Point E Model for 2D - 3D

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Stable Diffusion

Stable Diffusion is a deep learning, text-to-image model released in 2022 based on diffusion techniques. It is primarily used to generate detailed images conditioned on text descriptions.

Stable diffusion uses pre-trained models. Each model is trained on a specific set of images. This gives the model data to emulate which allows it to create high quality results especially after fine-tuning.

Model: Realistic Vision V6.0 B1

https://civitai.com/models/4201/realistic-vision-v60-b1

Model: Anything V3 (Anime)

https://civitai.com/models/66/anything-v3

Stable Diffusion

Webui:

- https://github.com/AUTOMATIC1111/stable-diffusion-webui

CompVis:

- https://github.com/CompVis/stable-diffusion

Online Generators/Resources:

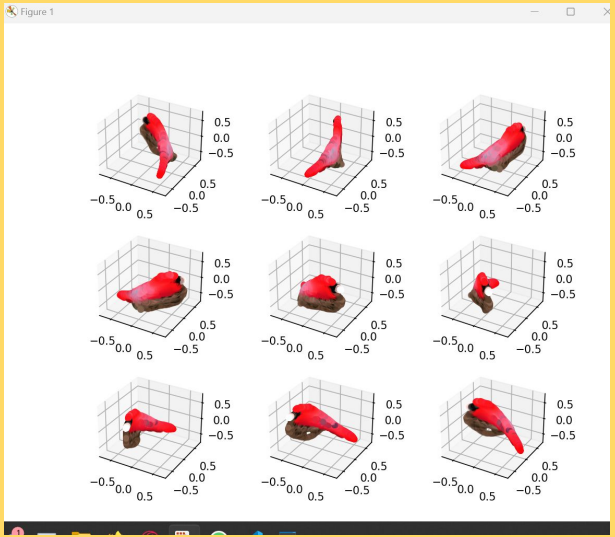
- https://civitai.com/
- https://huggingface.co/spaces/stabilityai/stable-diffusion
- https://stablediffusionweb.com/

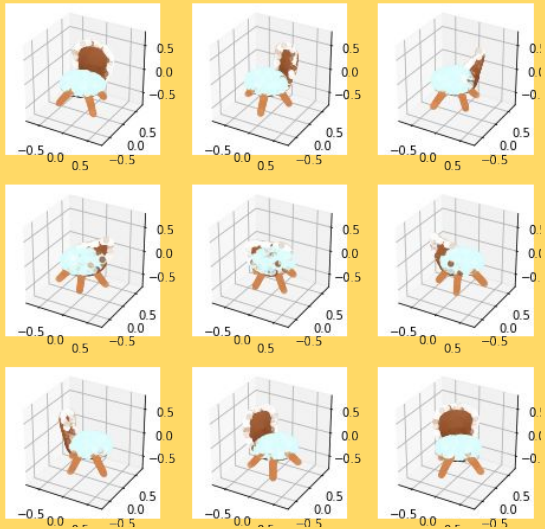
Visualizing Data

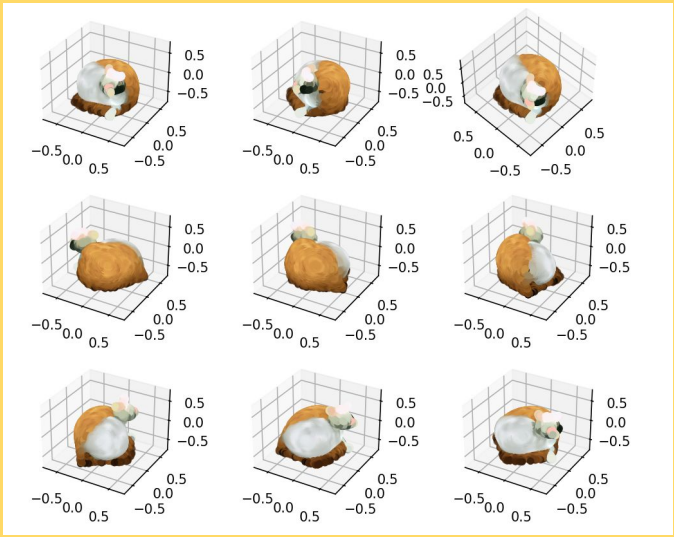
Show the generated point cloud:

- A new figure is created using plt.figure().

```
import matplotlib.pyplot as plt
```







Point-E Point Cloud Diffusion for 3D Model Synthesis

https://github.com/openai/point-e

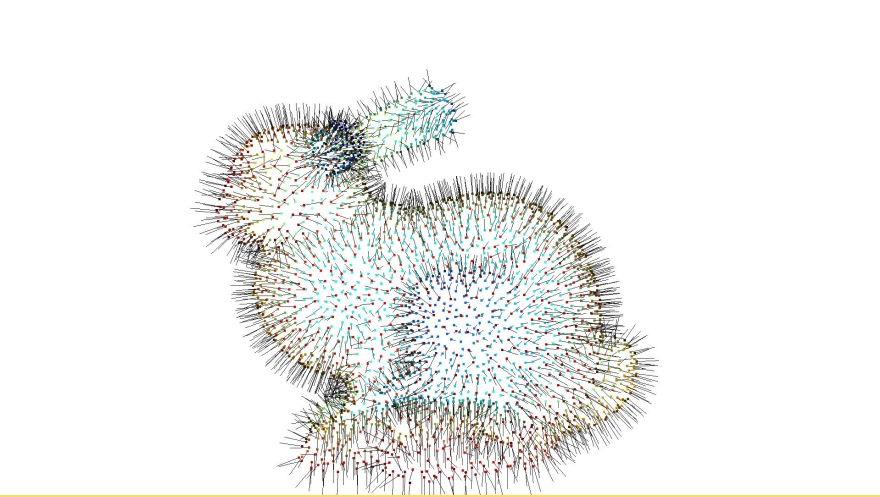
- From OpenAI
- Used for 3D model generation with text-to-3D or image-to-3D
- Generates point clouds from input
- Consumer friendly
  - Does not require a powerful GPU
  - Relatively fast generation time
  - Simple

DEMO:

https://colab.research.google.com/drive/1f_3eQUUAodyRd3OMnOHyA7bltQrmBsqc

Open3D

- Surface reconstruction using the ball pivoting method
  - Surface reconstruction is a way to generate a 3D geometry for a triangle mesh by estimating the surface (skin) from an unstructured point cloud

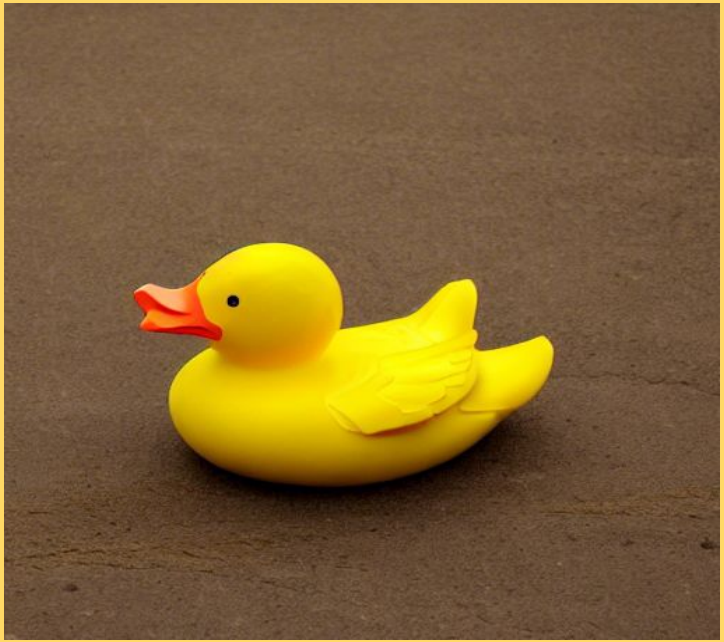


Other 3D Generation Models

- NVIDIA GET3D:
  - https://research.nvidia.com/labs/toronto-ai/GET3D/assets/paper.pdf
  - https://research.nvidia.com/labs/toronto-ai/GET3D/
  - Github Repo:
    - https://github.com/nv-tlabs/GET3D
    - Linux recommended
    - High-end NVIDIA GPUS
- 3DFY
  - https://3dfy.ai/

