

AI for Art

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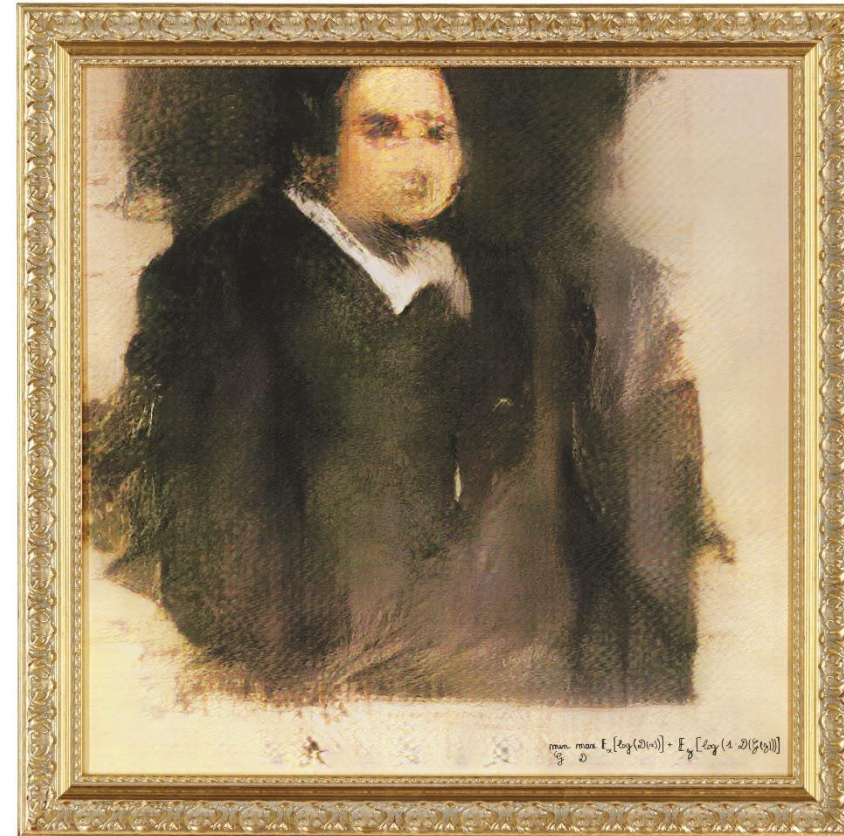


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Introduction- part 1

- Back in 2018, the first AI-generated portrait “Edmond de Belamy” was sold for more than \$432k at Christie’s art auction.
- It was created using a generative adversarial network (GAN) a part of “La Famille de Belamy” series by Obvious Art.



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Welcome
Point



Introduction – part 2

- In 2022, Jason M. Allen’s AI-generated artwork, “Space Opera Theater”, won the art prize in the digital category at the Colorado State Fair’s annual art competition.
- This piece was created with the AI-based tool Midjourney which can generate images by taking text prompts as input.



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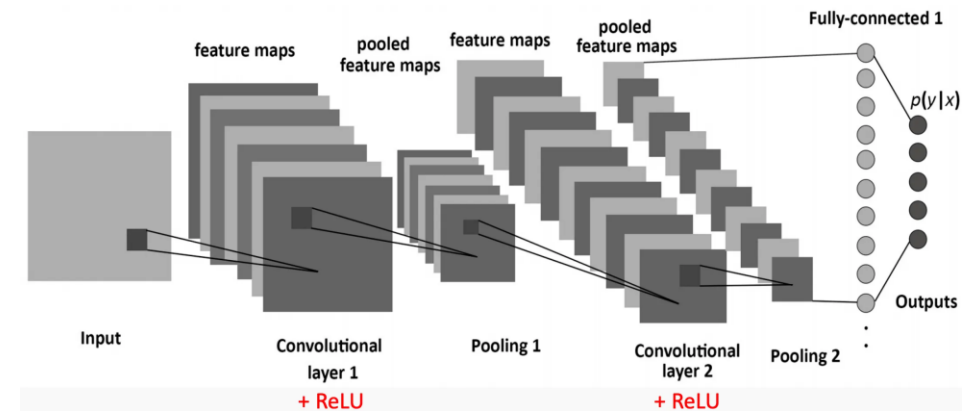


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Convolutional neural networks

