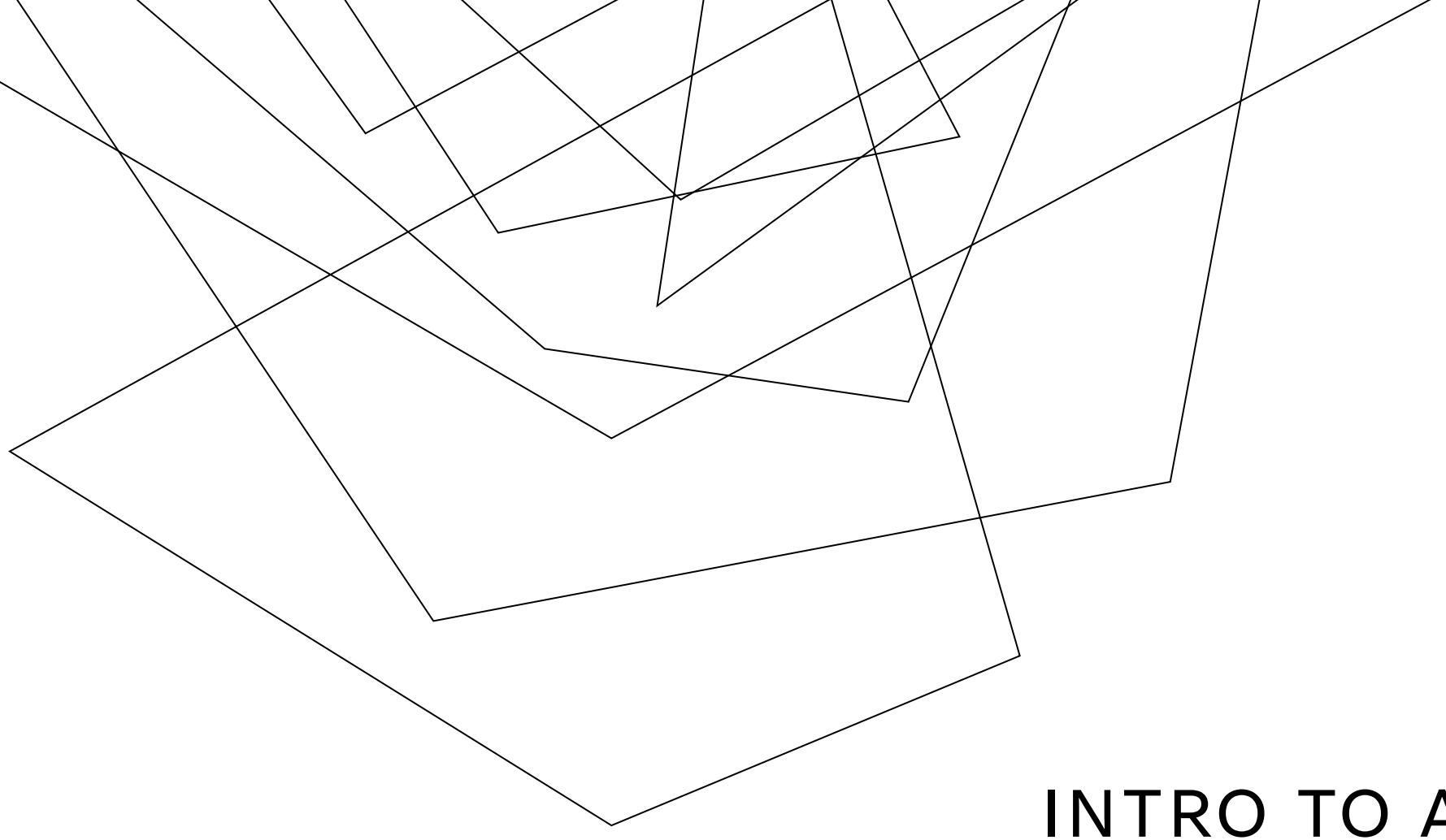


INTRO TO AI TOOLS FOR 3D IMAGES

Gemal Seede

AGENDA

History

Create an image

Changing an image

Create SBS and/or depth map for 2D image

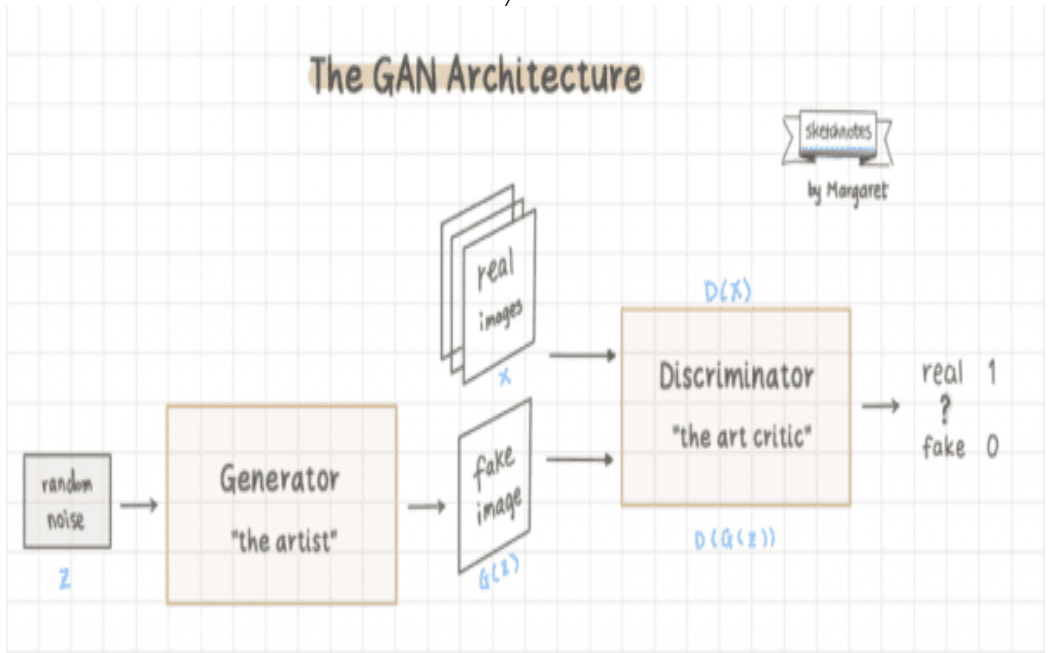
Summary

HISTORY

- 1956 Term AI was coined in 1956 at a conference at Dartmouth College
- 1980s New coding toolkits and increased financial investments gave AI a boost. Backpropagation rediscovered.
- 1990s Machine learning: approach shifts from teaching computers knowledge to giving them a lot of data and letting them learn
- 2000s Unsupervised machine learning is developed
- 2010s Deep learning
  - subset of Machine Learning that constructs artificial neural networks to mimic the human brain. Machine learning become integral to many applications.
  - Learning can be supervised, semi-supervised, or unsupervised

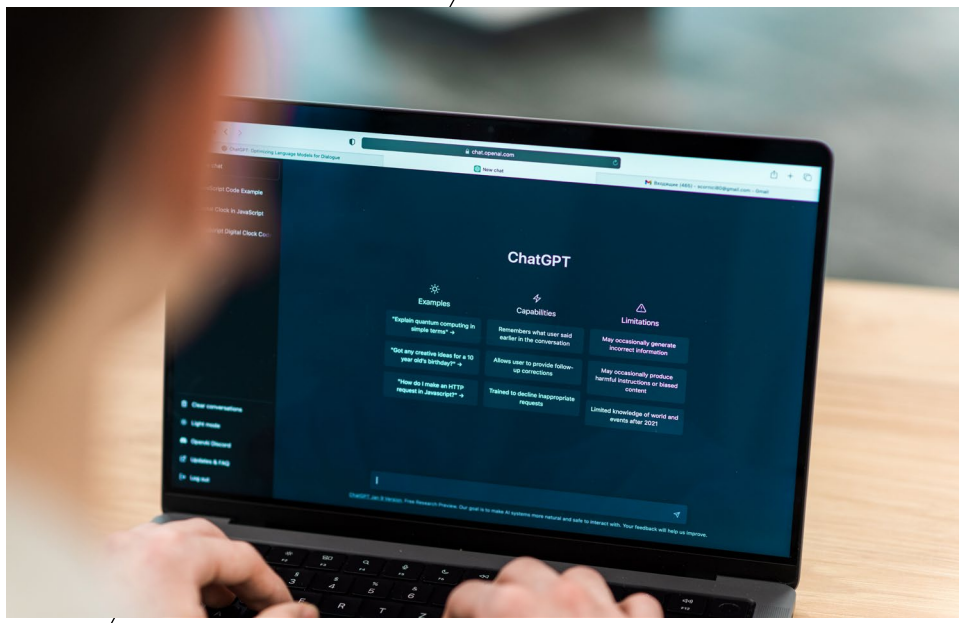
HISTORY – IMAGE GENERATORS

- 2014 student at U of Montreal invents Generative Adversarial Model (GANs)
  - 2 neural networks work against each other.
    - One generates something to match examples
    - The other tries to distinguish real and fake examples
  - The fake detector pushes the fake generator to get better
  - Researchers at UC Berkeley used this to modify existing images



