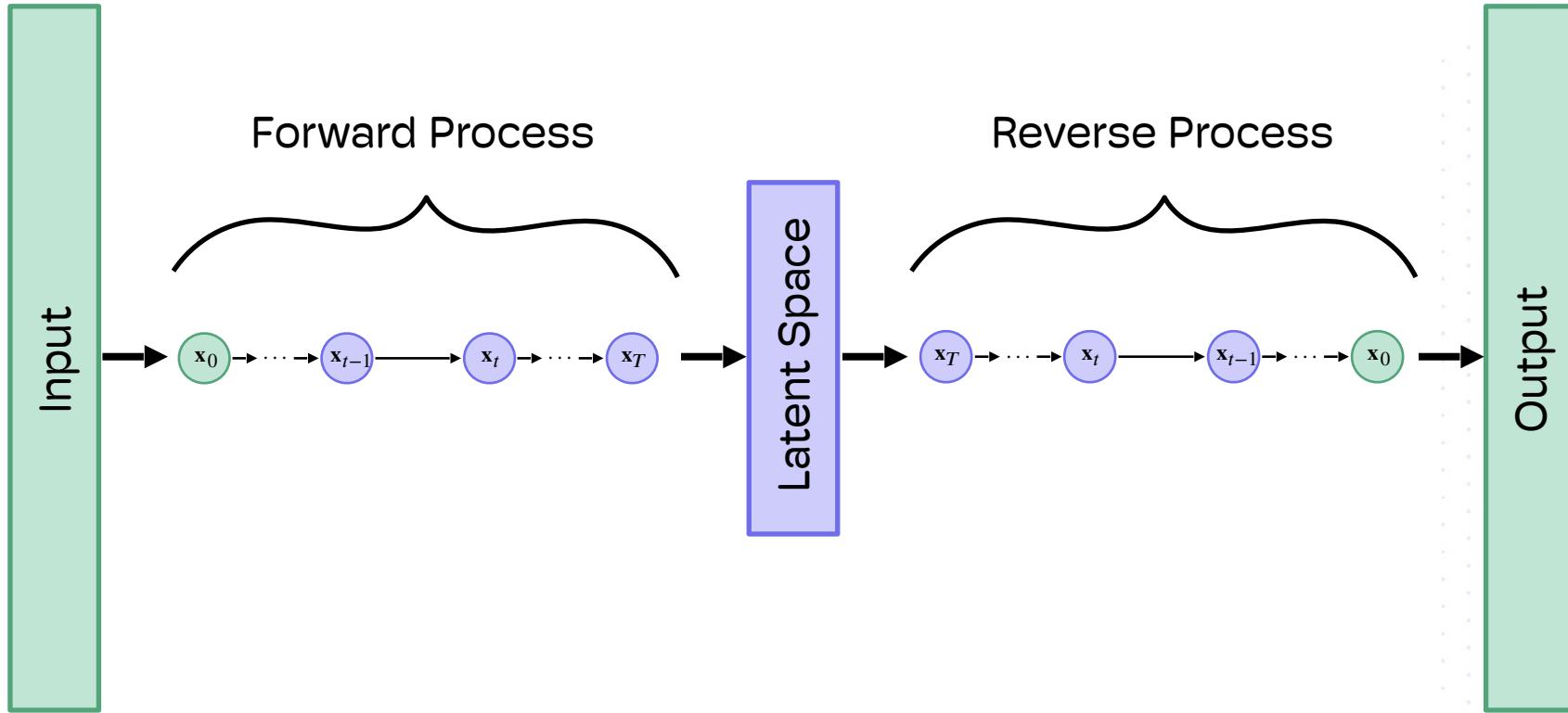


Diffusion Model

Variational Inference



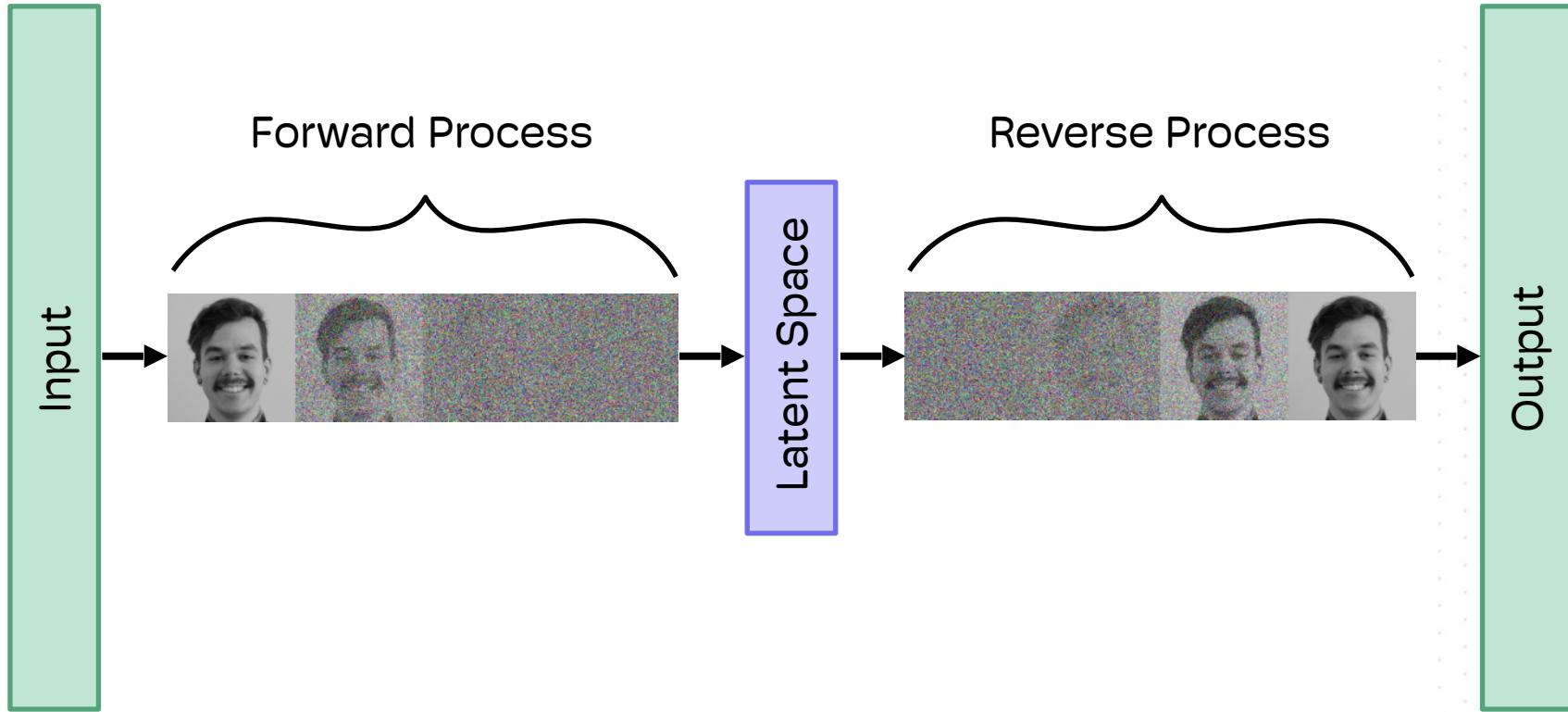
Diffusion Model



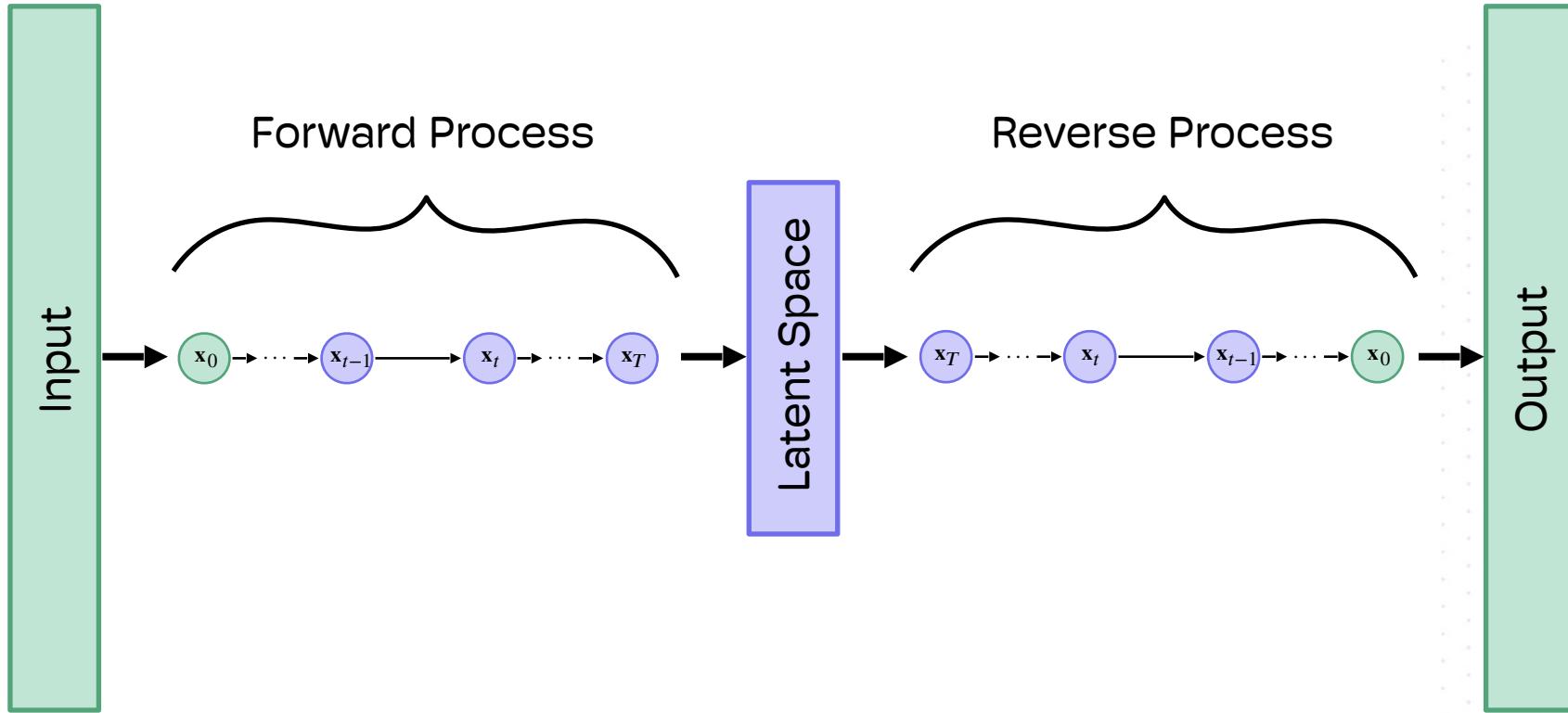
4.2

Sampling as Iterative Denoising

