

Open Source Communities

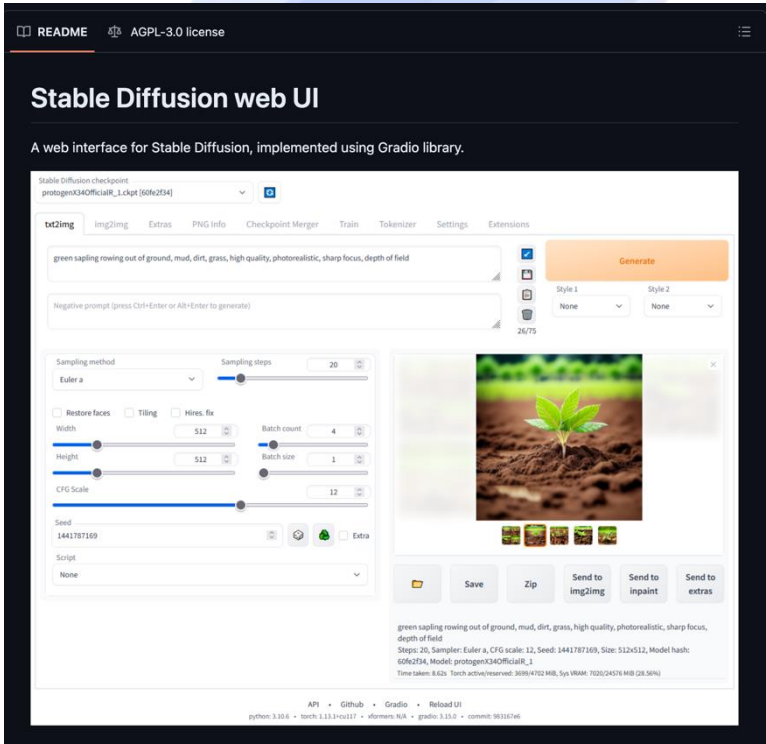
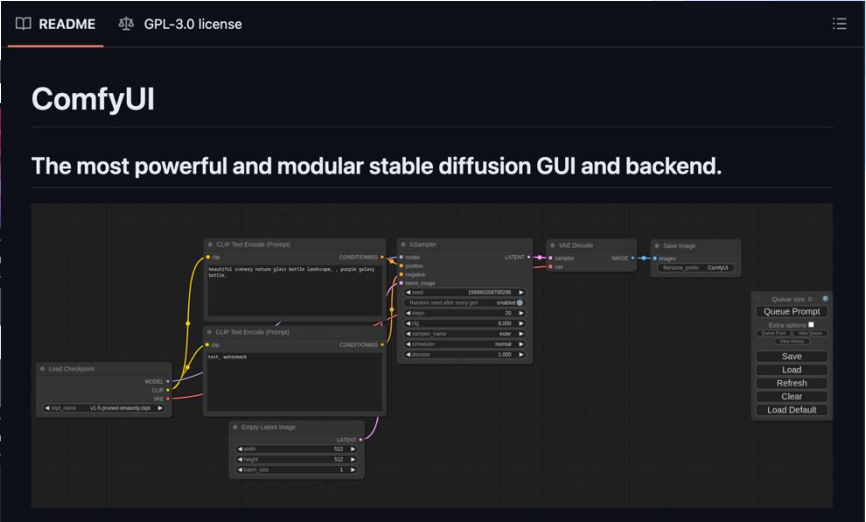
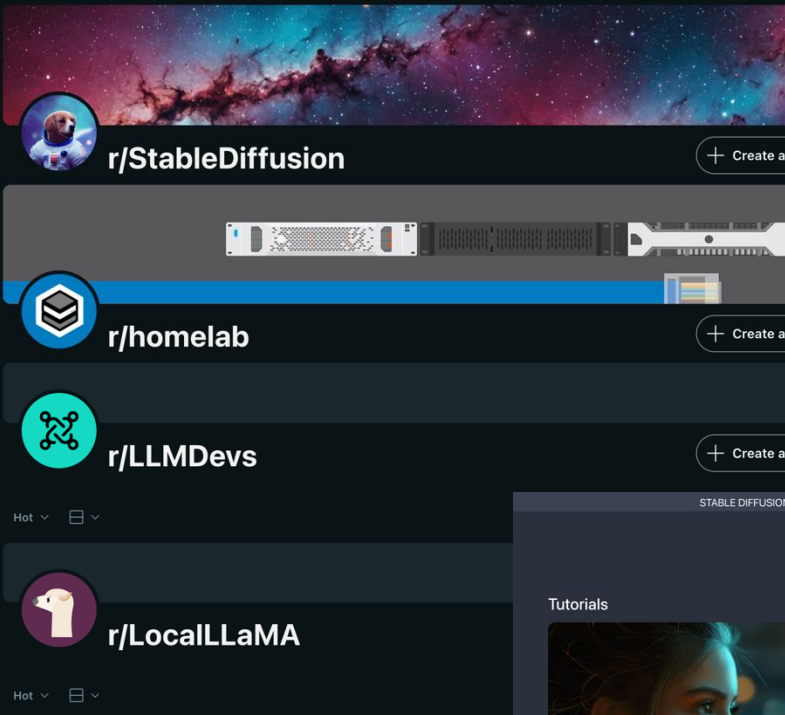
Accelerate Programme for Scientific Discovery



