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pip install diffusers transformers torch accelerate pillow
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Requirement already satisfied: diffusers in  
/usr/local/lib/python3.12/dist-packages (0.36.0)  
Requirement already satisfied: transformers in  
/usr/local/lib/python3.12/dist-packages (4.57.3)  
Requirement already satisfied: torch in  
/usr/local/lib/python3.12/dist-packages (2.9.0+cu126)  
Requirement already satisfied: accelerate in  
/usr/local/lib/python3.12/dist-packages (1.12.0)  
Requirement already satisfied: pillow in  
/usr/local/lib/python3.12/dist-packages (11.3.0)  
Requirement already satisfied: importlib_metadata in  
/usr/local/lib/python3.12/dist-packages (from diffusers) (8.7.1)  
Requirement already satisfied: filelock in  
/usr/local/lib/python3.12/dist-packages (from diffusers) (3.20.2)  
Requirement already satisfied: httpx<1.0.0 in  
/usr/local/lib/python3.12/dist-packages (from diffusers) (0.28.1)  
Requirement already satisfied: huggingface-hub<2.0,>=0.34.0 in  
/usr/local/lib/python3.12/dist-packages (from diffusers) (0.36.0)  
Requirement already satisfied: numpy in  
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Requirement already satisfied: regex!=2019.12.17 in  
/usr/local/lib/python3.12/dist-packages (from diffusers) (2025.11.3)  
Requirement already satisfied: requests in  
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Requirement already satisfied: safetensors>=0.3.1 in  
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Requirement already satisfied: packaging>=20.0 in  
/usr/local/lib/python3.12/dist-packages (from transformers) (25.0)  
Requirement already satisfied: pyyaml>=5.1 in  
/usr/local/lib/python3.12/dist-packages (from transformers) (6.0.3)  
Requirement already satisfied: tokenizers<=0.23.0,>=0.22.0 in  
/usr/local/lib/python3.12/dist-packages (from transformers) (0.22.2)  
Requirement already satisfied: tqdm>=4.27 in  
/usr/local/lib/python3.12/dist-packages (from transformers) (4.67.1)  
Requirement already satisfied: typing-extensions>=4.10.0 in  
/usr/local/lib/python3.12/dist-packages (from torch) (4.15.0)  
Requirement already satisfied: setuptools in  
/usr/local/lib/python3.12/dist-packages (from torch) (75.2.0)  
Requirement already satisfied: sympy>=1.13.3 in  
/usr/local/lib/python3.12/dist-packages (from torch) (1.14.0)  
Requirement already satisfied: networkx>=2.5.1 in  
/usr/local/lib/python3.12/dist-packages (from torch) (3.6.1)  
Requirement already satisfied: jinja2 in  
/usr/local/lib/python3.12/dist-packages (from torch) (3.1.6)  
Requirement already satisfied: fsspec>=0.8.5 in  
/usr/local/lib/python3.12/dist-packages (from torch) (2025.3.0)  
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.6.77 in  
/usr/local/lib/python3.12/dist-packages (from torch) (12.6.77)
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Requirement already satisfied: nvidia-cuda-runtime-cu12==12.6.77 in
/usr/local/lib/python3.12/dist-packages (from torch) (12.6.77)
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.6.80 in
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Requirement already satisfied: nvidia-cudnn-cu12==9.10.2.21 in
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Requirement already satisfied: nvidia-cublas-cu12==12.6.4.1 in
/usr/local/lib/python3.12/dist-packages (from torch) (12.6.4.1)
Requirement already satisfied: nvidia-cufft-cu12==11.3.0.4 in
/usr/local/lib/python3.12/dist-packages (from torch) (11.3.0.4)
Requirement already satisfied: nvidia-curand-cu12==10.3.7.77 in
/usr/local/lib/python3.12/dist-packages (from torch) (10.3.7.77)
Requirement already satisfied: nvidia-cusolver-cu12==11.7.1.2 in
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Requirement already satisfied: nvidia-nvshmem-cu12==3.3.20 in
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Requirement already satisfied: nvidia-nvjitlink-cu12==12.6.85 in
/usr/local/lib/python3.12/dist-packages (from torch) (12.6.85)
Requirement already satisfied: nvidia-cufile-cu12==1.11.1.6 in
/usr/local/lib/python3.12/dist-packages (from torch) (1.11.1.6)
Requirement already satisfied: triton==3.5.0 in
/usr/local/lib/python3.12/dist-packages (from torch) (3.5.0)
Requirement already satisfied: psutil in
/usr/local/lib/python3.12/dist-packages (from accelerate) (5.9.5)
Requirement already satisfied: anyio in
/usr/local/lib/python3.12/dist-packages (from httpx<1.0.0->diffusers)
(4.12.1)
Requirement already satisfied: certifi in
/usr/local/lib/python3.12/dist-packages (from httpx<1.0.0->diffusers)
(2026.1.4)
Requirement already satisfied: httpcore==1.* in
/usr/local/lib/python3.12/dist-packages (from httpx<1.0.0->diffusers)
(1.0.9)
Requirement already satisfied: idna in /usr/local/lib/python3.12/dist-
packages (from httpx<1.0.0->diffusers) (3.11)
Requirement already satisfied: h11>=0.16 in
/usr/local/lib/python3.12/dist-packages (from httpcore==1.*-
>httpx<1.0.0->diffusers) (0.16.0)
Requirement already satisfied: hf-xet<2.0.0,>=1.1.3 in
/usr/local/lib/python3.12/dist-packages (from huggingface-
hub<2.0,>=0.34.0->diffusers) (1.2.0)