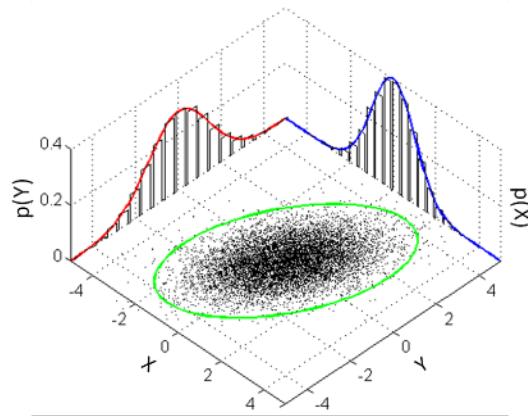
Diffusion Model



Diffusion Model

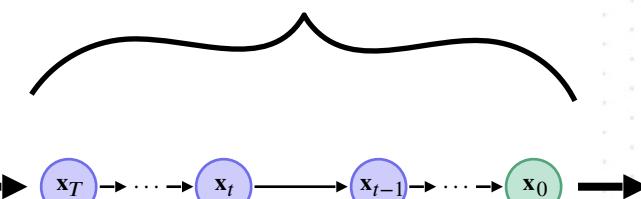


Diffusion Model



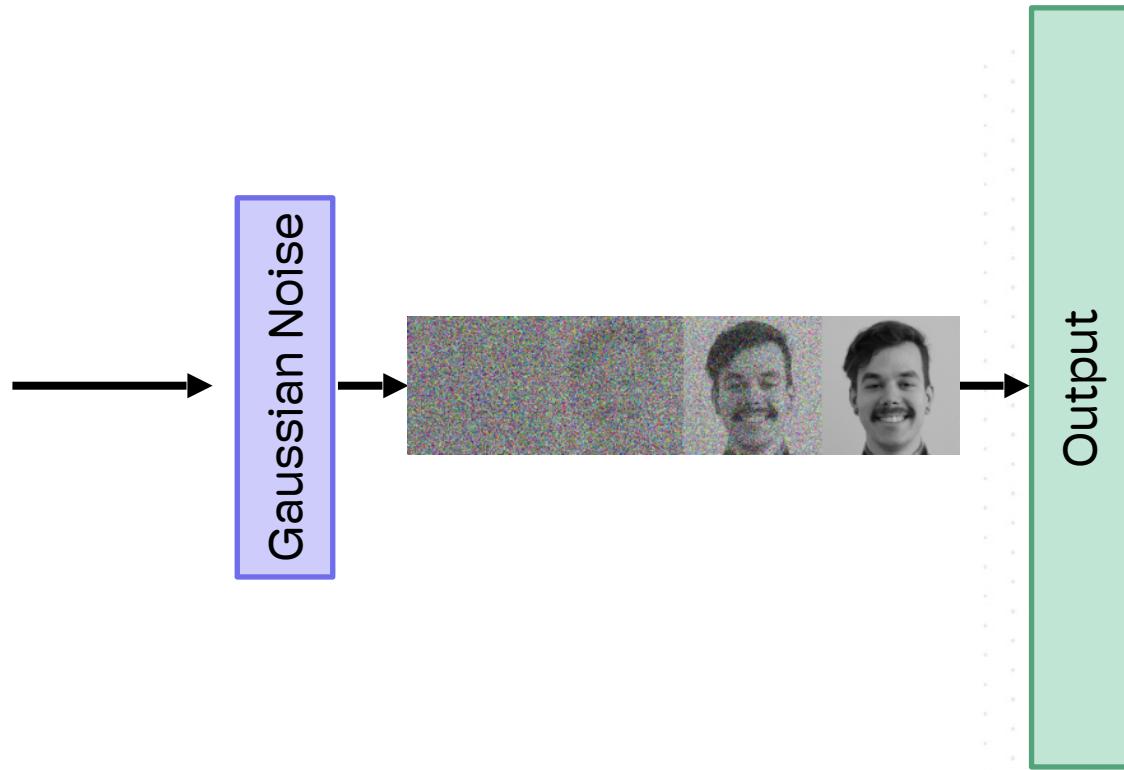
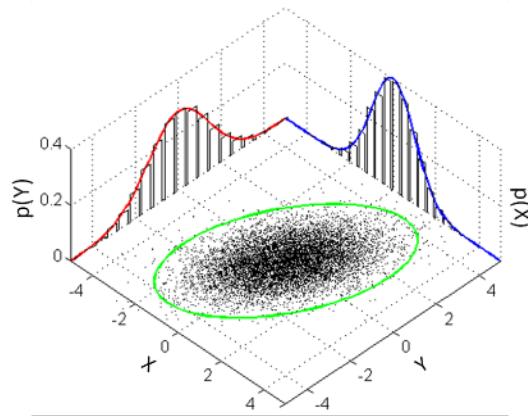
Gaussian Noise