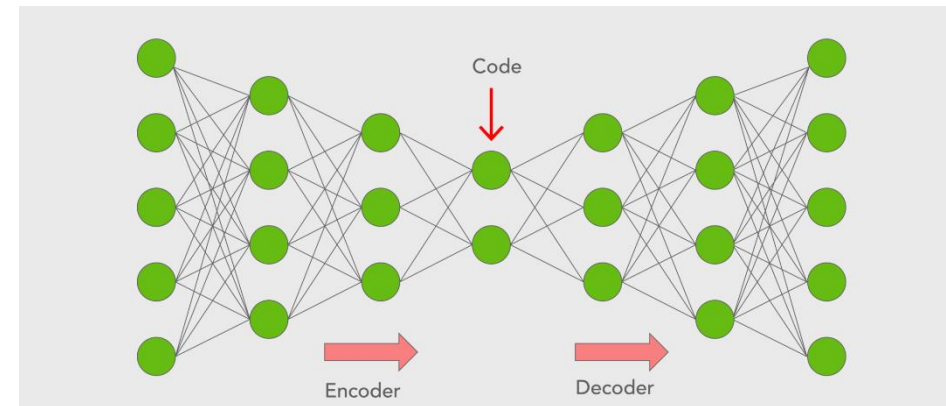
- Convolutional neural networks, usually referred to as CNNs, are deep neural networks utilized often for image processing
- In a deep CNN, increasingly more abstract features are extracted from the image through a series of hidden layers
- A typical CNN includes three kinds of layers: convolutional layers, pooling layers, and fully-connected layer



An example CNN with two convolutional layers, two pooling layers, and a fully connected layer which decides the final classification of the image into one of several categories.

Autoencoders

- A typical example of unsupervised learning
- This neural network learns to reconstruct the input data as the output by extracting a representation of the data.
- The general structure of an autoencoder consists of an encoder and a decoder



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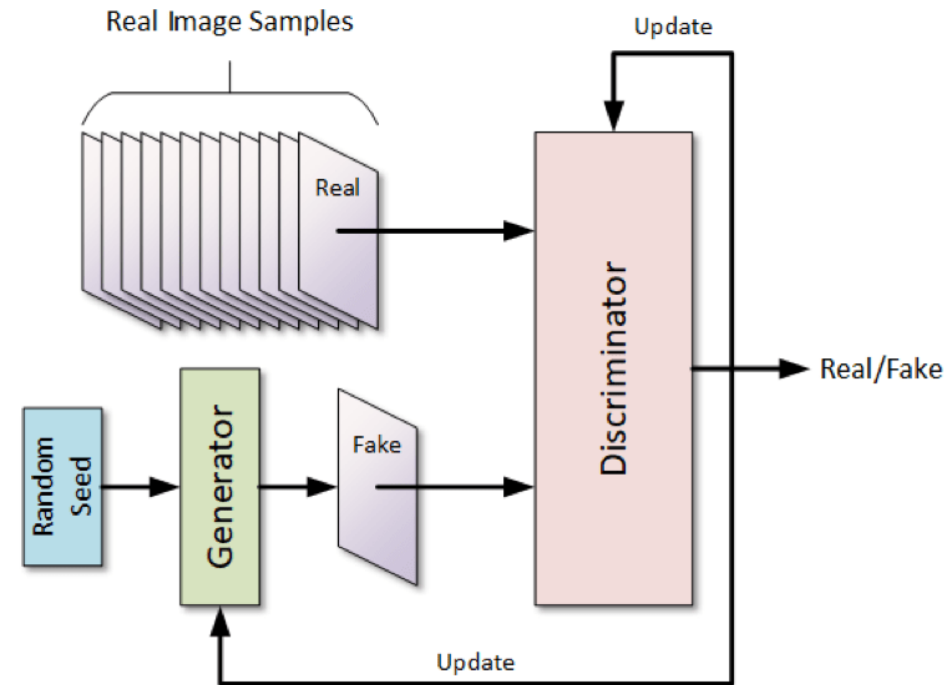


