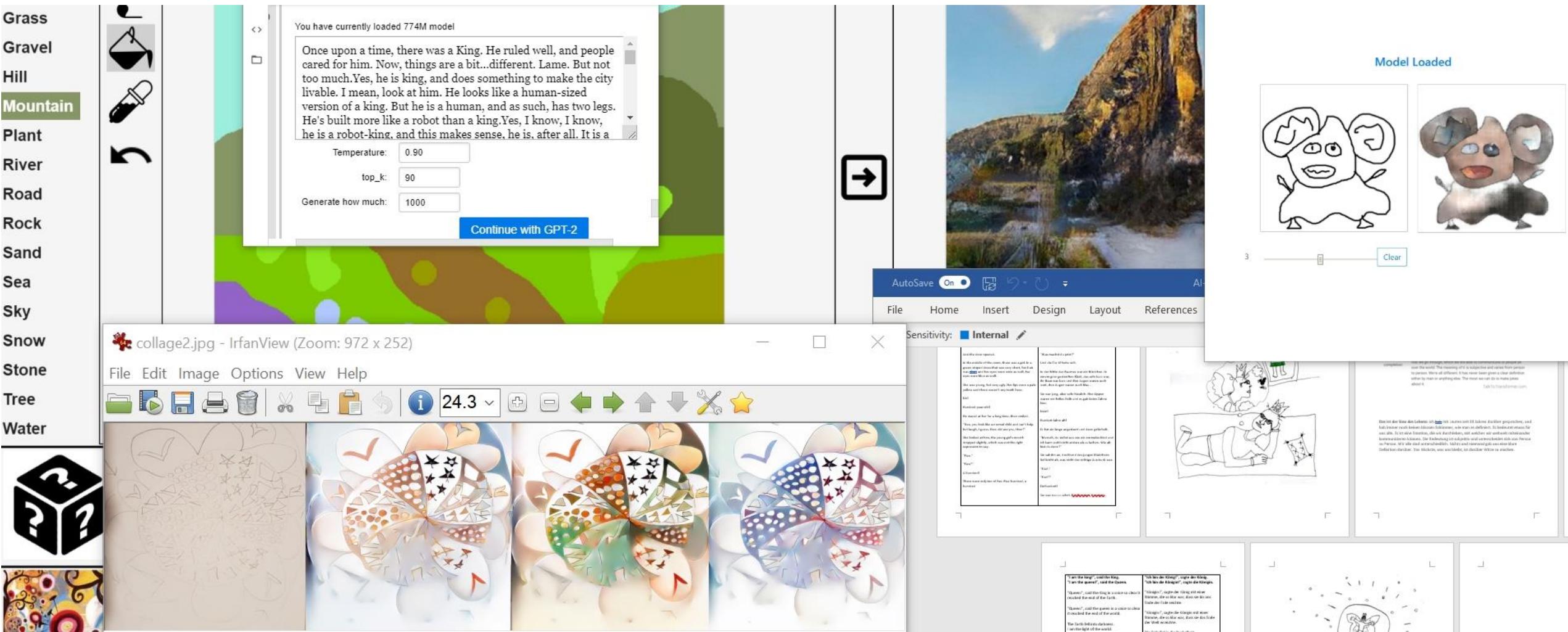


Creative AI



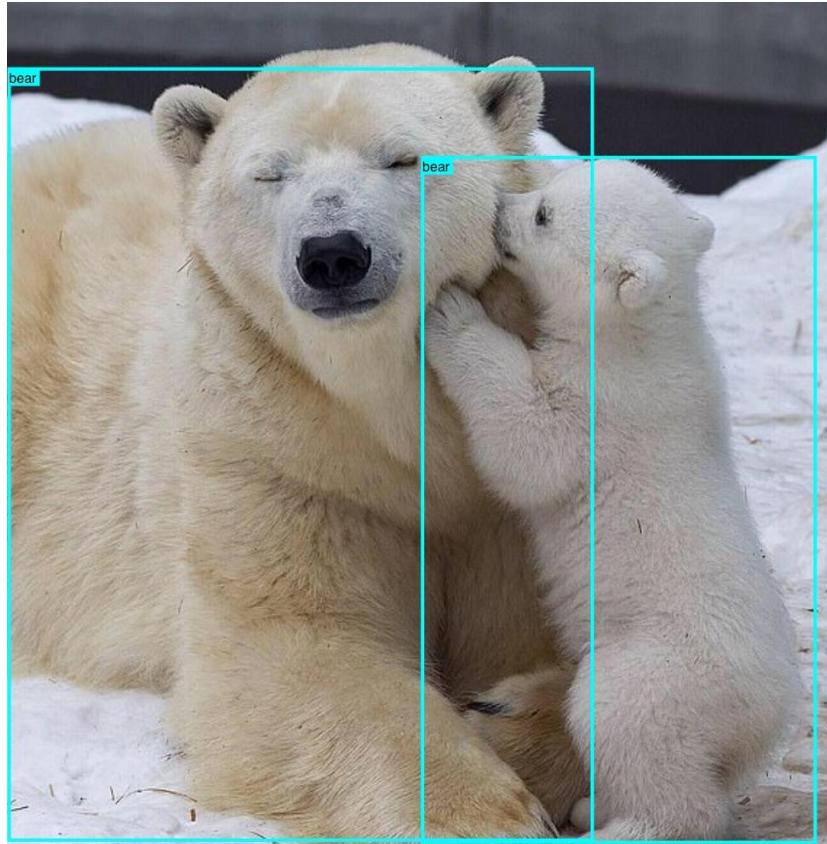
Vladimir Alexeev, December 2020, Kiel AI

01

Seeing and creating

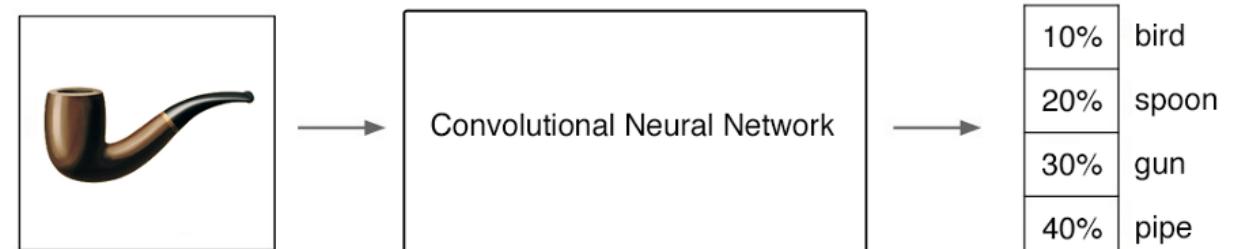


Pattern Recognition



<https://twitter.com/tkasasagi/status/1186250114186170368>

- Object Detection in images
- Neural Networks
- Trained on Image Datasets (ImageNet, Flickr Faces HQ etc.)



<https://medium.com/@samim/adversarial-machines-998d8362e996>

...But Reality?



Emma Salisbury

@salisbot



People with no idea about AI
saying it will take over the world:

My Neural Network:



11.5K 1:03 PM - Nov 16, 2019



3,139 people are talking about this



CNN and GAN

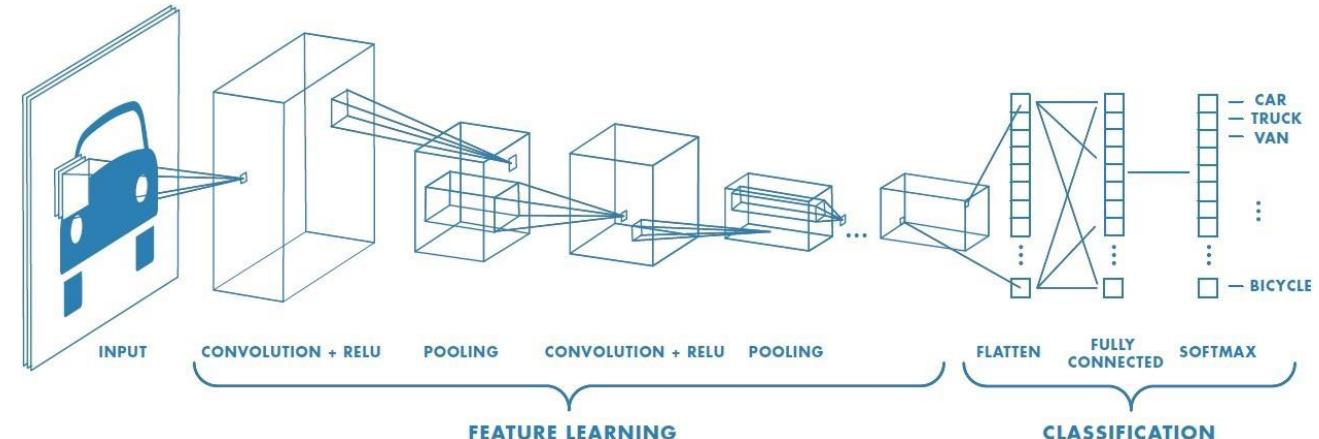
CNN - Convolutional Neural Network

- designed for data with spatial structure
- Identifying patterns in images
- Using layers / filters

