Noise, Perception and Learning: Applications in AI art
IAP 2023

Figure 1: AI Art generated by DALL-E 2 using text-to-image

Instructor Information

Sarah Muschinske, PhD student in EECS, RLE
Aspen Hopkins, PhD student in EECS, CSAIL
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Class Information

Days: IAP TTH (except Tuesday Jan 24th, makeup on Wednesday Jan 25th)
Time: 5-6pm lecture
6-7pm Lab / discussion
Classroom: 36-112

Course Description

This seminar-style course will cover topics related to generative art and will provide tutorials on a variety of generative art tools for image, text, and audio generation. A focus of this course will be on the similarities and differences between human and machine perception. This will be tied in to human-machine interfaces as well as how noise effects perception. In addition, this course will provide an overview of the basic operation of widely-used generative models including GANs and diffusion models. *Prerequisites: None*.

Course Objectives

After this course, you should be able to:

- Generate AI art (using both GUIs and APIs)
- Identify similarities between natural and artificial neural networks
- Understand adversarial examples as they pertain to neural networks
- Generate random seeds using varying forms of noise
- Understand the basic operation of text-to-image, text-to-video, autoregression, and language modeling algorithms (such as GPT-3)

Software

You will need access to a computer capable of accessing AI generation tools including DALL-E 2,

Stable Diffusion, Wombo.Art, Nightcafe, and DeepDream

Class Attendance and Participation

If you're interested in a lecture topic, you should feel encouraged attend both the lecture and the optional post-lecture discussion session.

Tentative Schedule

The following is a *tentative* schedule for the course.

Date	Instructor	Topic
01/10		Intro to generative art
01/12	Aspen Hopkins John Simonaitis	Perception and Design Thinking/Fundamentals
01/17	Logan Engstrom, Andrew Ilyas	Artificial neural networks and adversarial examples
01/19	Sarah Muschinske	Noise, pattern, and image
01/25	Mikey Fernandez	Human-machine interfaces
01/26	Aspen Hopkins John Simonaitis	Data visualization and human perception of data
01/31	Chandler Squires	Fractals, visualizers, and causality
02/02	Final Projects	AI art, DeepDream, etc.

Homework & Labs

Generative art is so easy to make, I'd highly recommend just making some yourself! You are encouraged to work with others on generating art from prompts. Art is a social activity! If you create something you think is interesting, or you can find the origins of how it was generated, please present it in class at the end of IAP.

Suggested Prompts – No due date

- Create an image using a text-to-image generator GUI
- Create an image using a text-to-image generator API
- Modify the random seed used in a text-to-image generator API
- Present your generated image to the class with an explanation of how you generated it and what data you think the AI pulled from