Stable Diffusion

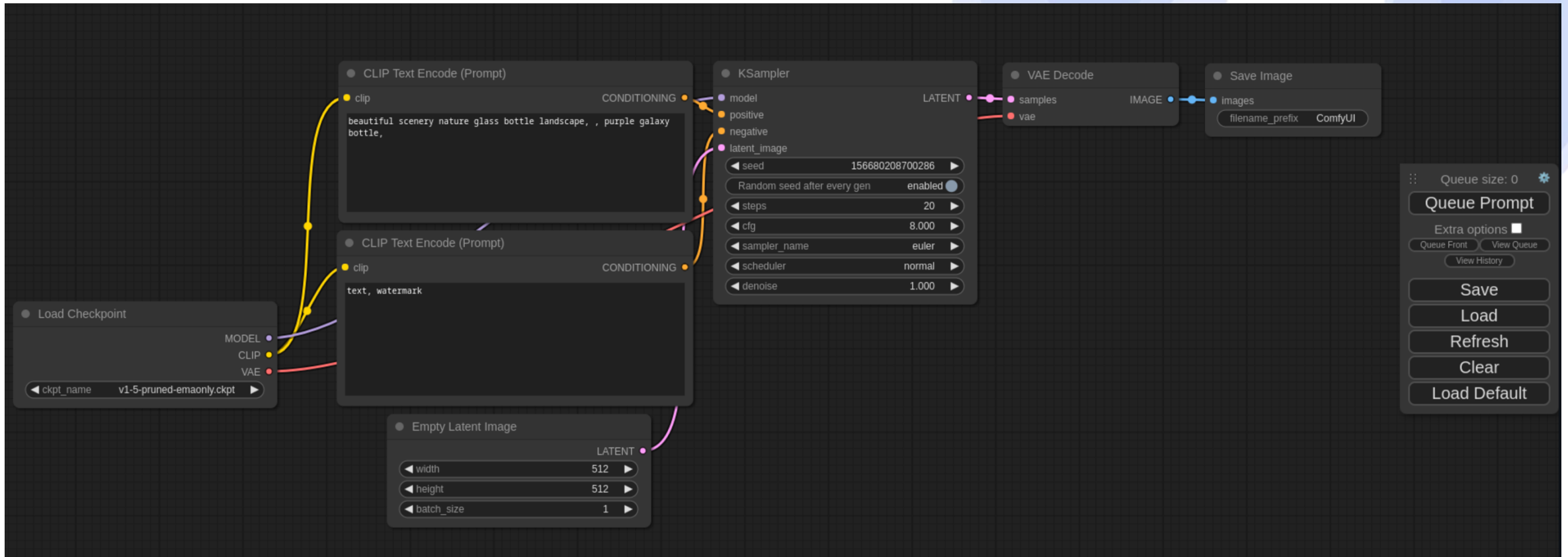
Stable Diffusion highlights the power of open source

- A rich and varied community has



Stable Diffusion

ComfyUI



Stable Diffusion

Stable Diffusion web UI (aka Automatic1111)