GAN - Generative Adversarial Network

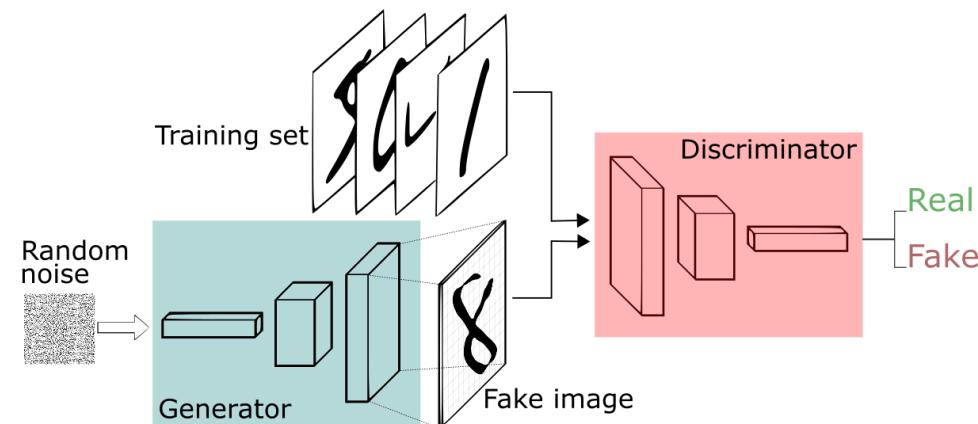
- generative model based on neural networks
- Framework with two neural networks: Generator + Discriminator
- Trained on visual databases

CNN - Convolutional Neural Network



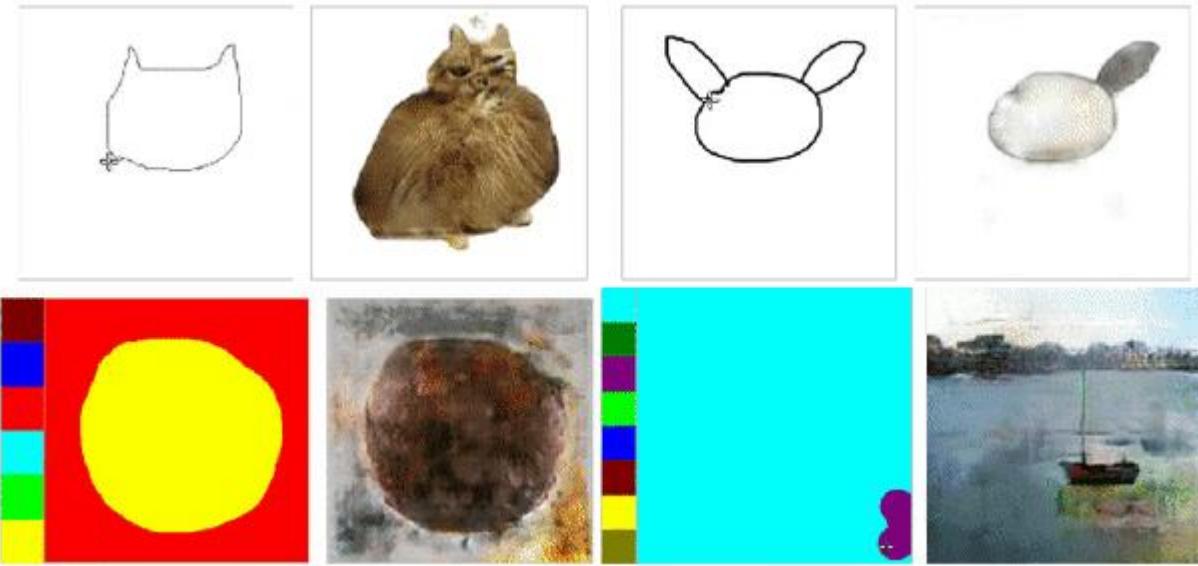
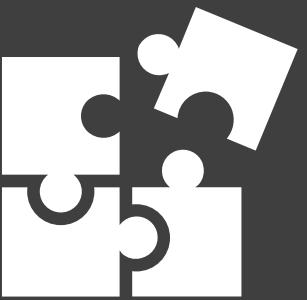
<https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the-eli5-way-3bd2b1164a53>

GAN - Generative Adversarial Networks



<https://sthalles.github.io/intro-to-gans/>

Pix2Pix



Pix2Pix:

Detection of specific objects (trained on labelled datasets)

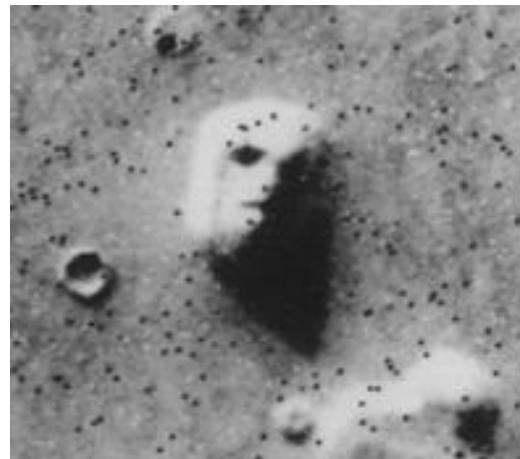
<https://zaidalyafeai.github.io/pix2pix/cats.html>

- Cats
- Houses
- Shoes
- Pokemons
- etc.

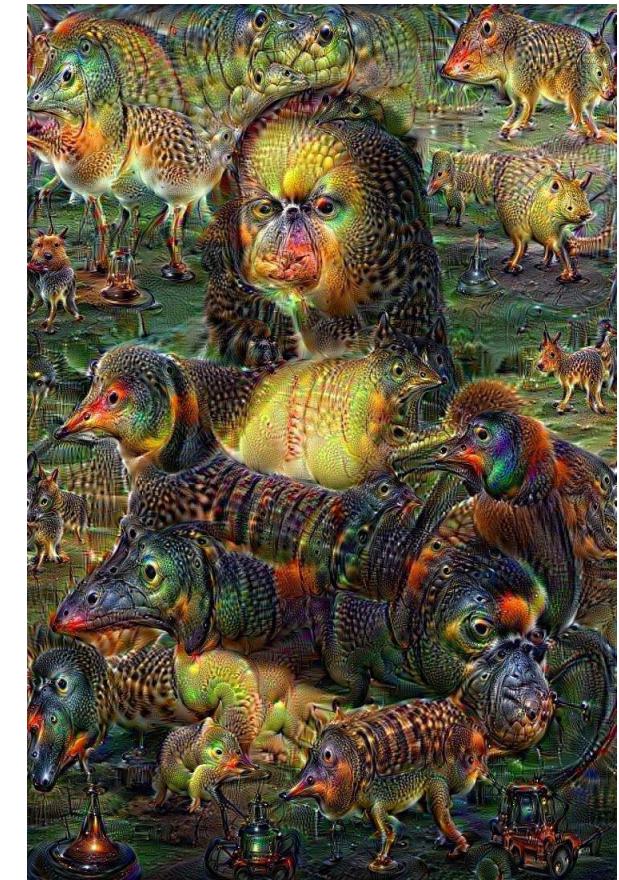
Google Deep Dream

Deep Dream is a computer vision program which uses a convolutional neural network to find and enhance patterns in images via algorithmic **pareidolia**.