GENERATIVE PRE-TRAINED TRANSFORMER (GPT)

- 2020s OpenAI invents ChatGPT and GPT-4
- large language models understand a prompt and predict the words to respond.
- Consumes Tokens… computing resource related to the number of words you feed it and the number of words it produces. To use OpenAI GPT-4 unlimitedly requires a subscription
- However, Microsoft Bing includes 15 GPT-4 queries per day for free

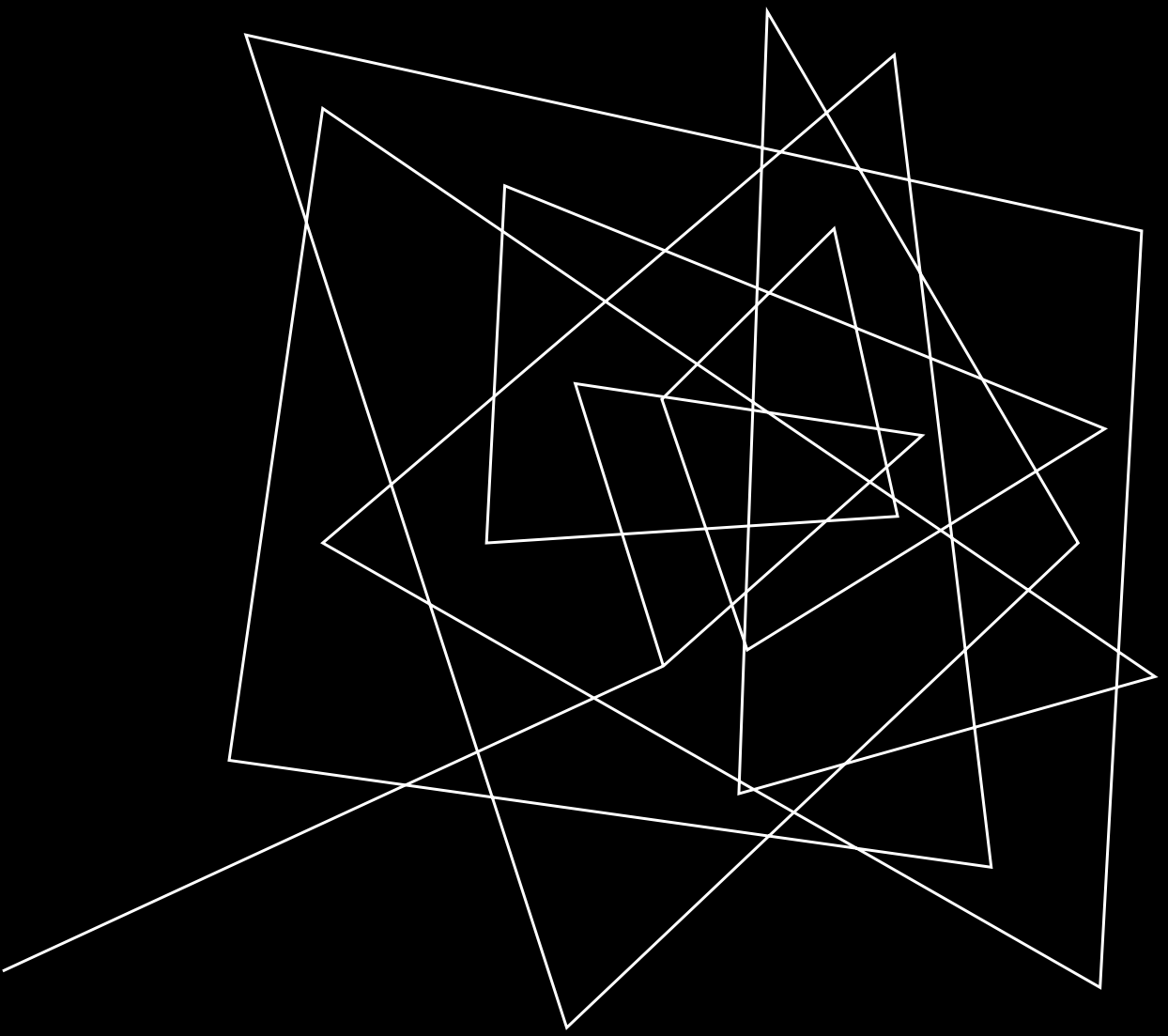


BACK TO AI IMAGE GENERATORS

- 2021 OpenAI announces DALL-E to create images from a text prompt
- Diffusion models from physics are used in DALL-E 2 to learn how to remove noise
- 2022 Breakthrough year according to people in this industry. See quotes…

"I think we'll see more aesthetic exploration over the next three years than the past 200 years."
David Holz CEO of AI startup MidJourney

"We got fast enough, cheap enough, and most importantly good enough to make this accessible to everyone, everywhere"
Emad Mostaque, CEO of Stability AI



CREATING IMAGES

Using AI tools

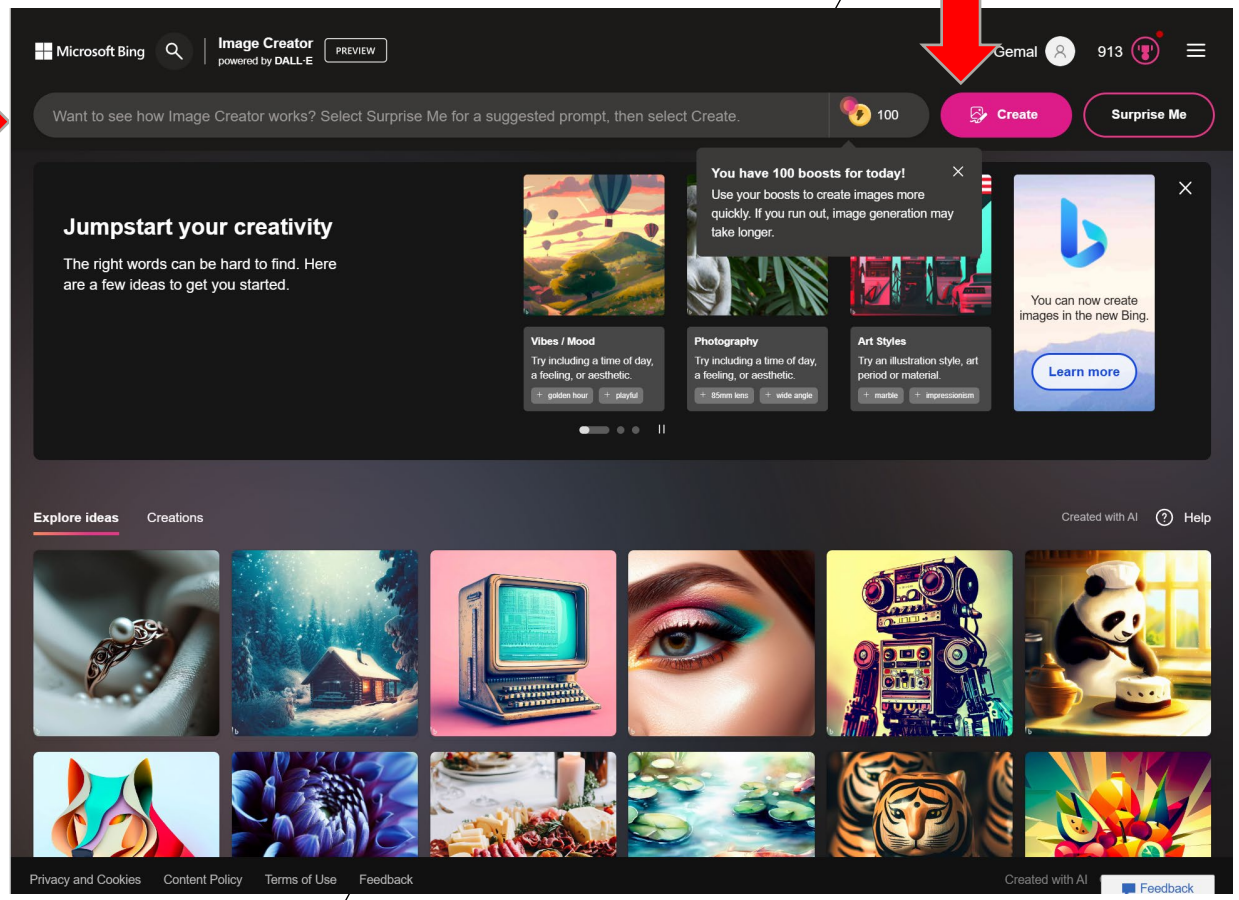
CREATING AN IMAGE

Top three tools for creating images are:

- Midjourney
  - https://www.midjourney.com/app/
- DALL·E (openai.com) or (bing.com/create)
  - https://labs.openai.com
  - https://www.bing.com/create
- Stable Diffusion AI
  - https://stability.ai
  - Can also be used to create 3D depth maps