Example 1: Rubber Duck

Stable diffusion prompt used: a rubber duck, blank background



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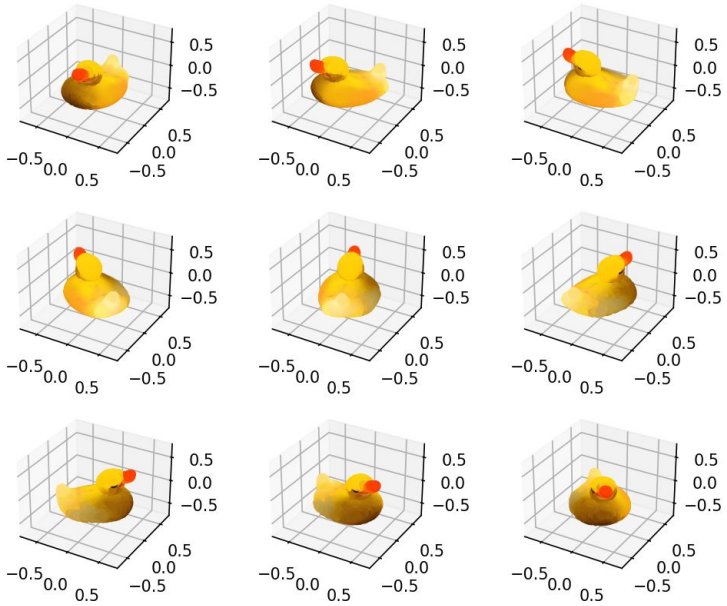
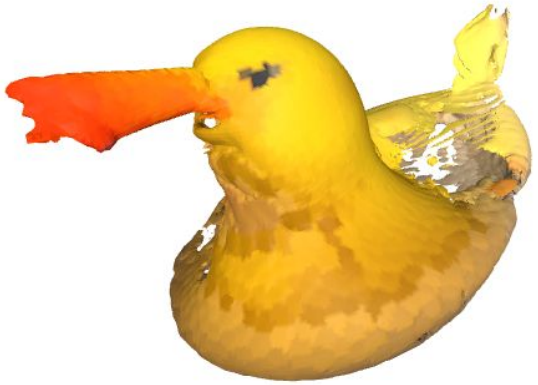
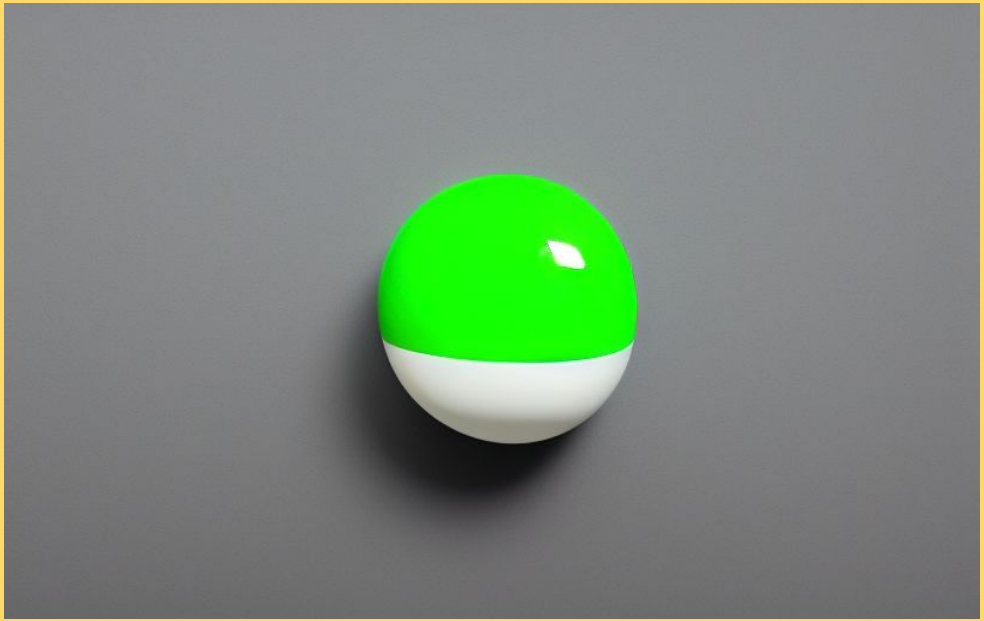