<https://hackernoon.com/deep-dream-with-tensorflow-a-practical-guide-to-build-your-first-deep-dream-experience-f91df601f479>



Human pareidolia



Deep Dream pareidolia



HOW TO:

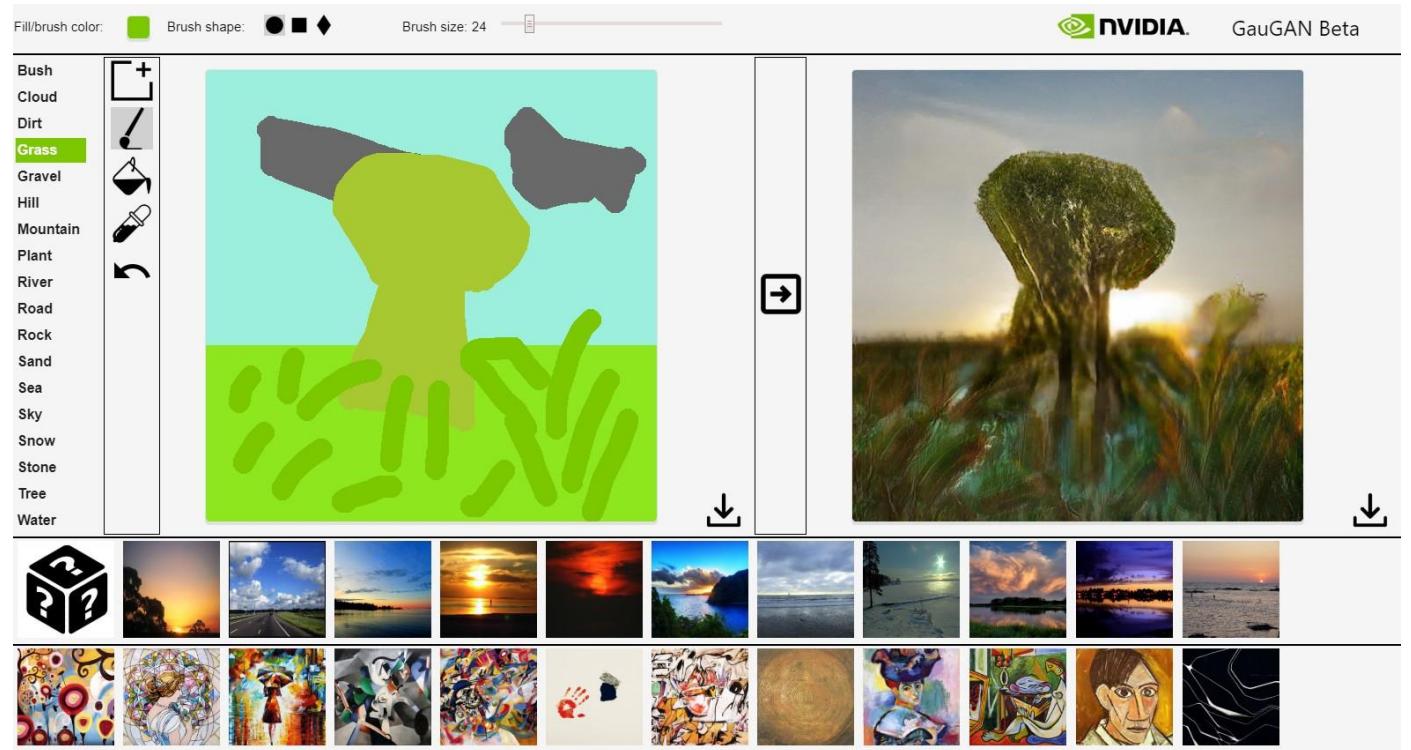
- **Linux / Ubuntu:**
 - Install Google Dreams Repositories
<https://gist.github.com/ewnd9/3d3f688f8c6d3fe643f1>
- **Windows:**
 - Prepare Virtual Environment
 - Install Anaconda/Docker
 - Instal Python Script
 - Install Caffe...
<http://www.knight-of-pi.org/installing-the-google-deepdream-software/>
- **Cross platform:**
 - Use Google Colab Notebook
([LINK](#))



Why dogs?

"A neural network's **ability to recognize** what's in an image comes from **being trained on an initial data set**. In Deep Dream's case, that data set is from **ImageNet**, a database created by researchers at **Stanford and Princeton** who built a database of **14 million human-labeled images**. But Google didn't use the whole database. Instead, they used a **smaller subset of the ImageNet** database released in 2012 for use in a contest... a subset which contained "**fine-grained classification of 120 dog sub-classes**."

<https://www.fastcompany.com/3048941/why-googles-deep-dream-ai-hallucinates-in-dog-faces>



GauGAN:

Segmentation: applying specific objects to color masks.

Photorealistic transfer of a drawing.

Style-Transfer

<http://nvidia-research-mingyuliu.com/gaugan>

GAN Progress



Ian Goodfellow
@goodfellow_jan

Following

4.5 years of GAN progress on face generation. arxiv.org/abs/1406.2661
arxiv.org/abs/1511.06434
arxiv.org/abs/1606.07536
arxiv.org/abs/1710.10196
arxiv.org/abs/1812.04948



4:40 PM - 14 Jan 2019

1,203 Retweets 3,293 Likes



32 1.2K 3.3K

https://twitter.com/goodfellow_ian/status/1084973596236144640?lang=de

BigGAN

BigGAN generates images, trained on bigger labelled datasets.

- [Colab NoteBook](#)



BigGAN Interpolation

BigGAN transforms image „seeds”

- [Colab NoteBook](#)

Interpolation

num_samples: 2

num_interps: 5

truncation: 0.2

noise_seed_A: 0

category_A: 187) Yorkshire terrier

noise_seed_B: 0

category_B: 812) space shuttle



StyleTransfer

Style of an image A transferred to image B.

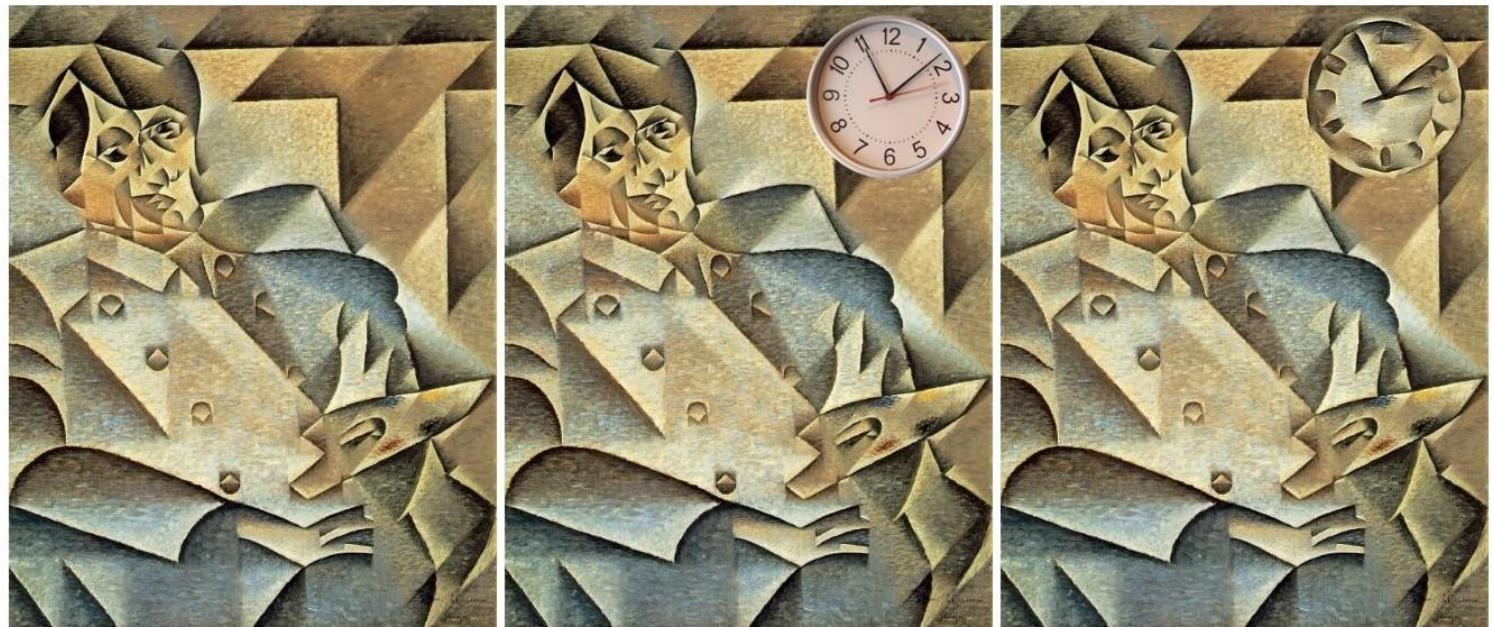
- [Colab NoteBook](#)



