4.S00 / 4.S12
SPECIAL SUBJECT

Design Intelligence

Instructor: Marcelo Coelho
Co-Instructor / TA: Diego Pinochet

T 7-9 F 2-5 pm

6 Modules → 4 Exercises + 1 Final Project

6 Modules

1. Introduction to Neural Networks
2. Data + Tools of the Trade
3. Convolutional Neural Networks
4. Autoencoders/UNet
5. Generative Adversarial Networks
6. Recurrent Neural Networks

Grading

Exercises = 40% (10% each)

1. From Parametric to Neural Networks
2. Interactive Drawing Machine
3. Neural Fabricator
4. Music Video

Final Project = 50%

Participation = 10%

Exercises

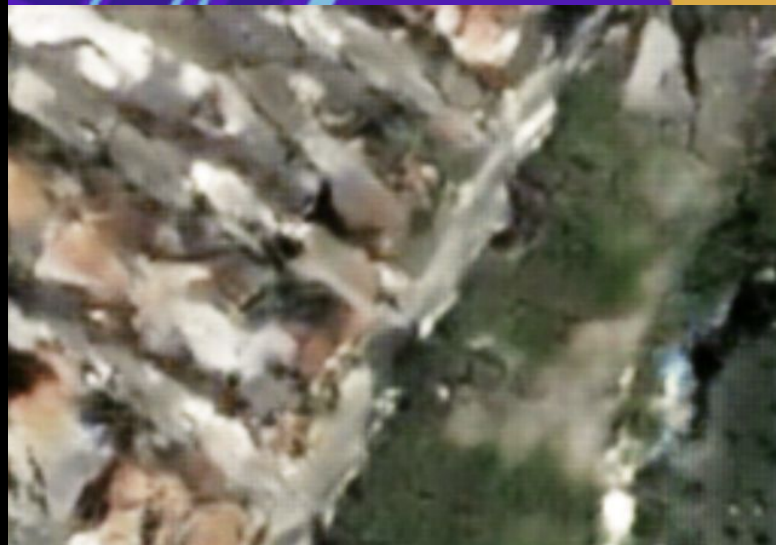
1. From Parametric to GANs
2. Interactive Drawing Machine
3. Neural Fabricator
4. Music Video

Ex. 1 - From Parametric to GANs

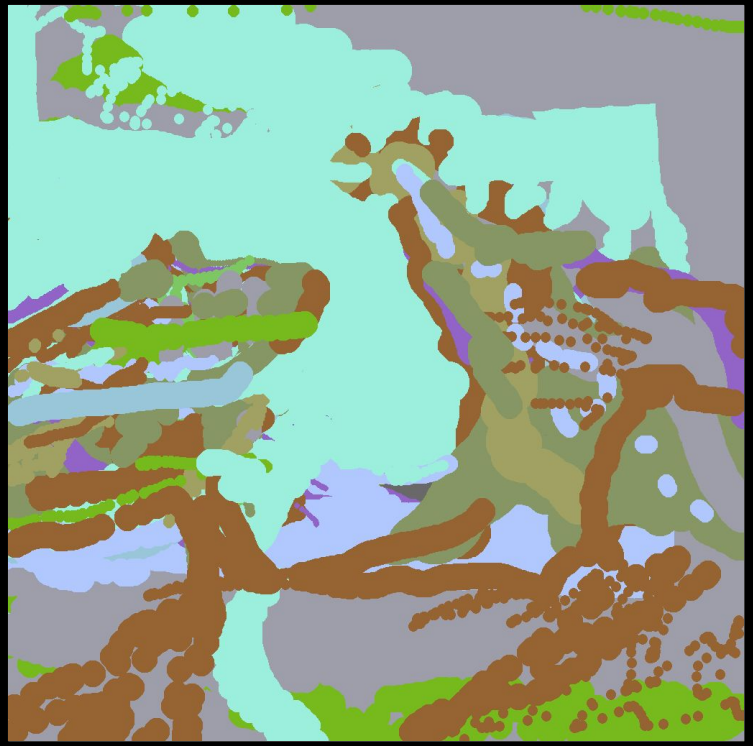
You will create parametric drawings in p5js that act as input for a generative neural network, experimenting with and comparing the trade offs of both generative methods.

