



Generative AI with Diffusion Models

Part 6: Wrap-up & Assessment

Agenda

- Part 1: From U-Nets to Diffusion

- Part 2: Denoising Diffusion Probabilistic Models

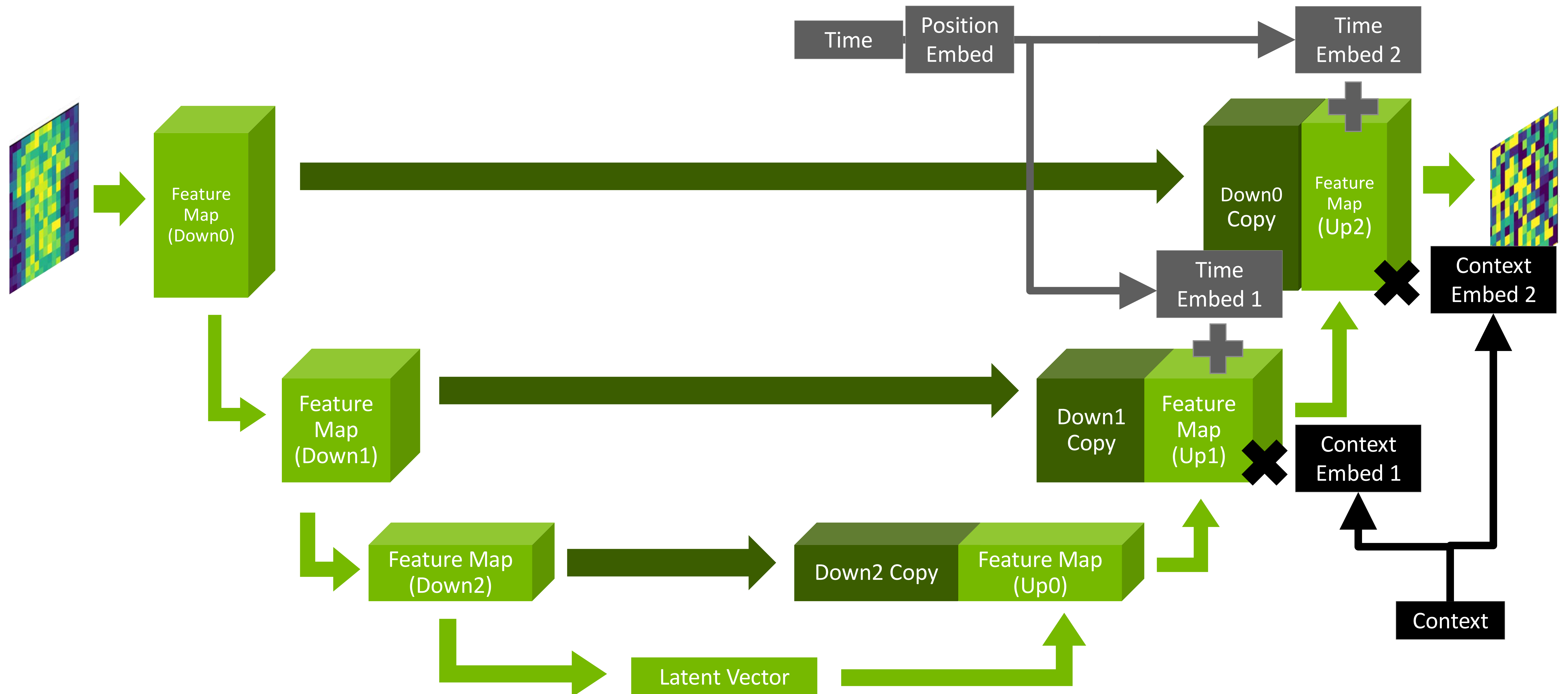
- Part 3: Optimizations

- Part 4: Classifier-Free Diffusion Guidance

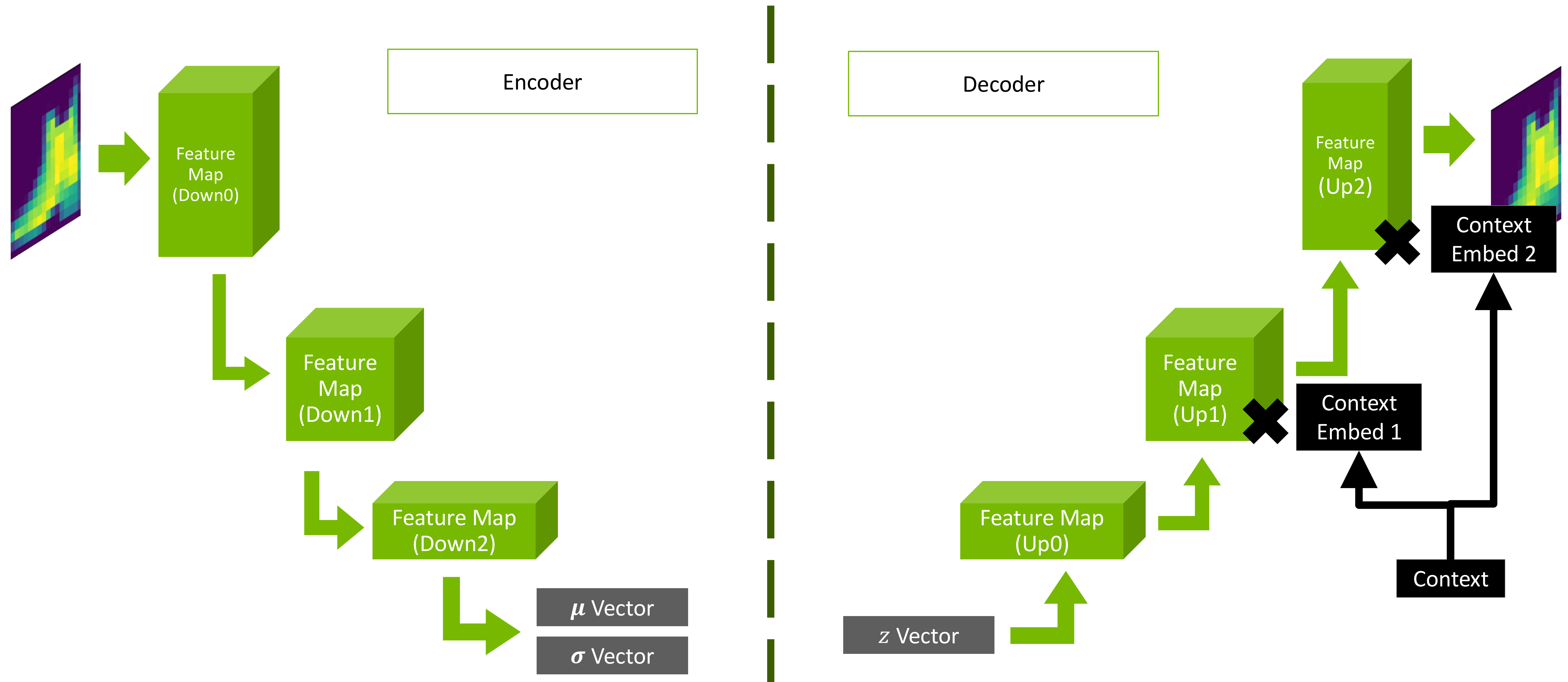
- Part 5: CLIP
- Part 6: Wrap-up & Assessment