StyleTransfer: Kreativ

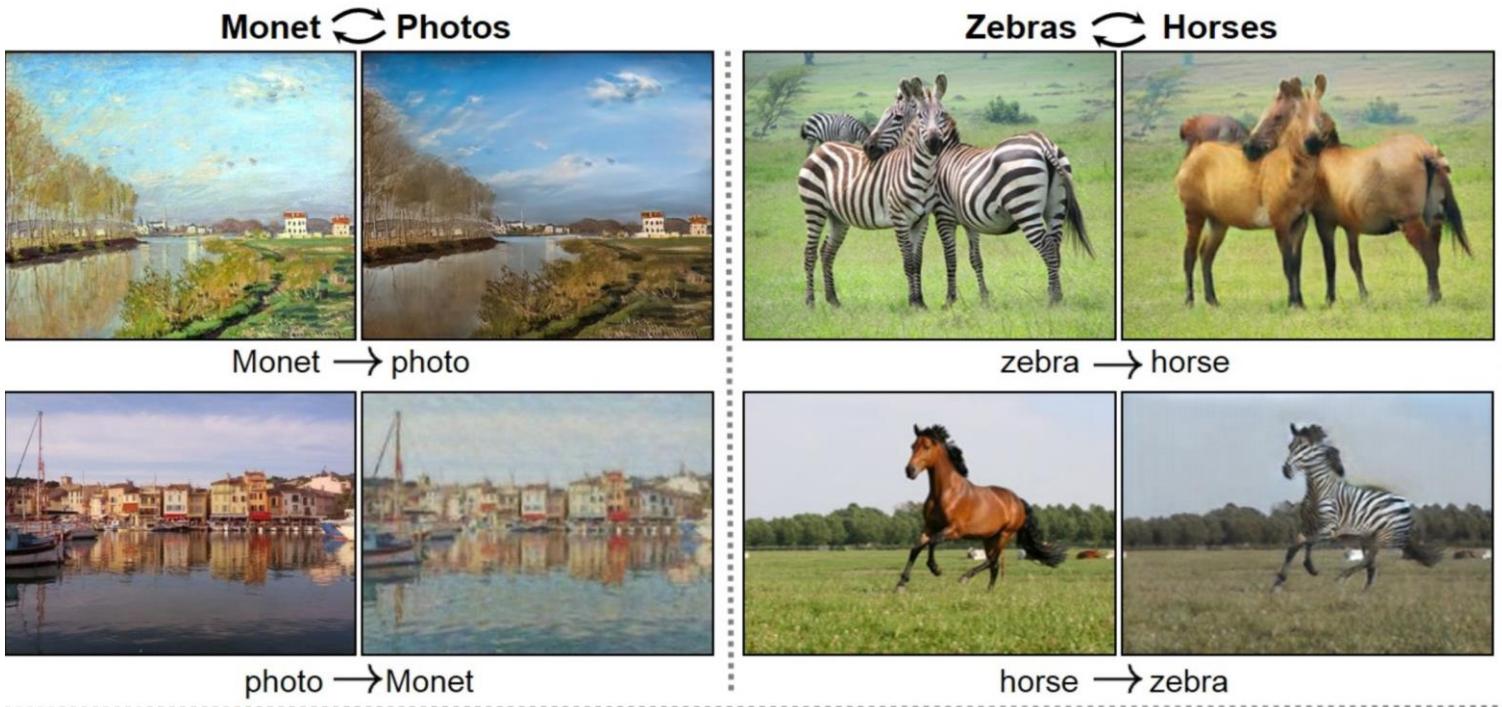
Collaging using style transfer

- [Colab NoteBook](#)



CycleGAN

CycleGAN: transfer of visual features without paired images



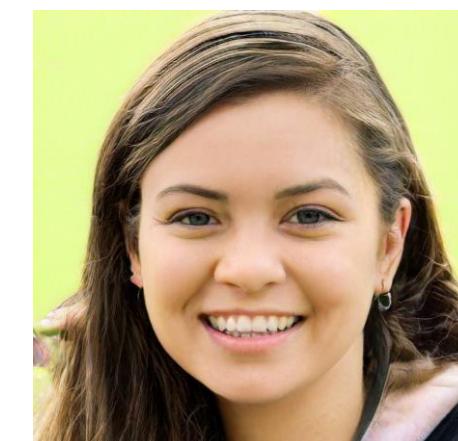
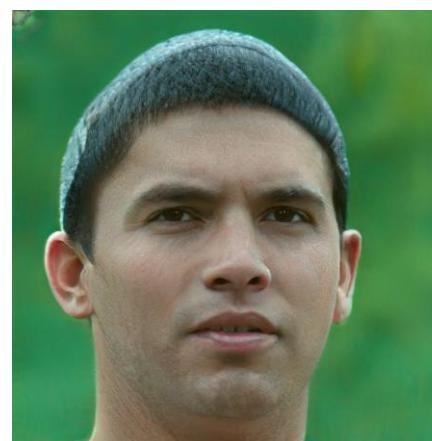
StyleGAN StyleGAN2

Neural Framework, trained on
highscaled images



Demonstration

- ThisPersonDoesnotExist.com
also: ThisCatDoesNotExist.com



Demonstration

- ThisPersonDoesnotExist.com
also: ThisCatDoesNotExist.com
- GANbreeder.com



Randomize Cross-Breed Edit Genome

guinea pig badger gown stone wall Granny Smith

tench Add

reset make adjustment

A user interface for editing a genome. It features a horizontal slider with several points corresponding to different animal species: guinea pig, badger, gown, stone wall, and Granny Smith. Below the slider is a dropdown menu set to "tench" with an "Add" button next to it. At the bottom are two buttons: "reset" and "make adjustment".Four close-up images of apples showing different mutations. From left to right: 1. A green apple with a brown, textured spot. 2. A green apple with a large, circular hole. 3. A brown, textured apple. 4. A white apple with a small red spot.

Demonstration

- ThisPersonDoesnotExist.com
also: ThisCatDoesNotExist.com
- GANbreeder.com
- Colab Notebooks ([TensorFlow](#))

Category-conditional sampling

num_samples:

truncation:

noise_seed:

category: 979) valley, vale



Artbreeder

Artbreeder

Extend your imagination



Artbreeder:

Generation of portraits, landscapes, objects etc.

<http://www.Artbreeder.com>



Nate Silver

AI Expert (MIT)

"AI is still an incredibly complex, complex problem. [...] Right now we have no technology that we can actually use to control an entity that hasn't been programmed to behave the way we say it should."



merzmensch
6 hours ago



Children Crossbreed Edit-Genes

Click an option to save it

Similar Different

Red arrow pointing down to the edit interface.



