

MedGAN ID-CGAN CoGAN LR-GAN CGAN IcGAN
b-GAN LS-GAN AffGAN LAPGAN DiscoGAN MPM-GAN AdaGAN
LSGAN InfoGAN CatGAN DRAGAN AMGAN iGAN IAN

GANs for Creativity and Design

McGAN Ian Goodfellow, Staff Research Scientist, Google Brain MIX+GAN

MGAN NIPS Workshop on ML for Creativity and Design

FF-GAN Long Beach, CA 2017-12-08 GoGAN BS-GAN

C-VAE-GAN C-RNN-GAN DR-GAN DCGAN

MAGAN 3D-GAN CCGAN AC-GAN Progressive GAN BiGAN

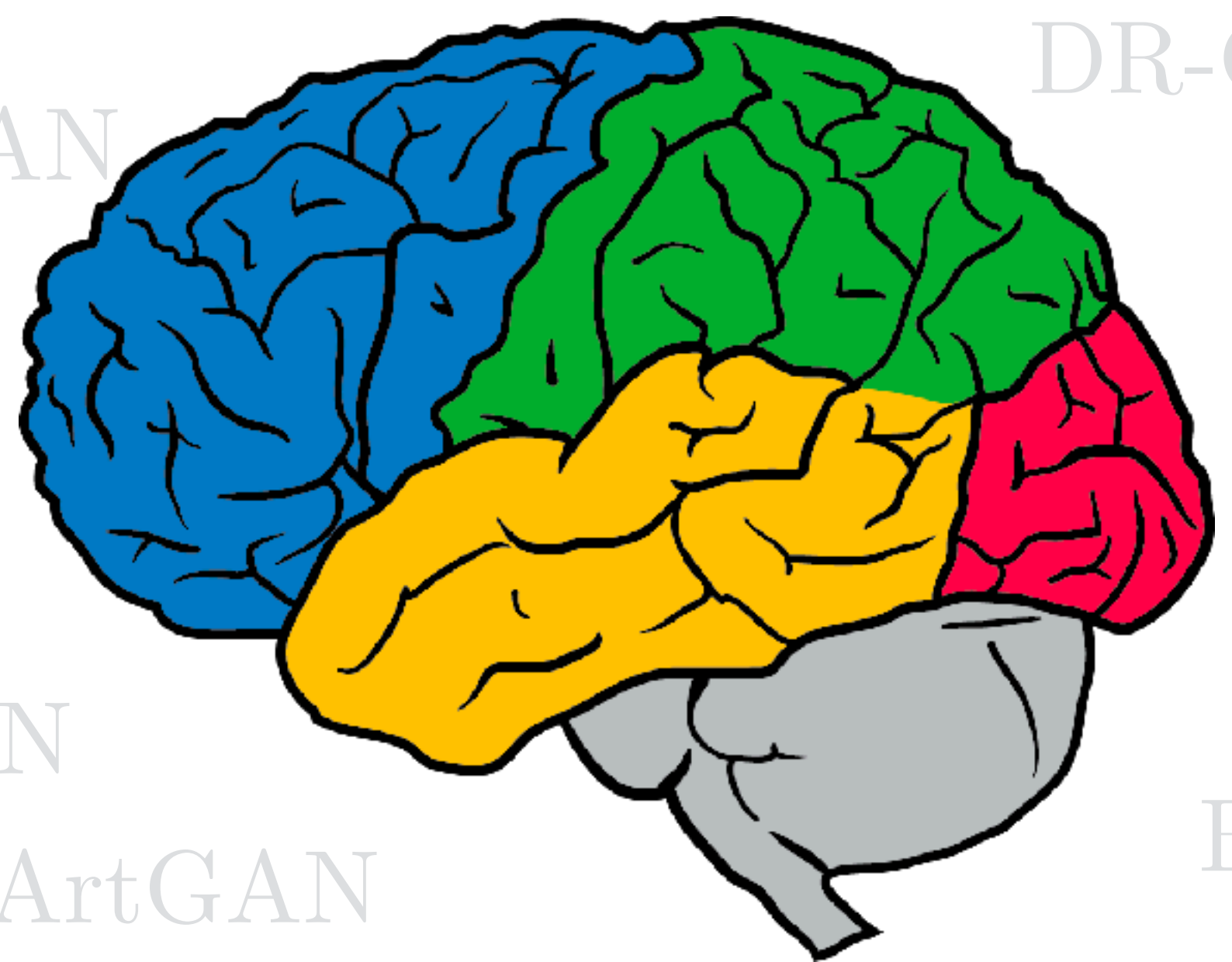
GAWWN DualGAN CycleGAN GP-GAN

Bayesian GAN AnoGAN DTN

EBGAN SN-GAN MAD-GAN

ALI Context-RNN-GAN BEGAN AL-CGAN

MARTA-GAN f-GAN ArtGAN MalGAN



Dictionary

creativity



cre·a·tiv·i·ty

/ˌkrēāˈtɪvədē/ 

noun

the use of the imagination or original ideas, especially in the production of an artistic work.

