ARTISTIC FACES GENERATOR

Using Deep Convolutional Generative Adversarial Network (**DCGAN**)

STEVEN L TRUONG

WARM-UP

Which face is from a real person?

WARM-UP

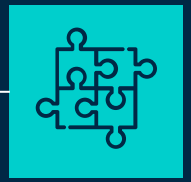
Which face is from a real person?

WARM-UP

Which face is from a real person?

Thispersondoesnotexist.com - NVIDIA

INTRODUCTION



01

WHAT are DCGANs?

High-level introduction about DCGANs

02

PROCESS

Training and testing

03

RESULTS

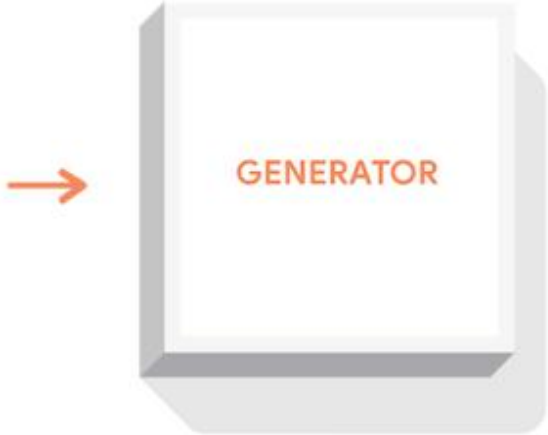
How to improve the model?

DCGANs?

Deep Convolutional Generative Adversarial Networks.

01

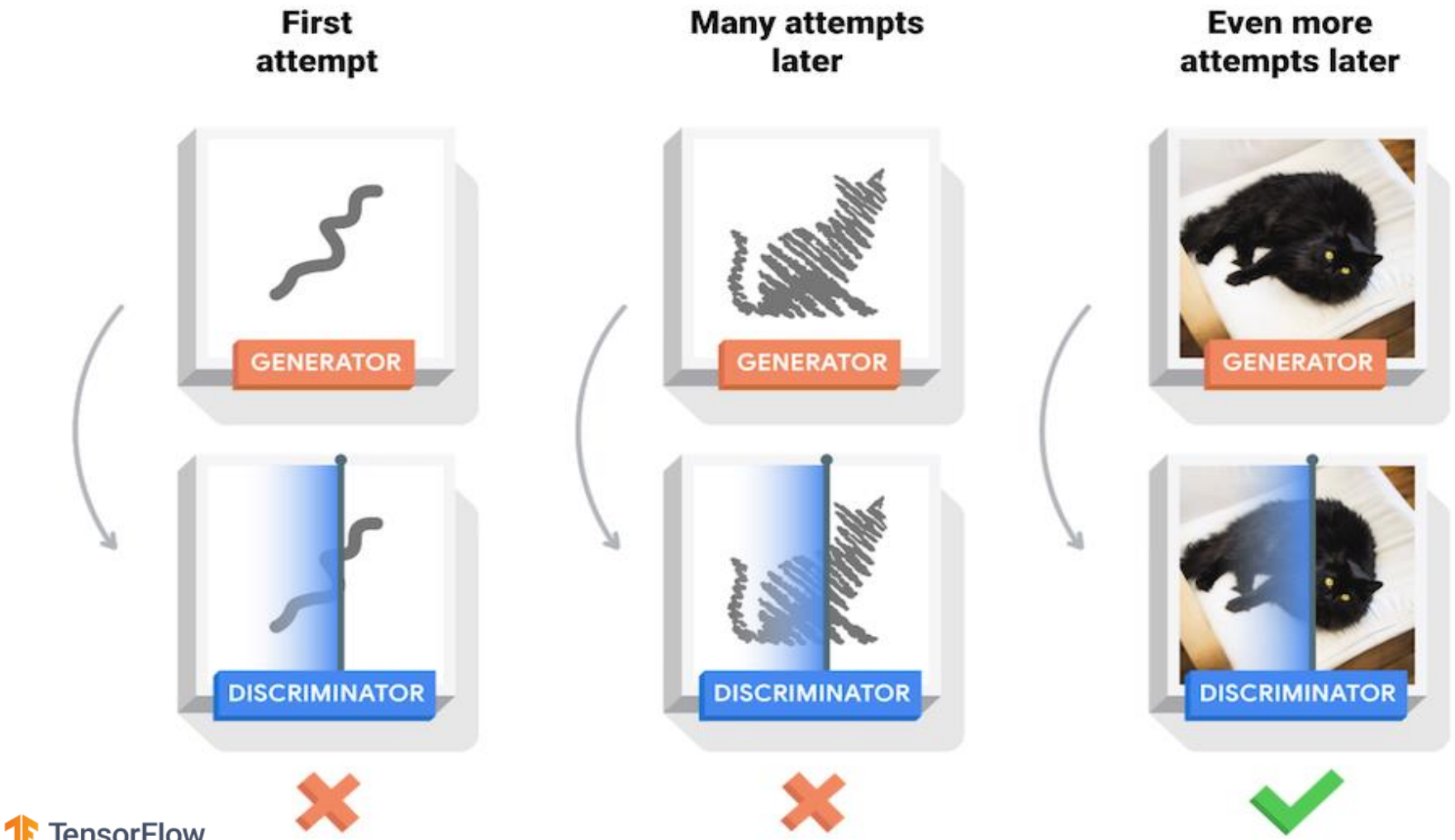
GENERATOR
"The Artist"
A neural network trying to create pictures of cats that look real.