Variational Autoencoders (VAE)

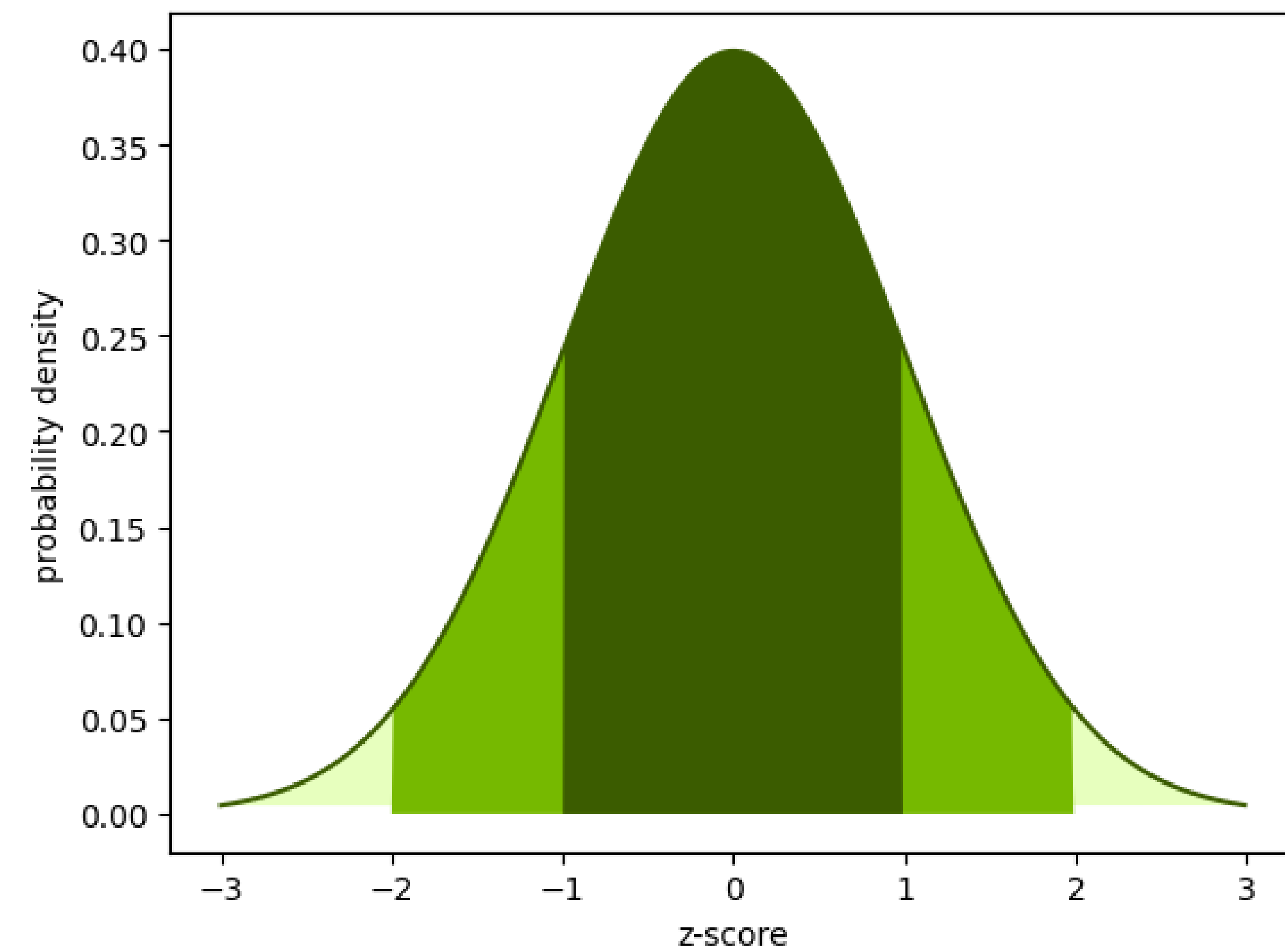
U-Net



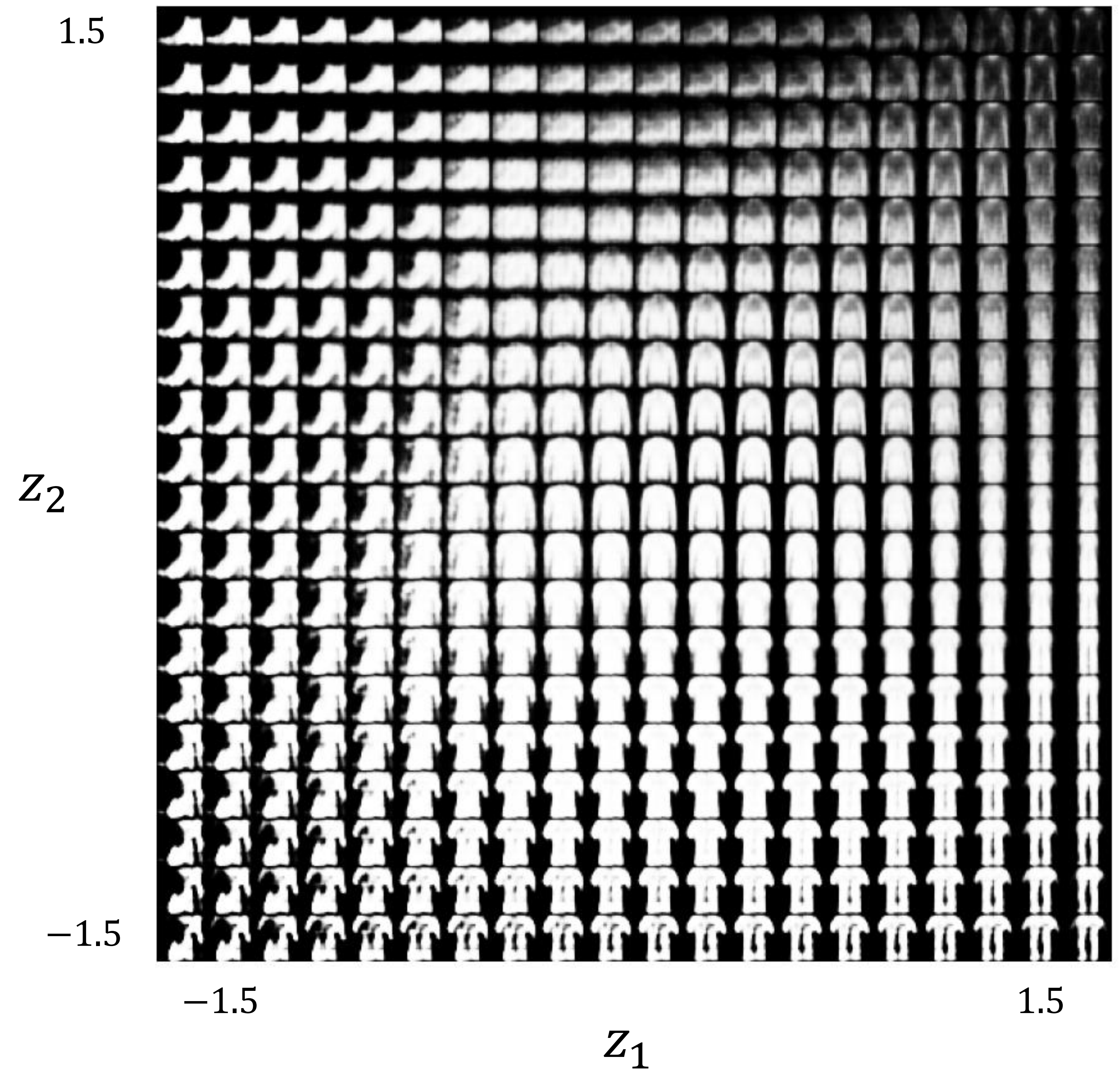
Variational Autoencoder



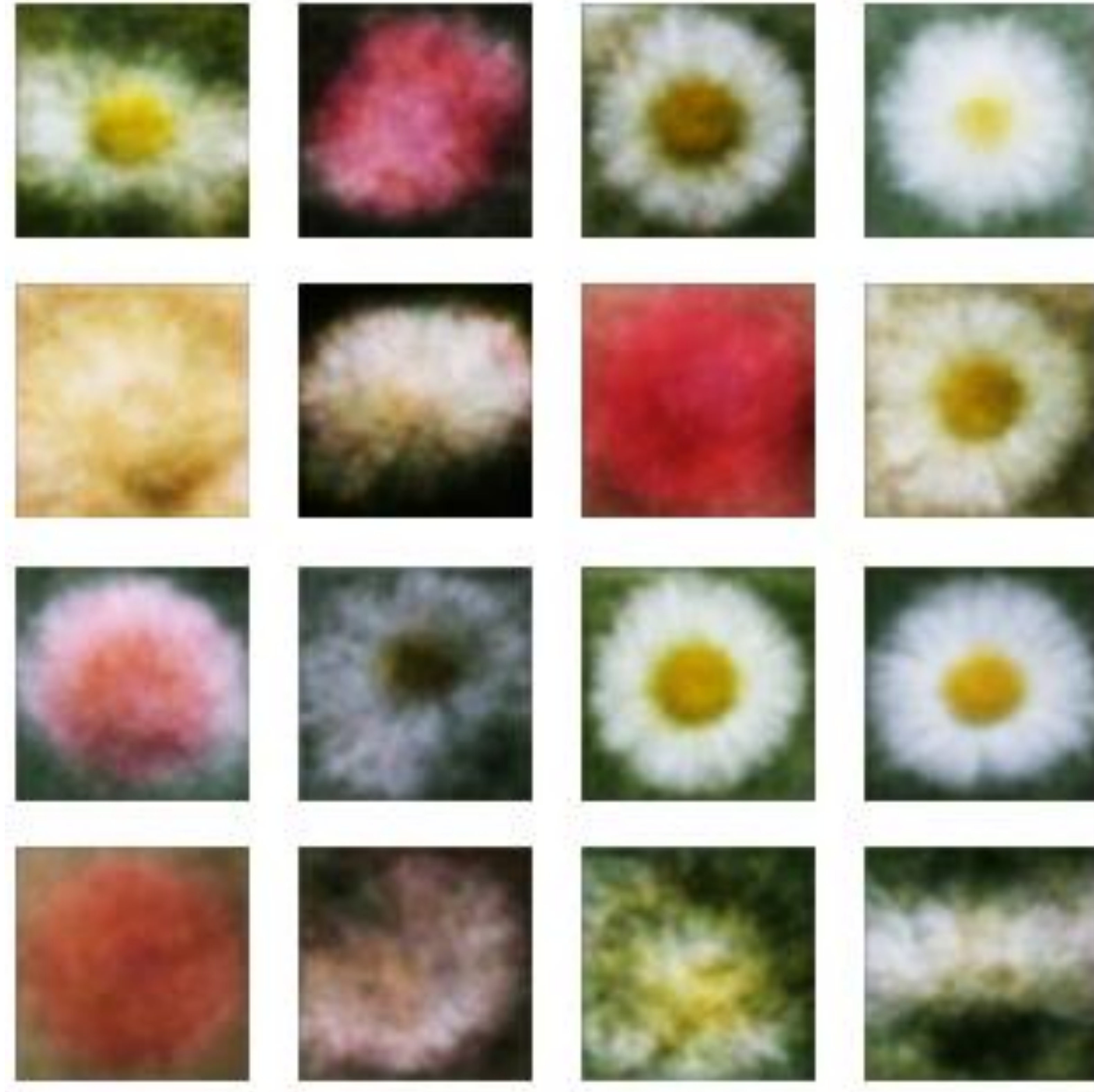
Variational Autoencoder



FashionMNIST
2 Latent Variables



Variational Autoencoder



Modified TF Flowers
20 Latent Variables
16 Random Images



State of the Art Models

State of the Art Models

All of them are used

A visualization of a diffusion model showing a green, textured, and somewhat abstract landscape or terrain. The word "Diffusion" is overlaid in white text.

Diffusion

A visualization of a Variational Autoencoder (VAE) model showing a grid of six small, blurry images of flowers. The word "VAE" is overlaid in white text.

VAE

A visualization of a Contrastive Language-Image Pre-training (CLIP) model showing a 2x4 grid of colored squares with numerical values. The word "CLIP" is overlaid in white text.