CREATING AN IMAGE USING DALL-E

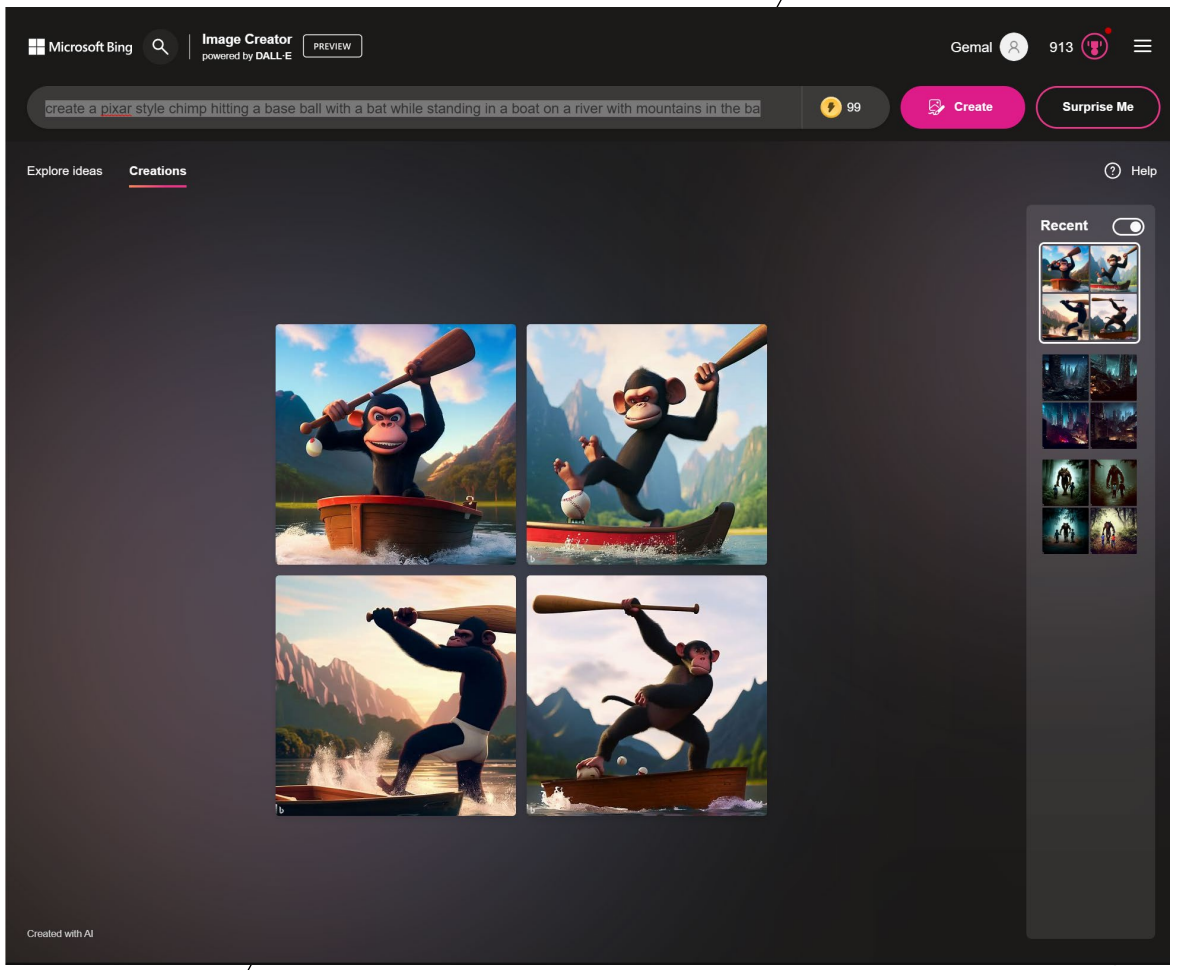
- Simple to use
- Accessible from OpenAI's web page
- Alternatively, can use Microsoft Bing
- To use, describe what you want to see in the foreground, background, the style you want, and any other details, and hit the Create button.
- The text you type is called a prompt



CREATING AN IMAGE USING DALL-E ON BING - EXAMPLE

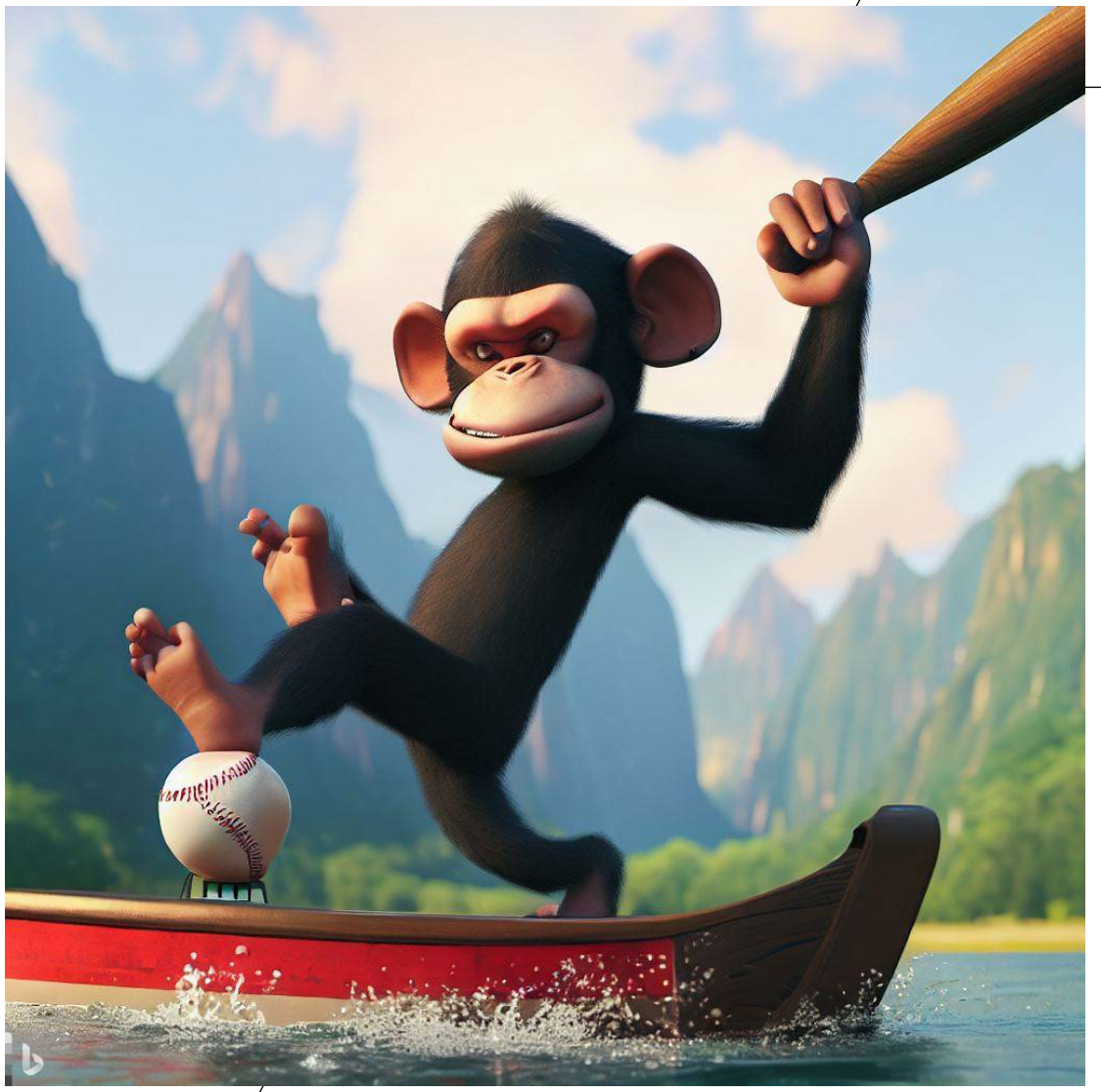
Prompt:

create a Pixar-style chimp hitting a baseball with a bat while standing in a boat on a river with mountains in the background



CREATING AN IMAGE USING DALL-E ON BING - EXAMPLE

- Choose an image and download it
- You can redo prompts to get the output closer to what you want