synonyms: [inventiveness](#), [imagination](#), [innovation](#), [innovativeness](#), [originality](#), [individuality](#); [More](#)



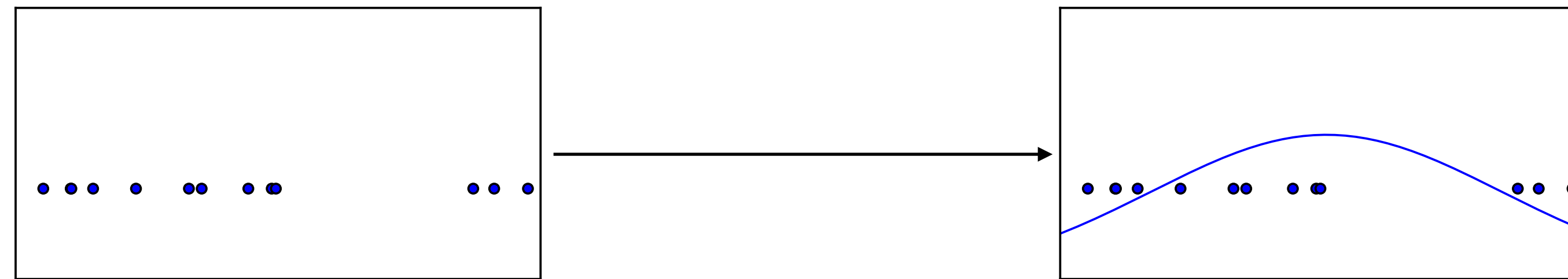
Translations, word origin, and more definitions