DISCRIMINATOR
"The Art Critic"
A neural network examining cat pictures to determine if they're real or fake.

Thousands of real-world images labeled "CAT"

TensorFlow


First attempt
Many attempts later
Even more attempts later
GENERATOR
GENERATOR
GENERATOR
DISCRIMINATOR
DISCRIMINATOR
DISCRIMINATOR
TensorFlow

GANs Architecture:

- **Deep Convolutional GANs**
- **Progressive Growing GANs**
- **StyleGANs**

GANs Architecture:

- **Deep Convolutional GANs**
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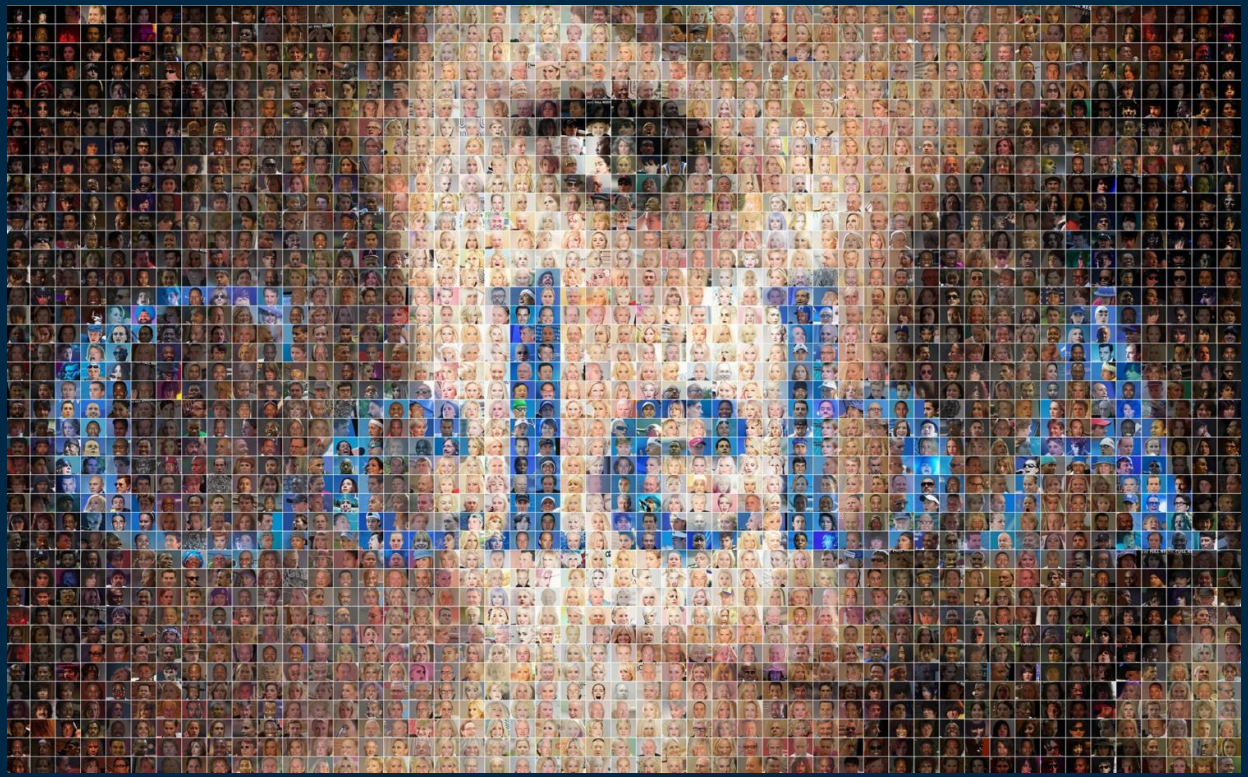
Data

