GANs e Arte

Tuts

Edmond de Belamy

O que são GANs?

Generative Adversarial Nets

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Abstract

We propose a new framework for estimating generative models via an adversarial process, in which we simultaneously train two models: a generative model G that captures the data distribution, and a discriminative model D that estimates the probability that a sample came from the training data rather than G. The training procedure for G is to maximize the probability of D making a mistake. This framework corresponds to a minimax two-player game. In the space of arbitrary functions G and D, a unique solution exists, with G recovering the training data distribution and D equal to $\frac{1}{2}$ everywhere. In the case where G and D are defined by multilayer perceptrons, the entire system can be trained with backpropagation. There is no need for any Markov chains or unrolled approximate inference networks during either training or generation of samples. Experiments demonstrate the potential of the framework through qualitative and quantitative evaluation of the generated samples.

1 Introduction

The promise of deep learning is to discover rich, hierarchical models [2] that represent probability distributions over the kinds of data encountered in artificial intelligence applications, such as natural images, audio waveforms containing speech, and symbols in natural language corpora. So far, the most striking successes in deep learning have involved discriminative models, usually those that map a high-dimensional, rich sensory input to a class label [14, 22]. These striking successes have primarily been based on the backpropagation and dropout algorithms, using piecewise linear units [19, 9, 10] which have a particularly well-behaved gradient . Deep *generative* models have had less of an impact, due to the difficulty of approximating many intractable probabilistic computations that arise in maximum likelihood estimation and related strategies, and due to difficulty of leveraging the benefits of piecewise linear units in the generative context. We propose a new generative model estimation procedure that sidesteps these difficulties. [1]
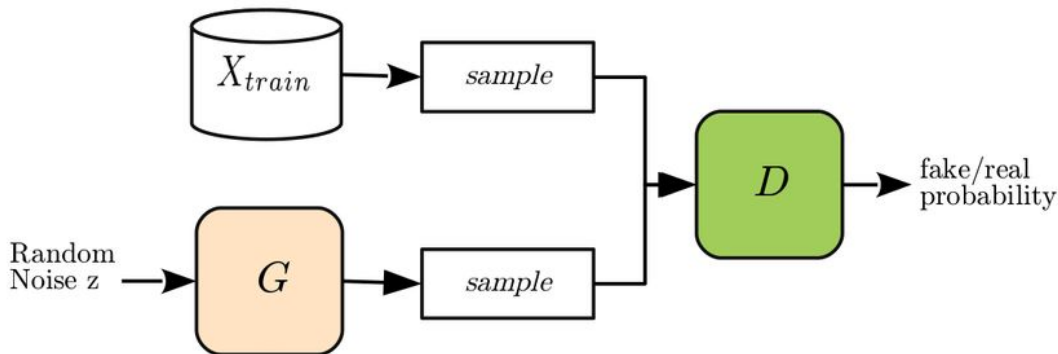
In the proposed *adversarial nets* framework, the generative model is pitted against an adversary: a discriminative model that learns to determine whether a sample is from the model distribution or the data distribution. The generative model can be thought of as analogous to a team of counterfeiters, trying to produce fake currency and use it without detection, while the discriminative model is analogous to the police, trying to detect the counterfeit currency. Competition in this game drives both teams to improve their methods until the counterfeits are indistinguishable from the genuine articles.

[*] Jean Pouget-Abadie is visiting Université de Montréal from Ecole Polytechnique.
[†] Sherjil Ozair is visiting Université de Montréal from Indian Institute of Technology Delhi
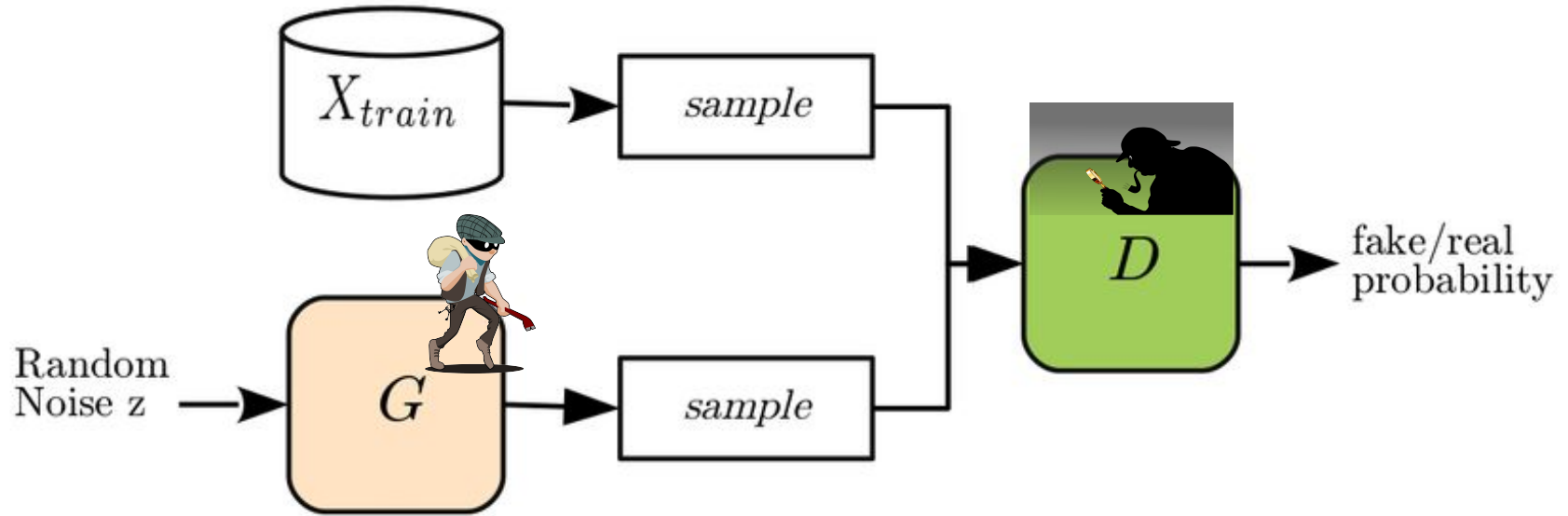[1] Yoshua Bengio is a CIFAR Senior Fellow.
[‡] All code and hyperparameters available at http://www.github.com/goodfeli/adversarial