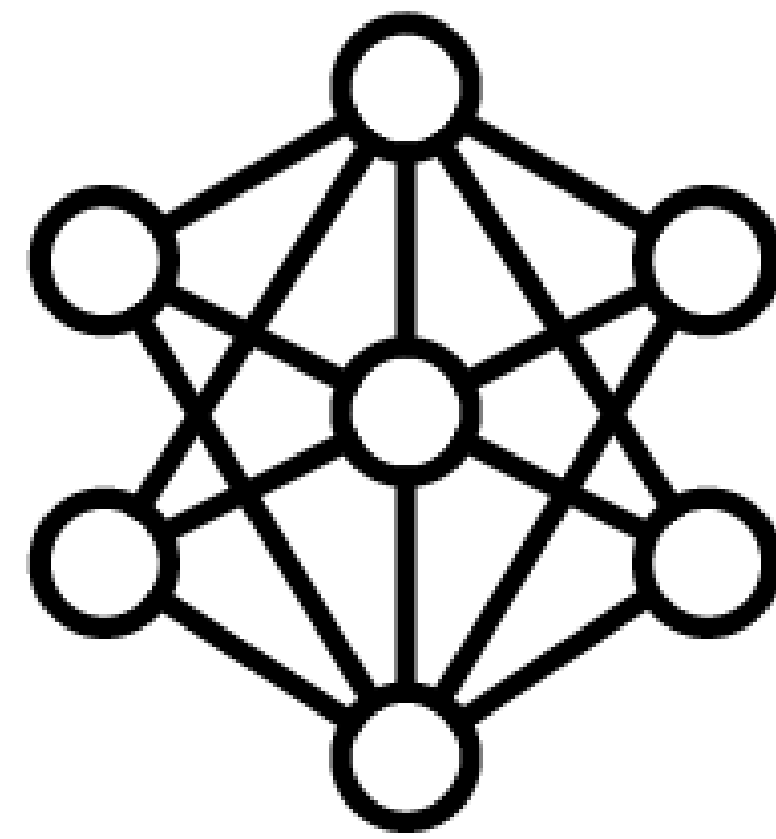
0.20	0.27	0.15	0.16
0.20	0.18	0.26	0.20

CLIP

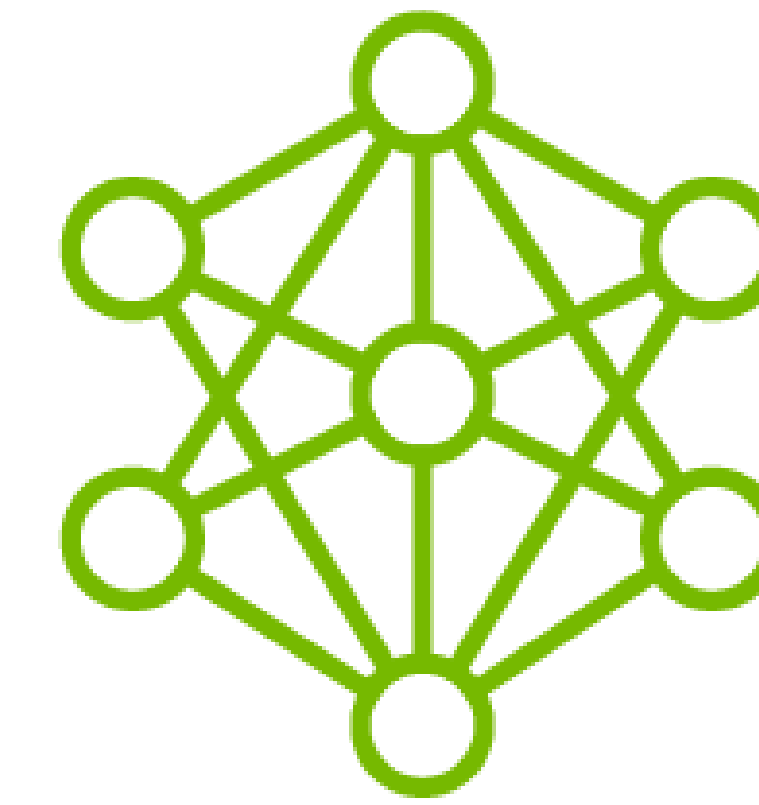
A visualization of a Generative Adversarial Network (GAN) model showing a split image of a landscape with a body of water and mountains. The word "GAN" is overlaid in white text.

GAN

Latent Diffusion



VAE



Diffusion



Encode
Image

Latent Diffusion

Decode
Image



Tiled Upsampling

Transposed Convolution Review

Kernel

.25	.25
.25	.25

Image

1	0	1
0	1	0
1	0	1

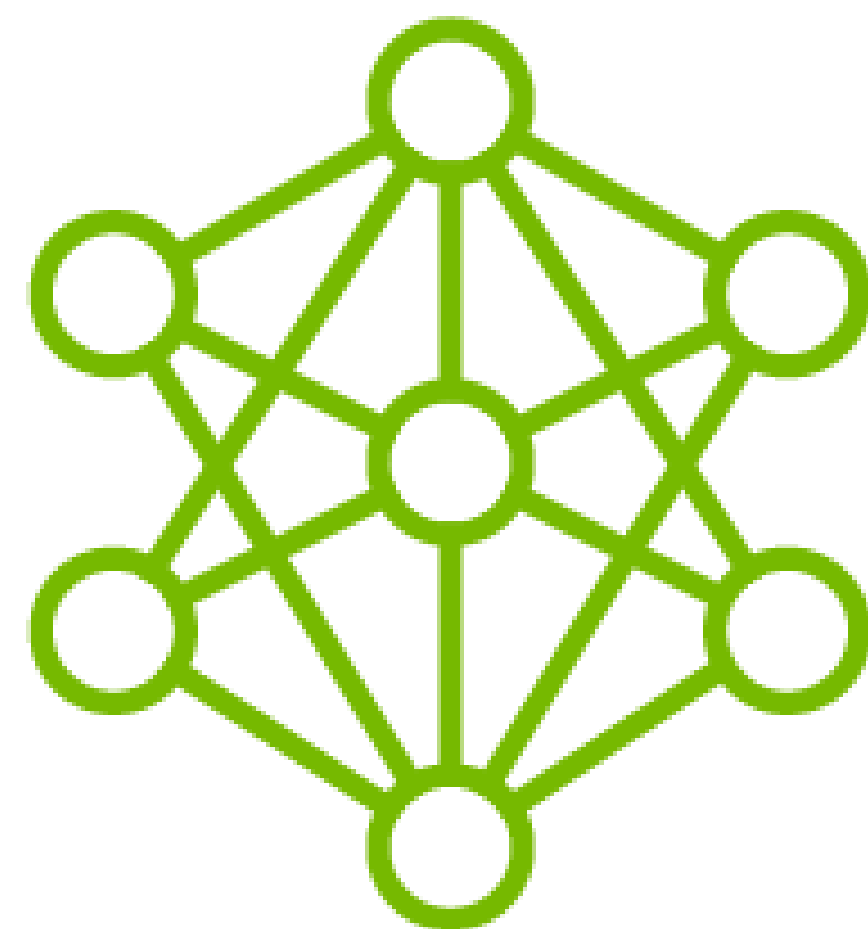
Output

.25	0	0	.25
0	.25	.25	0
0	.25	.25	0
.25	0	0	.25

Tiled Upsampling

Convolving with a Neural Network

Kernel?