merzmensch
6 hours ago

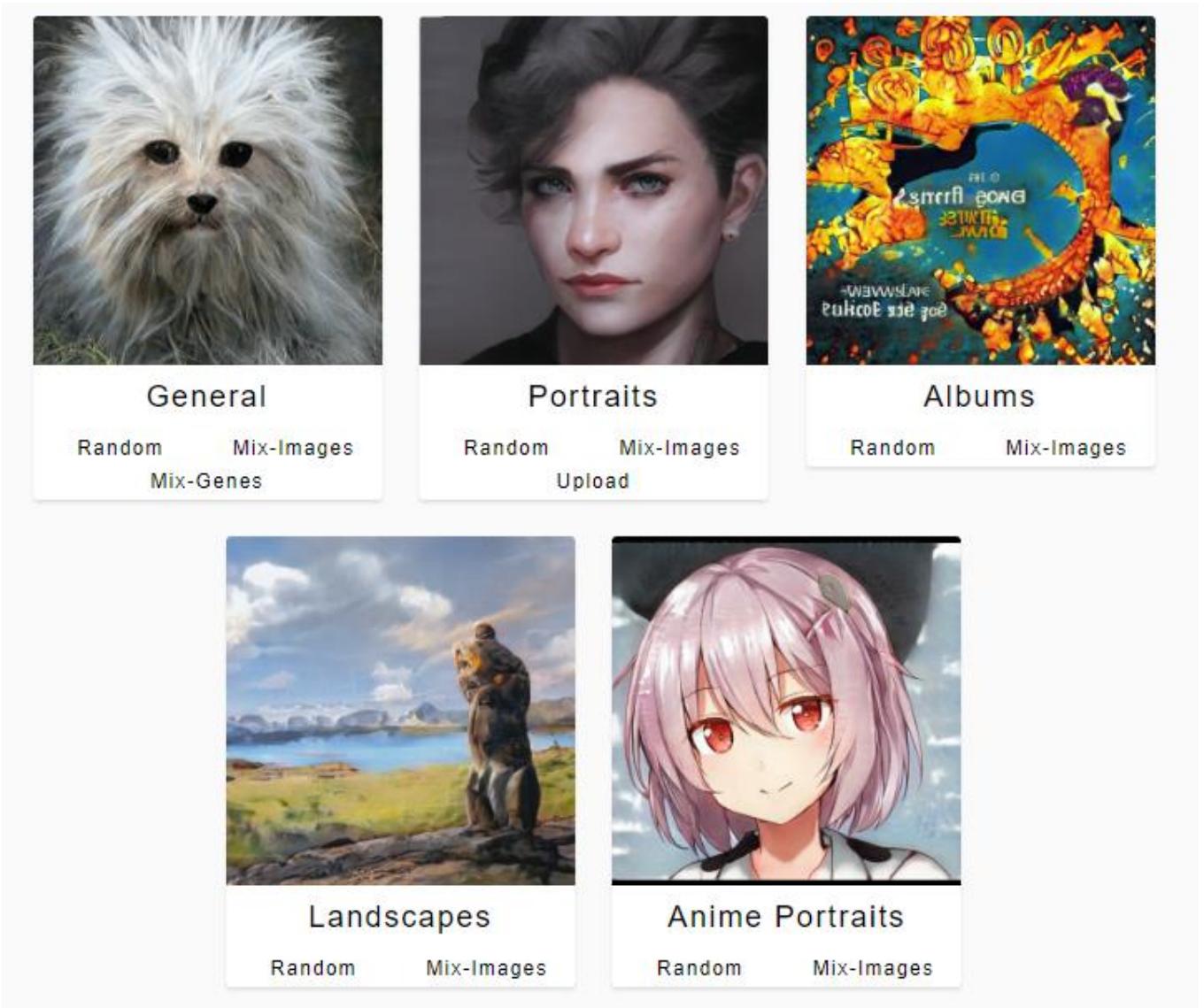
Children Crossbreed Edit-Genes

Width Height Age Smile
Glasses Gender Beard Mustache
Eyesopen Mouthopen Brightness Sharpness
Angry Confused Disgusted Happy
Sad Concept_art

Reset Save

Artbreeder

- General (BigGAN)
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



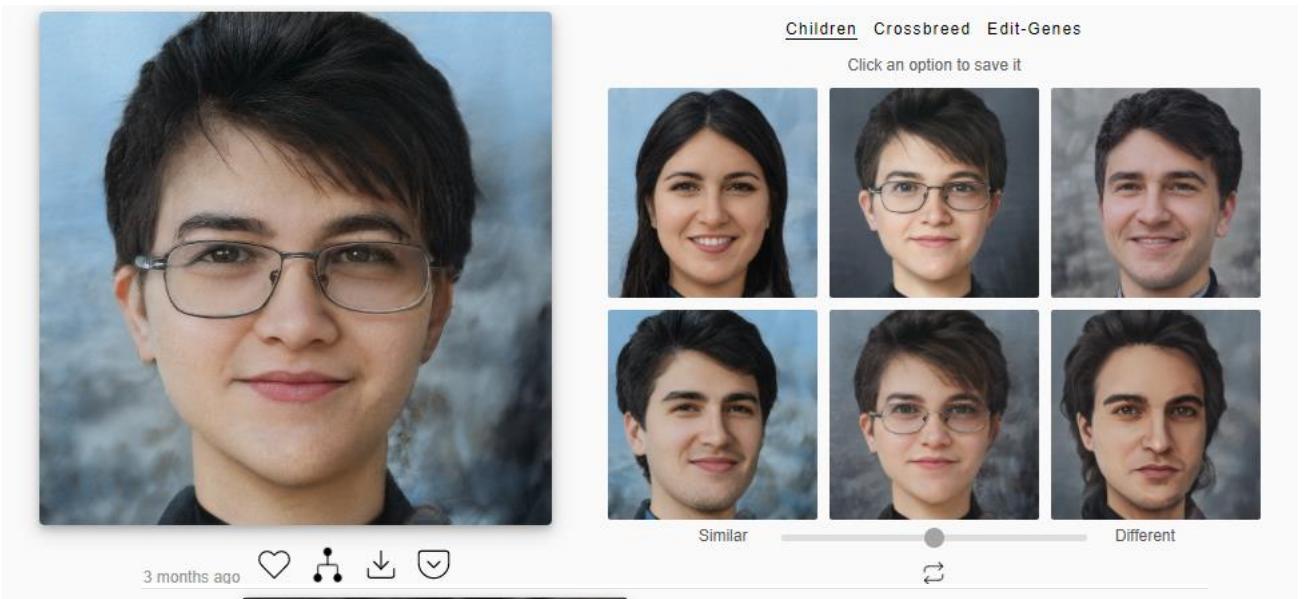
Artbreeder

- General (BigGAN)
- **Portraits (StyleGAN2)**
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



Portraits

[Random](#) [Mix-Images](#)
[Upload](#)