Welcome
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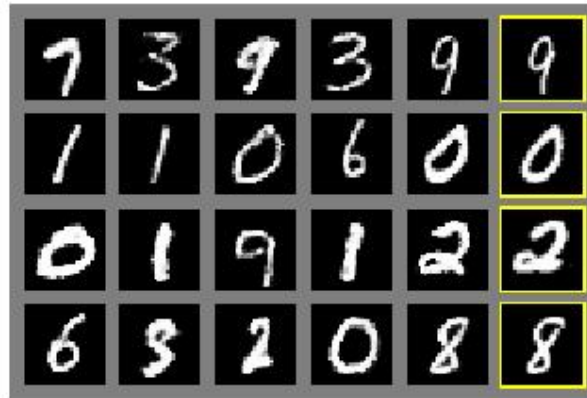


Generative adversarial networks

- GANs consist of two neural networks, the generator and the discriminator, that compete with each other in a zero-sum game framework.
- The generative model can be thought of as analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. Competition in this game drives both teams to improve their methods until the counterfeits are indistinguishable



Generative adversarial networks



a)



b)



c)



d)

Diffusion models

- Today, text-to-image models such as DALL-E or Midjourney have turned AI into a popular tool to produce images. These are diffusion models which have shown great success in generating high-quality images.
- They have already been proven to outperform GANs at image synthesis
- In comparison with GANs, the training of diffusion models does not require an adversarial setting.



Image created by DALL-E 3

Diffusion models

Diffusion models require two main steps in the training phase:

- At first, during the forward (diffusion) process, random noise is gradually added to the input image until the original input becomes all noise
- Secondly, during the reconstruction or reverse process, the model reconstructs the original data from the noise obtained in the forward process.



Image created by Midjourney

Stable Diffusion

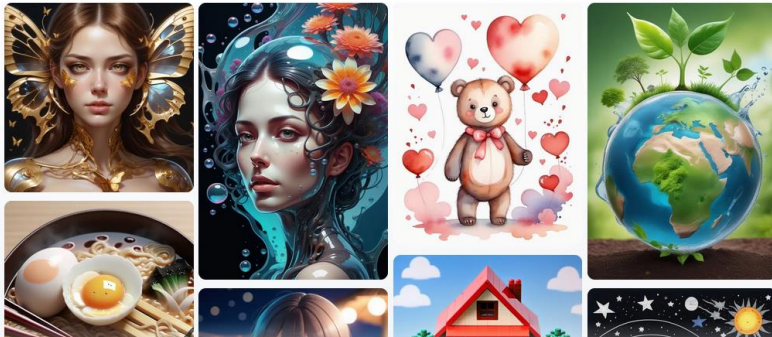
Stable Diffusion Online

Stable Diffusion is a latent text-to-image diffusion model capable of generating photo-realistic images given any text input, cultivates autonomous freedom to produce incredible imagery, empowers billions of people to create stunning art within seconds.

Create beautiful art using stable diffusion ONLINE for free.

What do you want to draw?

TRY AN EXAMPLE



Stable Diffusion checkpoint
protogenX340OfficialR_1ckpt [60fe2f34]

txt2img | img2img | Extras | PNG Info | Checkpoint Merger | Train | Tokenizer | Settings | Extensions

green sapling rowing out of ground, mud, dirt, grass, high quality, photorealistic, sharp focus, depth of field

Negative prompt (press Ctrl+Enter or Alt+Enter to generate)