Feedback

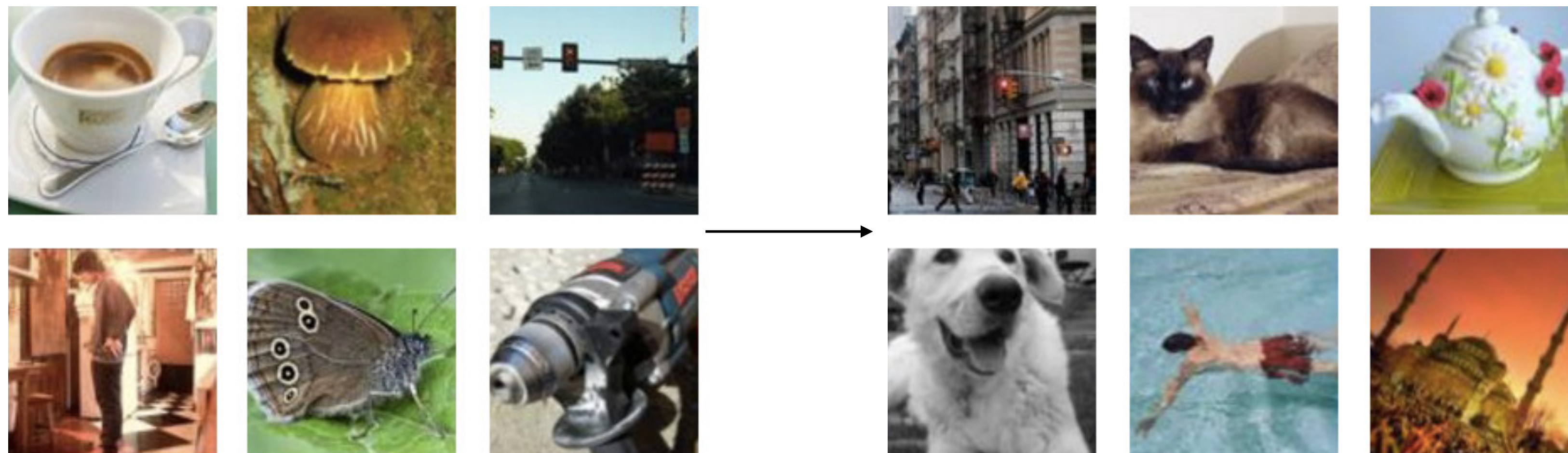
no mention of *realism*

Generative Modeling

- Density estimation



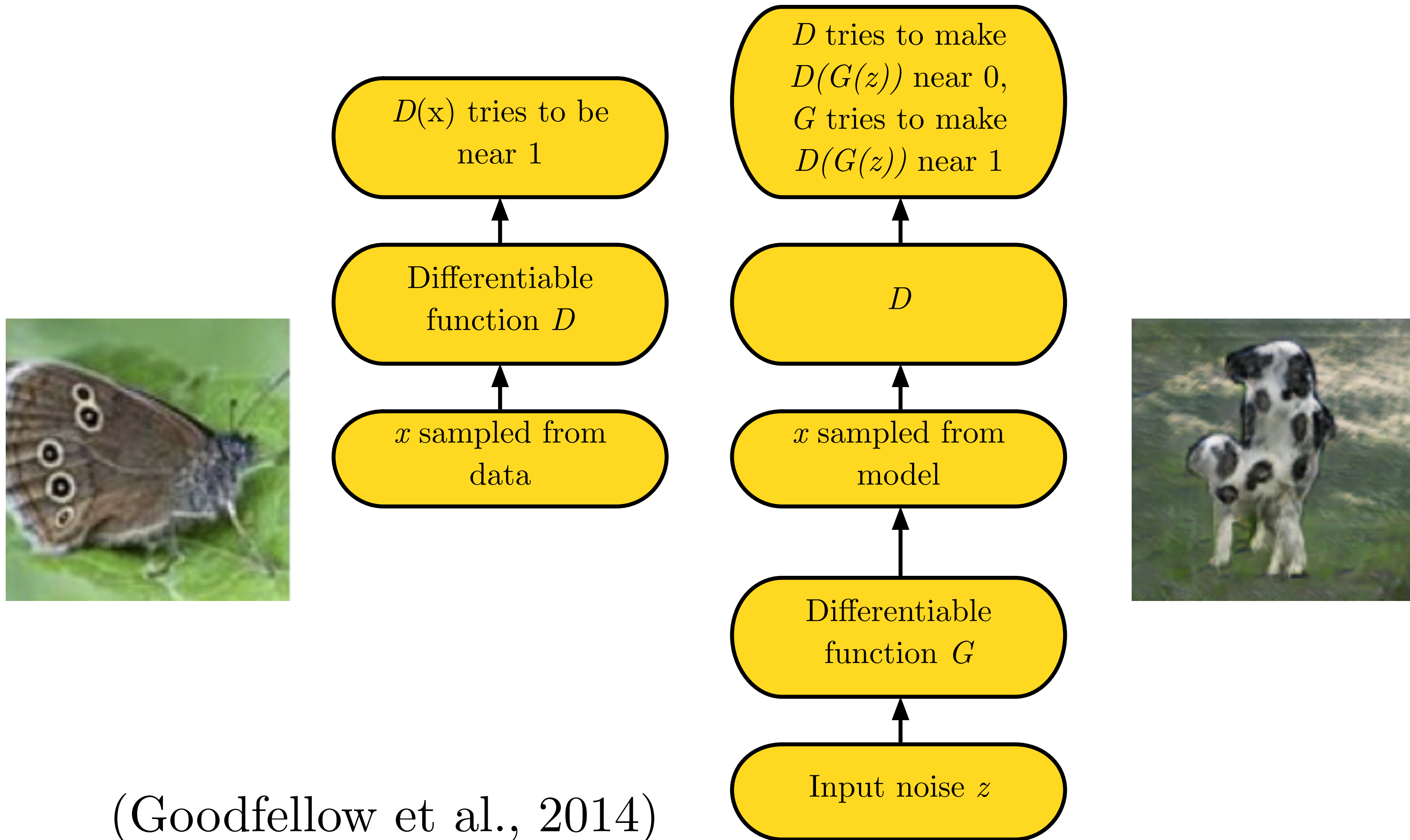
- Sample generation



Training examples

Model samples

Adversarial Nets Framework



Imagination

Definition of IMAGINATION

- 1 : the act or power of forming a mental **image** of something not present to the senses or never before wholly perceived in reality

(Merriam Webster)

What is in this image?