>200k faces

From Multimedia Laboratory, The Chinese University of Hong Kong



Data samples

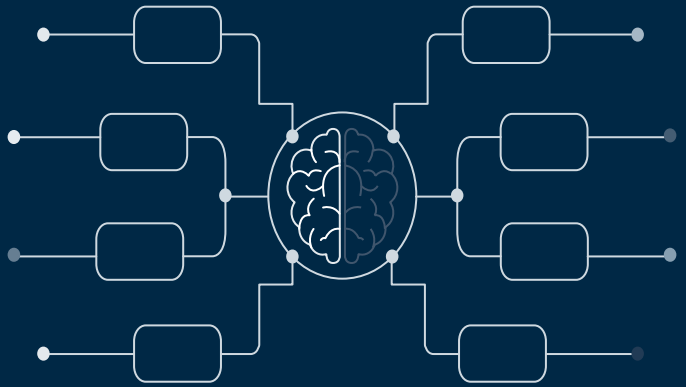
Training phases

02

Each training iteration is divided into two phases.

Phase 1:

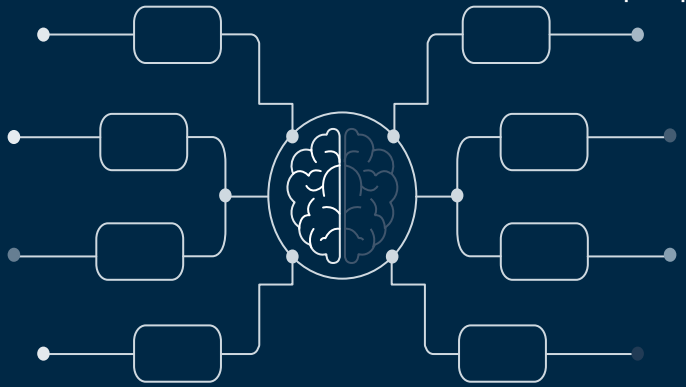
DISCRIMINATOR



Phase 1:

DISCRIMINATOR

Real images from training set + fake images produced by generator.
0: fake | 1: real
Loss = binary cross-entropy
Backpropagation only optimizes during this phase.

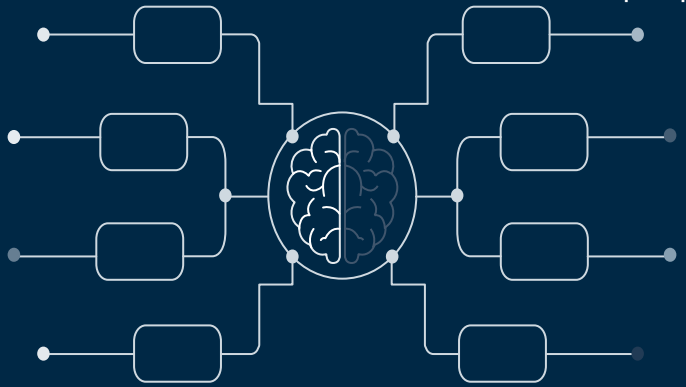


Phase 2:

GENERATOR

DISCRIMINATOR

Real images from training set + fake images produced by generator.
0: fake | 1: real
Loss = binary cross-entropy
Backpropagation only optimizes during this phase.



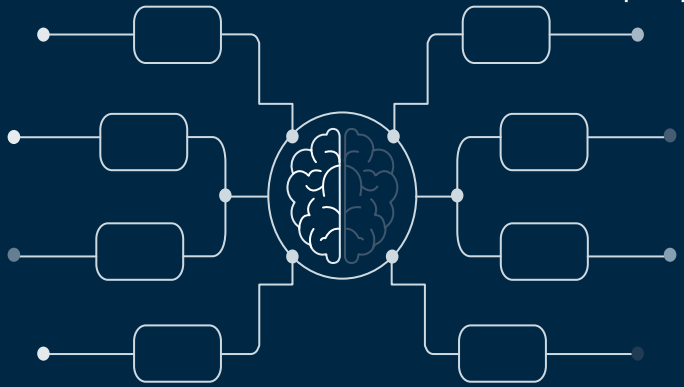
Phase 2:

GENERATOR

Produce another batch of fake images for the discriminator to guess real/fake.
All labels are set to 1 (real).
Discriminator's trainable params set to False.