Image

1	0	1
0	1	0
1	0	1

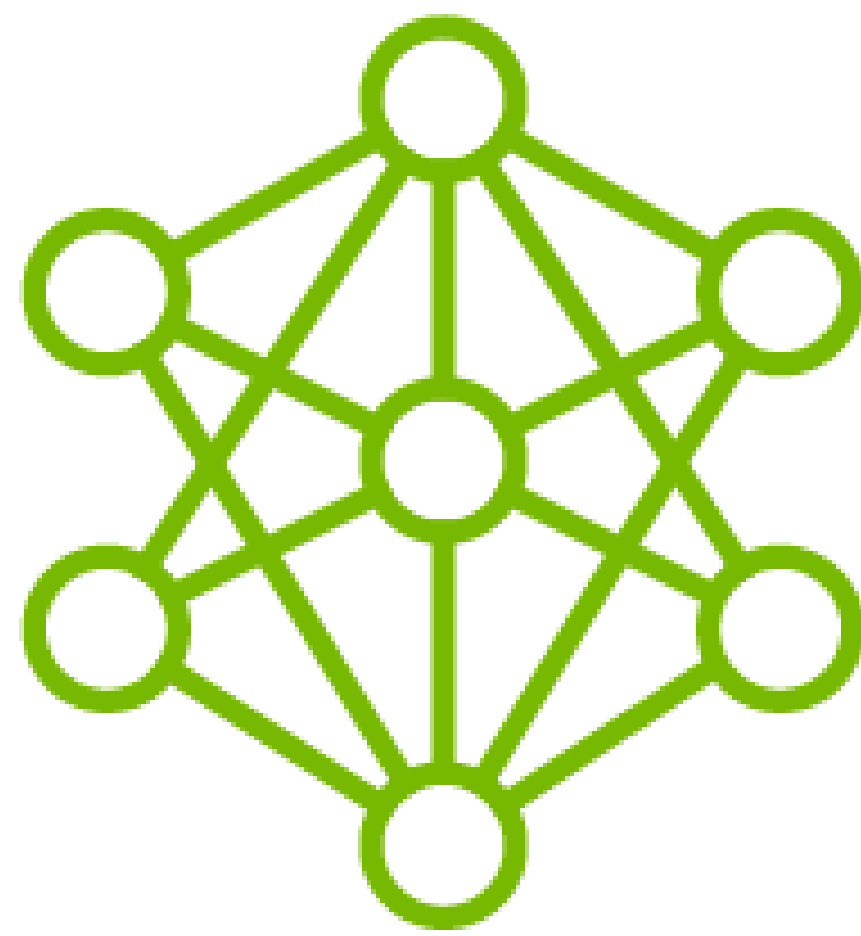
Output

?	?	?	?
?	?	?	?
?	?	?	?
?	?	?	?

Tiled Upsampling

Convolving with a Neural Network

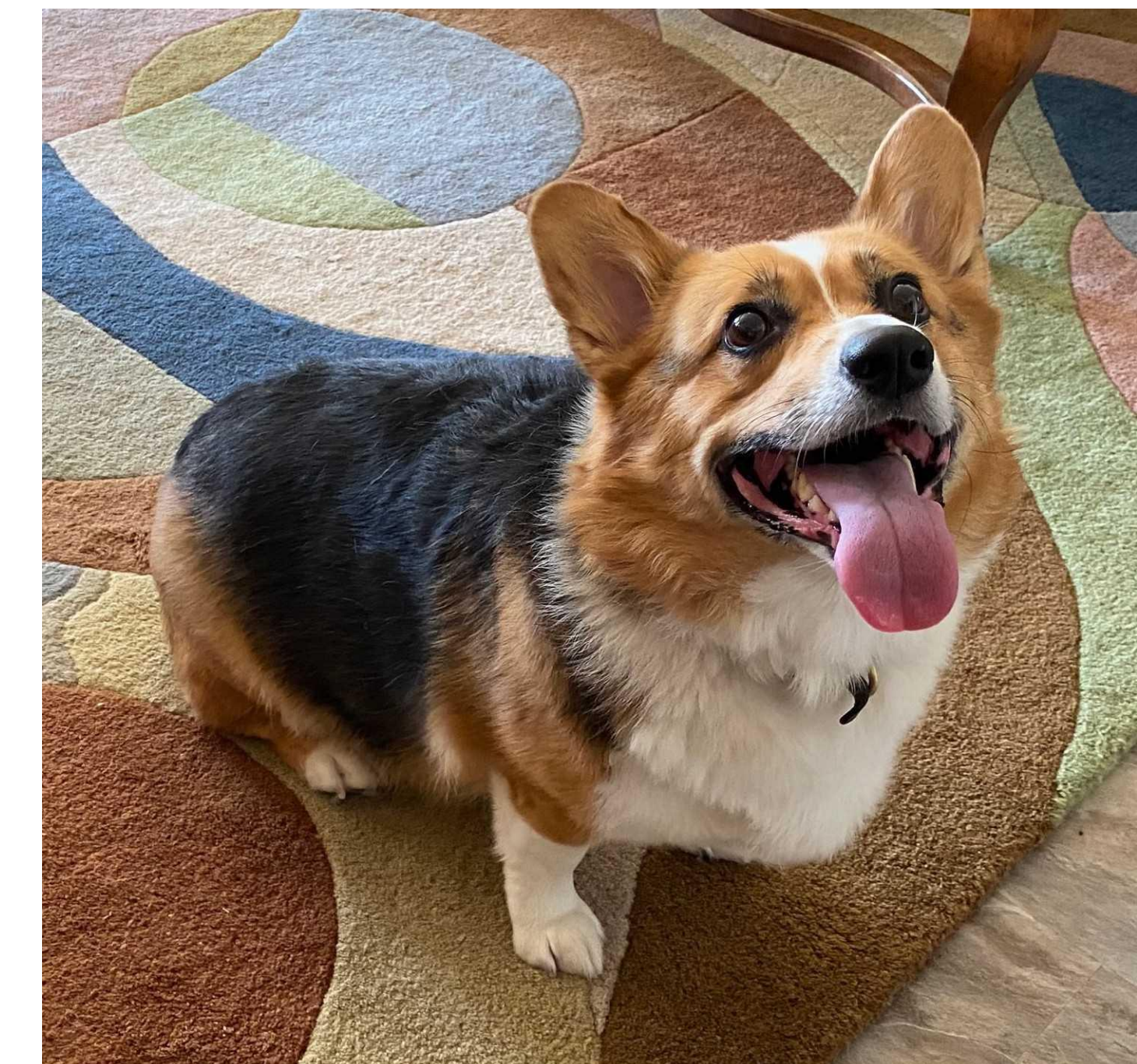
Kernel?