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Requirement already satisfied: mpmath<1.4,>=1.1.0 in
/usr/local/lib/python3.12/dist-packages (from sympy>=1.13.3->torch)
(1.3.0)
Requirement already satisfied: zipp>=3.20 in
/usr/local/lib/python3.12/dist-packages (from importlib_metadata-
>diffusers) (3.23.0)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.12/dist-packages (from jinja2->torch) (3.0.3)
Requirement already satisfied: charset_normalizer<4,>=2 in
/usr/local/lib/python3.12/dist-packages (from requests->diffusers)
(3.4.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in
/usr/local/lib/python3.12/dist-packages (from requests->diffusers)
(2.5.0)
```

```
import torch
from diffusers import StableDiffusionPipeline
import os
from IPython.display import display # Added for visibility

# 1. Setup
model_id = "runwayml/stable-diffusion-v1-5"
output_dir = "synthetic_dataset"
os.makedirs(output_dir, exist_ok=True)

# 2. Load the pre-trained model [cite: 9]
pipe = StableDiffusionPipeline.from_pretrained(model_id,
torch_dtype=torch.float16)
pipe = pipe.to("cuda")

# 3. Input prompts (at least 5) [cite: 10]
prompts = [
    "A futuristic city skyline with flying cars at sunset",
    "A serene mountain landscape with a crystal clear lake",
    "A cute robot serving coffee in a vintage cafe",
    "An astronaut riding a horse on Mars, cinematic lighting",
    "A magical forest with glowing plants and mythical creatures"
]

# 4. Generate, Save, and Display [cite: 11, 12, 13]
for i, prompt in enumerate(prompts):
    print(f"--- Generating Image {i+1} ---")

    # Generate the image
    image = pipe(prompt).images[0]

    # Save the output
    file_path = os.path.join(output_dir, f"synthetic_image_{i+1}.png")
    image.save(file_path)
```

```
# DISPLAY the output in the screen
display(image)

{"model_id": "a7c0f7e0aad543dab7e9360fdb108838", "version_major": 2, "version_minor": 0}

--- Generating Image 1 ---

{"model_id": "4fe2745c7a8f4ccc93a973412e08f01a", "version_major": 2, "version_minor": 0}
```