Reverse Process

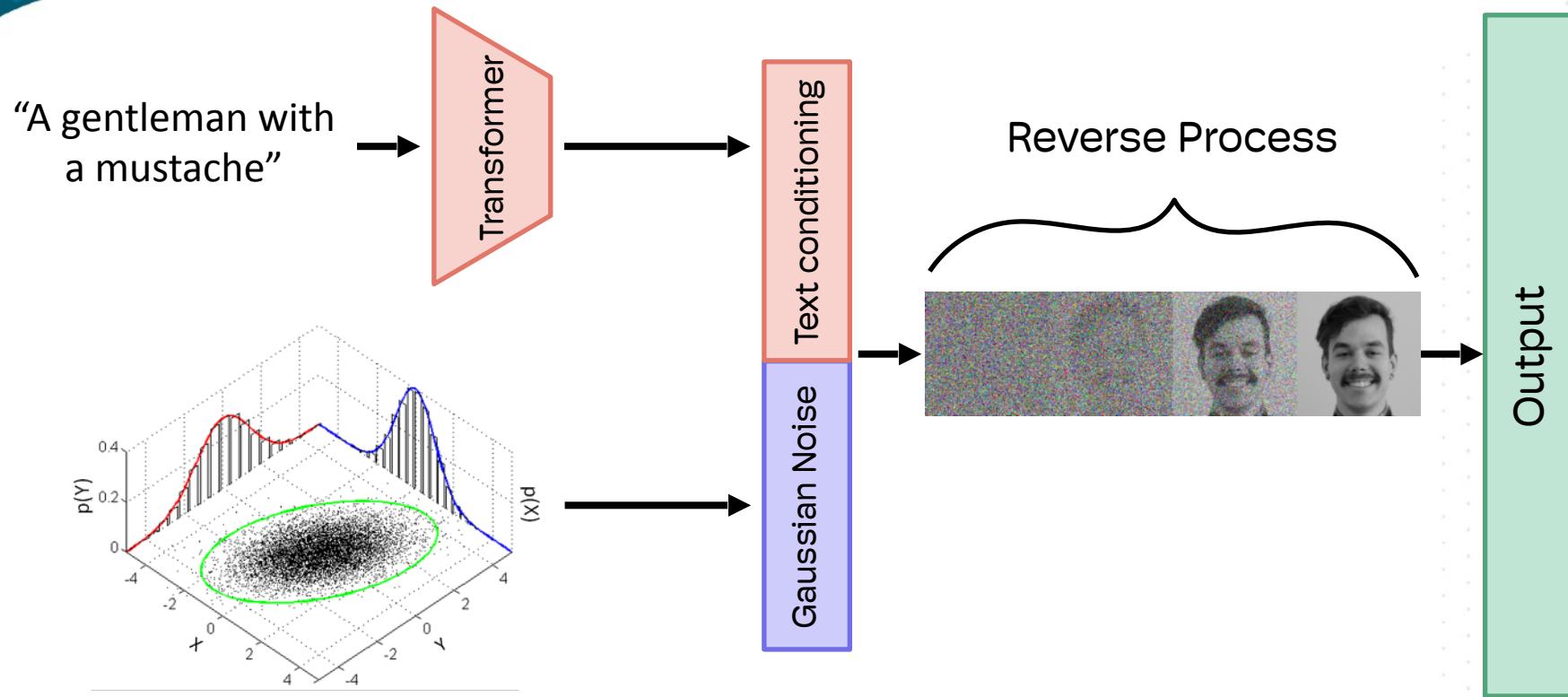


Output

Diffusion Model



Text-to-Image



4.3

Diffusers and the Hugging Face Ecosystem

Screen Sharing

4.4

Generating Images with Diffusers Pipelines

Live Coding

4.5

Deconstructing the Diffusion Process

Live Coding

4.6

Forward Process as Encoder