Example 2: Green Sphere

Stable diffusion prompt used: a green sphere, white background, centered



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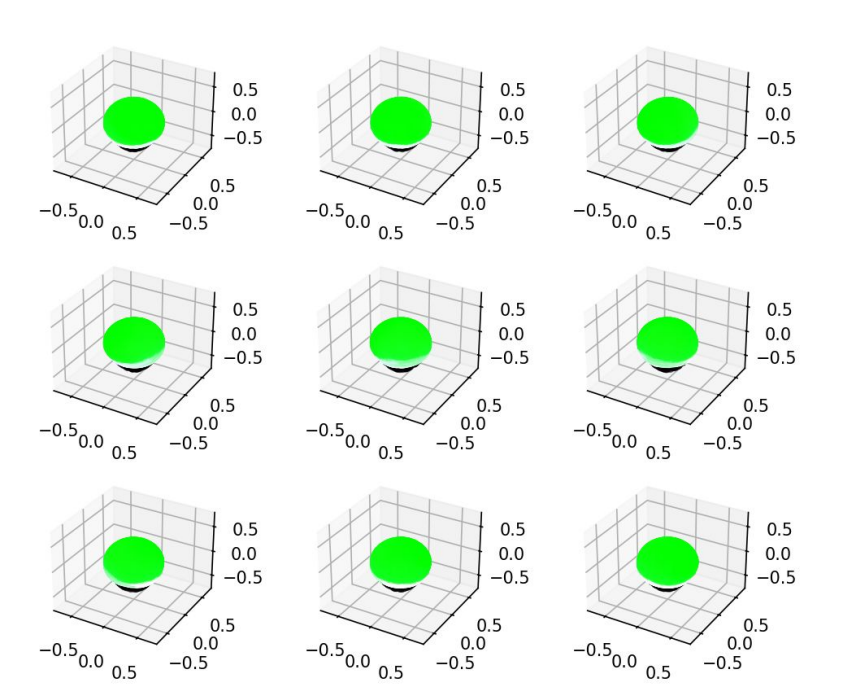