```
--- Generating Image 2 ---
```

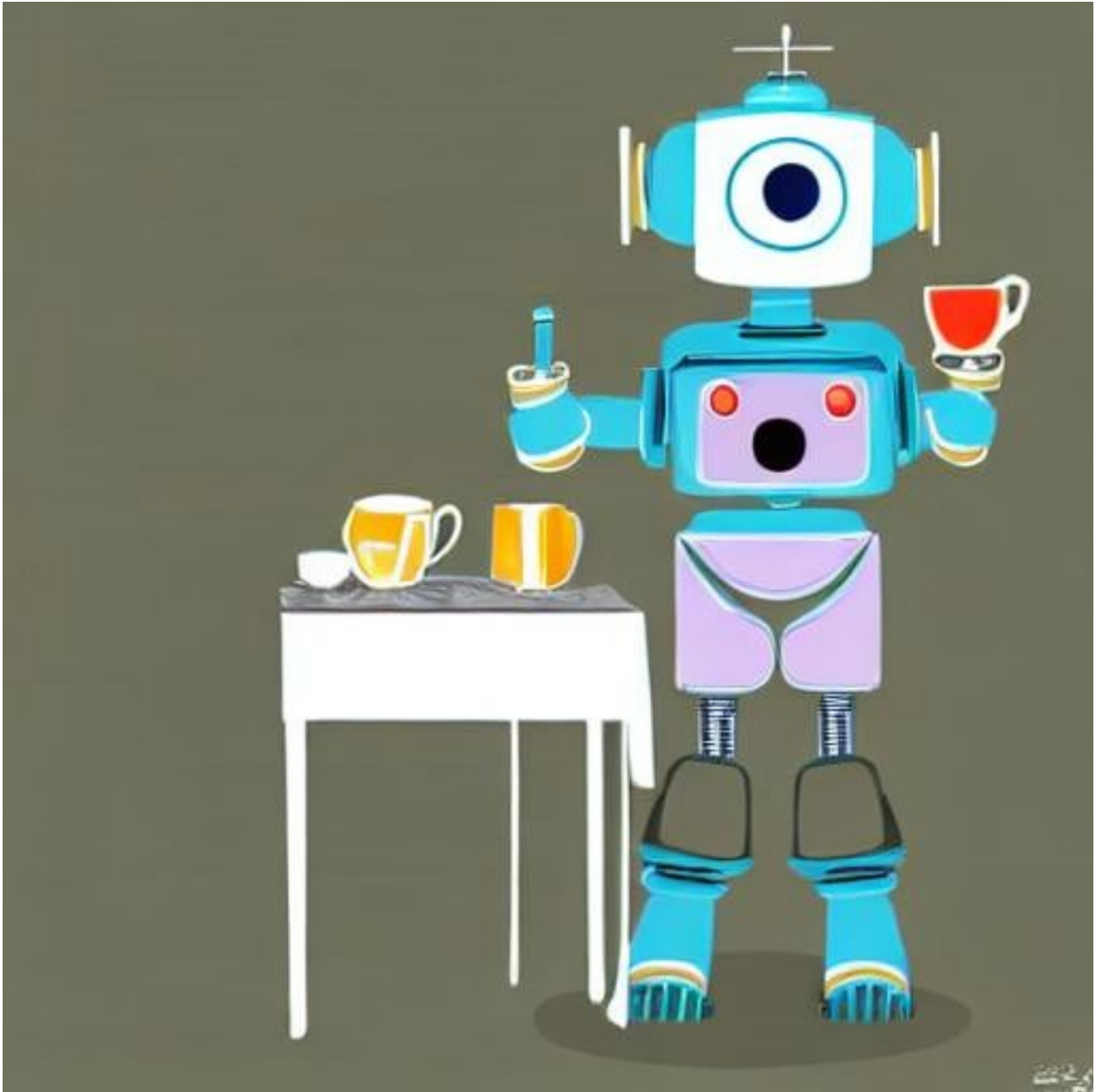


```
{"model_id": "85eae3f940ec4647b9c33ec85d002aa9", "version_major": 2, "version_minor": 0}
```



--- Generating Image 3 ---

```
{"model_id": "6db0455525494ae680c97342ec3f0f0f", "version_major": 2, "version_minor": 0}
```



--- Generating Image 4 ---

```
{"model_id": "d728e11f44d449d7ae8a10c0616aa579", "version_major": 2, "version_minor": 0}
```



--- Generating Image 5 ---

```
{"model_id": "1dc3d323f8c147c78195f588392a12c1", "version_major": 2, "version_minor": 0}
```