Live Coding

4.7

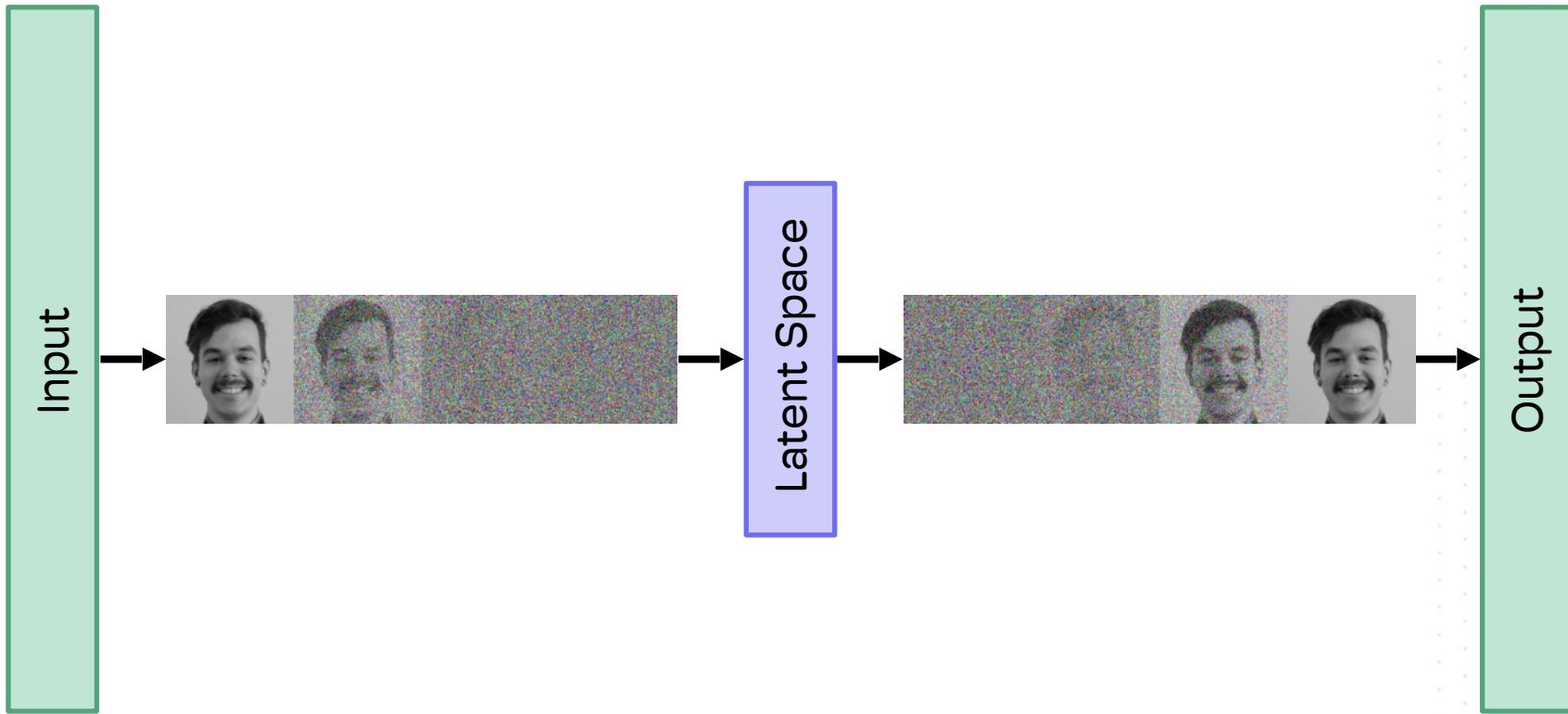
Reverse Process as Decoder

Live Coding

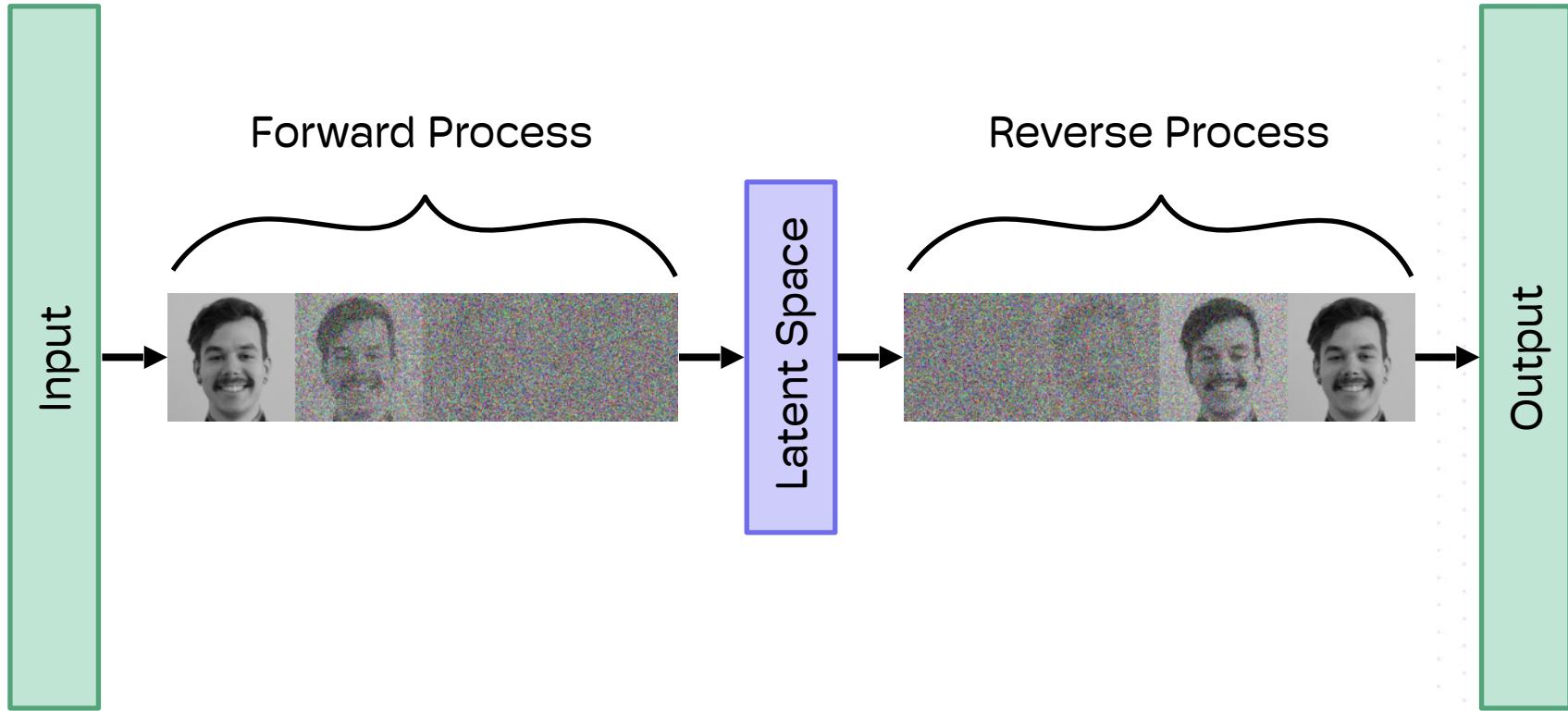
4.8

Interpolating Diffusion Models

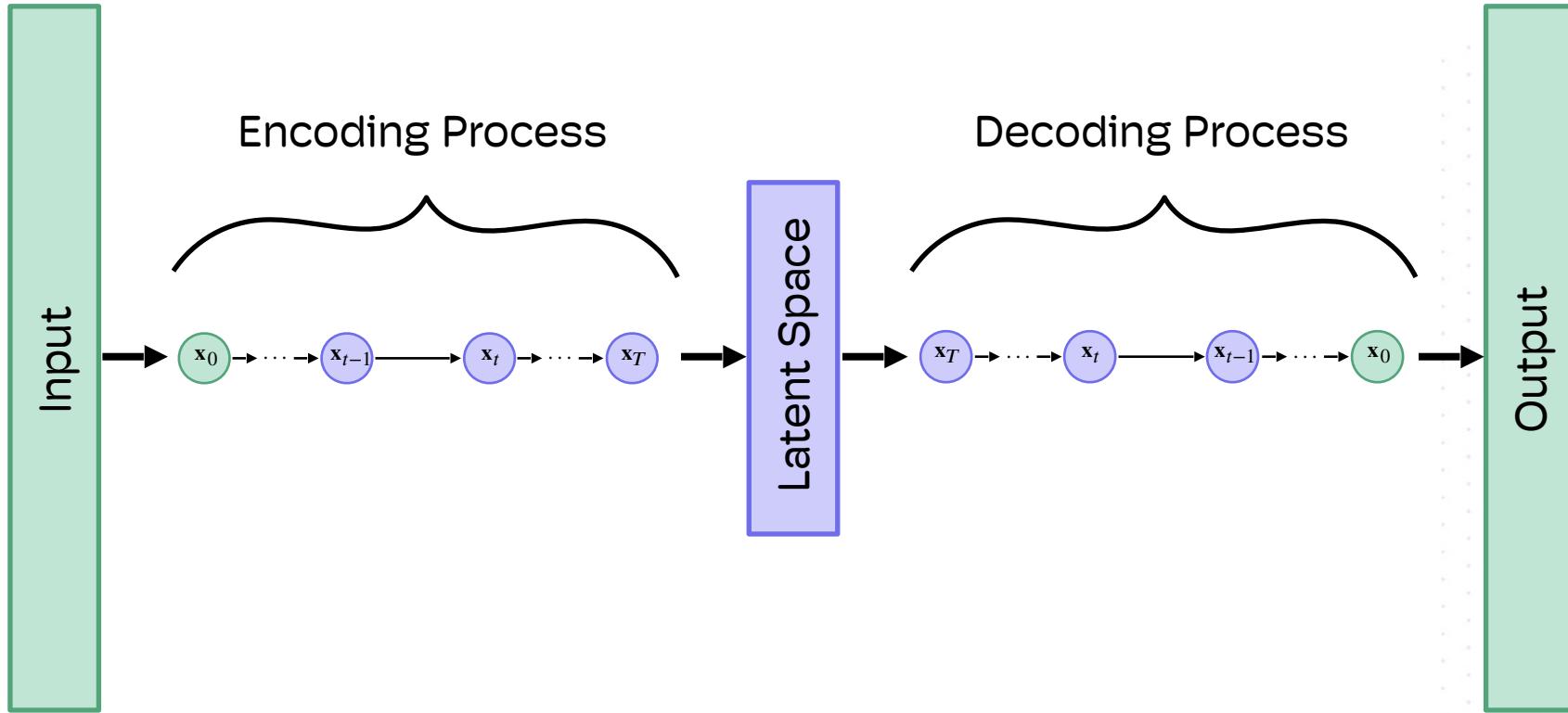
Diffusion Model



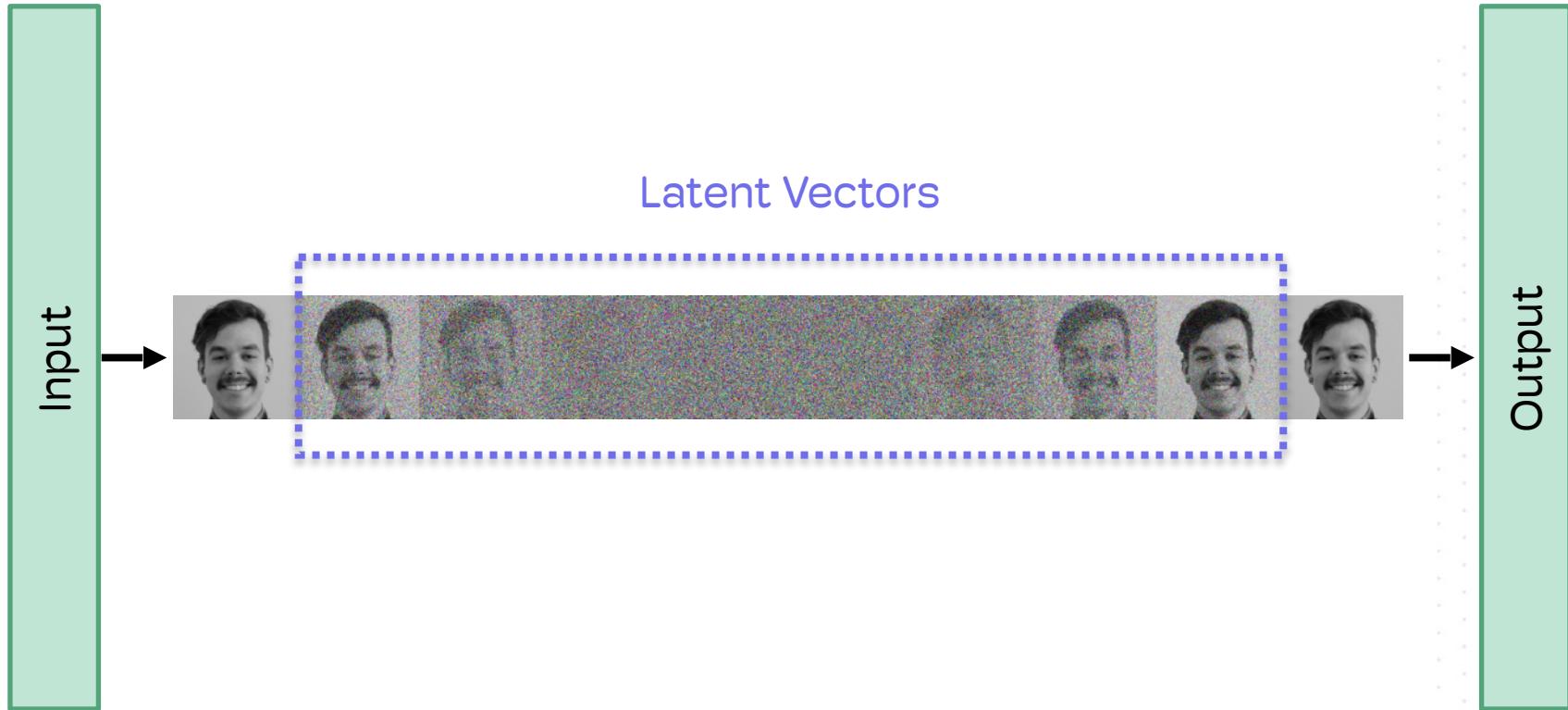
Diffusion Model



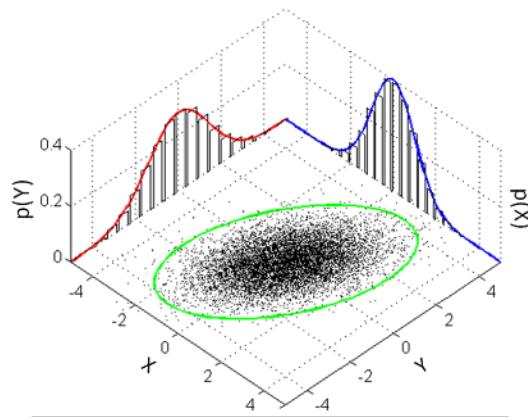
