Project in Generative Adversarial Networks

Alexander Mennborg
Ismat Halabi
Elliot Härenby Deak

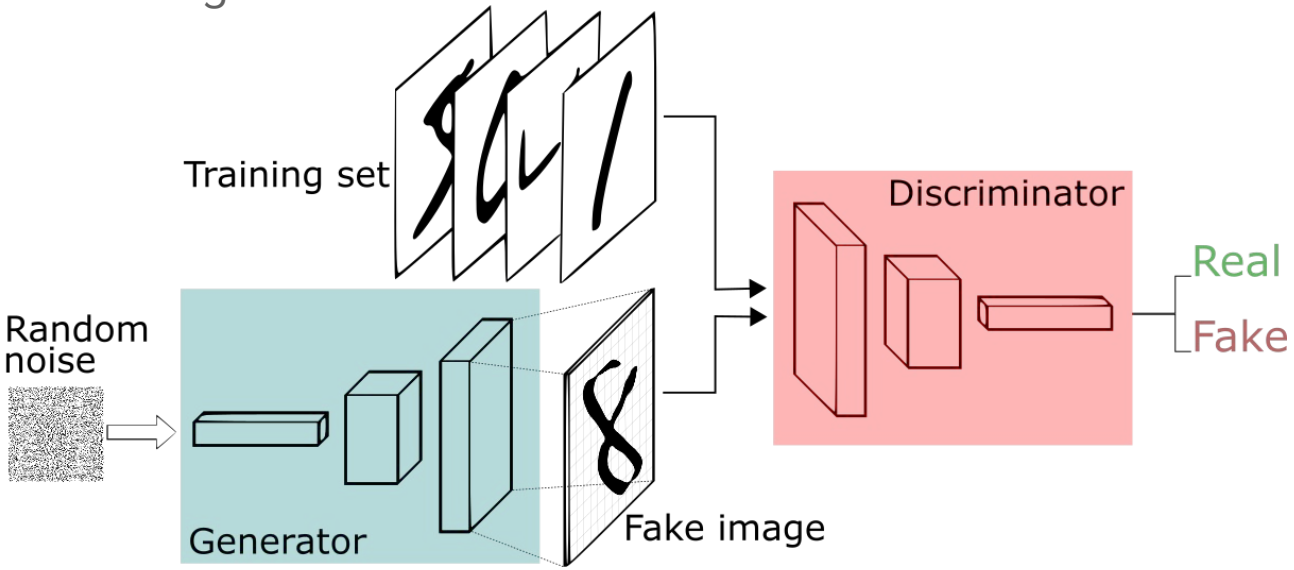
Table of Contents

Introduction

- Initial goal generate CIFAR10 images
  - Using generative adversarial networks

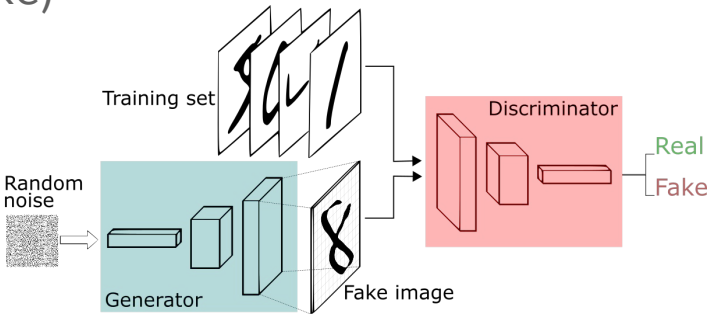
What are GANs?

- Generative algorithms very hard to train
- Idea: evaluate real/ fake images
- Training adversary



How does GANs work?