Generate

Style 1: None | Style 2: None

26/75


Sampling method: Euler a | Sampling steps: 20

Restore faces | Tiling | Hires. fix

Width: 512 | Height: 512 | Batch count: 4 | Batch size: 1 | CFG Scale: 12

Seed: 1441787169

Script: None



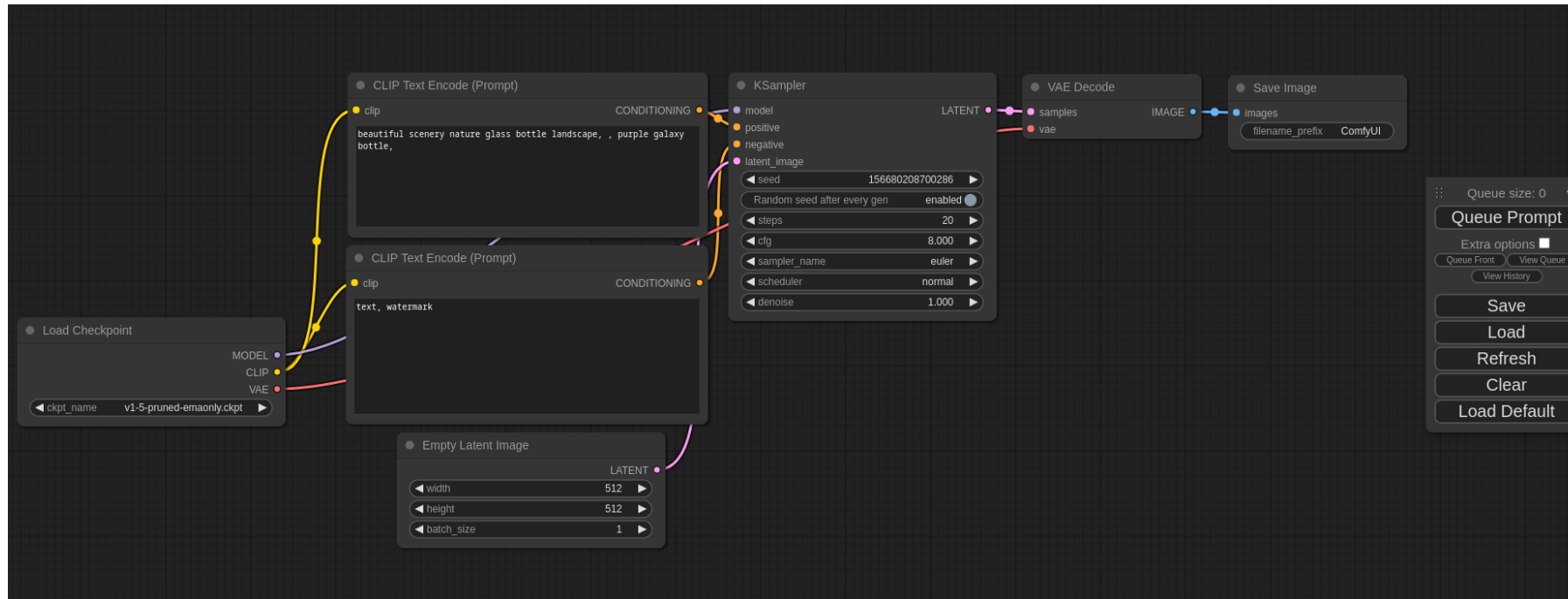
Save | Zip | Send to img2img | Send to inpaint | Send to extras

green sapling rowing out of ground, mud, dirt, grass, high quality, photorealistic, sharp focus, depth of field
Steps: 20, Sampler: Euler a, CFG scale: 12, Seed: 1441787169, Size: 512x512, Model hash: 60fe2f34, Model: protogenX340OfficialR_1
Time taken: 8.62s Torch active/reserved: 3699/4702 MiB, Sys VRAM: 7020/24576 MiB (28.56%)

API • Github • Gradio • Reload UI
python: 3.10.6 • torch: 1.13.1+cu117 • xformers: N/A • gradio: 3.15.0 • commit: 983167e6