Diffusion Model



Diffusion Model

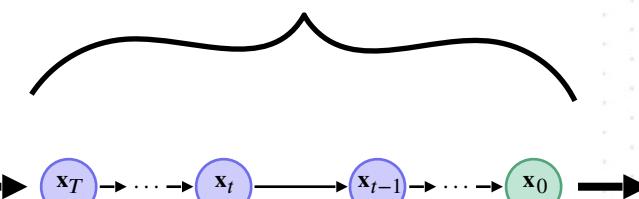


Diffusion Model



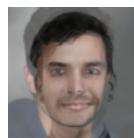
Gaussian Noise

Reverse Process



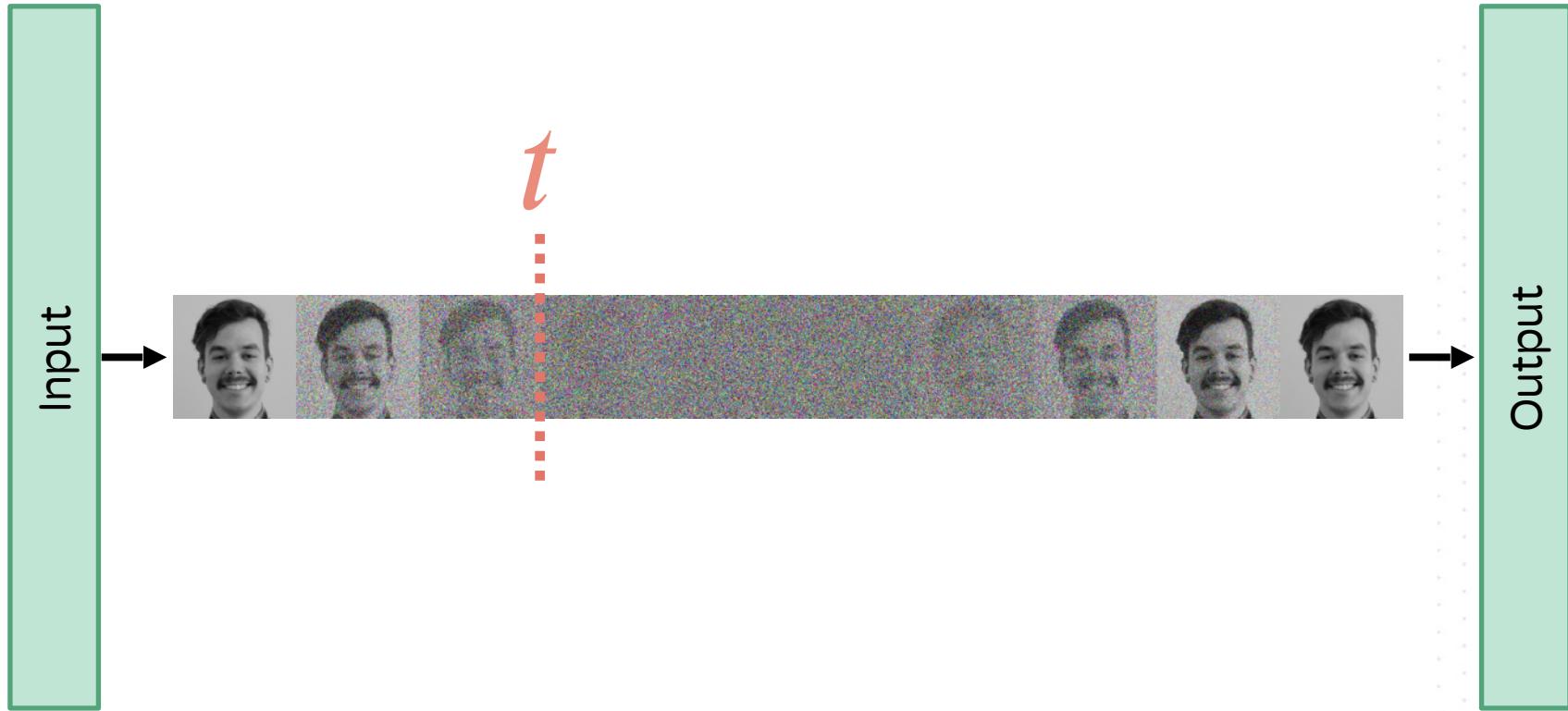
Output

Latent Space Interpolation

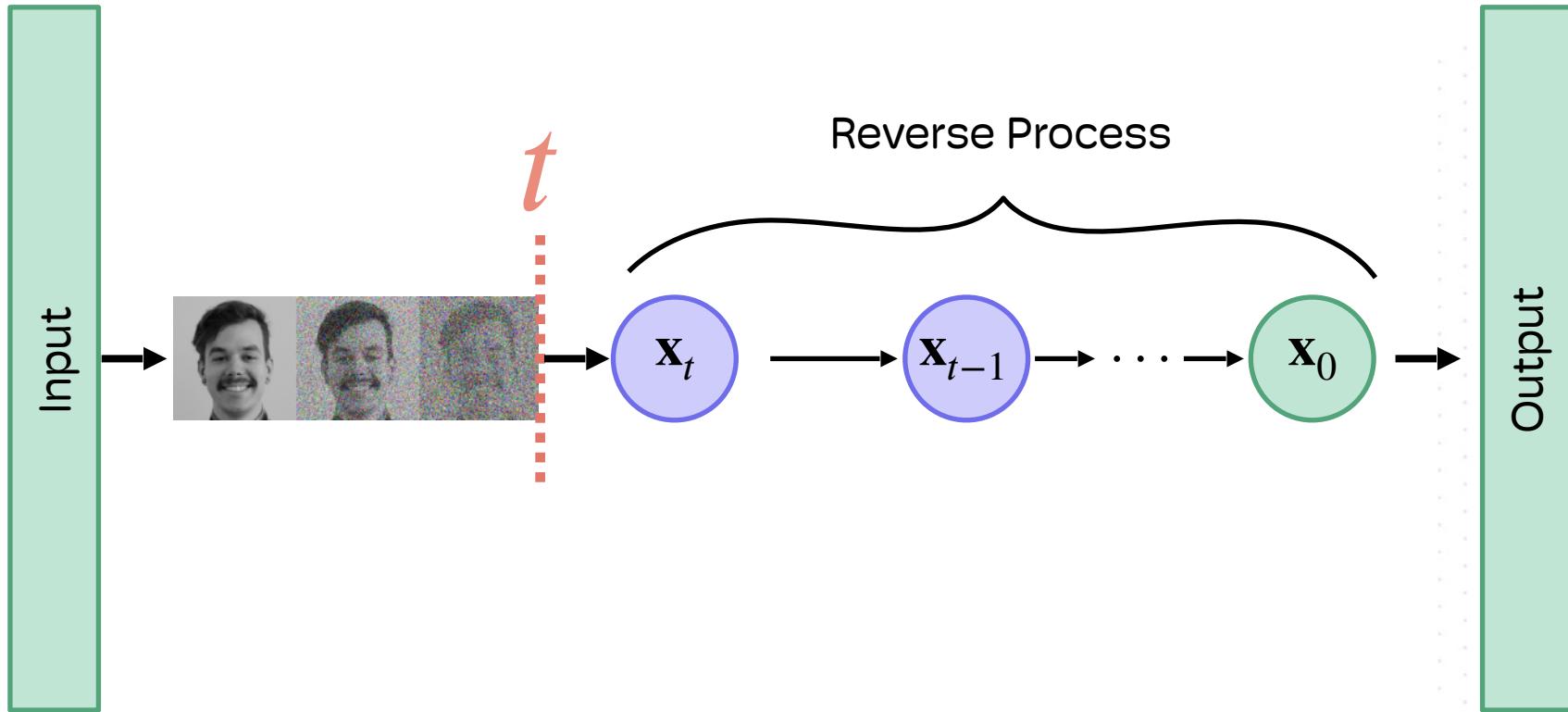


Natural Image