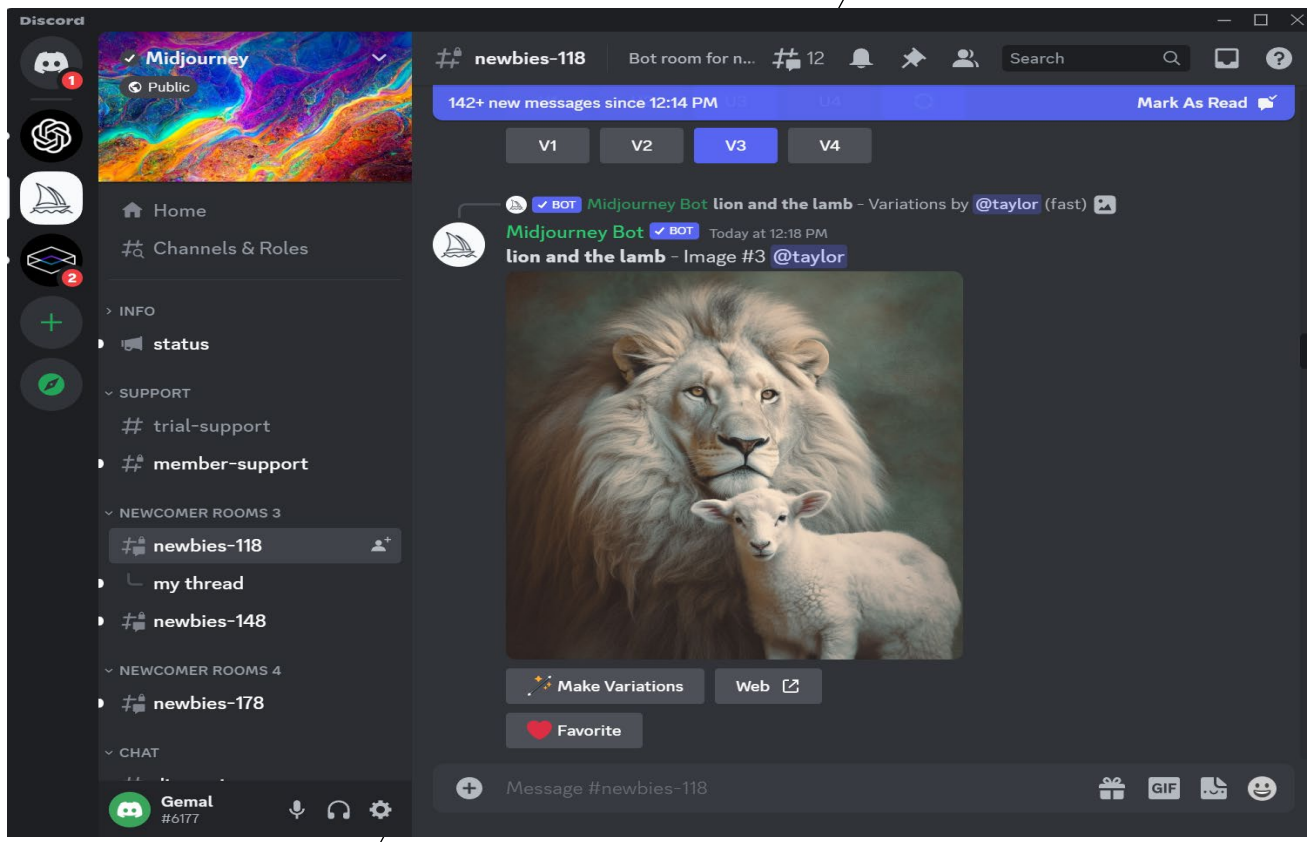
CREATING AN IMAGE USING MIDJOURNEY

Midjourney is the best of the breed as of today

Not an app, it's a bot on the Discord app

- Discord is free software created in 2016 to let gamers talk to each other while playing games
- Available on computers and mobile phones. Helps to use both
- Anyone can create a server… an area where you and others you let join can chat or talk
- Download Discord
  - https://discord.com/download

Search and join the Midjourney server

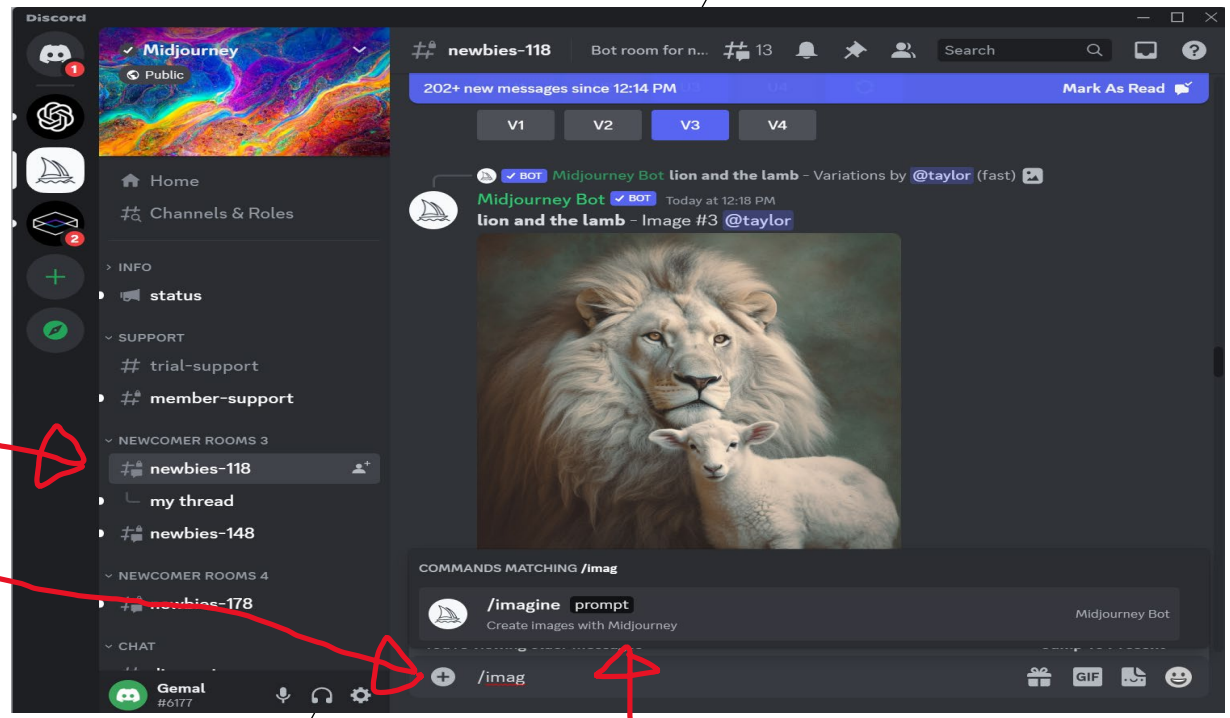


CREATING AN IMAGE USING MIDJOURNEY - STEPS

Again, the text you type for an image is called a prompt

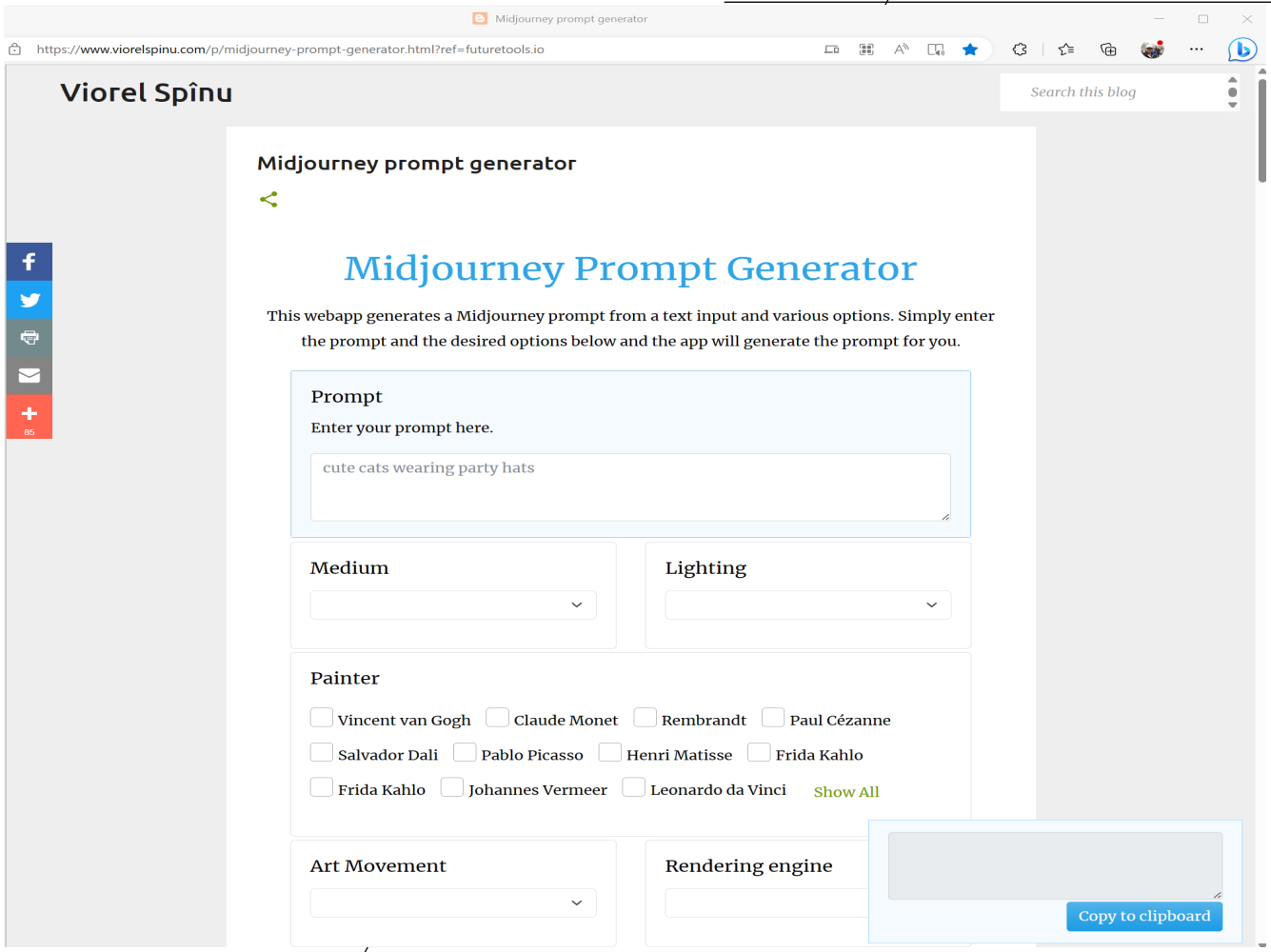
For 25 free image generations

1. Click on the Midjourney Server
2. Click on one of the newbie rooms
3. Click in the prompt text box
4. Start typing “/imagine prompt”
5. A box should appear. Type your prompt there and hit return