Image



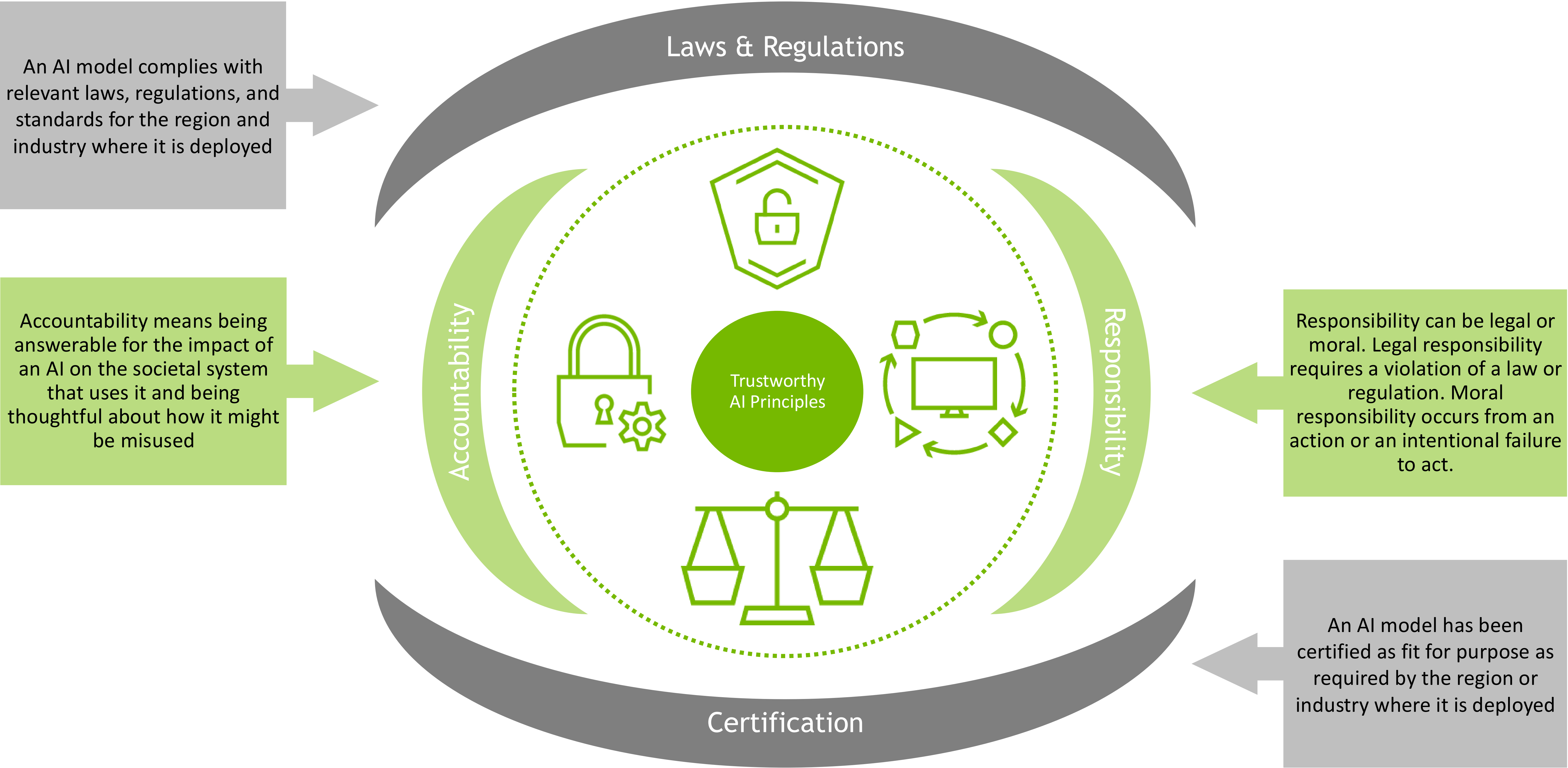
Output





Trustworthy AI

Foundations of Trustworthiness



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test.py
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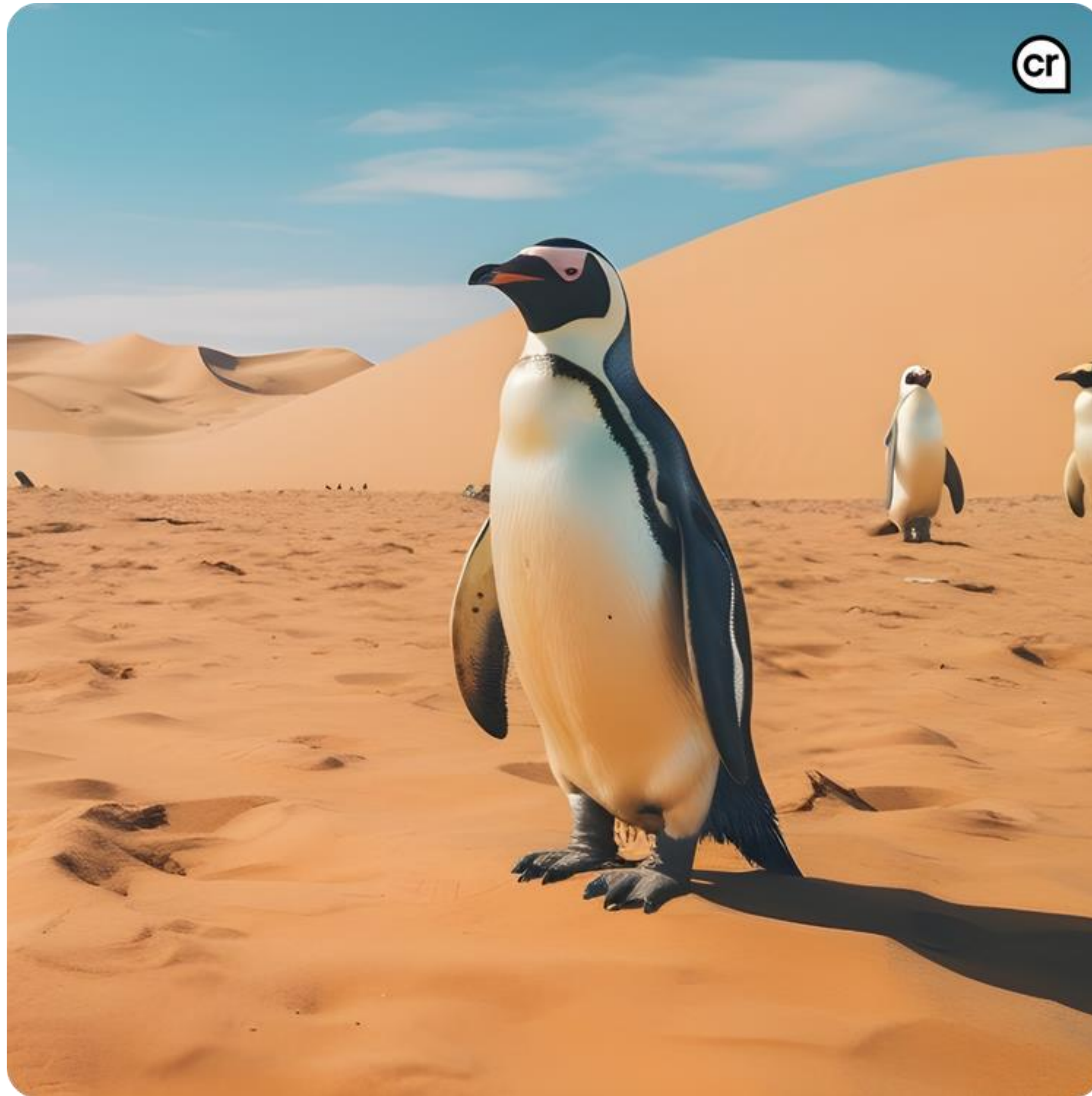