Manifold

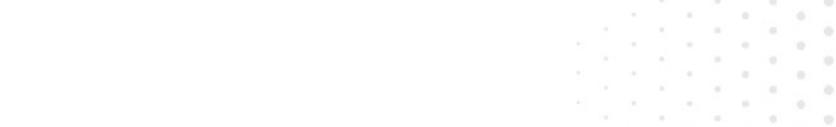
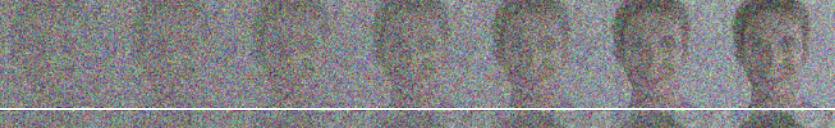
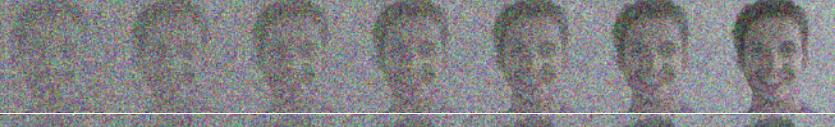
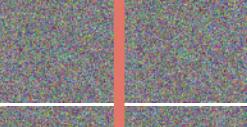
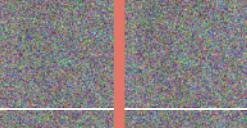
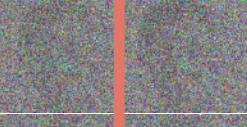
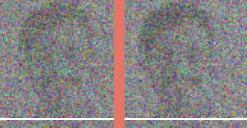
Diffusion Model