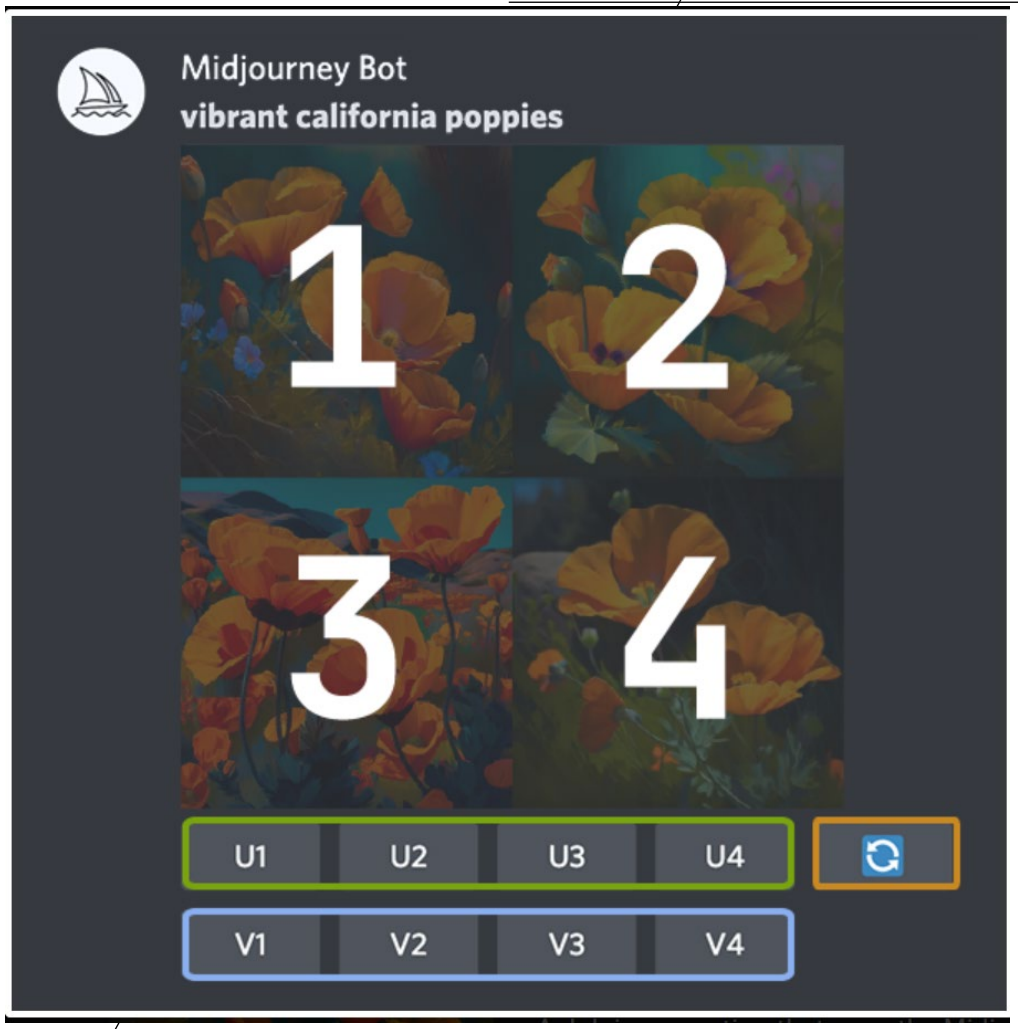
CREATING AN IMAGE USING MIDJOURNEY - PROMPTS

- Midjourney prompts can have MANY options, so:
- People have written prompt generators to help you get the perfect prompt
  - E.g. Midjourney prompt generator (viorelspinu.com)
  - https://www.viorelspinu.com/p/midjourney-prompt-generator.html?ref=futuretools.io
- Documentation and user guides are available here
  - Midjourney Documentation and User Guide
  - https://docs.midjourney.com
- Could also use chatGPT and to generate the prompt for you



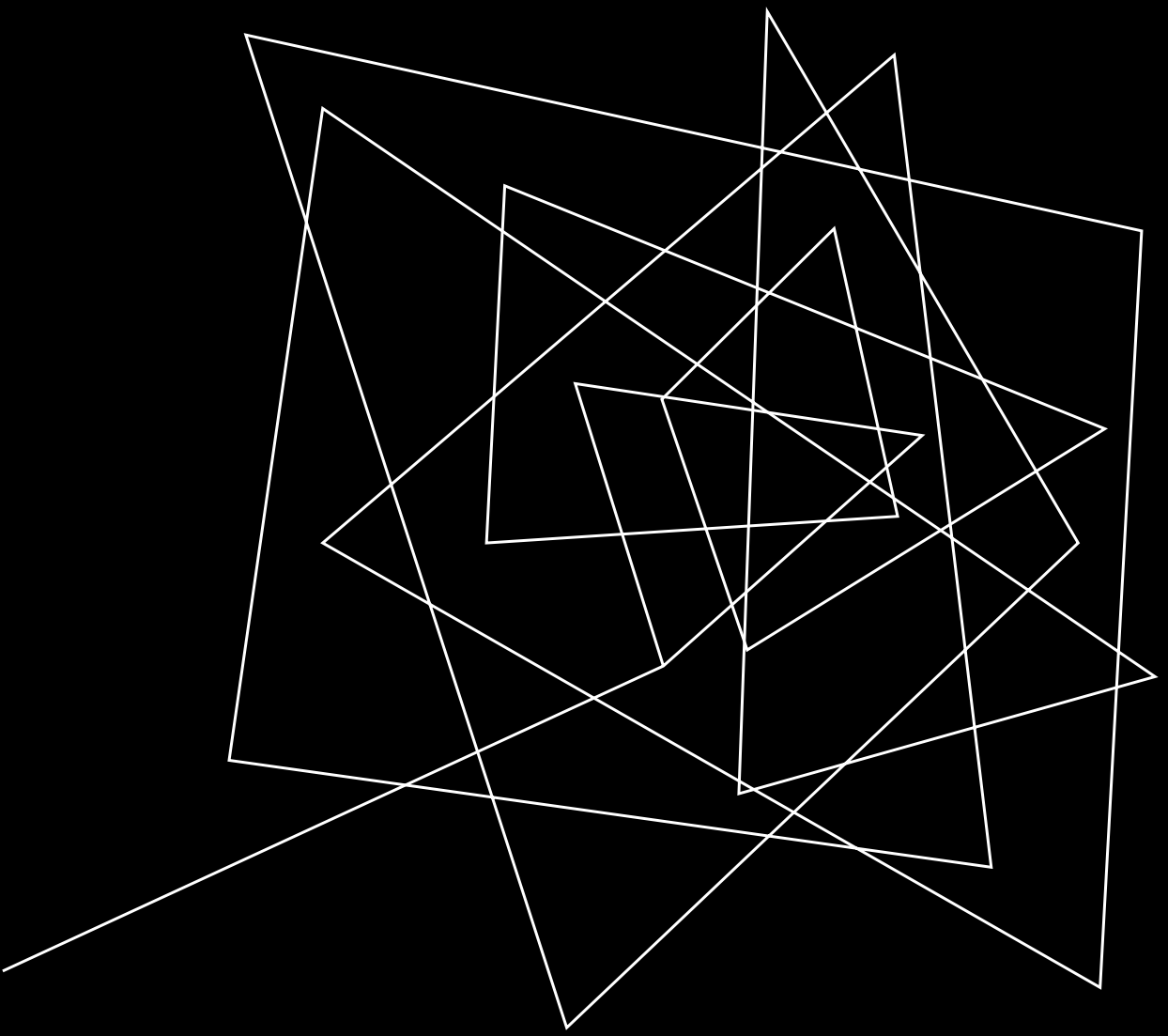
CREATING AN IMAGE USING MIDJOURNEY – RESULTS

- After about a minute, you will get 4 images that you can upscale or resubmit for variations
- Clicking U1 will upscale image 1
- Clicking V1 gives you variations of image 1
- You can repeat this process until you're happy with a final image
- Then just right-click and save the image.