1

https://arxiv.org/pdf/1406.2661.pdf

https://www.researchgate.net/figure/Generative-Adversarial-Network-GAN_fig1_317061929

Detetive x Falsificador

CycleGAN

Monet ⟷ Photos

Zebras ⟷ Horses

Summer ⟷ Winter

Monet → photo

zebra → horse

summer → winter

photo → Monet

horse → zebra

winter → summer

Photograph

Monet

Van Gogh

Cezanne

Ukiyo-e

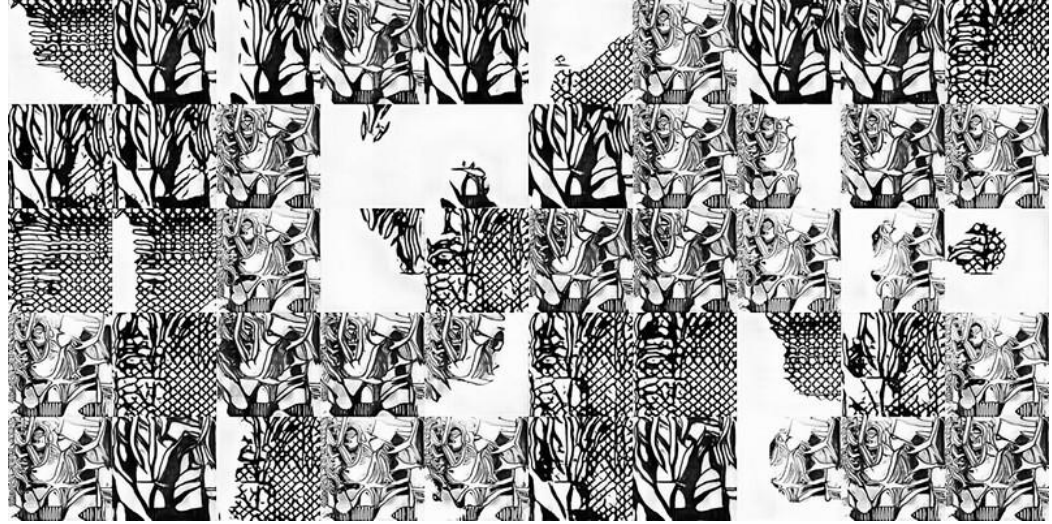https://junyanz.github.io/CycleGAN/

Helena Sarin

http://www.aiartonline.com/highlights/helena-sarin/
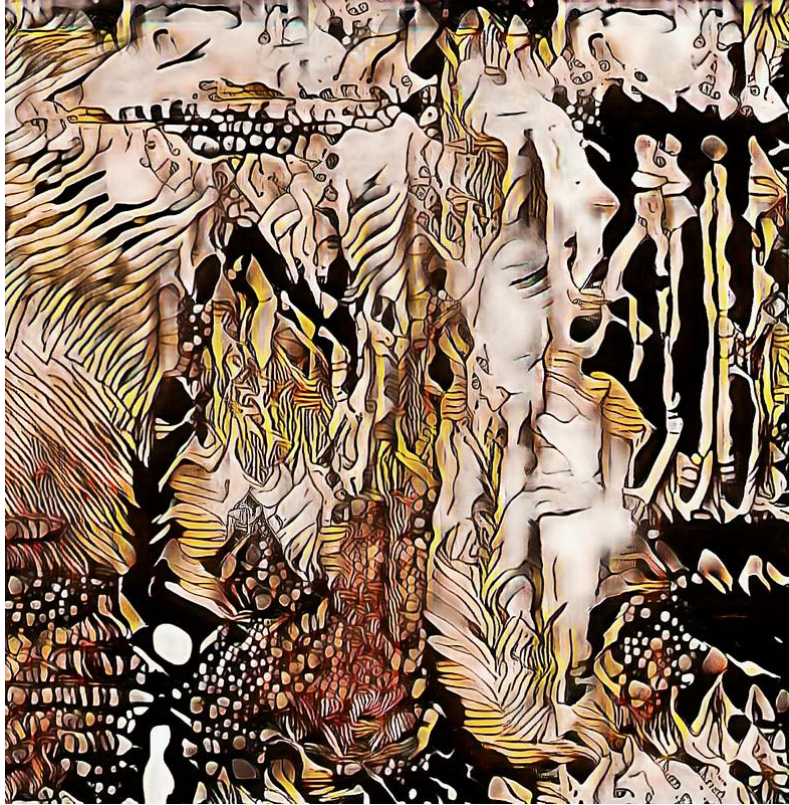
Referências

Generative Adversarial Nets, Ian Goodfellow et al;

AI Art at Christie's Sells For $432.000, NYT;

Helena Sarin: Why Bigger Isn't Always Better With GANs and AI Art, Artnome;

Unpaired Image-to-Image Translation using Cycle-Consistent Adversarial Networks, Jun-Yan Zhu et al;

GAN Zoo.

Obrigado!

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