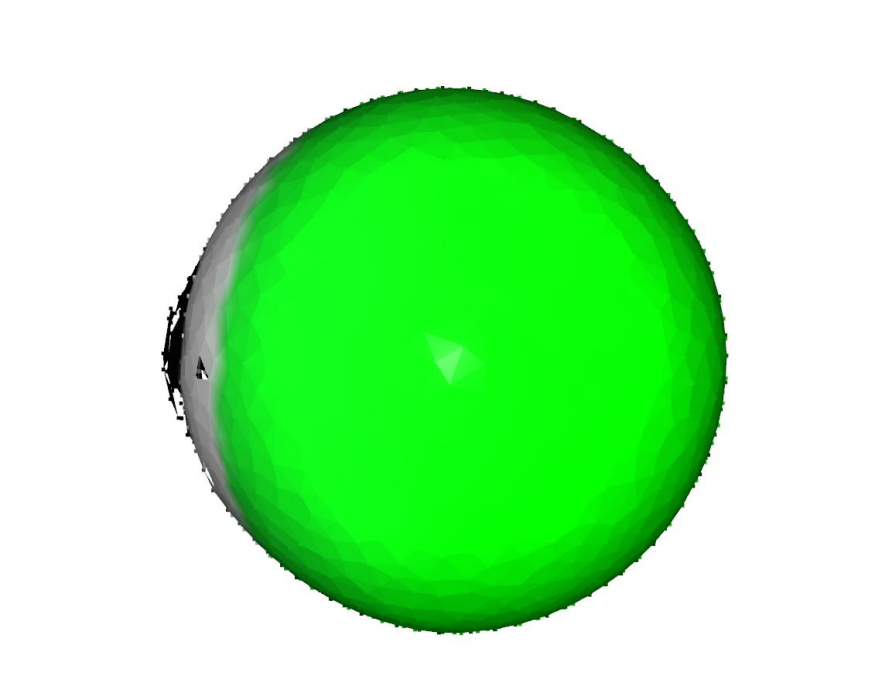

Example 3: House

Stable diffusion prompt used: a small house, white background

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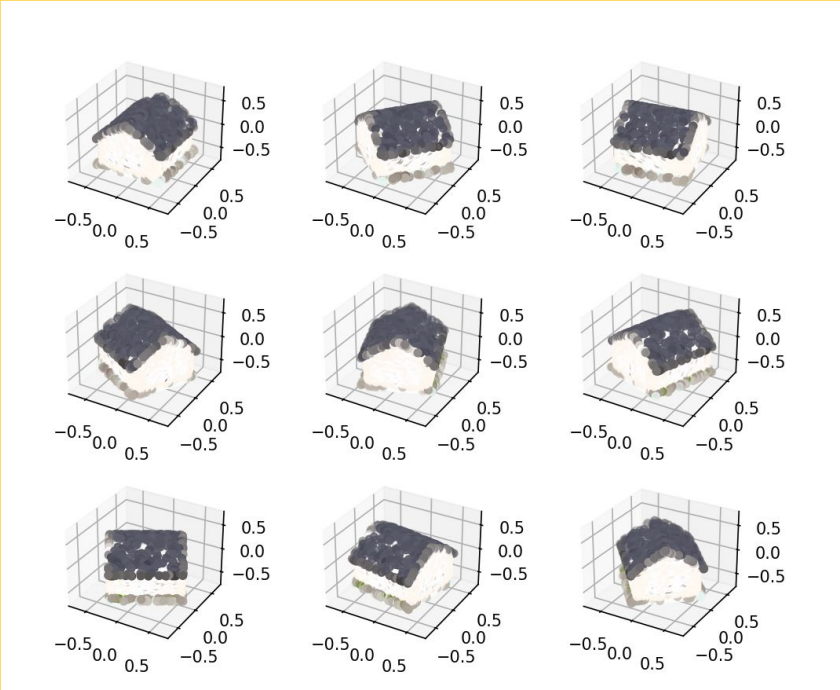
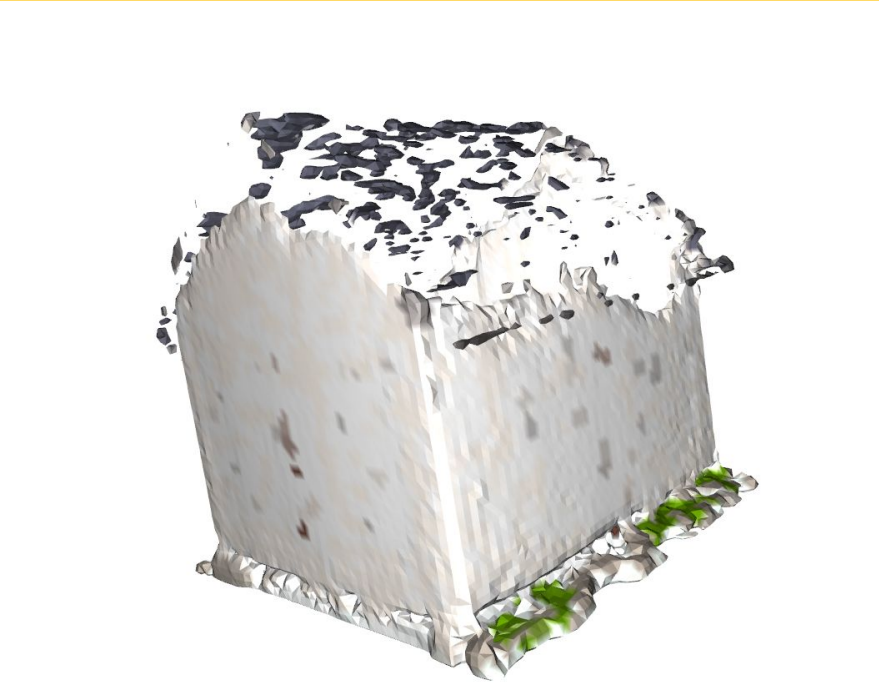
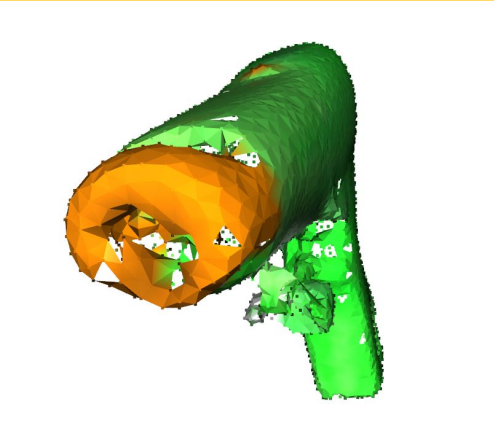
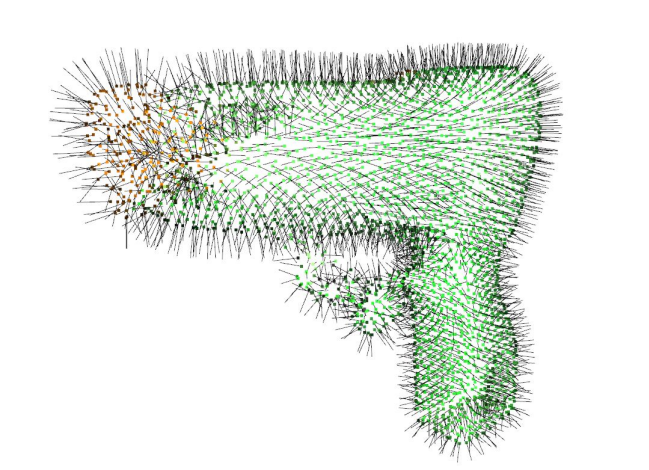