“not
present
to the
senses”



(Yeh et al., 2016)

Generative modeling reveals a face

“not
present
to the
senses”



(Yeh et al., 2016)

Celebrities who have never existed

“never
before
wholly
perceived
in reality”



(Karras et al., 2017)

Is imperfect mimicry originality?



(Karras et al., 2017)

Creative Adversarial Networks



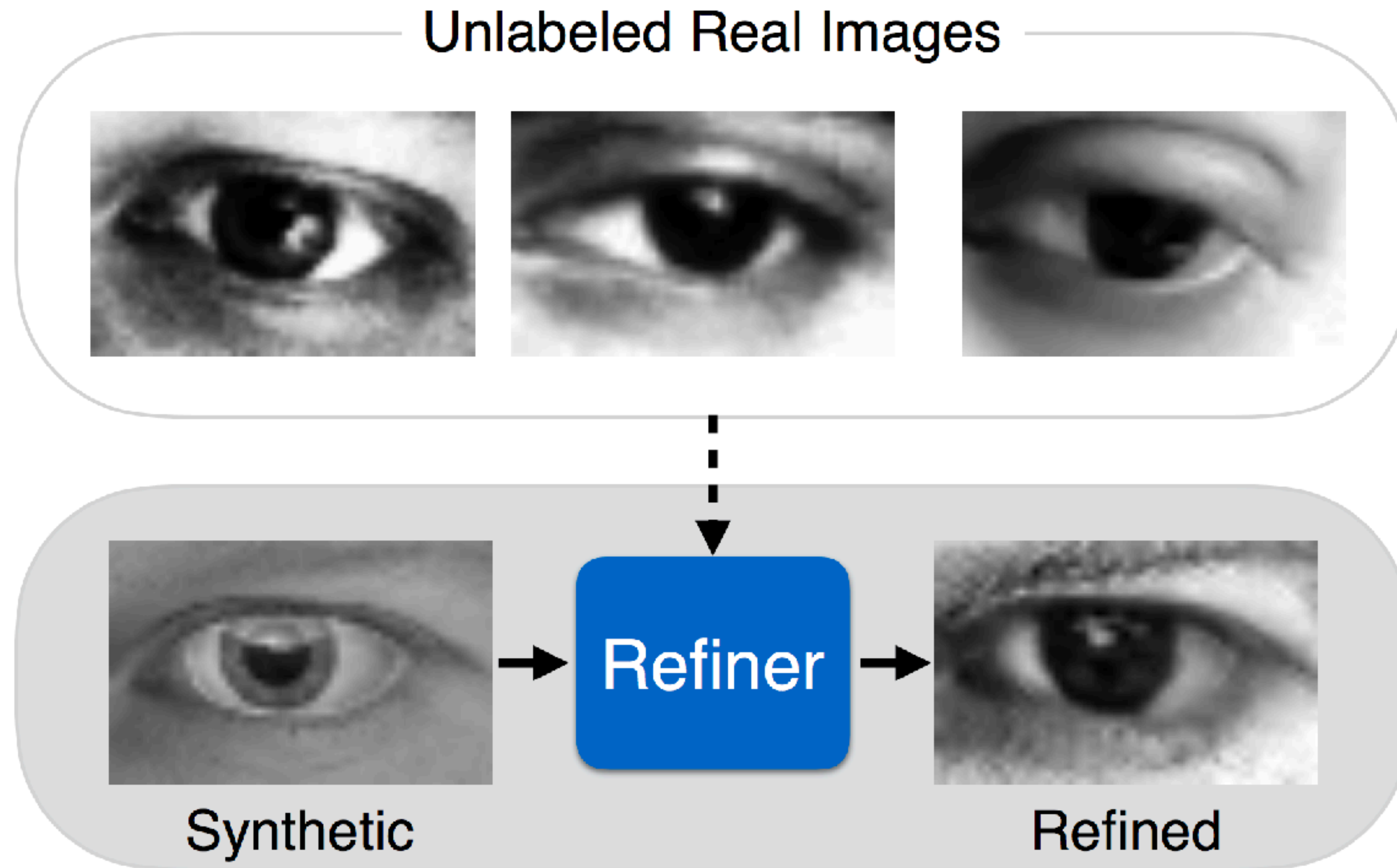
See this
afternoon's
keynote

(Elgammal et al., 2017)