Learning objectives:

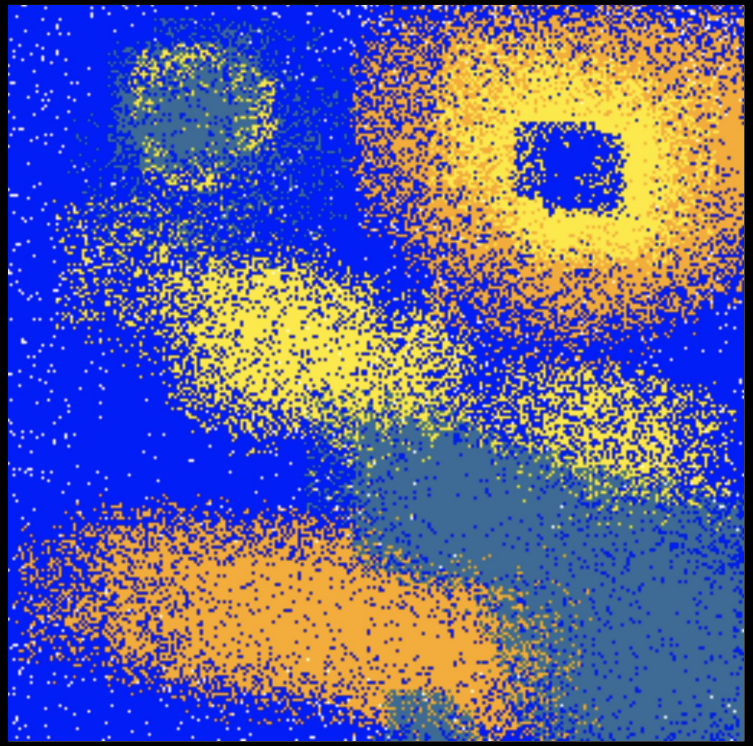
Introduction to Neural Networks
Basic Tools (p5js, ml5, python, colabs)



