Generative Adversarial Networks (GANs)

Bert Gollnick

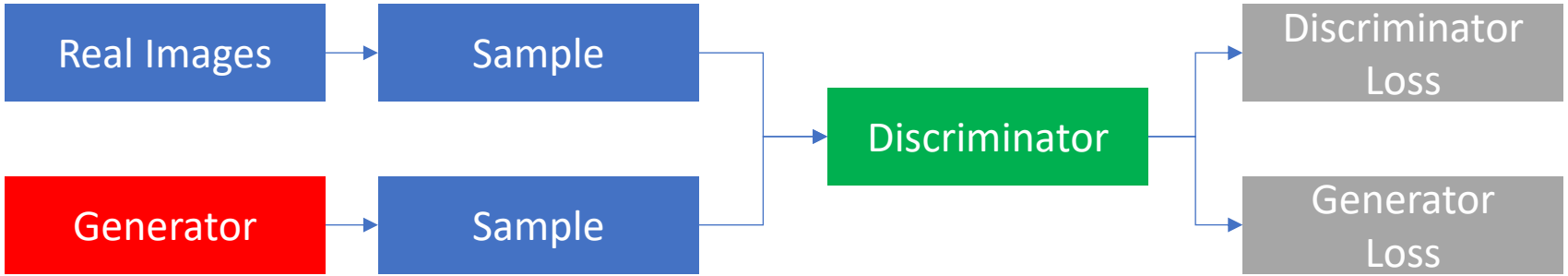
Generative Adversarial Networks

Introduction

- Type of deep learning network
- Two neural networks
  - Generator
  - Discriminator
- Discriminator tries to classify real from fake-images
- Generator tries to create (fake) images that are classified as real images
- Both networks contest each other in a zero-sum game
- Both trained simultaneously

Generative Adversarial Networks

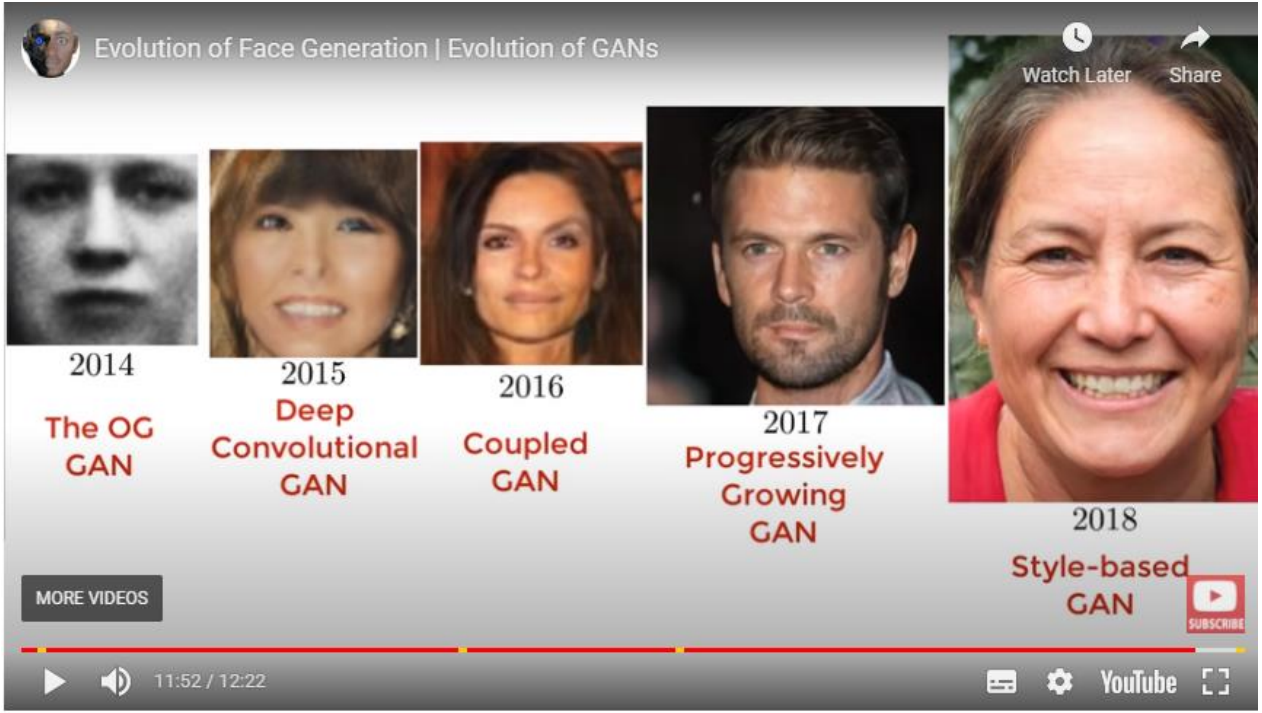
Architecture



Generative Adversarial Networks

Applications

- Face Generation (Link)



Generative Adversarial Networks

Applications

- Medicine
  - Produce data for rare diseases
- Video
  - Deep fake
  - Increase frame rate of videos (Dual Video Discriminator GAN)
- Music
- Artwork
  - Produce new artwork (SkeGAN, GANpaint)
- Speech
  - GAN based text-to-speech (GAN-TTS)
- Robotics

Generative Adversarial Networks

Advantages / Disadvantages

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- Interesting concept
- Image upsampling (higher resolution of actual images)
- Generate music, videos

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- Simultaneous training hard
- Very computationally expensive
- Deepfakes