CREATING AN IMAGE USING MIDJOURNEY – EXAMPLE

- Prompt:
- create a landscape, impressionism painting of three laser-eyed dragons in the foreground and a rocky mountain in the background in the style of John Harris using volumetric lighting with a vignette at 4K resolution and 32-bit pixel depth --v 5 --aspect 16:9



DEPTH MAPS

Converting 2D images to 3D

DEPTH MAPS

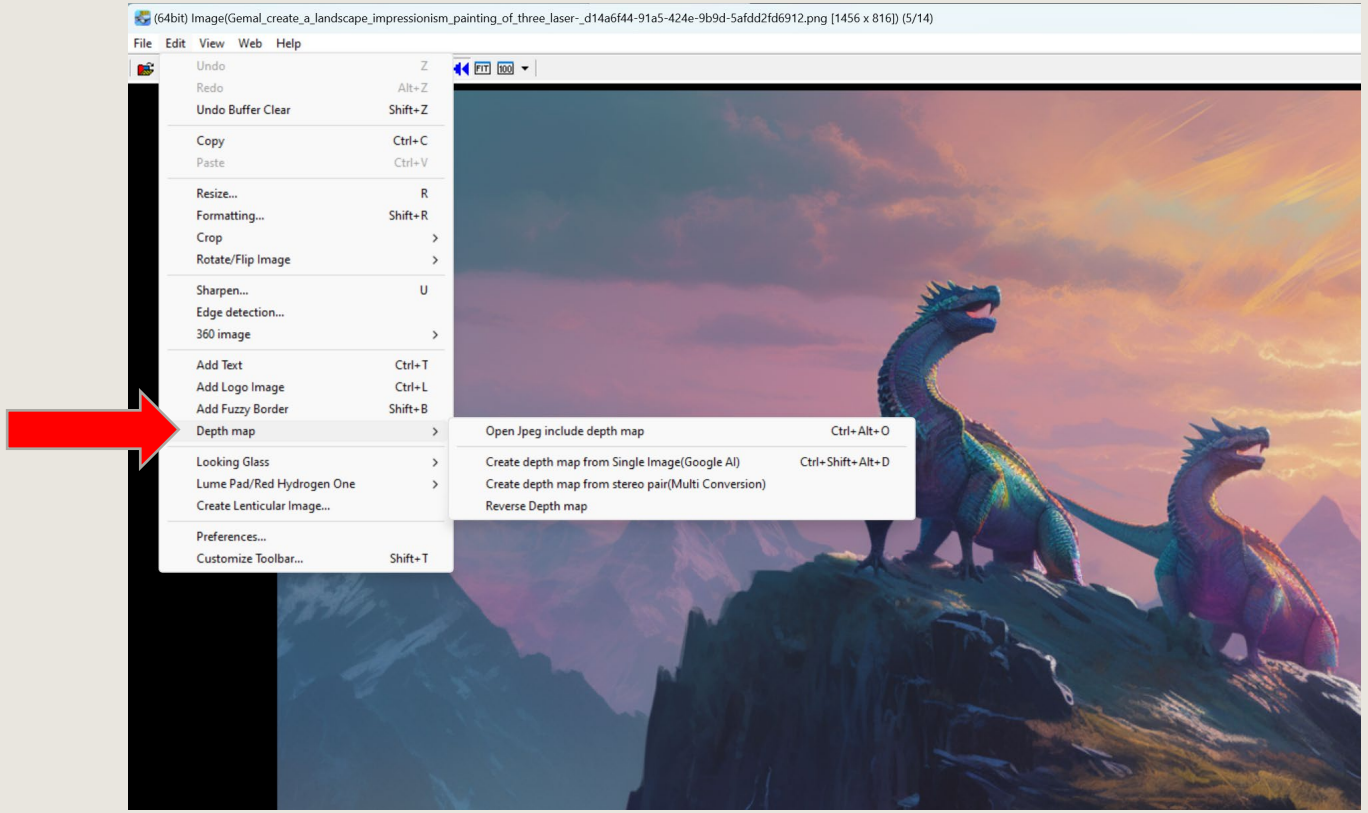
A **depth map** is an image or image channel that contains information relating to the distance of the surface of scene objects from a viewpoint

DEPTH MAPS – USING SPM

- Can create from a stereo pair:
  - This allows a stereo image to be converted to a 2D image and a depth map
    - Edit>Depth Map >Create Depth Map from Stereo Pair

- Can create from 2D image
  - Load image
    - File> Open Single Image
  - Convert to 3D*
    - Edit>Depth Map> Create Depth Map from Single Image

- * Requires installing Python & Google AI

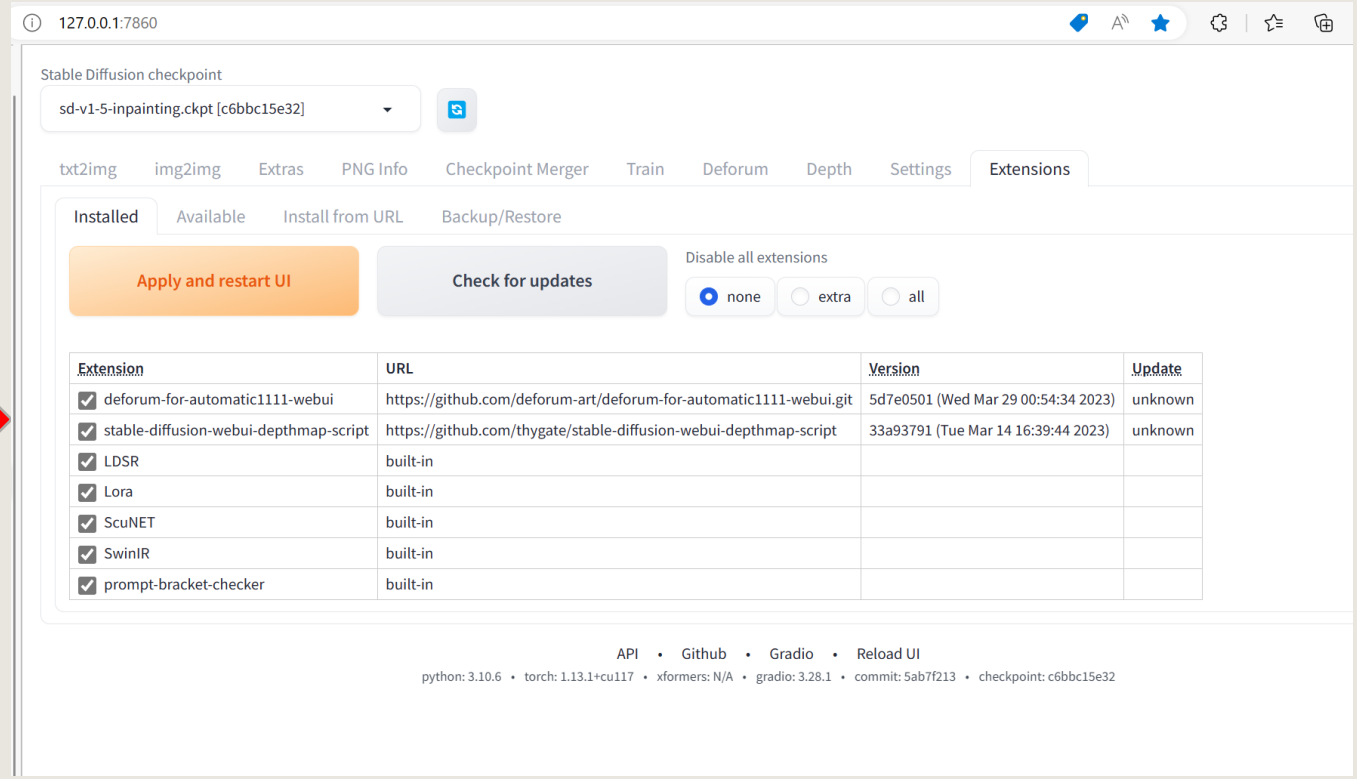


DEPTH MAPS – INSTALLING STABLE DIFFUSION

Also easy to use, but complicated to install

Need to download and install the following

1. Python, a code interpreter
2. Git for Windows
3. Automatic 1111 from GitHub
4. Stable diffusion model from HuggingFace.com
5. Edit a batch file
6. Run the batch file
7. Enter IP address that the batch file gives you into your web browser
8. Add stable diffusion extensions like depth from within Automatic 1111