Diffusion Model



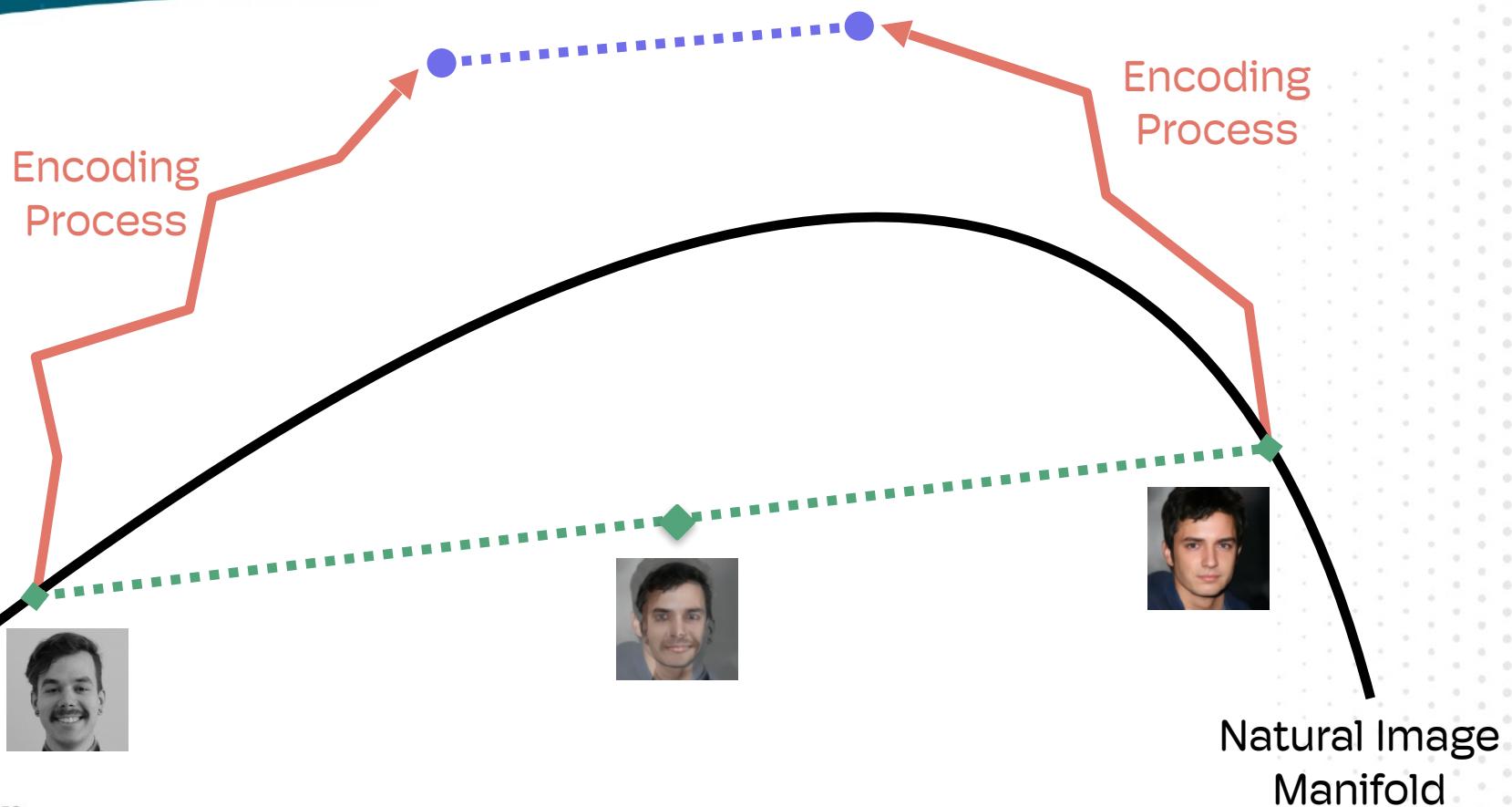
t



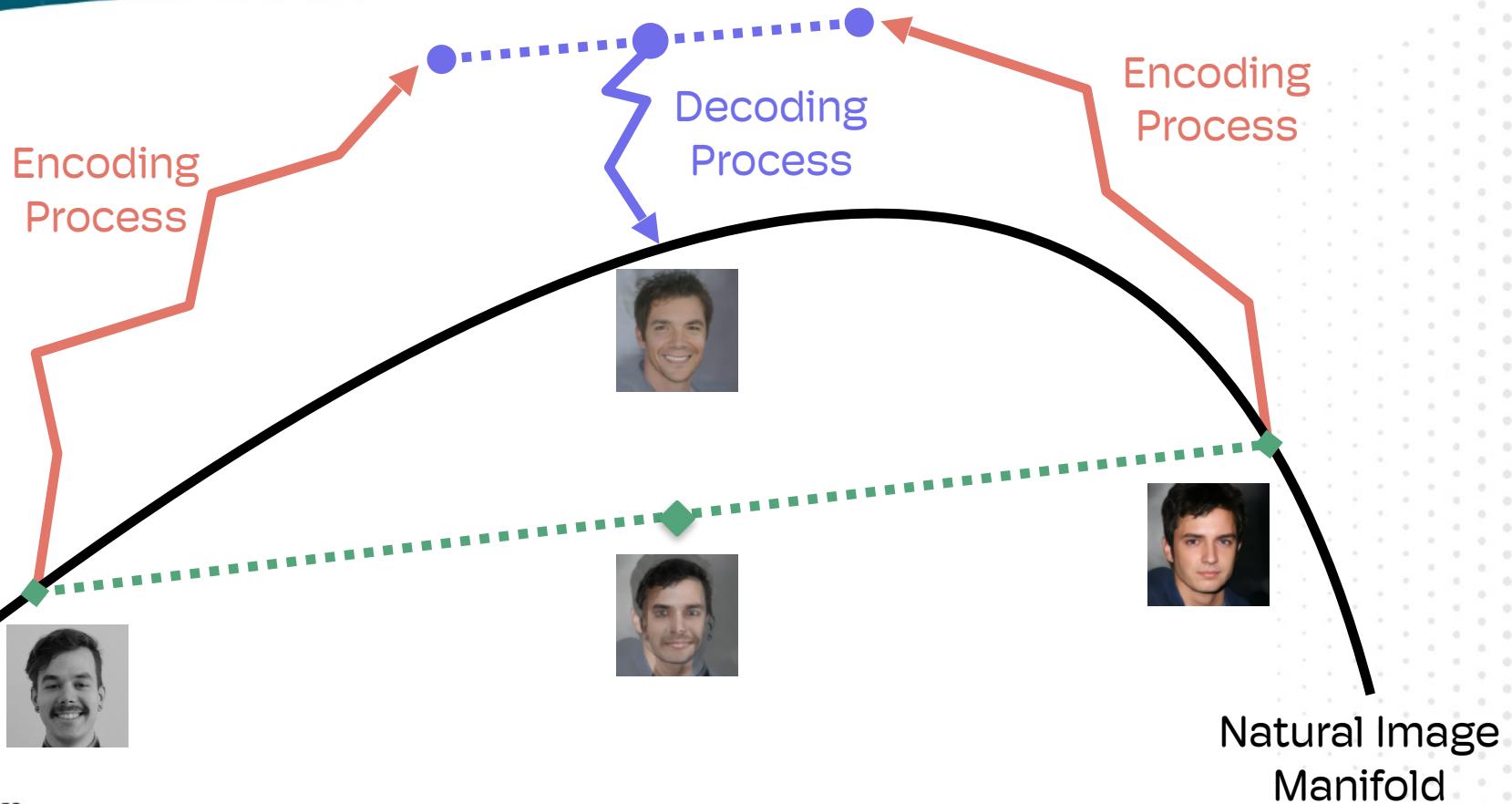
Diffusion Model



Latent Space Interpolation

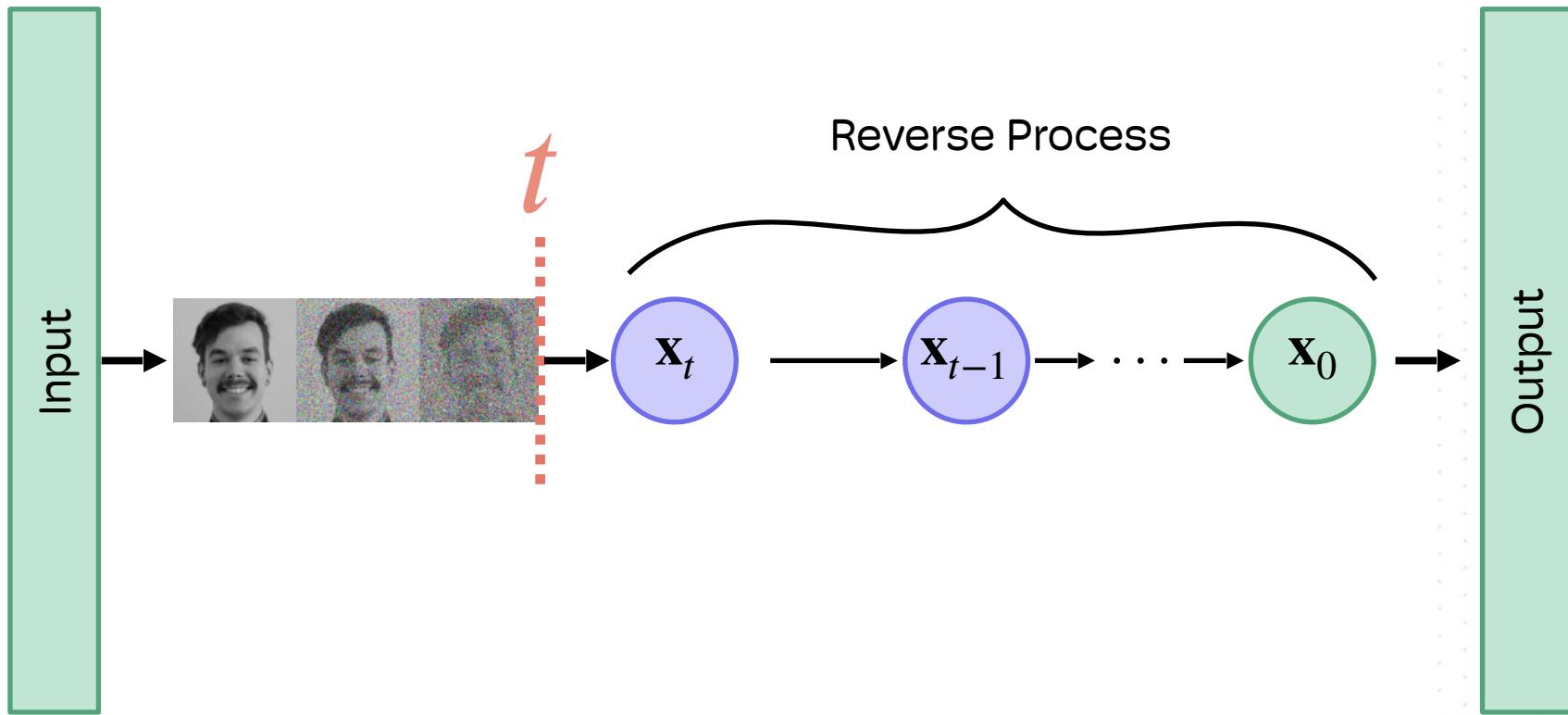


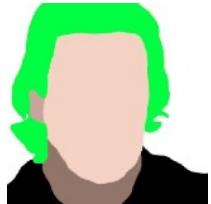
Latent Space Interpolation



4.9

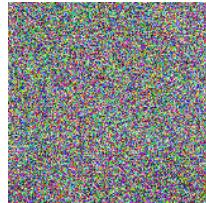
Image-to-Image Translation with SDEdit





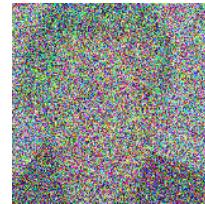
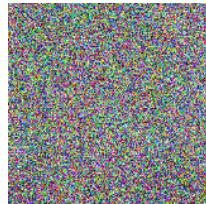
Control
Image

SDEdit



Control
Image

SDEdit

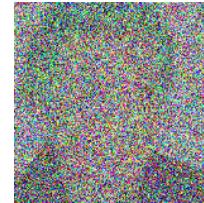


Control
Image

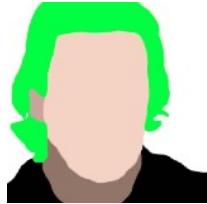
SDEdit



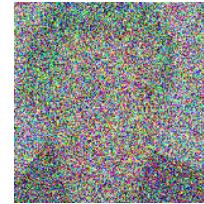