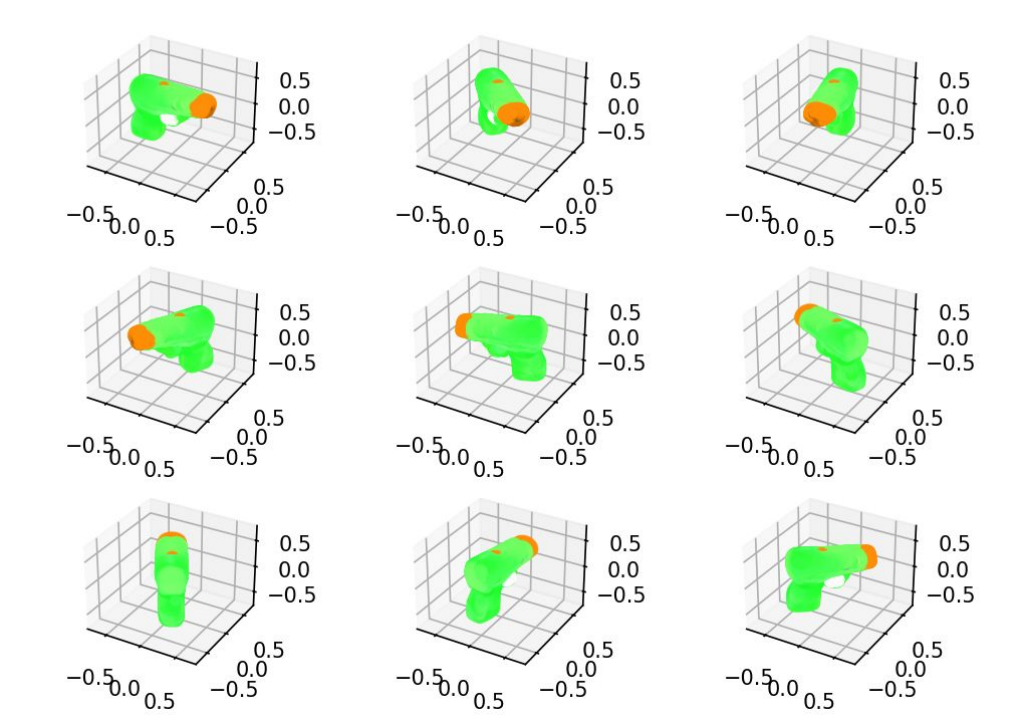


Example 4: Custom Image

“gun” emoji



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