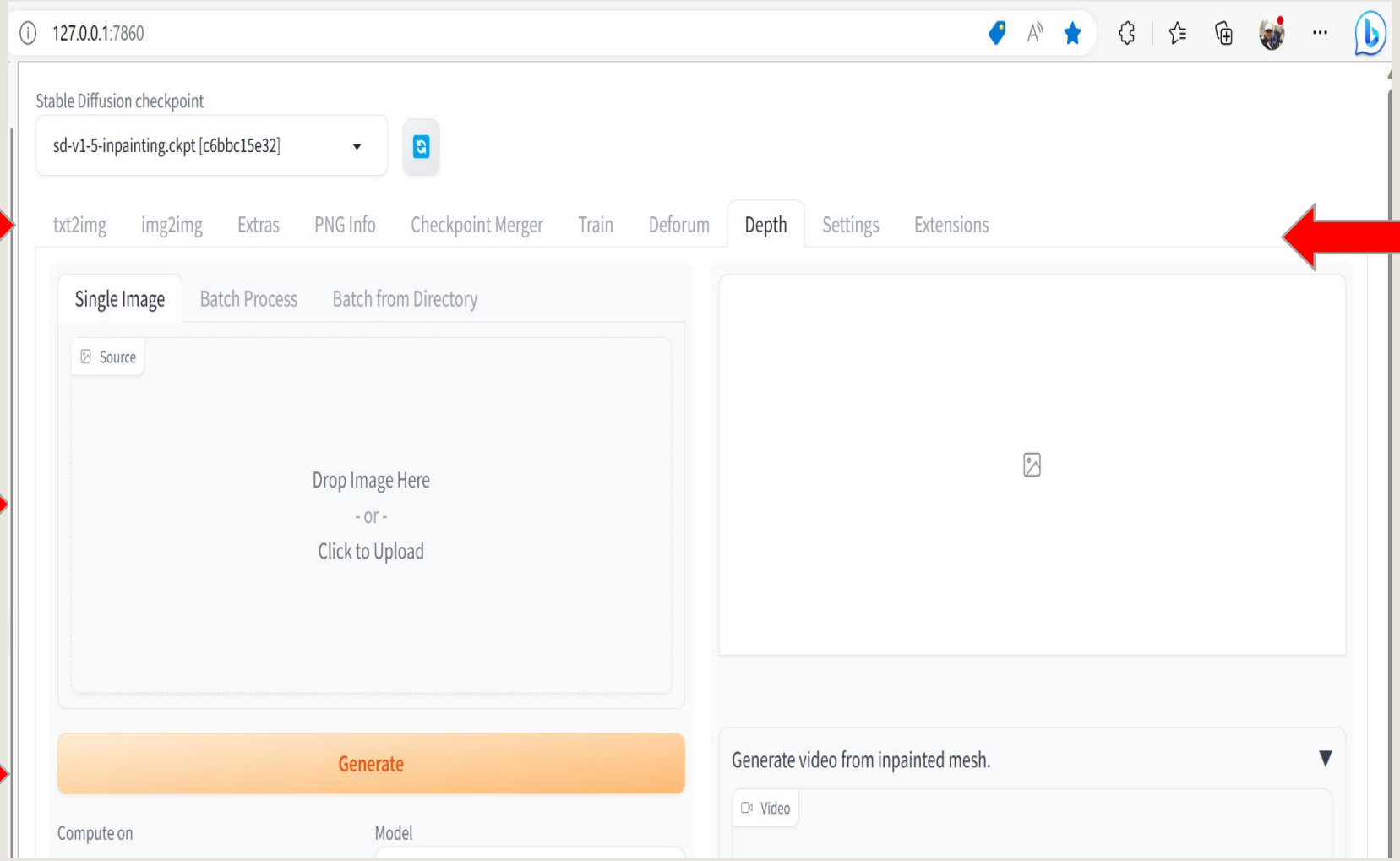


DEPTH MAPS – USING STABLE DIFFUSION

Click Depth Tab

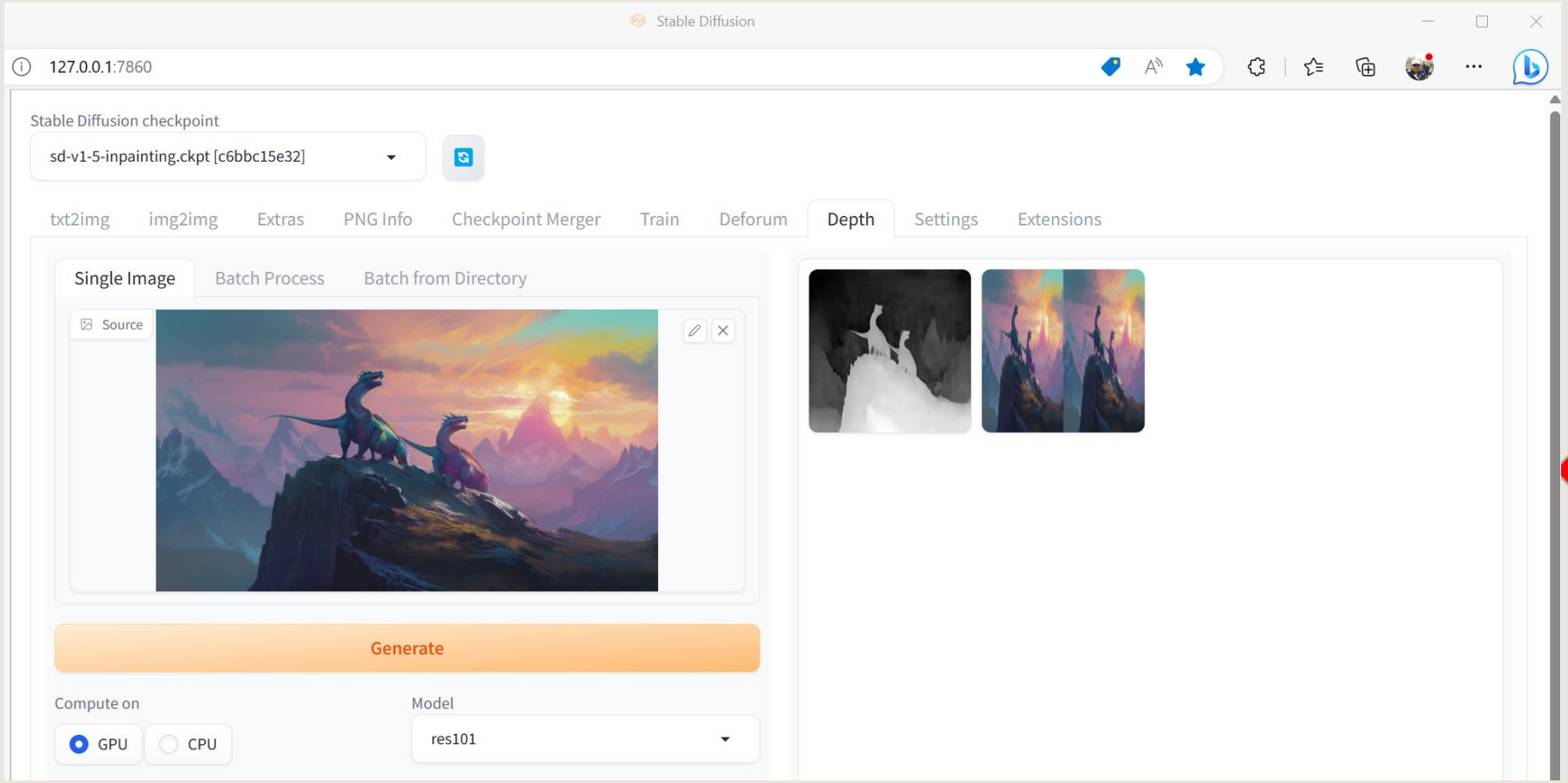
Drag 2D image here

Click here



(Note the first two tabs: you can create images from text and modify images with other images ON YOUR COMPUTER)

DEPTH MAPS – USING STABLE DIFFUSION



Get 3D images here

Can create 3D images: side-by-side, 2D + depth map, anaglyph, top-bottom, heat maps

DEPTH MAP – INTERESTING POSSIBILITIES

Some ideas for using depth maps:

Modify them with Photoshop to:

1. Correct window violations
2. Give an image a depth map from a different picture
3. Move an object closer or further away
4. Convert the image for use on other devices or platforms (such as Looking Glass Portrait, Facebook)

DEPTH MAP – INTERESTING POSSIBILITIES

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DEPTH MAP – FIXING WINDOWS VIOLATION