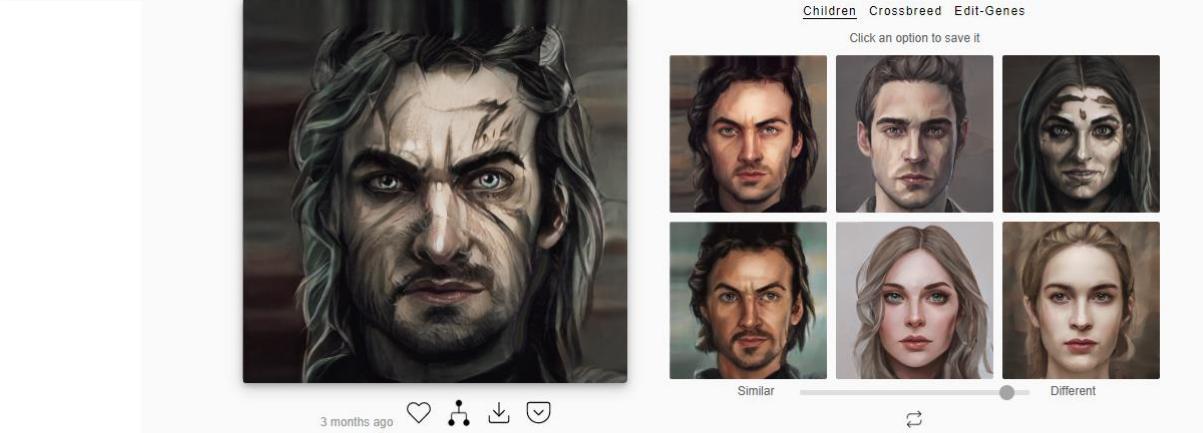


3 months ago

Similar Different

Children Crossbreed Edit-Genes

Click an option to save it

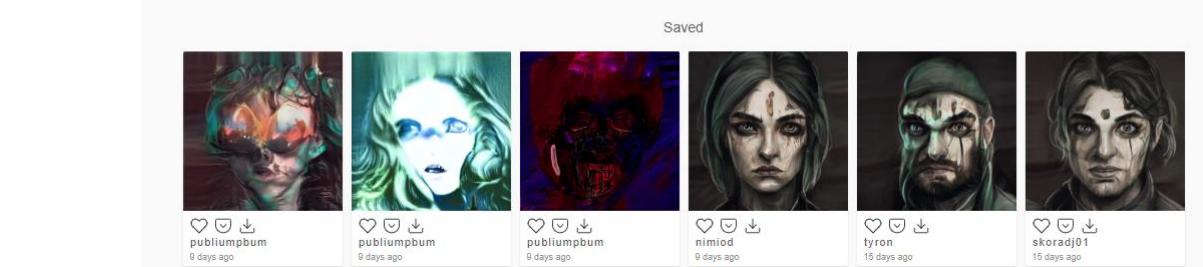


3 months ago

Similar Different

Children Crossbreed Edit-Genes

Click an option to save it



9 days ago

9 days ago

9 days ago

9 days ago

15 days ago

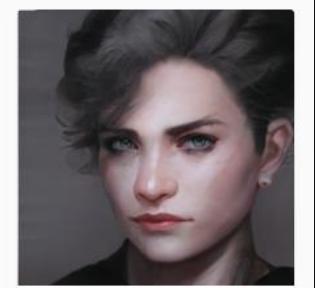
15 days ago

Children Crossbreed Edit-Genes

Saved

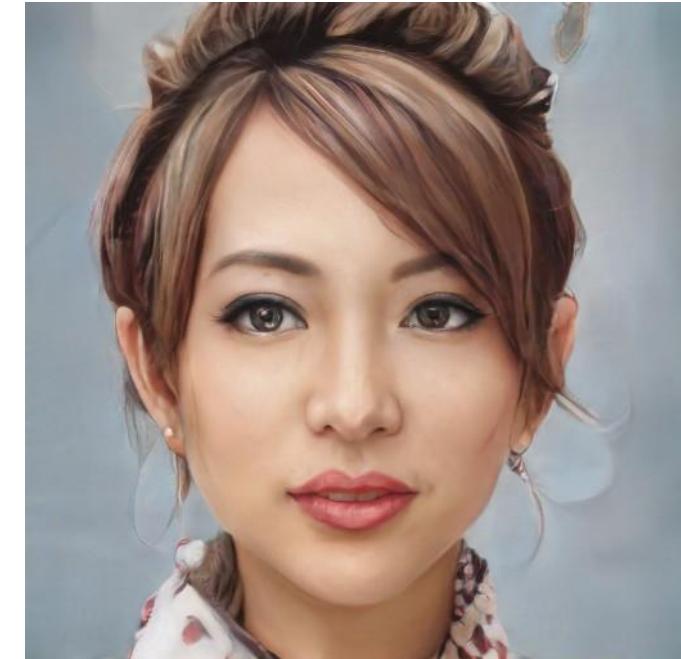
Artbreeder

- General (BigGAN)
- **Portraits (StyleGAN2)**
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



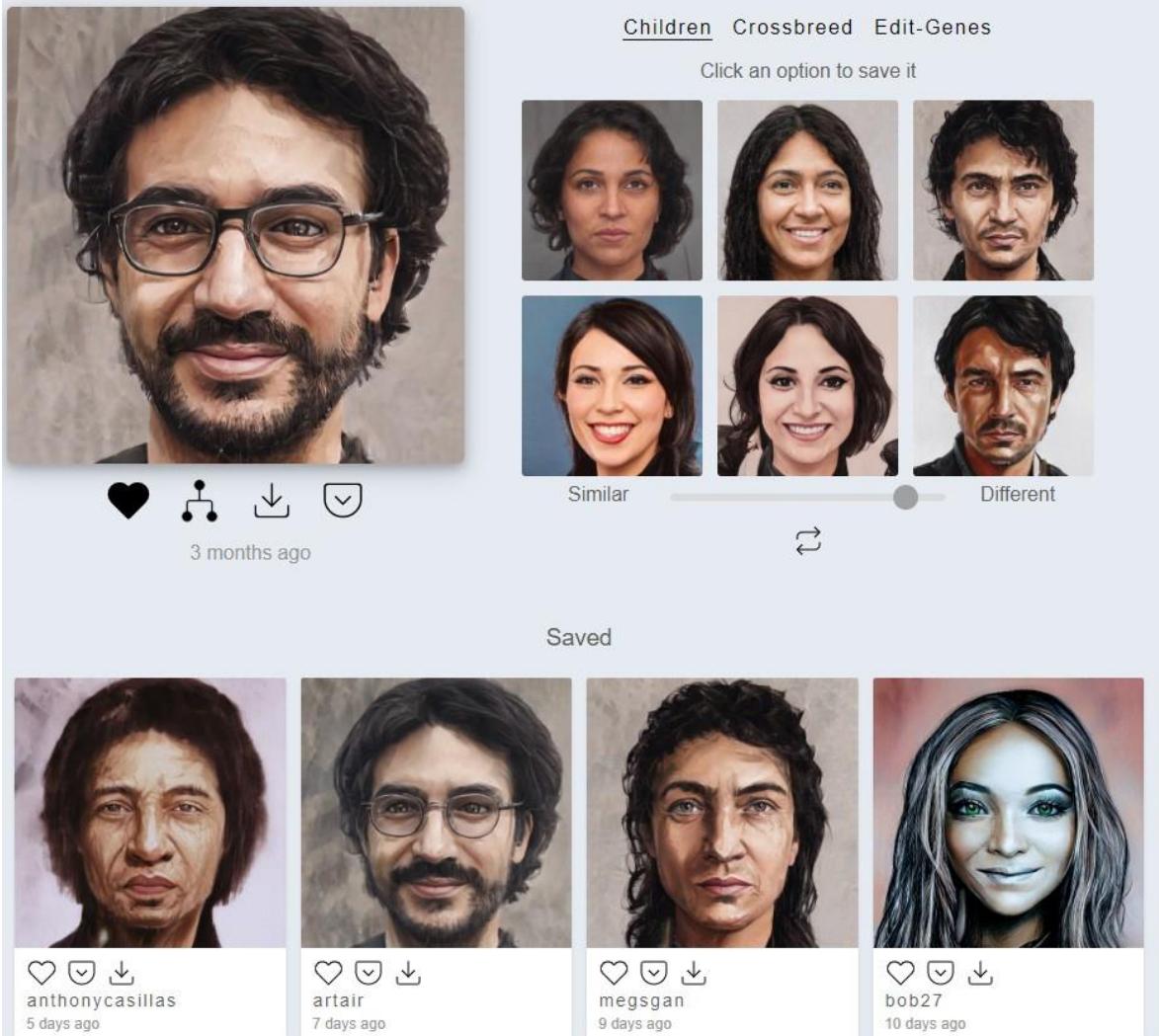
Portraits

[Random](#) [Mix-Images](#)
[Upload](#)



