Hairy GAN

Computational creativity by virtually editing your hairstyle

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Overview

- Computational creativity
  - Domains
  - Style editing applications
- Hairstyle30k dataset
- Implementation of the network
  - General Adversarial Networks (GAN)
    - What & why
  - InfoGAN
  - CVAE
- Training specifications
- Results & discussion

Computational creativity

… is a scientific field with a long history and many debated questions

TODO: sketch history of C.C. and add other relevant RQ. from the research field.

Can computers be creative?

Can computers (re)produce the physical process *and* cognitive aspects of human creations?

Domains

❏

TODO: sketch the different application domains of computational creativity

Style editing applications

TODO: sketch the importance of the a hairstyle editing application

- Most applications focus on facial expressions or features

Hairstyle30k

TODO: explain the goals and implementation of “Learning to Generate and Edit Hairstyles”

Yin, Weidong et al. “Learning to Generate and Edit Hairstyles.” *ACM Multimedia* (2017). PDF

- 64 different hairstyles
- On average 480 images/hairstyle
- What was really in the dataset? (noise, bias)
- Adjusting the dataset
- Goal: train a new hairstyle

Generative Adversarial Networks (1/2)

> *"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."*

I. J. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio. 2014. Generative adversarial nets. In Proceedings of the 27th International Conference on Neural Information Processing Systems - Volume 2 (NIPS'14), Cambridge, MA, USA, 2672-2680. PDF

Generative Adversarial Networks (1/2)

Tegenstrijdig proces

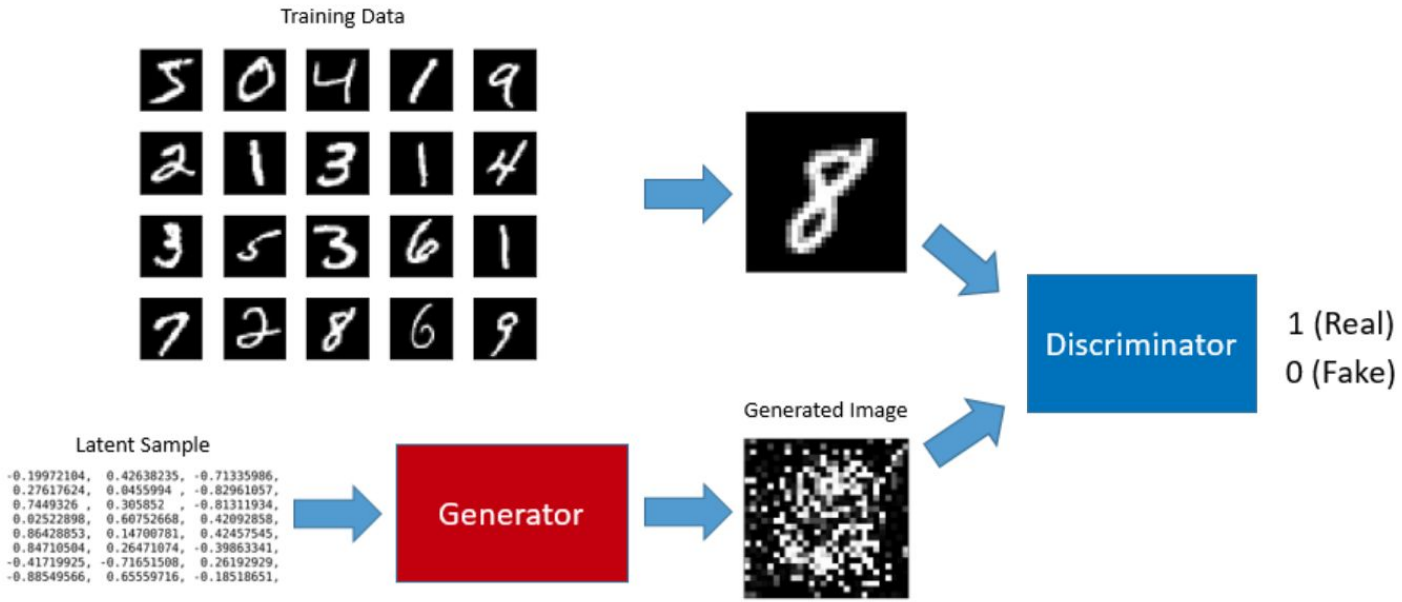
Genereer nieuwe afb.

