Generative Adversarial Networks

Deep Learning — Unit 9

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Slides available at `jonkrohn.com/talks`

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Outline

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1. Deep Learning Projects
2. Applications
3. Essential Theory
4. “Quick, Draw!” Implementation

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Progress Check

Your Deep Learning Project V

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Where are you at with respect to the following?

1. Splitting your data
   - training set (80% — for optimizing parameters)
   - validation set (10% — for hyperparameters)
   - test set (10% — don't touch yet!)
2. Building and assessing architecture
   - get above chance (simplifying problem, if necessary)
   - do existing performance benchmarks exist?
   - if not, use a simple architecture as benchmark

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1. build a machine-vision architecture to classify images, e.g.:
   - [Fashion MNIST]
   - one of dozens of "image" data sets from [CrowdFlower]
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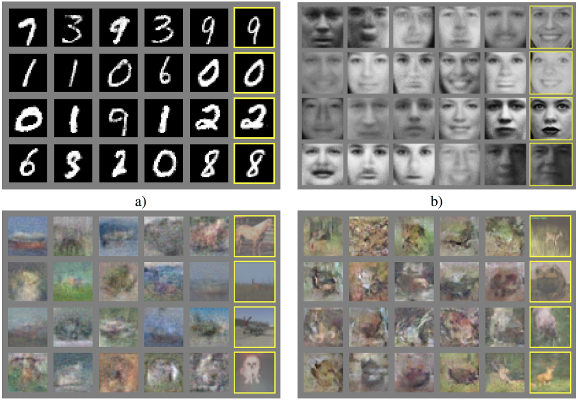
GANs

Goodfellow et al. (2014)



a) b) c) d)

DCGANs

Radford et al. (2016)

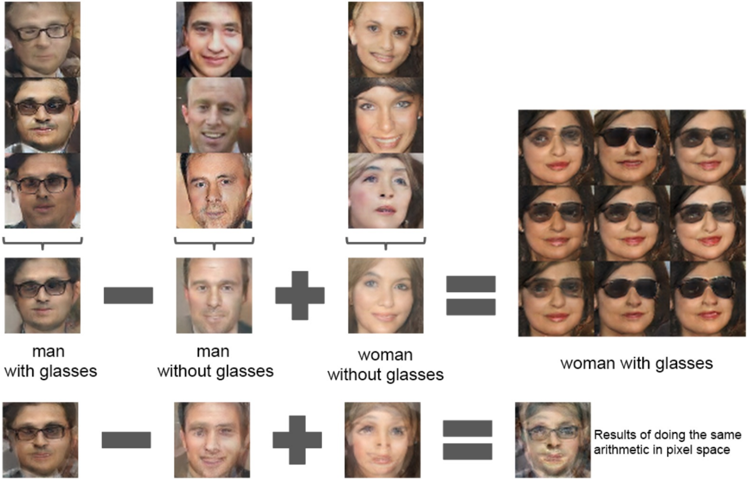
(a) Generated by LSGANs.

(b) Generated by DCGANs (Reported in [13]).

Figure 5: Generated images on LSUN-bedroom.

DCGANs

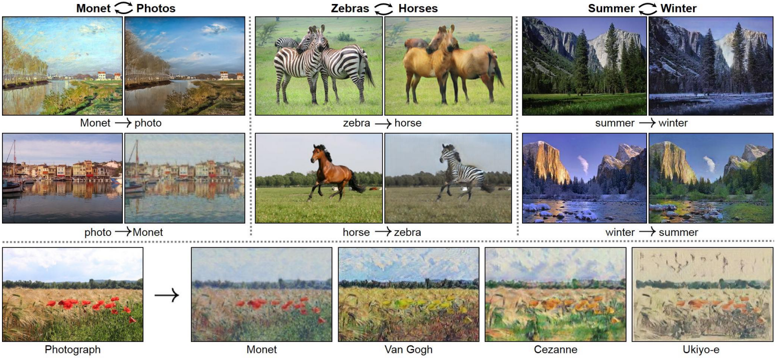
Radford et al. (2016)



Results of doing the same arithmetic in pixel space

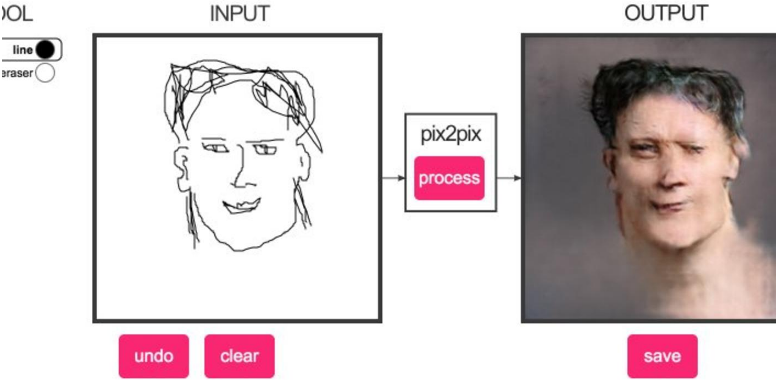
CycleGANs

Zhu et al. (2017)



https://junyanz.github.io/CycleGAN

pix2pix
Isola et al. (2017)



https:

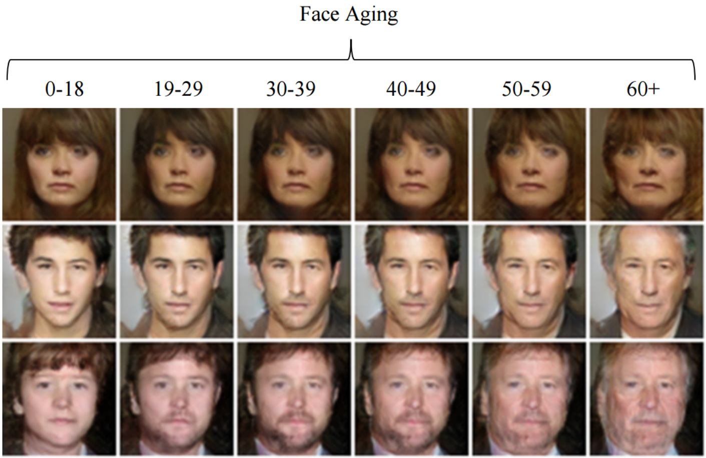
StackGAN

Zhang et al. (2017)

Figure 3. Example results by our proposed StackGAN, GAWWN [20], and GAN-INT-CLS [22] conditioned on text descriptions from CUB test set. GAWWN and GAN-INT-CLS generate 16 images for each text description, respectively. We select the best one for each of them to compare with our StackGAN.

[“celebrity” latent-space interpolation]

Latent-Space Interpolation



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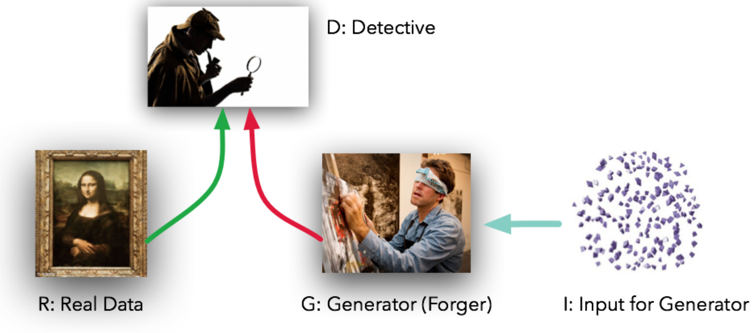
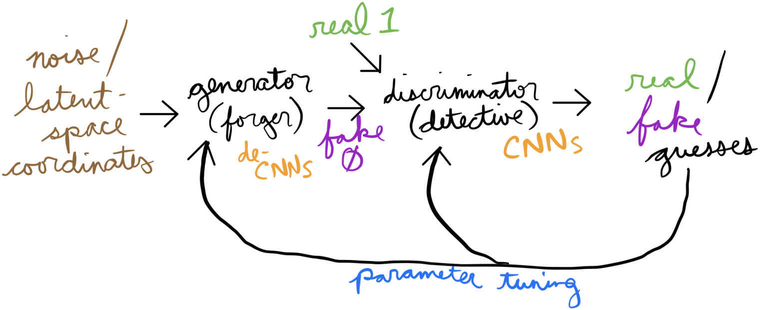
Outline

Goodfellow et al. (2014)



Goodfellow et al. (2014)



1-D Gaussian

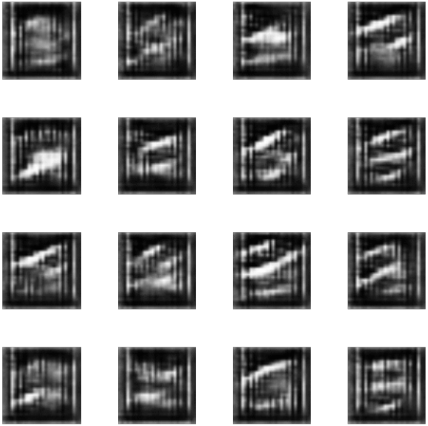
Approximating a Toy Distribution

[video]

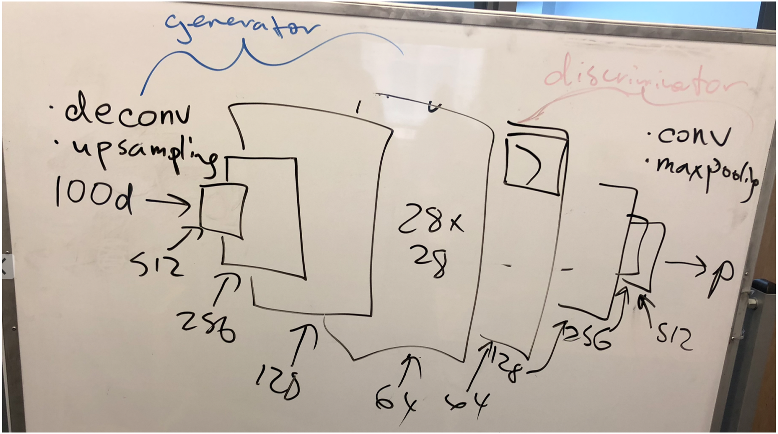
Outline

[Quick, Draw!]

GANimation
(Requires Adobe Reader)



GAN Code



[notebook]