BEFORE IMAGE has windows violation bottom center

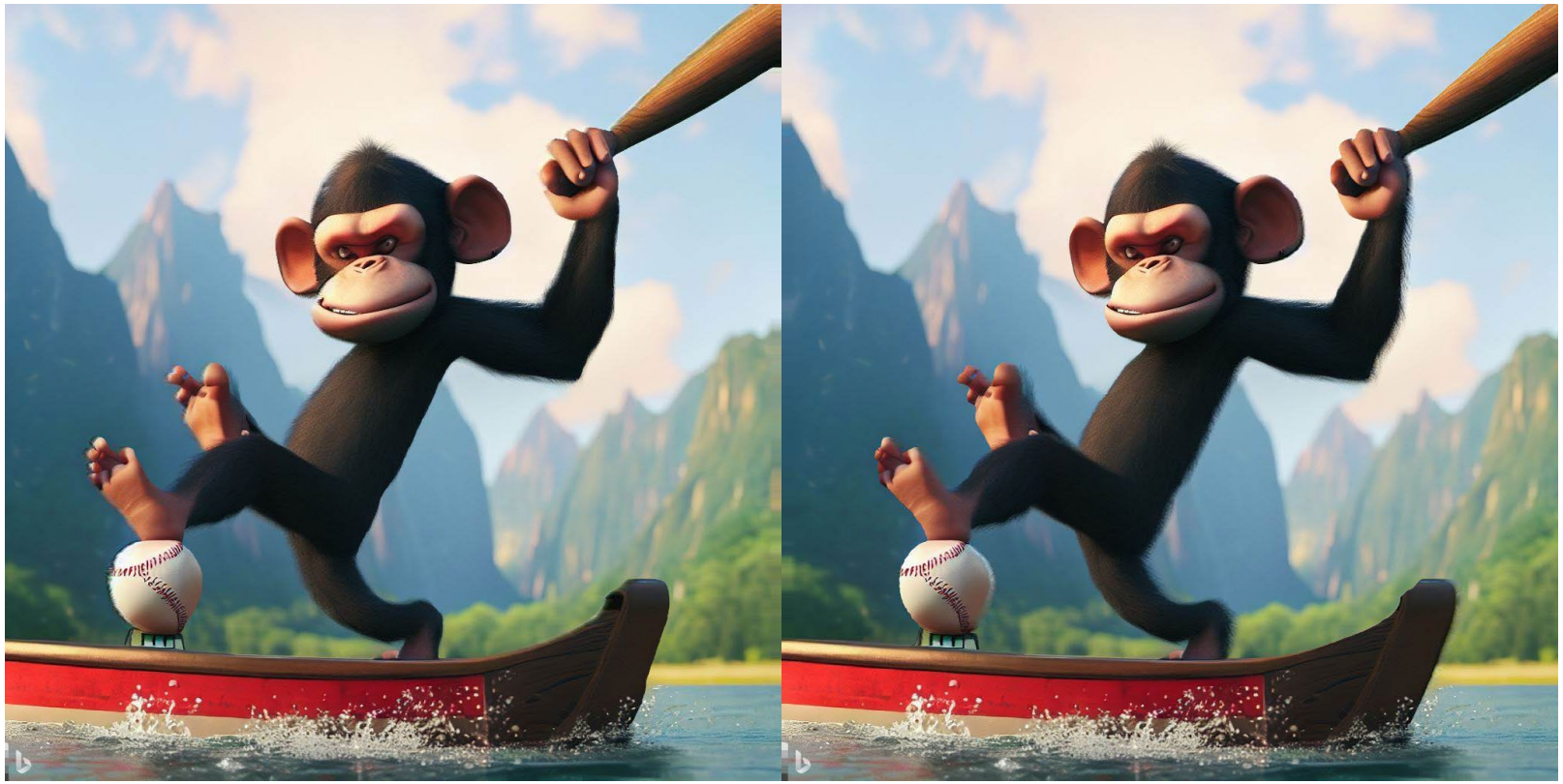
CONVERTED to 2D + Depth Map using SPM

DEPTH MAP – FIXING WINDOWS VIOLATION

CORRECTED DEPTH MAP
painting using Photoshop

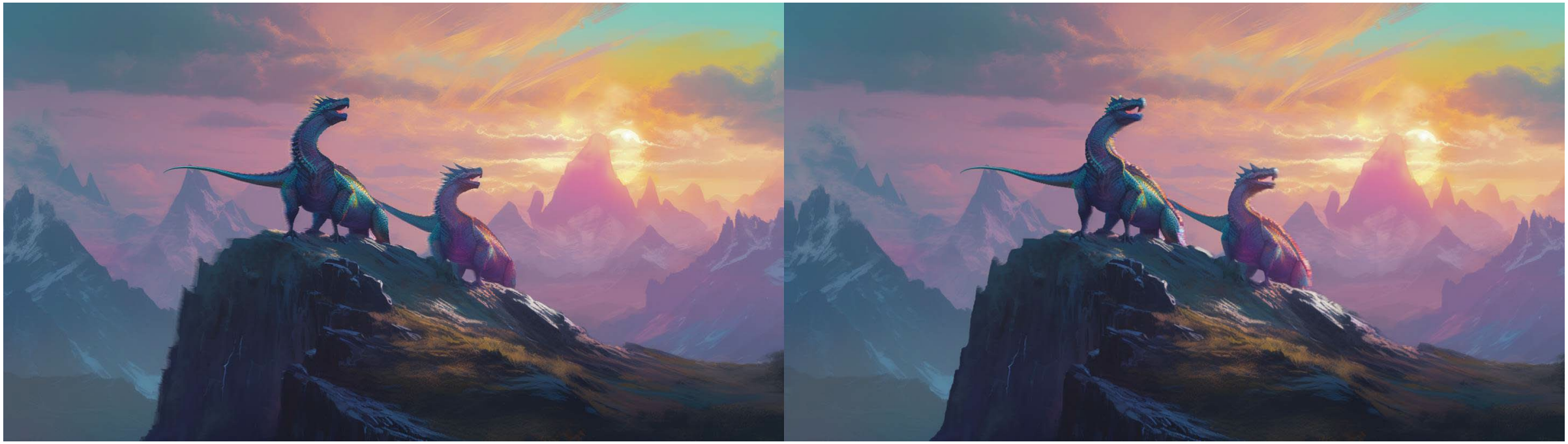
AFTER IMAGE with correction

2D TO 3D CONVERSION EXAMPLES



AI Image from DALL-E converted
using Stable Diffusion

2D TO 3D CONVERSION EXAMPLES

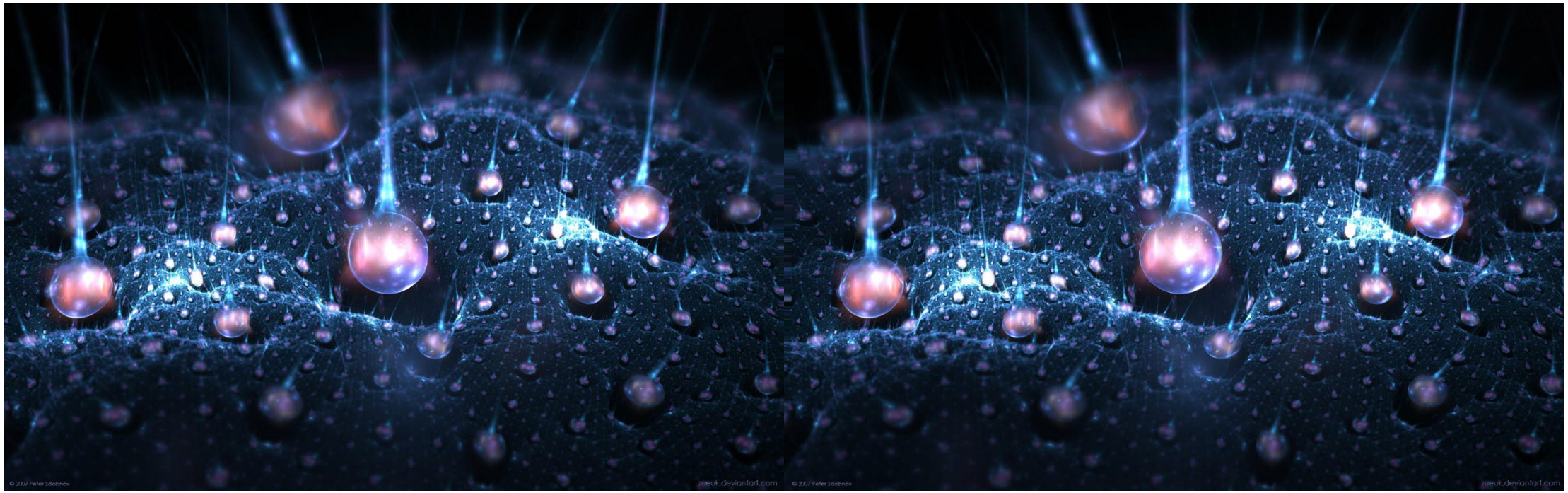


AI Image from Midjourney converted
using Stable Diffusion

2D TO 3D CONVERSION EXAMPLES

2D Photo downloaded from Bing Images
converted using Stable Diffusion

2D TO 3D CONVERSION EXAMPLES



2D CGI Image downloaded from Bing
Images converted using Stable Diffusion

SUMMARY

- AI tools are powerful and maturing FAST
- Some can be challenging to get running but are generally easy to use
- They open creative avenues that were previously difficult or impossible to accomplish
- AI can generate better-quality depth maps from 2D images
- Depth maps can help 3D photographers and image generators fix or enhance existing images, or create completely new ones

THANK YOU

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