DISCRIMINATOR

Real images from training set + fake images produced by generator.
0: fake | 1: real
Loss = binary cross-entropy
Backpropagation only optimizes during this phase.



UNTIL...

EQUILIBRIUM REACHED

The generator outsmarts the discriminator.

Results

From creepy faces to artistic masterpieces.

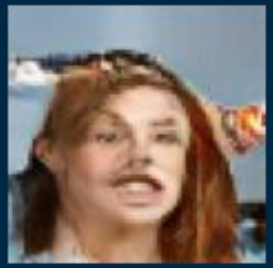
03

10 epocs

30 epocs

60 epocs

80 epocs

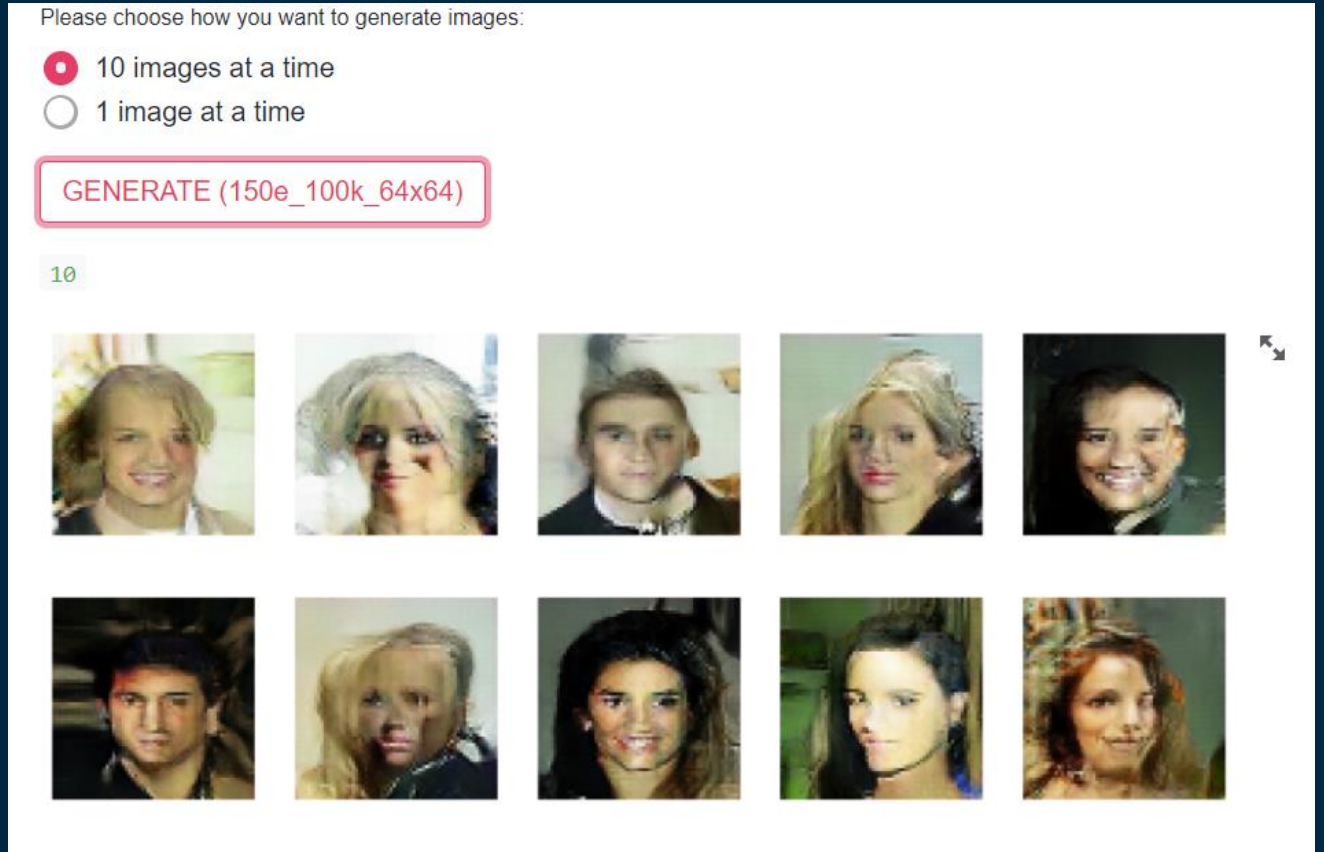




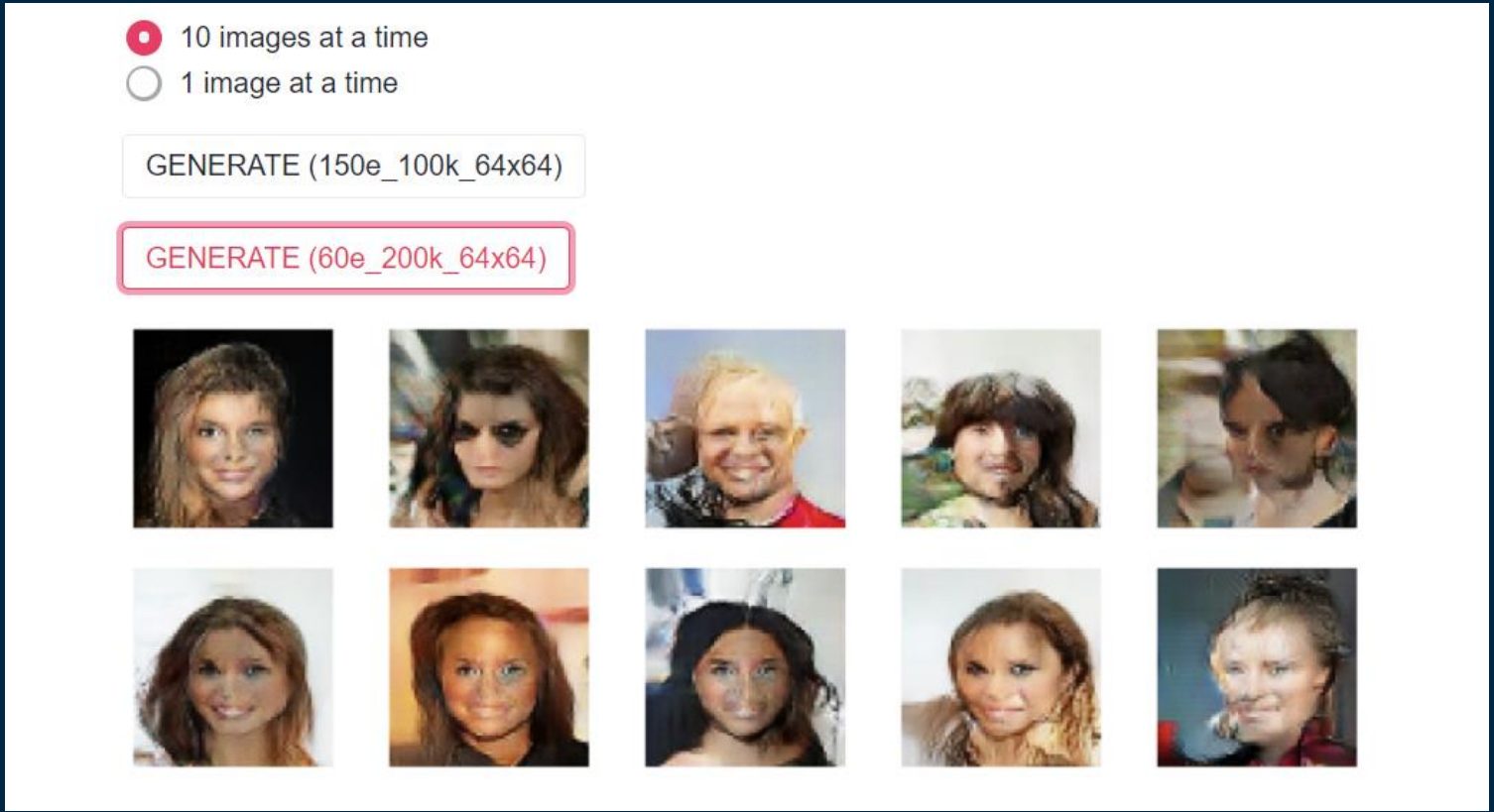





Streamlit App



Streamlit App



FUTURE WORK

- More epochs.
- Use higher resolution of the images (256x256, 512x512)
- Progressive Growing of GANs
- StyleGANs

THANK YOU

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