*"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."*

Evalueer nieuwe en originele afbeeldingen: echt of niet?

I. J. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio. 2014. Generative adversarial nets. In Proceedings of the 27th International Conference on Neural Information Processing Systems - Volume 2 (NIPS'14), Cambridge, MA, USA, 2672-2680. PDF

Generative Adversarial Networks (2/2)



Source: https://towardsdatascience.com/understanding-generative-adversarial-networks-4dafc963f2ef

InfoGAN

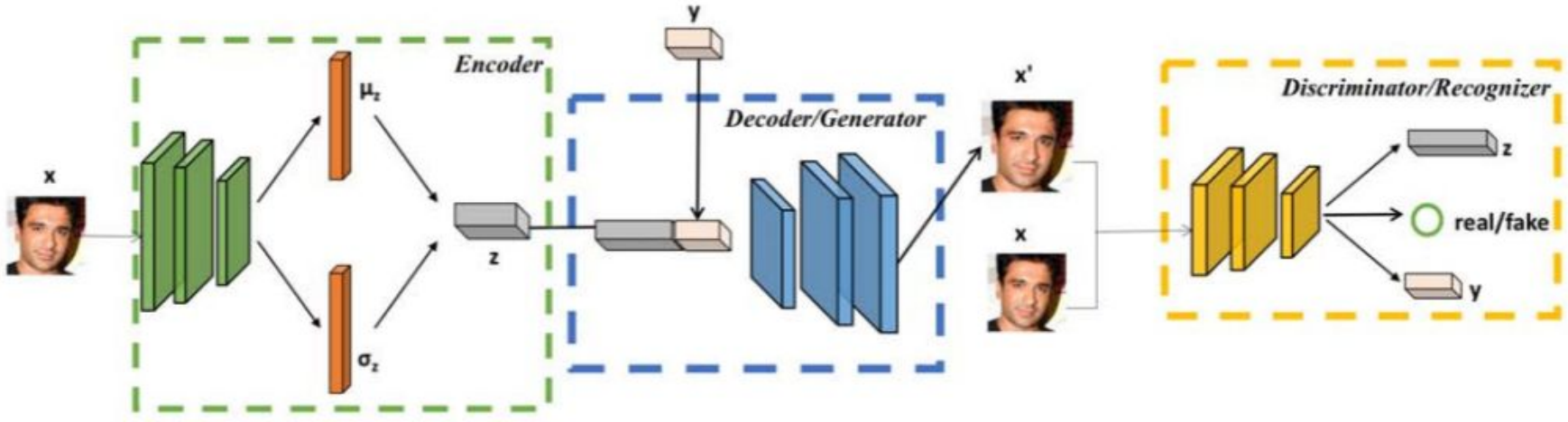
TODO: discuss our own implementation

CVAE

TODO: discuss our own implementation

Implementing the network

TODO: discuss our own implementation



Source: Yin, Weidong et al. “Learning to Generate and Edit Hairstyles.” *ACM Multimedia* (2017).

Implementing the network

TODO: discuss our own implementation, add some relevant code

- Python
- Tensorflow
- GPU

Implementing the network

TODO: discuss our own implementation

Encoder	Decoder (Generator)	Discriminator
64 Con (6x6)	| y | + 256 Fully Connected	64 Con (6x6)
128 Con (4x4)	8064 Fully Connected -> 4 x 4 x 7 x 72 Fully connected	128 Con (4x4)
256 Con (4x4)	288 Dec (3x3)	256 Con (4x4)
256 Con (4x4)	216 Dec (3x3)	256 Con (4x4)
256 x 2 Fully Connected	144 Dec (5x5)	1 Fully Connected
	72 Dec (5x5)	
	3 Dec (6x6)	

Training specifications

TODO: discuss our own implementation

Results & discussion

TODO: discuss how to evaluate results from a computational creativity application

- ❏ Compare outcome with results from the paper
- ❏ Conduct a small user test: Modified Turing Test [1]
- ❏

[1] Carolyn Lamb, Daniel G. Brown, and Charles L. A. Clarke. 2018. Evaluating Computational Creativity: An Interdisciplinary Tutorial. ACM Comput. Surv. 51, 2, Article 28 (February 2018), 34 pages. PDF