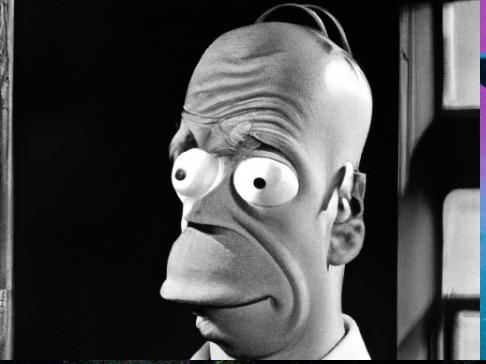
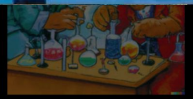




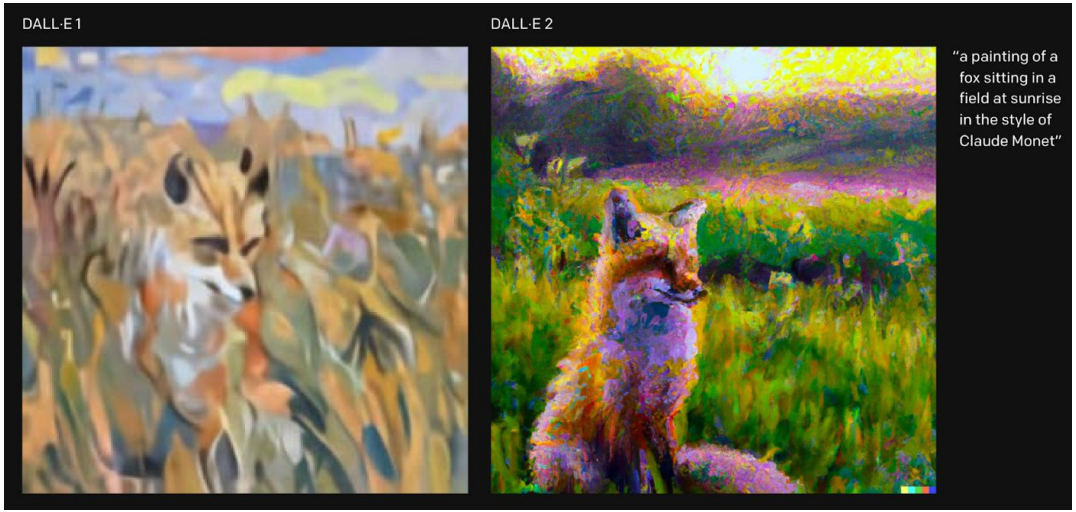




DALL·E

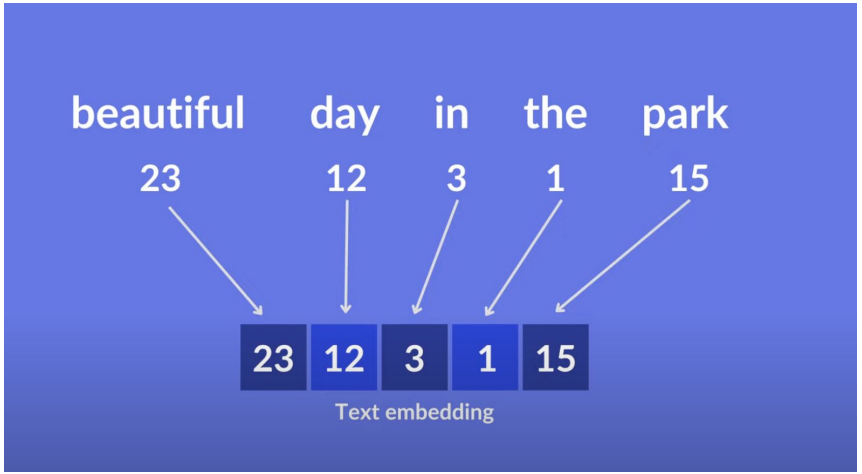
Introduction

- DALL·E uses AI to generate realistic images from the description of a scene or object
- DALL·E was first introduced by OpenAI in January 2021
- A year later DALL·E 2 was launched, significantly improving the resolution and adding features



Embedding

- Mathematical representation of information
- For example, this is the text embedding of a sentence in a vector space

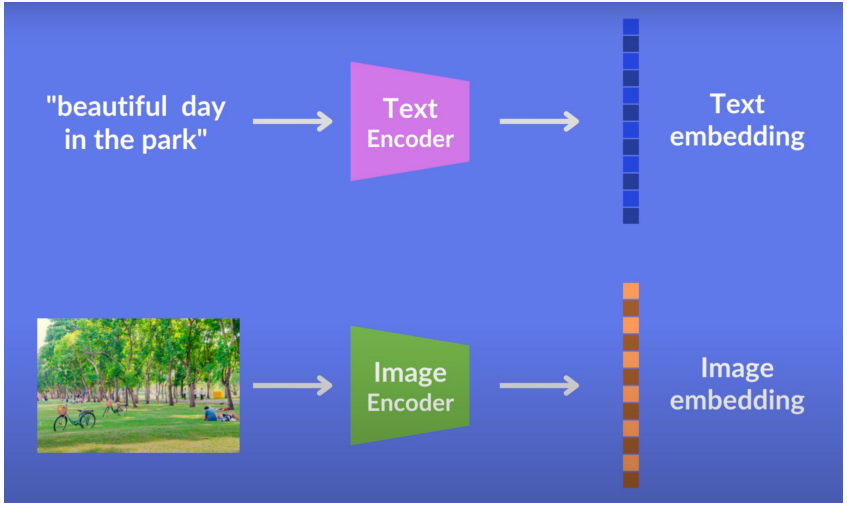


CLIP Model (Contrastive Language-Image Pre-Training)