GANs for design

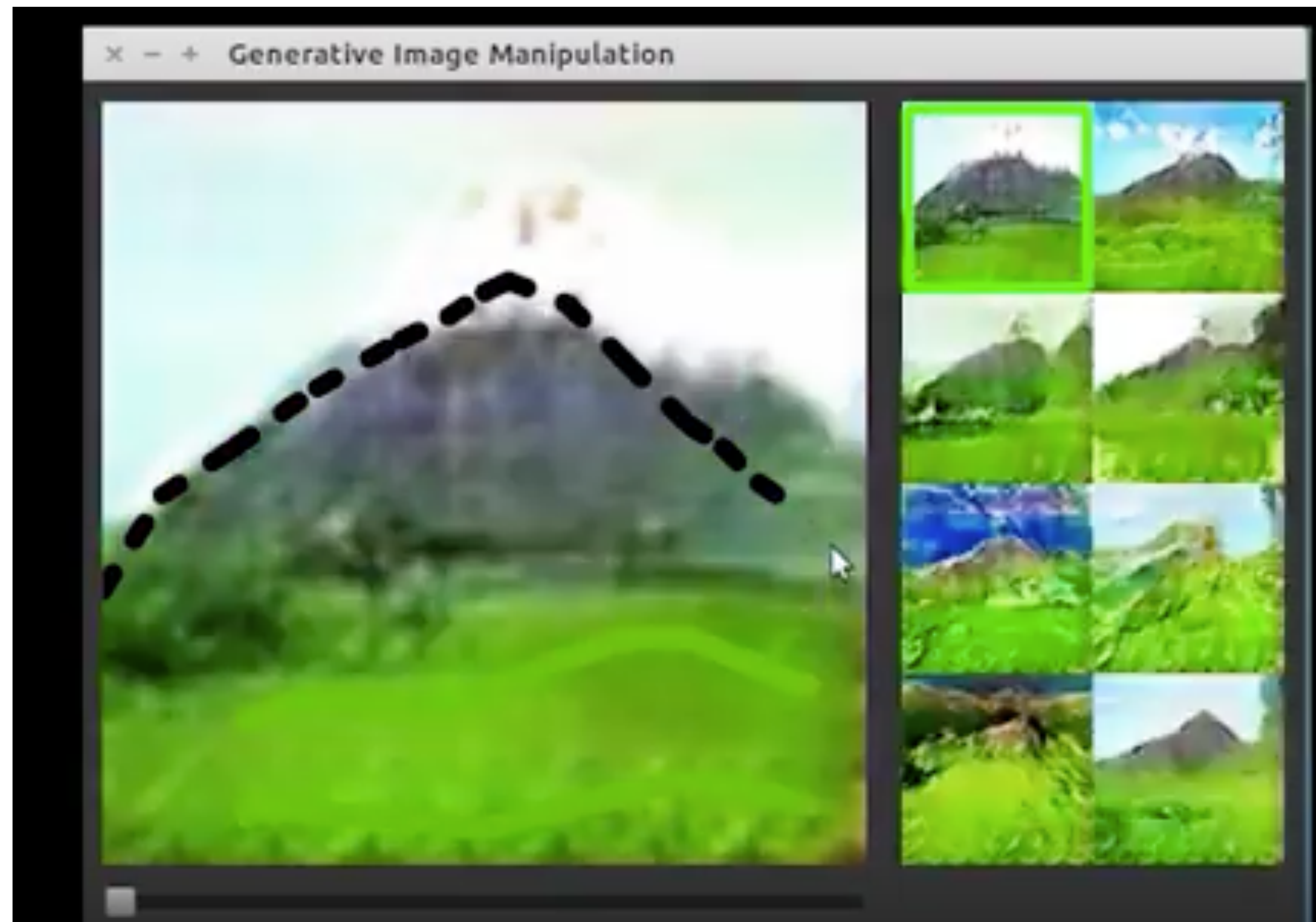
- A lower bar than “true creativity”
- A tool that assists a human designer

GANs for simulated training data



(Shrivastava et al., 2016)