- Generator
  - Input: random noise, Output: generated image
  - Recognizes many features, upscales
- Discriminator
  - Input: image, Output: two classes (real/ fake)
  - Opposite to generator, downscales
- Training, first discriminator then generator

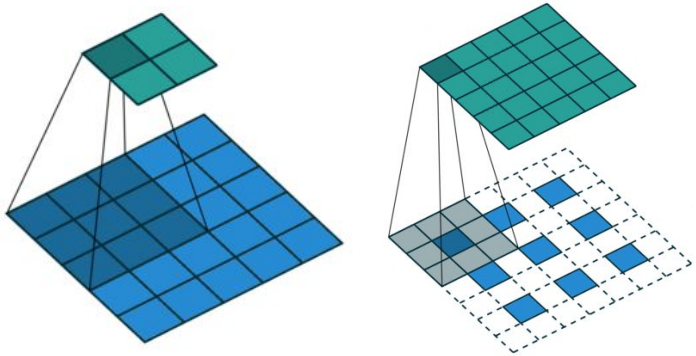


Deep Convolutional GANs

- Using CNNs for both models
- Discriminator - standard image classifier (e.g. AlexNet, 2 output classes)
- Generator - inverse of discriminator (except input is typically larger)
- Guidelines - Use batch norm., no pooling, ReLU (G) and LeakyReLU (D)

Downsampling
(strided convolution)

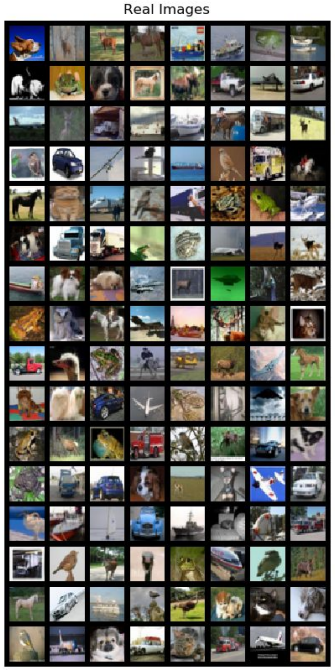
2x2 output
⇑
5x5 input

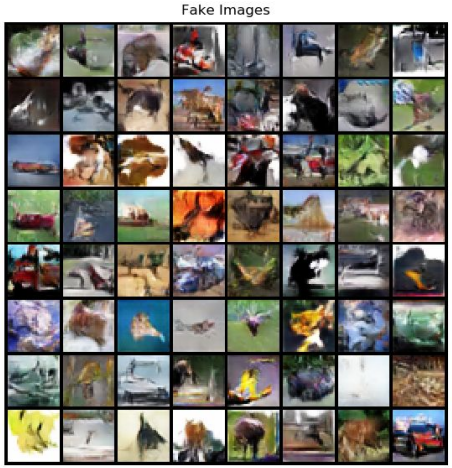


Upsampling
(fractional strided convolution)
5x5 output
⇑
3x3 input (padding)

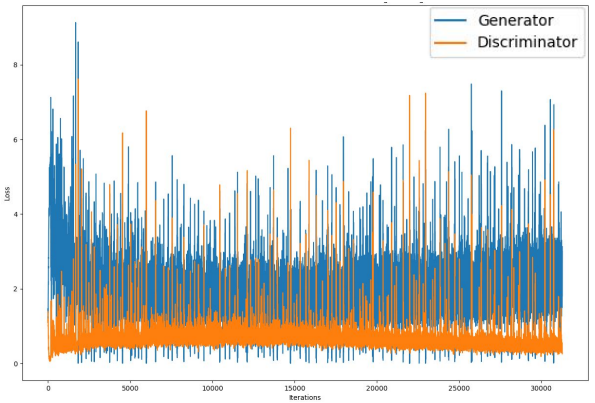
Gifs taken from: https://github.com/vdumoulin/conv_arithmetic

Training Results





- Training, quite unstable
- Fake images, blurry, CIFAR10 like
- After 60 epochs, G loss increased



References

Alec Radford, Luke Metz, Soumith Chintala. Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks, 2016.