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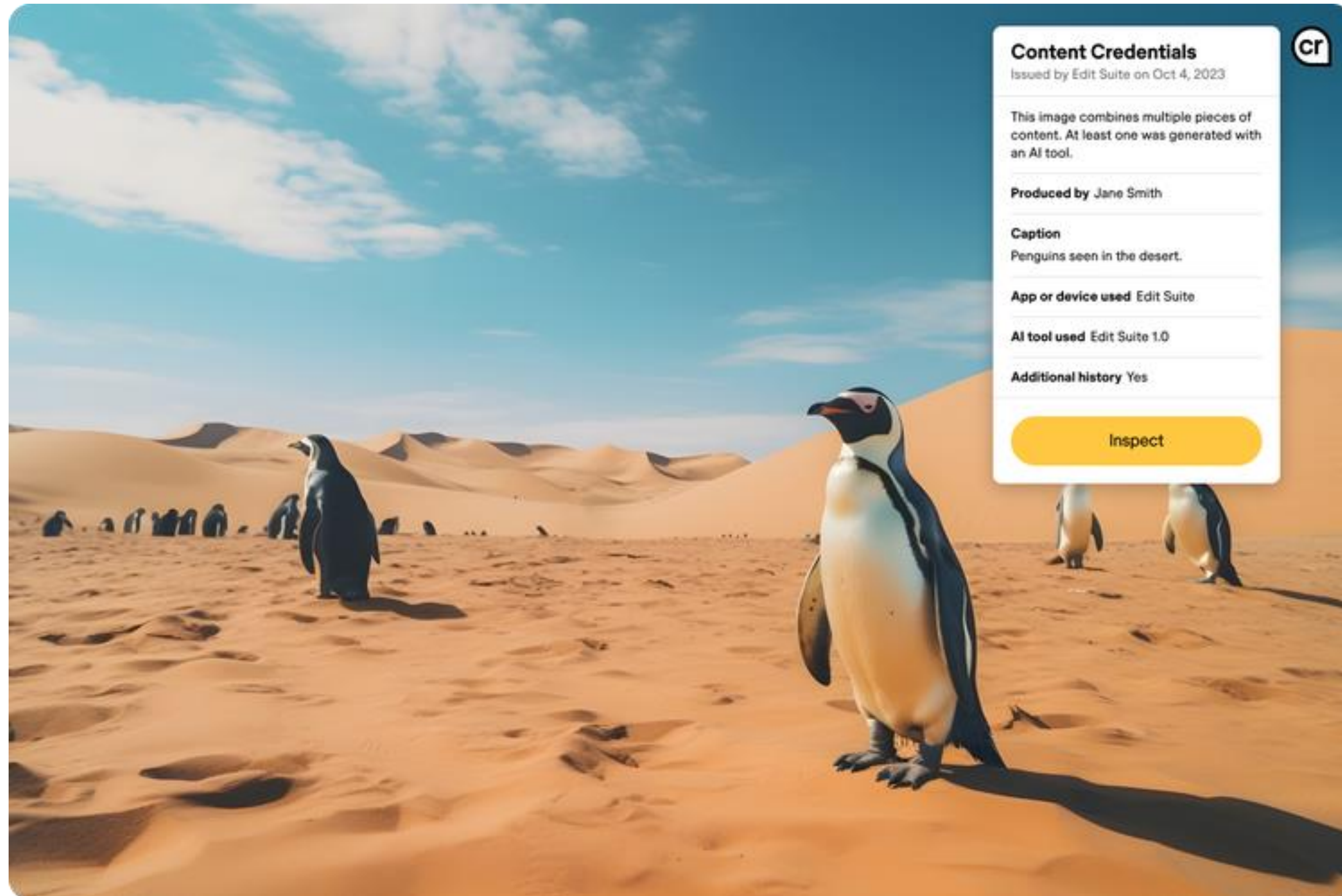
Trustworthy AI Tools



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Authenticity
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Trustworthy AI Tools