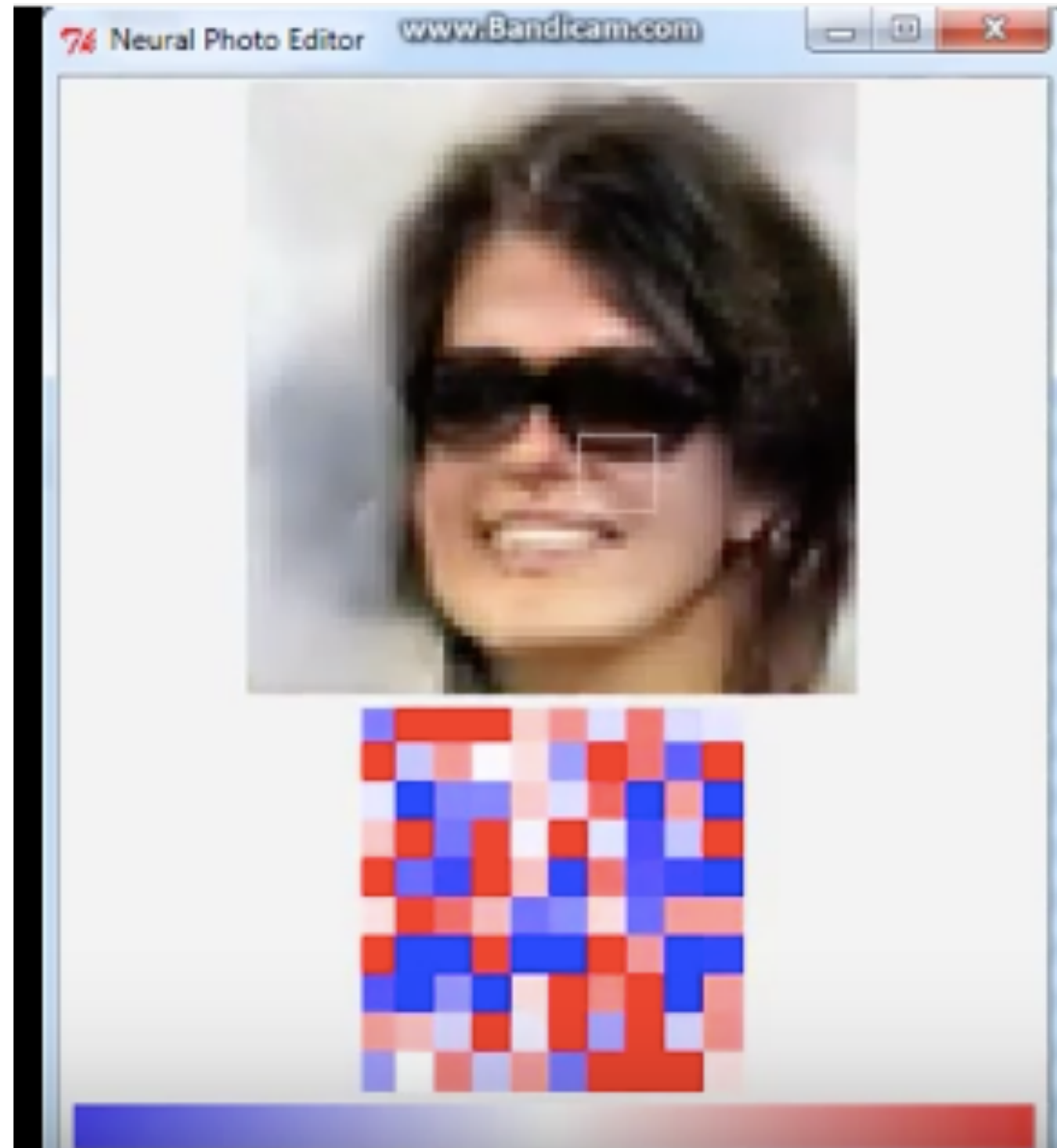
iGAN



youtube

(Zhu et al., 2016)

Introspective Adversarial Networks



youtube

(Brock et al., 2016)

Image to Image Translation



(Isola et al., 2016)

Unsupervised Image-to-Image Translation

Day to night



(Liu et al., 2017)

CycleGAN



(Zhu et al., 2017)

vue.ai



vue.ai



Future directions

- Beyond realism: train the discriminator to estimate how appealing an artifact is, in addition to or instead of modeling whether the design is statistically similar to past designs
- Extreme personalization: highly automate design to generate artifacts to fit each customer or appeal to each customer's tastes
- GAN-based simulators to help test artifacts being designed (vue.ai is a first step in this direction)

Conclusion

- GANs are useful tools for design
- GANs have a form of imagination
- It is debatable whether GANs are “original” enough to count as truly creative. Though designed to perfectly *mimic* a pattern, they can be used to do more than that