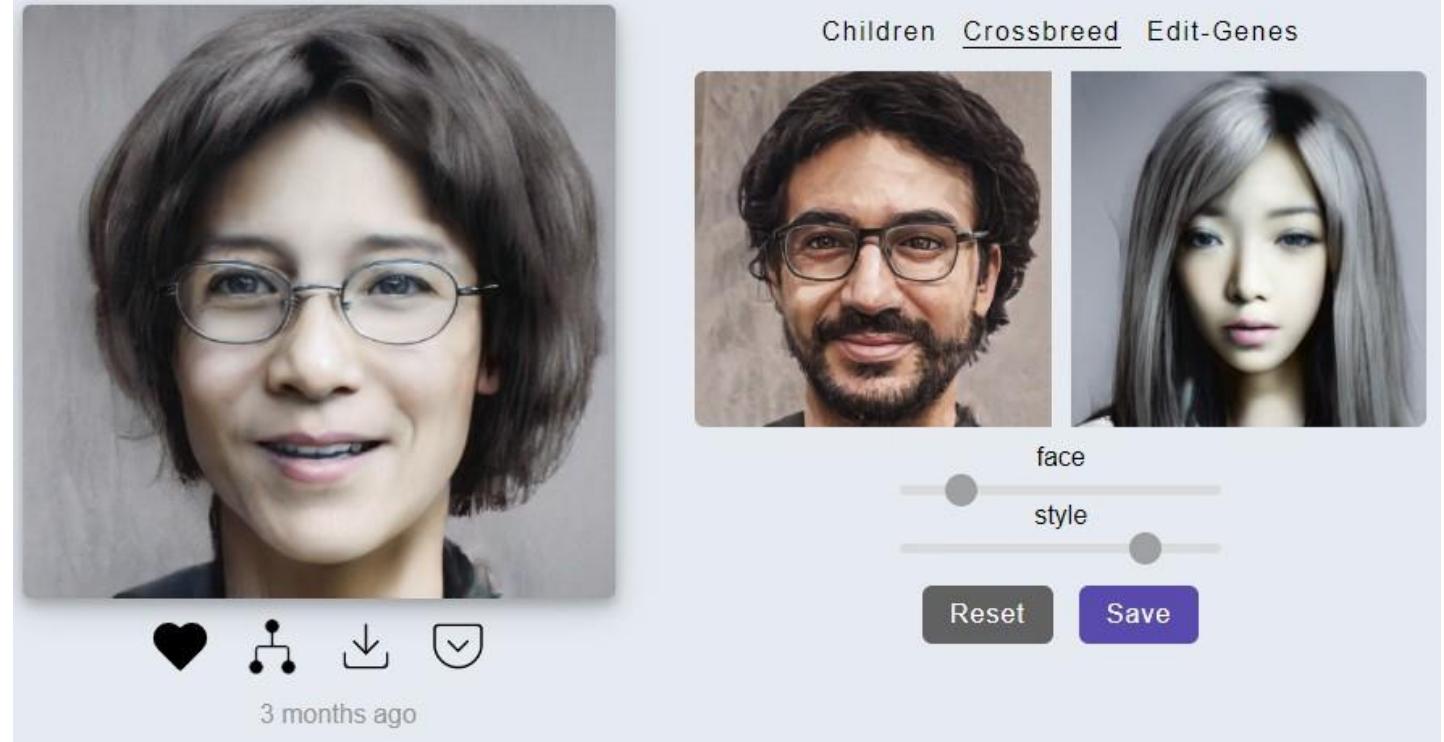
Artbreeder

- **General (BigGAN)**
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



Artbreeder

- General (**BigGAN**)
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



Artbreeder

- General (BigGAN)
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...

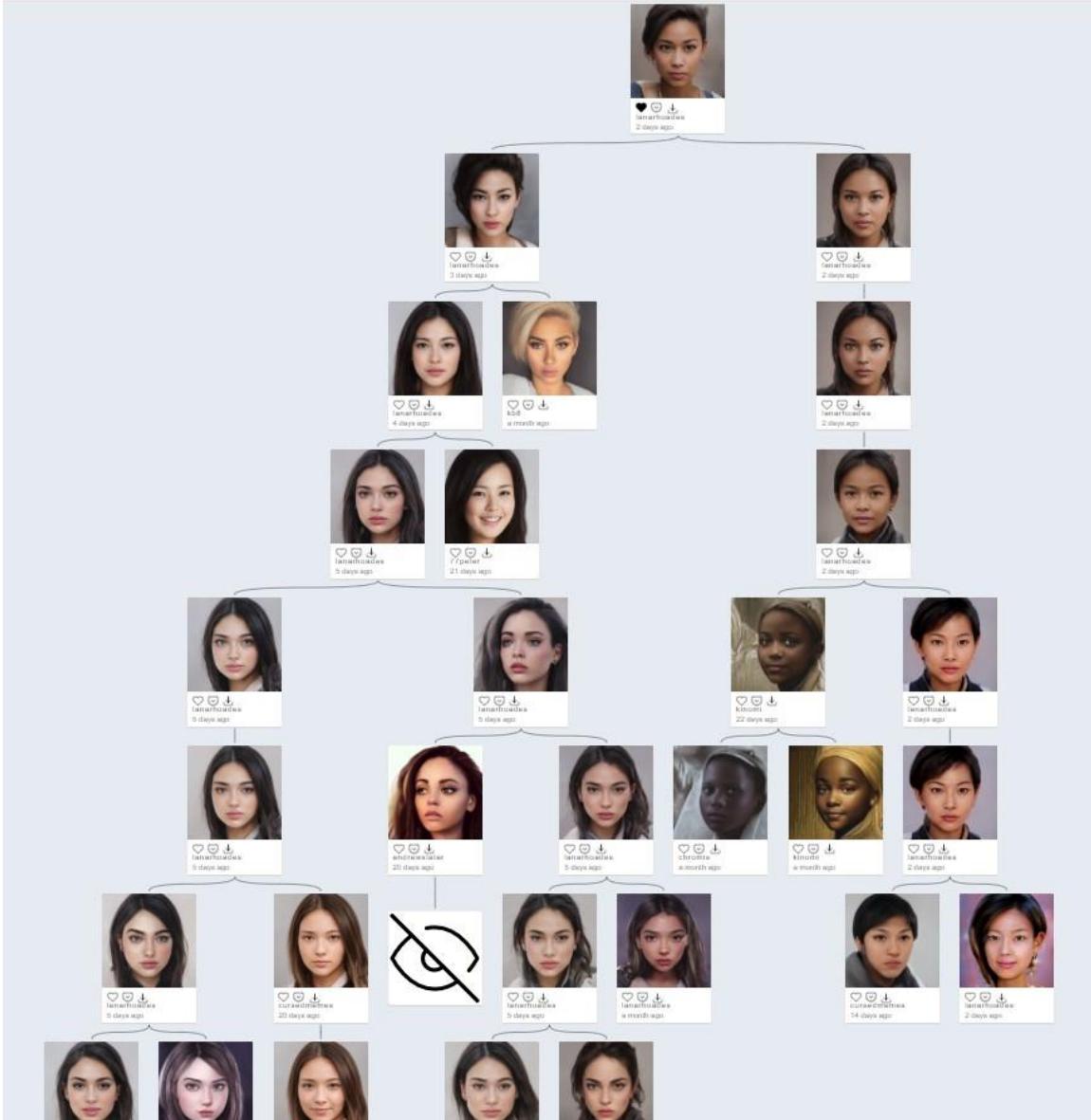
The image displays two separate Artbreeder interface screens, each showing a generated portrait and its corresponding genetic parameters.

Top Screenshot: A portrait of a man with dark hair, glasses, and a beard. The interface includes a grid of sliders for various traits: Width, Height, Yaw, Pitch; Concept Art, East Asian, White, Black; Age, Gender, Brightness, Sharpness; Smile, Facial Hair, Black Hair, Brown Hair; Blue Eyes, Makeup, Mouth Open, Eyes Open; and Eyeglasses, Red, Green, Blue. The "Edit-Genes" tab is selected.

Bottom Screenshot: A portrait of a woman with long brown hair and green eyes. The interface shows similar trait sliders: Width, Height, Yaw, Pitch; Concept Art, East Asian, White, Black; Age, Gender, Brightness, Sharpness; Smile, Facial Hair, Black Hair, Brown Hair; Blue Eyes, Makeup, Mouth Open, Eyes Open; and Eyeglasses, Red, Green, Blue. The "Edit-Genes" tab is also selected.

Artbreeder

- **General (BigGAN)**
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



Artbreeder

- **General (BigGAN)**
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



vladimir.alexeev

@alexeev_eu

I'd interesting effect with GAN (@Artbreeder). I've uploaded the portrait of Hans Arp (that with the left eye behind the paper disc) - and GAN "reconstructed" the invisible part of face.
(Interestingly, it also corrected the gaze direction).#AI #BigGAN
#Artbreeder #ganbreeder



♡ 5 12:48 PM - Oct 23, 2019



Children Crossbreed Edit-Genes

face

style

Reset Save

merzmensch 2 months ago

Artbreeder

- **General (BigGAN)**
- Portraits (StyleGAN2)
- Albums
- Landscapes
- Anime Portraits (Gwern)
- ...



02

It's a **magic**



DeOldify

DeOldify uses Deep Learning
for realistic colorizing of
black&white photos.