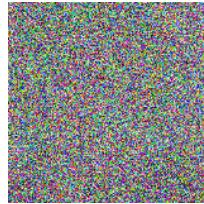
Control
Image



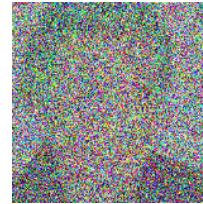
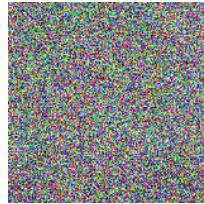
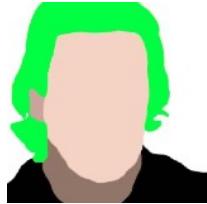
SDEdit



Control
Image

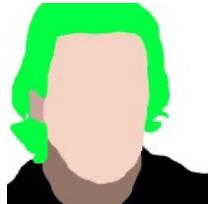


SDEdit

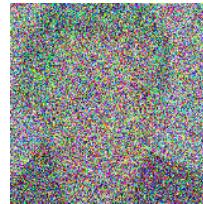
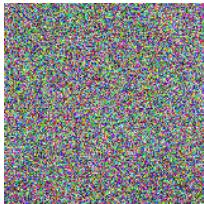


Control
Image

SDEdit



Control
Image



Output
Image

SDEdit

SDEdit “sweet spot”

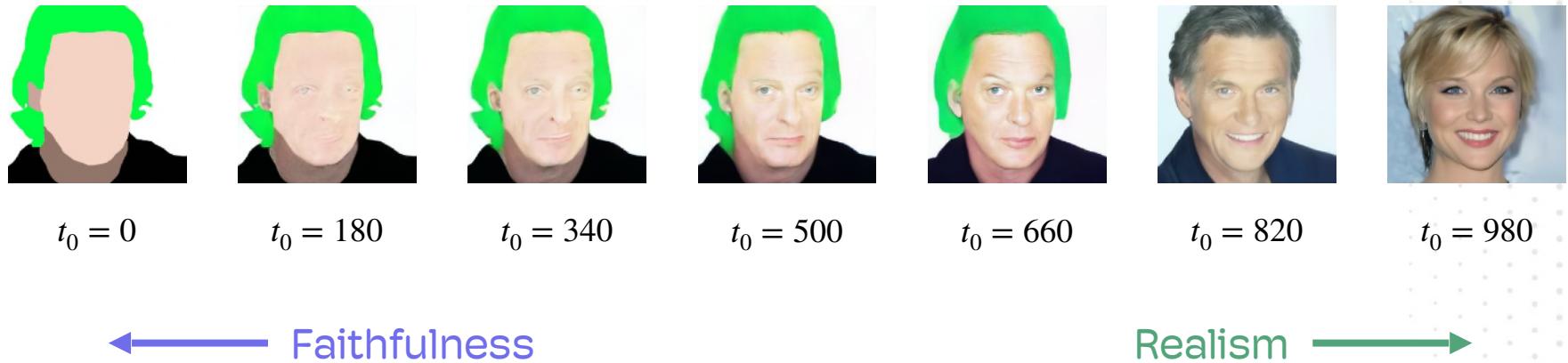


Image Restoration and Repair (Colorization and Denoising)

Generative Super-Resolution

Stroke-Based Editing

4.10

Image Restoration and Enhancement

Live Coding