Olivia Seow



Kat Labrou



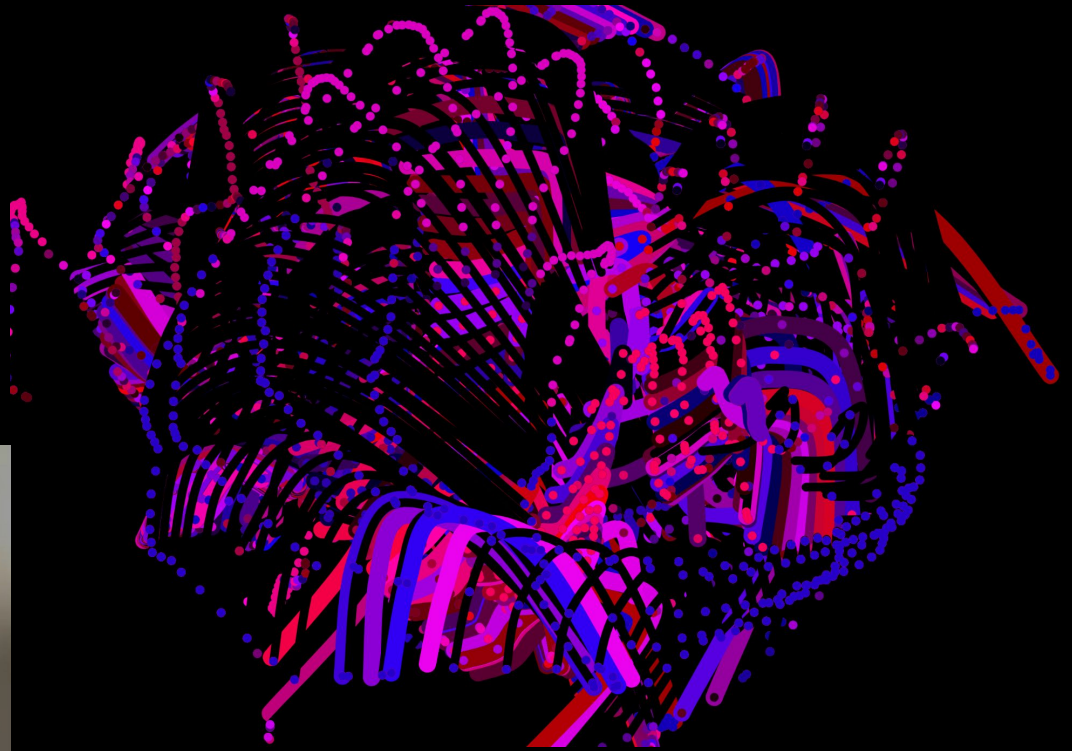
Diego Yañez-Laguna

Ex. 2- Interactive Drawing Machine

You will develop an interactive drawing machine by creating a unique dataset, training a classifier, and using its output as a source of dynamic input for visual composition and design.

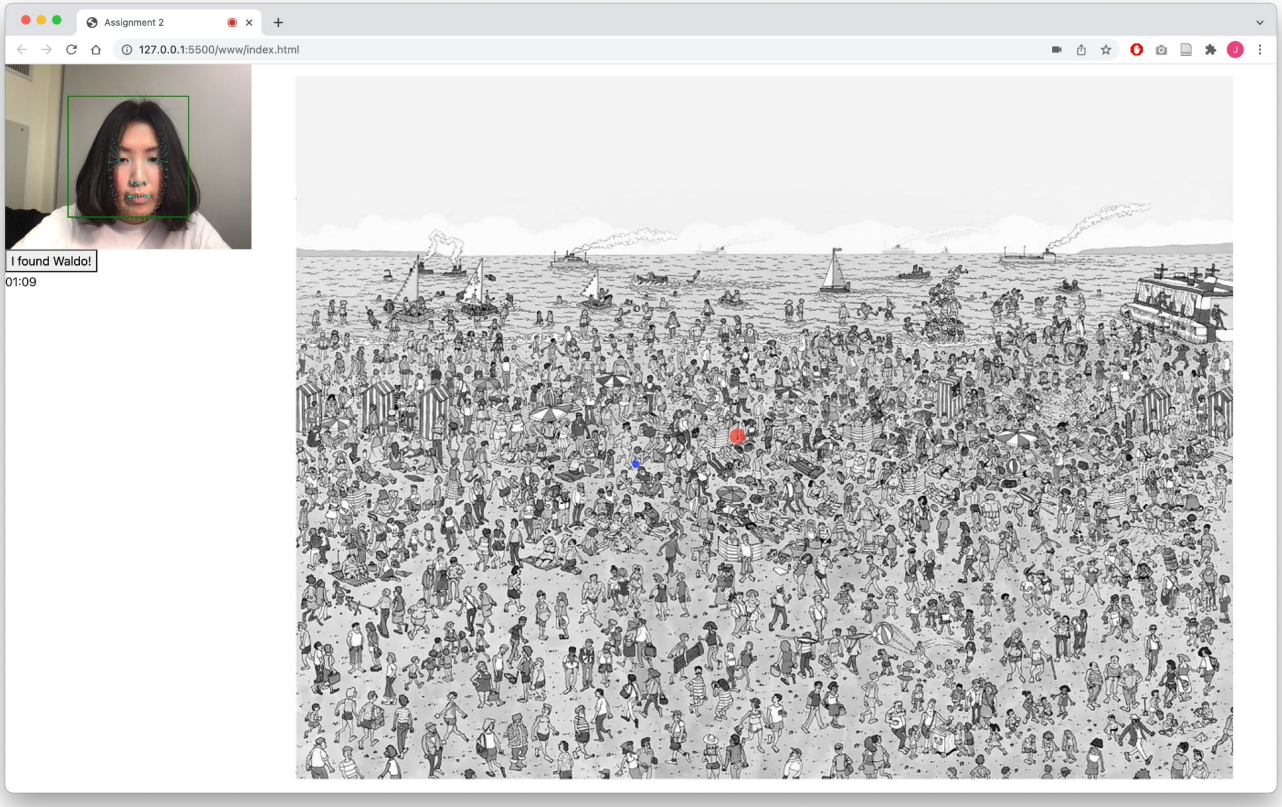
Learning objectives:

How to work with data
Training classifiers
Interaction Design



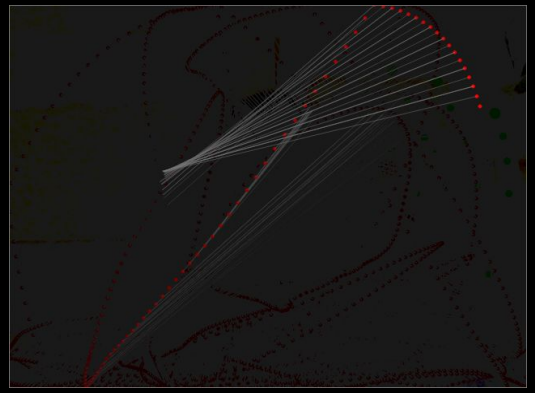
Drawing Gestural Landscapes

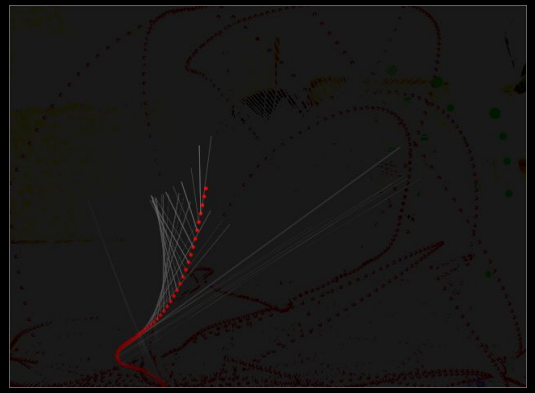
Kat Labrou

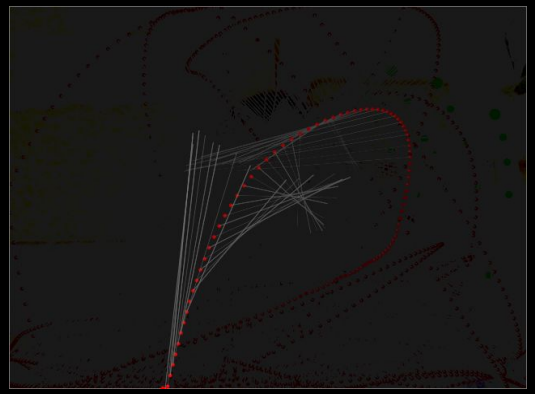


Where’s Wally? Eye tracker drawing machine

Jari Prachasartta







Force Application ML

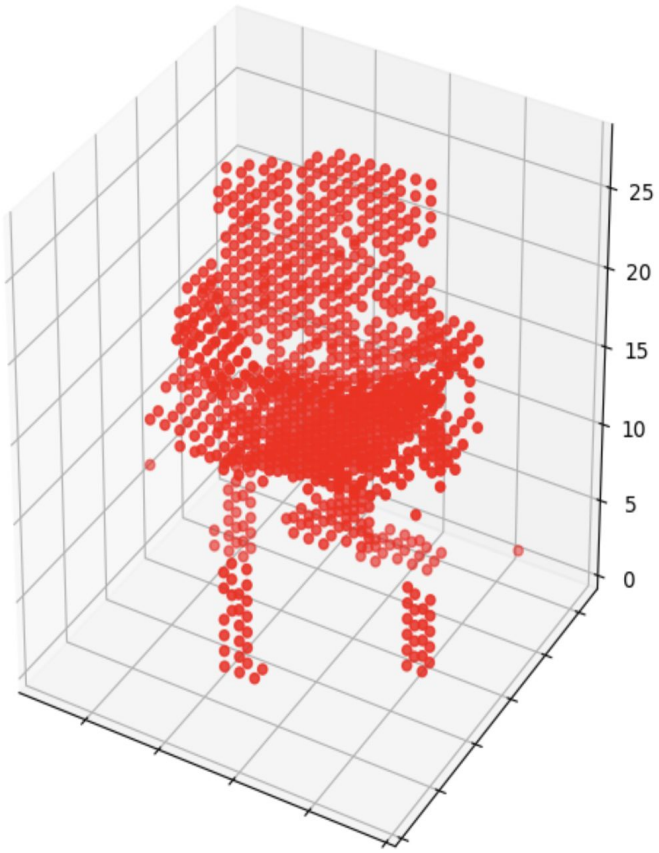
Zain Karsan

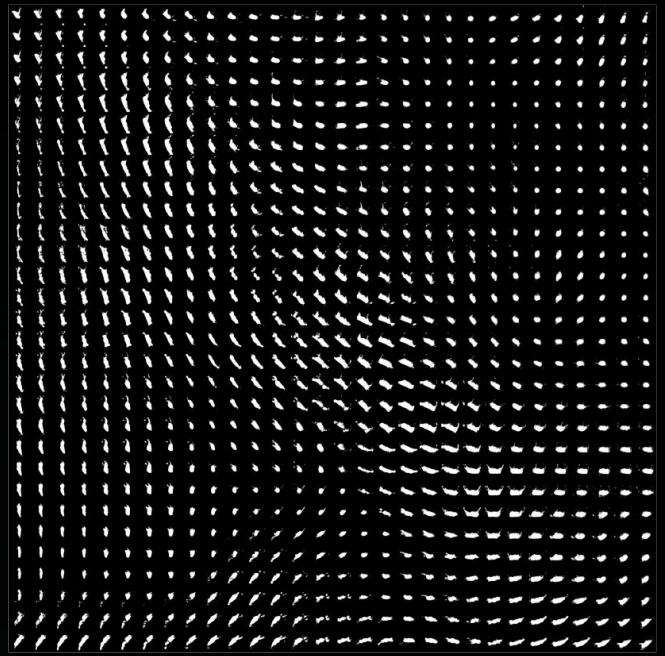
Ex. 3 - Neural Fabricator

You will generate synthetic data in order to train a variational autoencoder. Outputs from your neural network will act as source material for 3D design and fabrication.

Learning objectives:

Synthetic Data
VAEs
Design for Fabrication





ML Meat Grinder

Arthur Boscolo

LeafGAN for printing cyanotypes

Olivia Seow

Monogram VAE

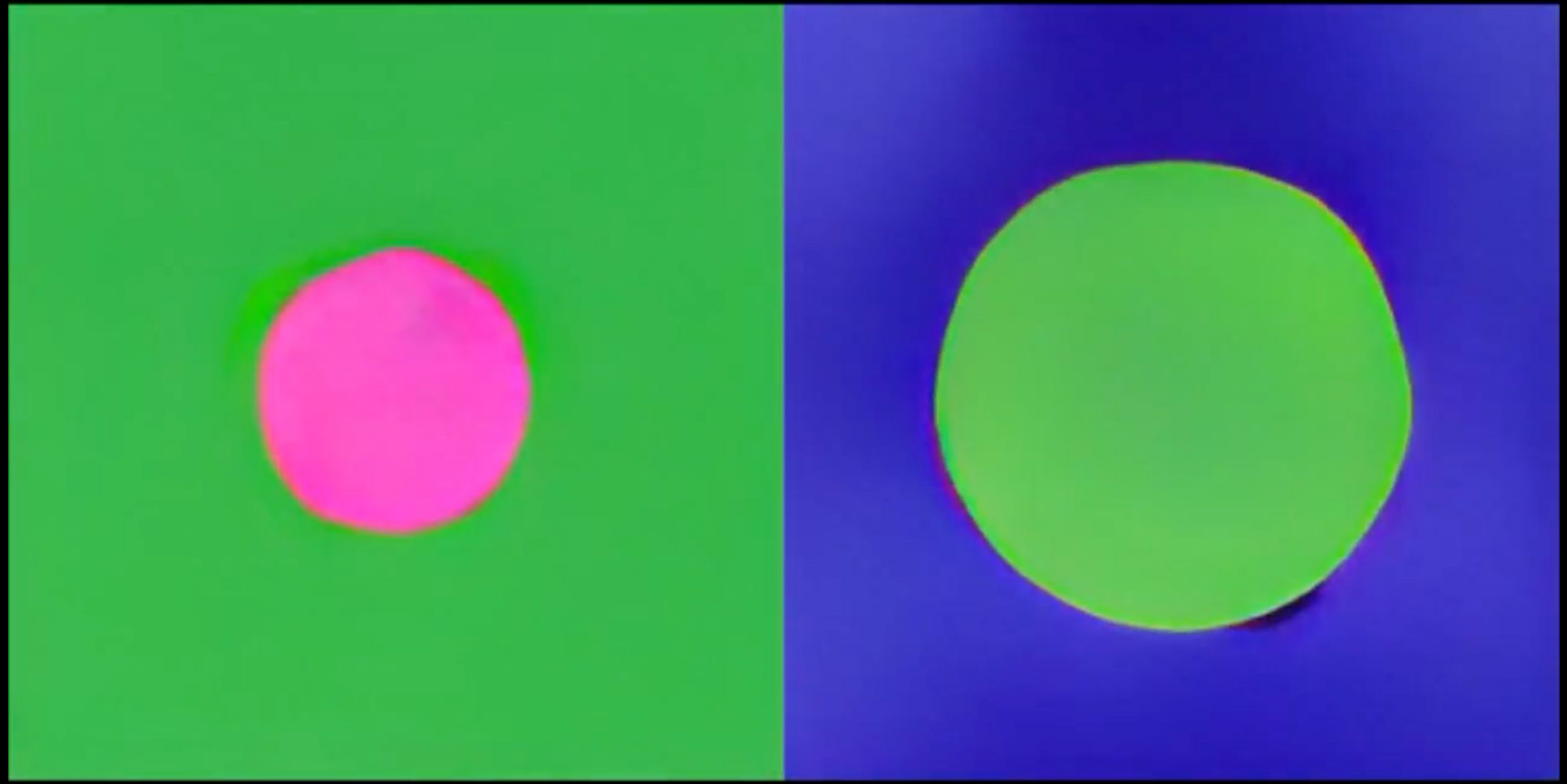
Diego Yañez-Laguna

Ex. 4 - Music Video

You will create a music video by combining VQGAN + CLIP and a recurrent neural network (RNN) for audio and sound generation.

Learning objectives:

Time and Memory in Neural Networks
Motion synthesis



Generative animation and sound

Karyn Nakamura

Prompt engineering with VQGAN + CLIP

Olivia Seow

images_interval: 2
max_iterations: 6

images_interval: 4