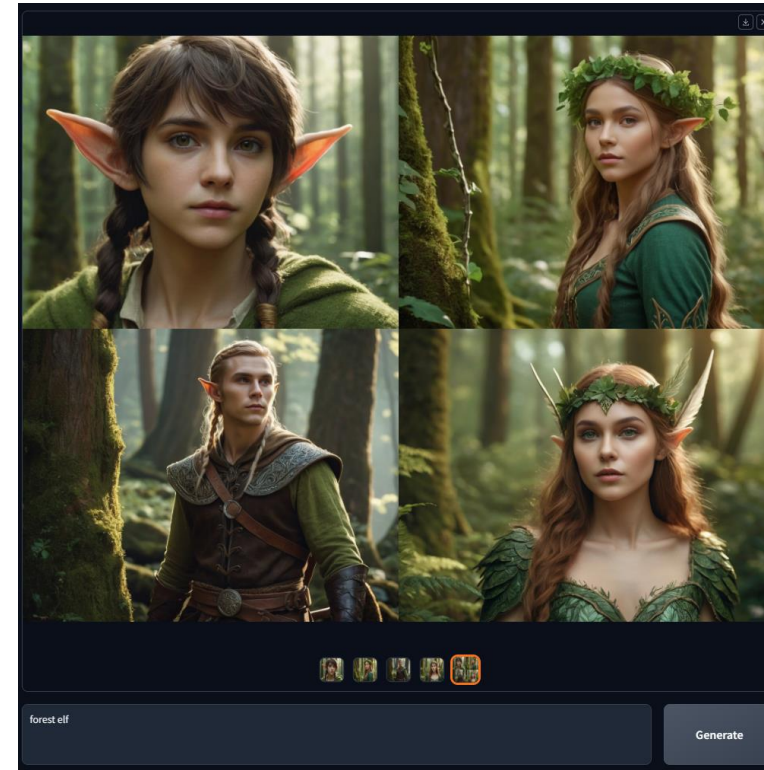


Comfy UI



Foocus

- An image generating software based on Diffusion model and Juggernaut XL flashpoint



Non-cherry-picked random batch by just typing two words "forest elf"

Foocus installation

On Windows

1. Download the Foocus from github repository
2. After you download the file, please uncompress it and then run the "run.bat".
3. After Foocus 2.1.60, you will also have run_anime.bat and run_realistic.bat. They are different model presets (and require different models, but they will be automatically downloaded).

On Linux

(Using Anaconda/Miniconda)

1. git clone <https://github.com/llyasviel/Foocus.git>
2. cd Foocus
3. conda env create -f environment.yaml
4. conda activate foocus
5. pip install -r requirements_versions.txt
6. conda activate foocus
7. python entry_with_update.py



Artists Concerns

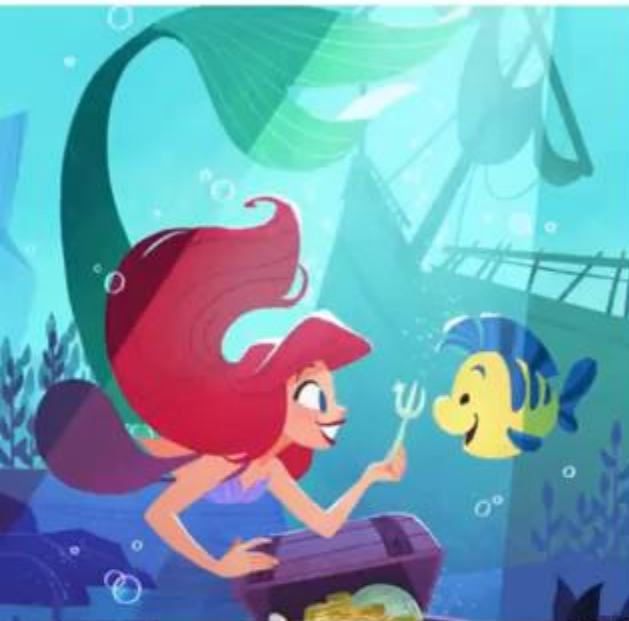
Artists have a complex relationship with AI-generated art because of:

- Authenticity and Originality
- Creative Control
- Intellectual Property and Ownership

Art Poisoning:

- Glaze
- Nightshade

Hollie's





Summary

- Deep learning has evolved significantly in its image processing capabilities compared to just a few years ago. At the start of the last decade, it was revolutionary that deep neural networks could categorize natural images. Now, these networks can produce intricate and lifelike images from basic text prompts.
- This accessibility means even those without programming skills can leverage these advanced models. However, it's crucial to emphasize the ethical and responsible use of such technology. While these tools empower artists to explore their creativity, they also hold the potential to influence the future of art.

Sourecs:

- Anne-Sofie Maerten¹ and Derya Soydaner – “From paintbrush to pixel: A review of deep neural networks in AI-generated art.”
- Github Stable-diffusion-webui:
<https://github.com/AUTOMATIC1111/stable-diffusion-webui?tab=readme-ov-file>
- Github ComfyUI: <https://github.com/comfyanonymous/ComfyUI>
- Github Foocus repository: <https://github.com/llyasviel/Foocus>
- Shad Ai - This result BLEW MY MIND!! How I DREW this image with AI art tools: <https://www.youtube.com/watch?v=RQ6NRgyUMuc>
- 2klikphilip - Protect your Art from AI:
<https://www.youtube.com/watch?v=nDrCC2Uee3k>



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Thank You for your attention

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