All content generated with Adobe Firefly is clearly labeled and can be inspected

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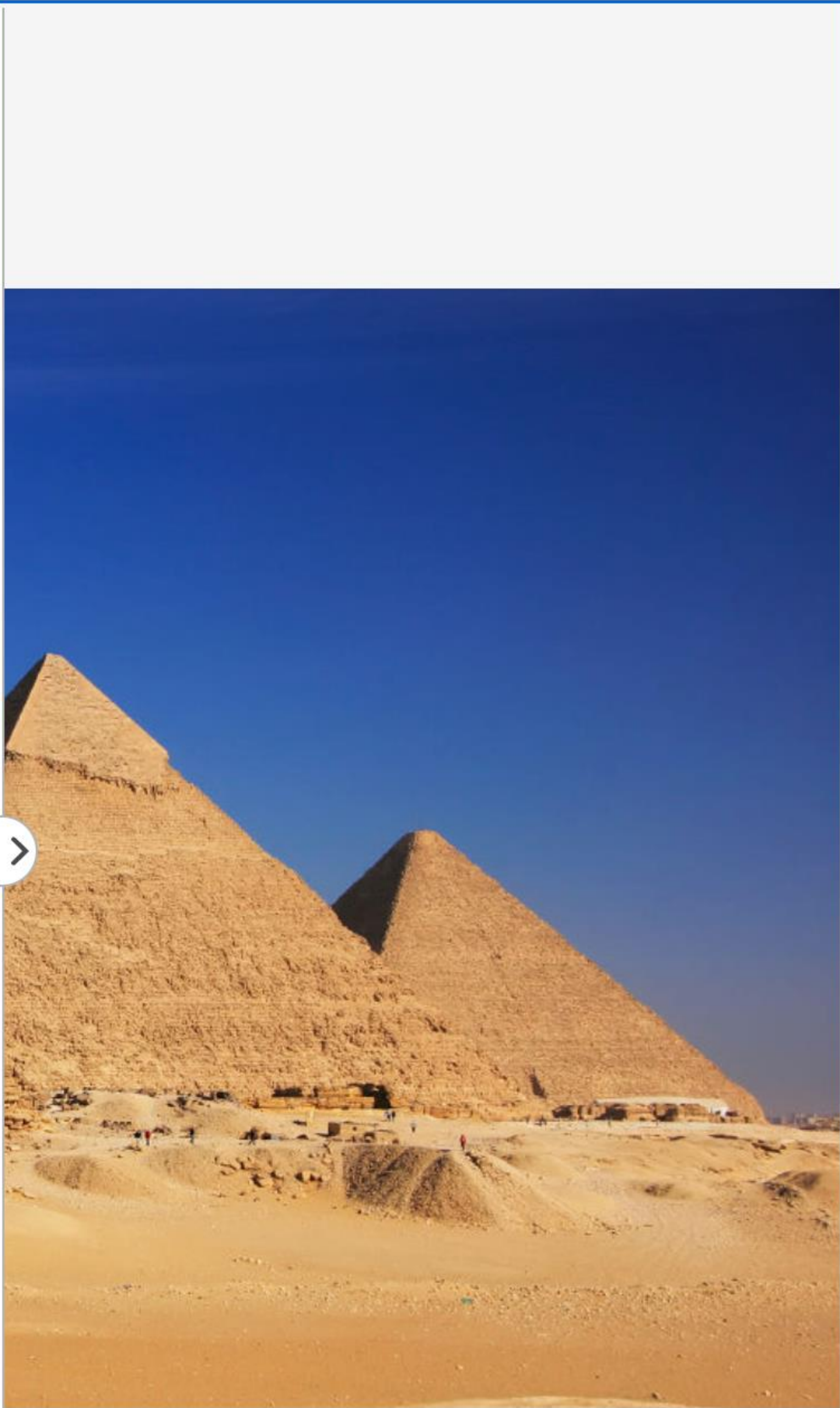
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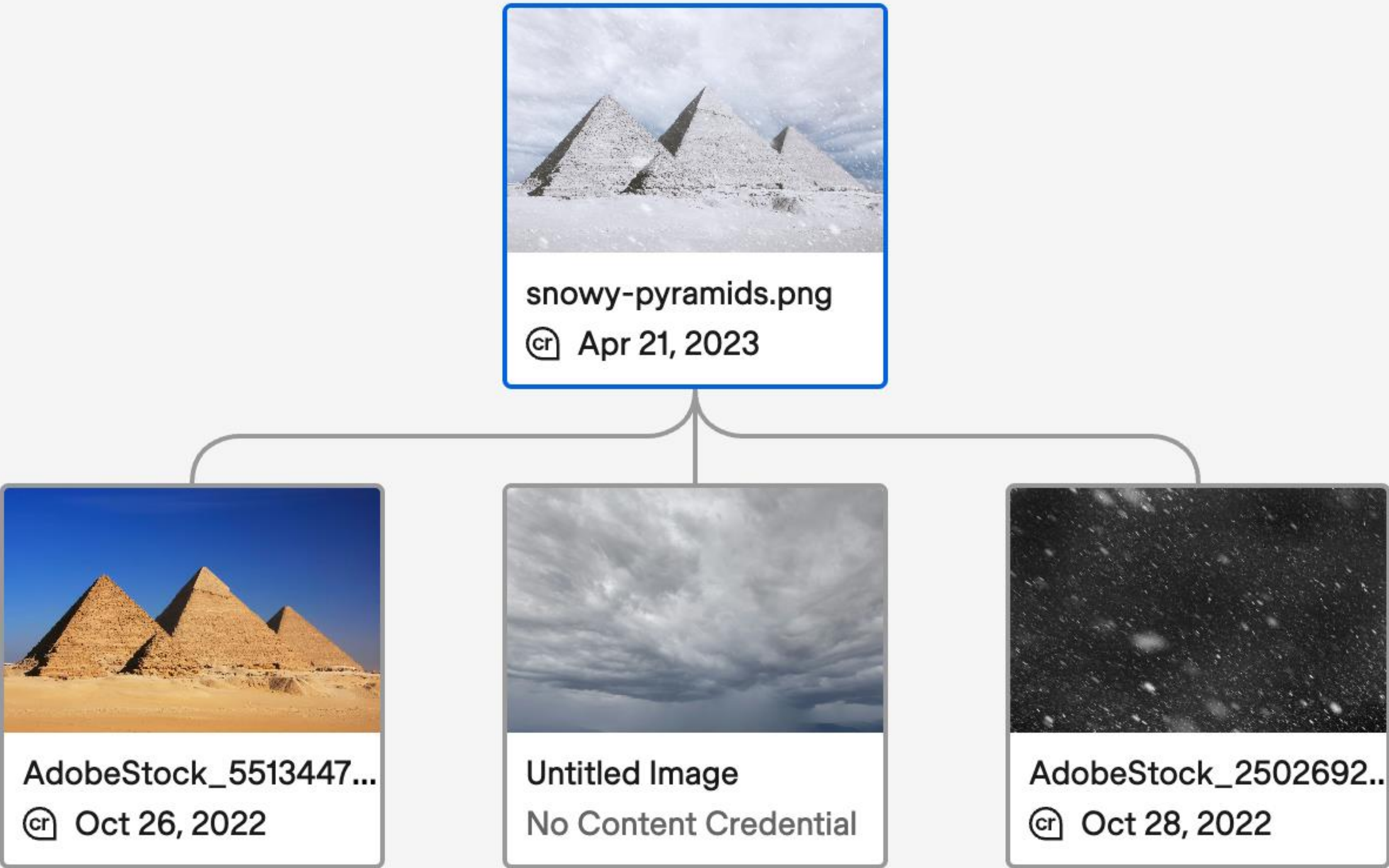
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The background features a series of overlapping, diagonal, wavy bands in various shades of green, ranging from light lime to dark forest green. The bands create a sense of depth and movement, flowing from the top left towards the bottom right. A solid green vertical bar is positioned on the far left edge of the frame.

Adobe Firefly

Adobe Firefly

<https://firefly.adobe.com/>



Text to Image

Generate images from a detailed text description.

Create with Firefly



Generative Fill

Use a brush to remove objects or paint in new ones.

Create with Firefly



Text Effects

Apply styles or textures to words and phrases.

Create with Firefly

Prompt Engineering

State-of-the-art Models

Better understanding the vocabulary the model was trained will make it easier to influence the results.



“Portrait of a happy canine with a
17mm lens”



Good Luck!



Adobe Firefly

Two cute robots that look like computer boards
waving goodbye under a starry sky