- It is a neural network model that returns the best caption for a given image
- The objective of the model is to learn the connection between the textual and visual representations of the same object
- It trains two encoders: ***Image Encoder*** *and* ***Text Encoder***

Image Encoder and Text Encoder

- Text encoder converts text to text embeddings
- Image encoder converts an image to image embeddings



Diffusion Model

- ## Prior

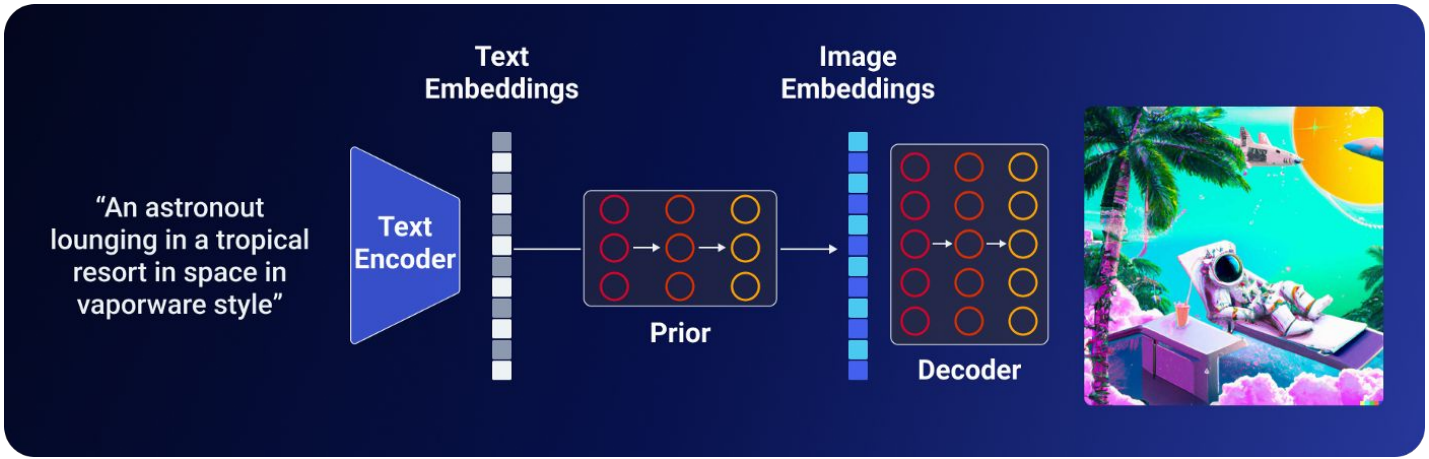
  Uses a diffusion model to generate the image embeddings with the most similarity to the text embeddings generated by CLIP.

- ## Decoder

  Uses a modified diffusion model called **GLIDE** (Guided Language to Image Diffusion for Generation and Editing) to generate the final image from the image embeddings.

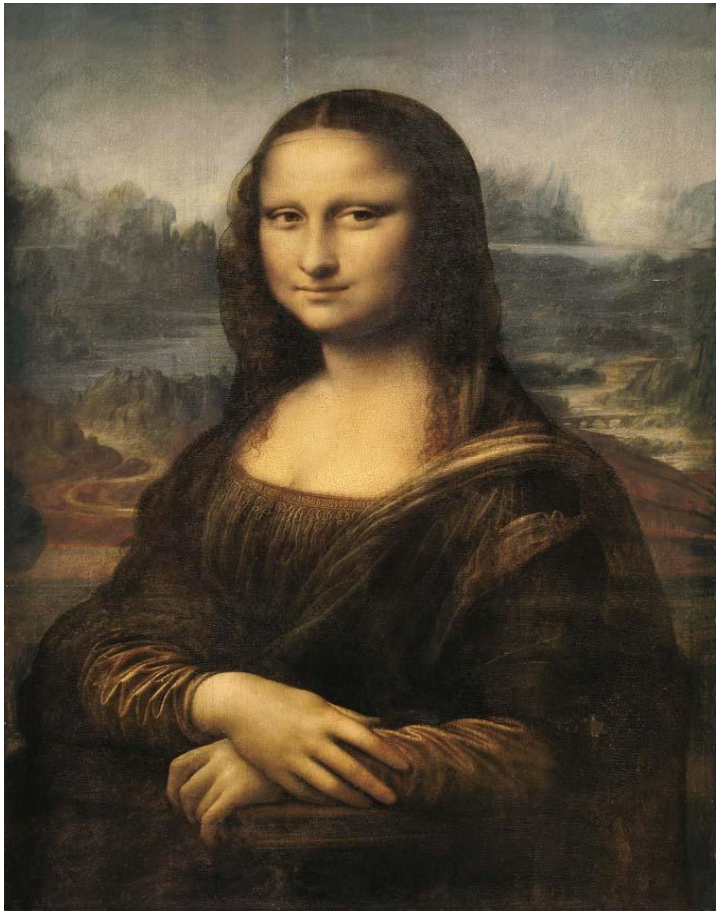
Architecture

- The text encoder takes the text prompt and generates text embeddings
- Text embeddings serve as the input for the prior, which generates the corresponding image embeddings
- Image decoder model generates an actual image from the embeddings



Inpainting

- Allows you to draw on a certain location of the image and add to the image based on a text prompt
- *“Add a mohawk”*



Generated by DALL·E 2

Outpainting

- Allows you to extend an image beyond its original border, adding visual elements in the same style
- ***Girl with a Pearl Earring*** by *Johannes Vermeer*, dated c. 1665.

Generated by DALL·E 2

Variations to Original Image

Original Image

Generated by DALL·E 2

References

- labs.openai.com
- How does DALL-E 2 actually work?
- pcmag.com/how-to/how-to-use-dall-e-ai-art-generator
- openai.com