- Restauration
- Experiments
- Images ([Colab Notebook](#)) and
Videos ([Colab Notebook](#))
- My [coverage](#)

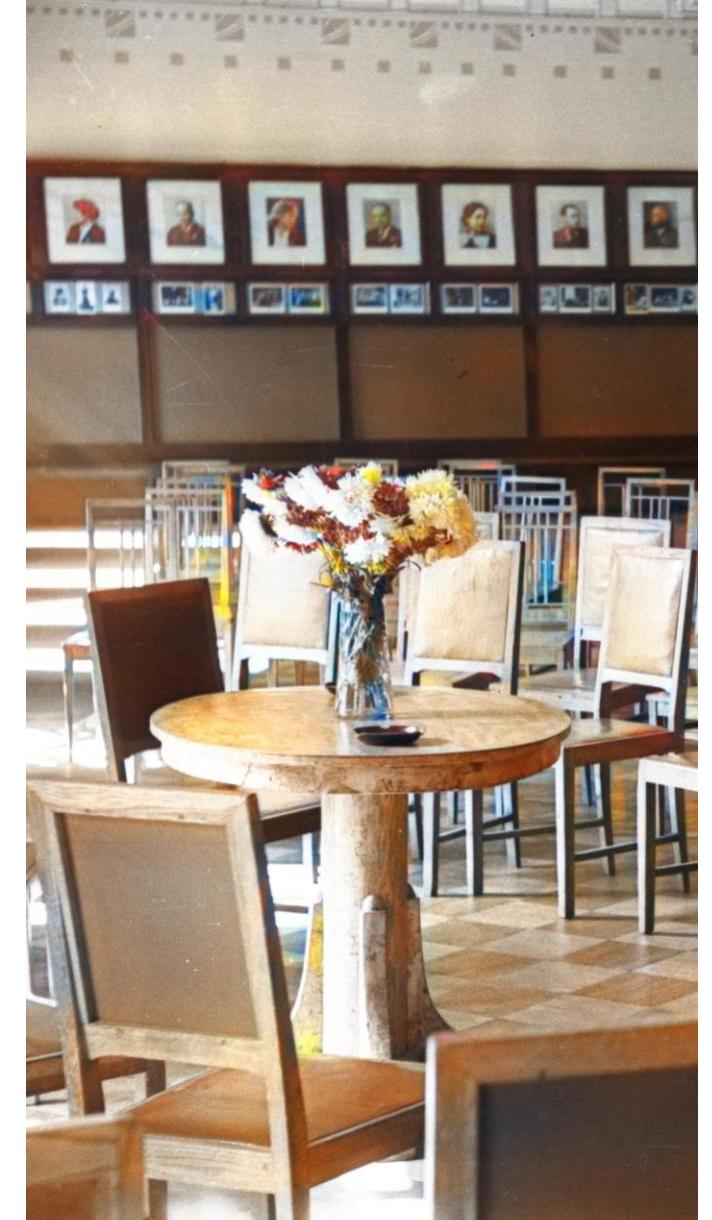


Photo: Vladimir Perelman

3D Ken Burns

3D camera flight, generated from a single photo.

- [Colab Notebook](#)
- My [coverage](#)



3D Ken Burns



3D Ken Burns

Exaggerating of parameters

- [Colab Notebook](#)



3D Ken Burns



Use case

USING VARIOUS MODELS:

DeOldify + 3D Ken Burns.

Read more here:

- [Re-animated History](#)
- [Beyond the Boundaries](#)

Short movie

- [dreAlms: in Black&White](#)



Use case

USING VARIOUS MODELS:

DeOldify + 3D Ken Burns.

Read more here:

- [Re-animated History](#)
- [Beyond the Boundaries](#)

Short movie

- [dreAlms: in Black&White](#)



Use case

USING VARIOUS MODELS:

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Read more here:

- [Re-animated History](#)
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Short movie

- [dreAlms: in Black&White](#)

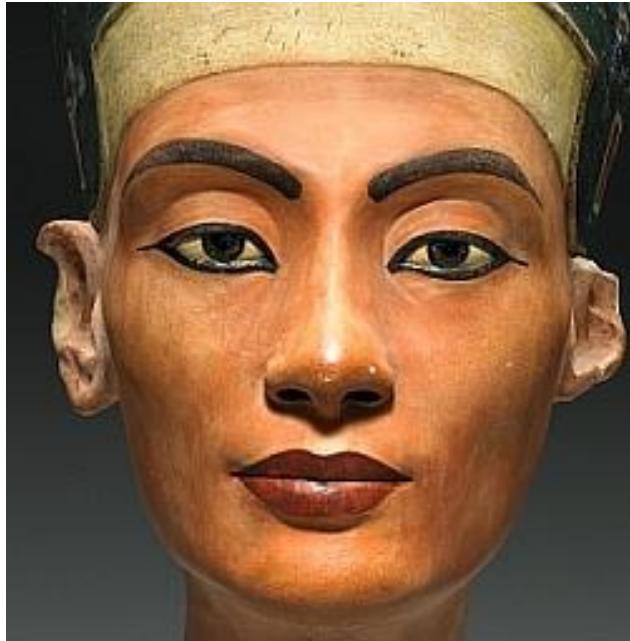


First Order Motion

Transfer of movements from a video footage to an image.

Read more here:

- [First Order Motion Model](#)



Nefertiti



Geoffrey Hinton



First Order Motion



03

Don't stop the
music



JukeBox

<https://soundcloud.com/merzmensch/sets/ai-music>



Unknown languages



Acoustic Guitar



Jazz



Free Style Jazz



Row Row Row your boat



Tracy Chapman sings AI-generated song



“Last Christmas”, continued by JukeBox

JukeBox

<https://jukebox.openai.com/>

<https://soundcloud.com/merzmensch/sets/ai-music>

<https://soundcloud.com/merzmensch/ai-written-soundtrack>

<https://soundcloud.com/merzmensch/jukeboxed-045>

<https://soundcloud.com/merzmensch/jukeboxed-051-scubas-in-congress>

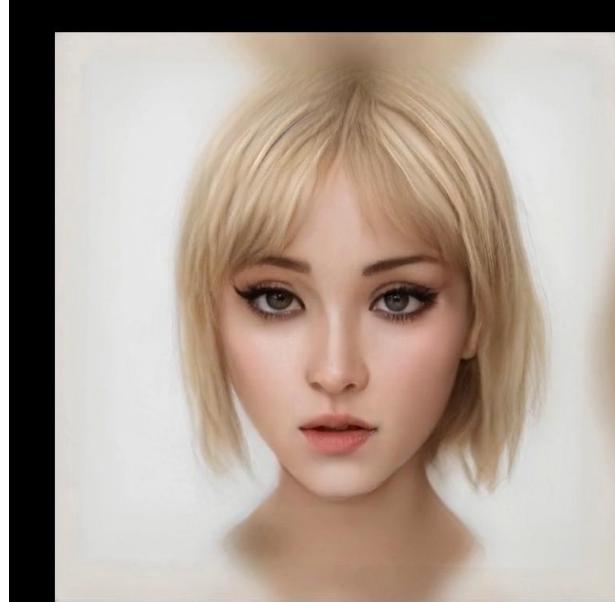
Jukebox Sample Explorer					Listing 7116 of 7116 songs
MODEL	COLLECTION	GENRE	ARTIST	TEMP	
5b_lyrics	Unseen lyrics	Rock	Eagles	0.99	
5b_lyrics	Re-renditions	Hard Rock	Motörhead	0.98	
5b	No lyrics conditioning	Rock	Cass McCombs	1.0	
5b_lyrics	Unseen lyrics	Folk Rock	Simon and Garfunkel	0.96	
5b	No lyrics conditioning	Hip Hop	Soulja Boy	1.0	
5b_lyrics	Re-renditions	Hip Hop	Eminem	0.995	
5b	No lyrics conditioning	Classical	Maria João Pires	0.98	
5b_lyrics	Unseen lyrics	Disco	Donna Summer	0.99	
5b_lyrics	Unseen lyrics	Jazz	Tony Bennett	0.98	
5b_lyrics	Unseen lyrics	Pop	Katy Perry	0.98	
5b_lyrics	Unseen lyrics	Rock	Smokie	0.96	
5b_lyrics	Unseen lyrics	Country	Kasey Chambers	0.98	
5b	No lyrics conditioning	Soundtrack	John Williams	1.0	
5b_lyrics	Novel artists and sty...	0.5 Classic Pop 0.5 Country	0.5 Frank Sinatra 0.5 Alan Jackson	0.96	
5b_lyrics	Re-renditions	Art Rock	Xiu Xiu	0.98	

Jukebox: A Generative Model for Audio

[blog](#) | [paper](#) | [code](#)



JukeBox



that is
the question:

<https://vimeo.com/479377091>

JukeBox



JukeBox

merzmensch

MADE WITH
TOKKING
HEADS.COM

Jabberwocky
Nat King Cole

Sources

MEDIUM

<https://medium.com/@Merzmensch>
<https://merzmensch.com>

TWITTER-LIST

<https://twitter.com/merzmensch>