max_iterations: 12

Snare and Hi-Hat Basquiat

Diego Yañez-Laguna

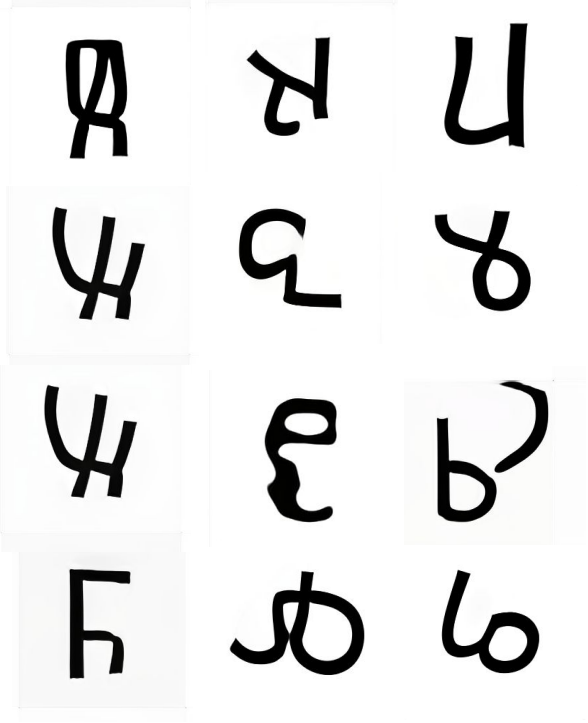
Final Project

The last 8 weeks are dedicated to the final project.

Inspired by the concepts and techniques seen earlier in the course, you will develop a longer and more in depth project, pursuing your own personal interests in art, design, interaction, artificial intelligence, and neural networks.

Imagined Music

Diego Yañez-Laguna



Alien Glyphs Generated with StyleGAN

Karyn Nakamura


Human-Machine Collaborative Drawing
Zain Karsan


Neural Foundry
Nix Liu Xin