Stable Diffusion checkpoint
protogenX34OfficialR_1.ckpt [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

Extra



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

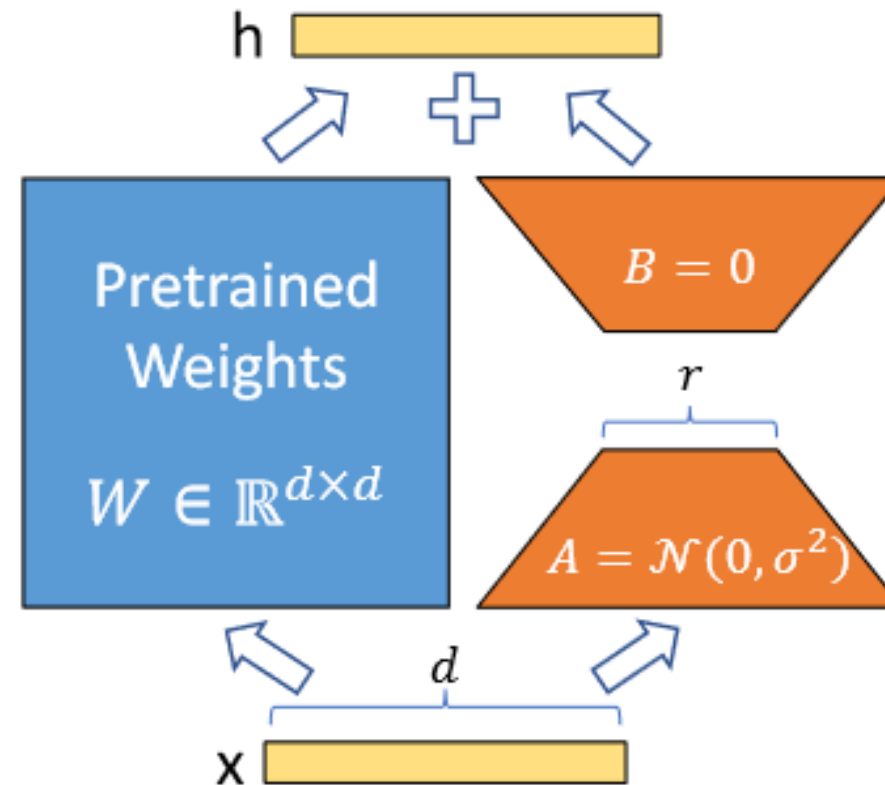
Steps: 20, Sampler: Euler a, CFG scale: 12, Seed: 1441787169, Size: 512x512, Model hash: 60fe2f34, Model: protogenX34OfficialR_1

Time taken: 8.62s Torch active/reserved: 3699/4702 MiB, Sys VRAM: 7020/24576 MiB (28.56%)

Save Zip Send to img2img Send to inpaint Send to extras

LoRAs and Checkpoints

- Finetuning a model can be expensive!
- The new weights are denoted by
$$W = W_0 + \Delta W$$
- The difference between the pretrained weights and finetuned weights, ΔW , is small and has low rank.
- Approximate ΔW by two low rank matrices that you can train instead.
- Each attention module has 4 matrices to train, and the final layers are usually fixed.
- Massively decreases the training cost, with minimal loss of performance.



Hugging Face Diffusers

Fortunately, Hugging Face has done a large amount of the work for us...



Diffusers

🤗 Diffusers is the go-to library for state-of-the-art pretrained diffusion models for generating images, audio, and even 3D structures of molecules. Whether you're looking for a simple inference solution or want to train your own diffusion model, 🤗 Diffusers is a modular toolbox that supports both. Our library is designed with a focus on usability over performance, simple over easy, and customizability over abstractions.

Hugging Face Diffusers

Diffusers offers a wide range of easy to build models...

- UNet1DModel
- UNet2DModel
- Options for conditioning
- Different schedulers and prebuilt pipelines

How can we help?

- Contact us for software engineering and machine learning support!
- accelerate-mle@cst.cam.ac.uk
- [Accelerate MLE website](#)



A Proposal writing



B Data collection



C Privacy & compliance



D Data pipeline



E Model implementation



F Hardware/GPU



G Deploying on the cloud



H Packaging and publishing model