

A decorative graphic on the left side of the slide, consisting of a grid of blue squares of varying shades, arranged in a way that creates a sense of depth and movement, resembling a stylized 'F' or a series of overlapping planes.

02- Deep Learning Nowadays

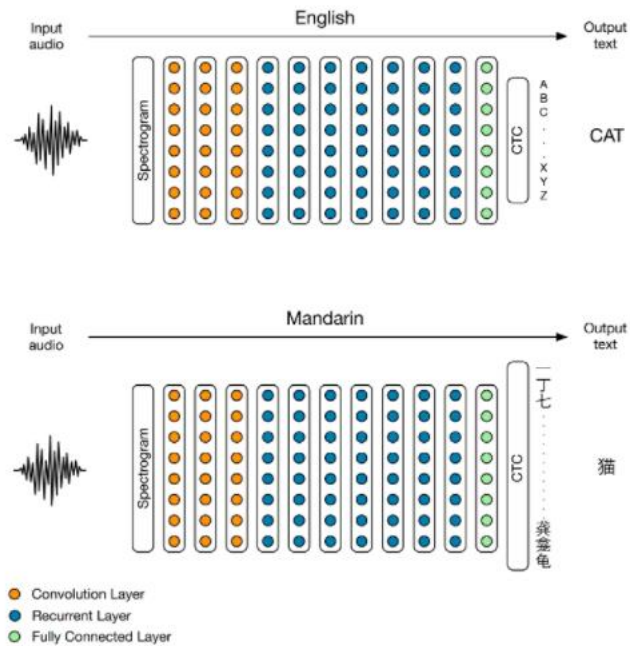
Deep Learning
Informatics Department



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DL Today

Speech to Text



[Baidu 2014]

DL Today

NLP

Translate

Italian Chinese French English - detected English Spanish French Translate

deep learning x

l'apprentissage en profondeur

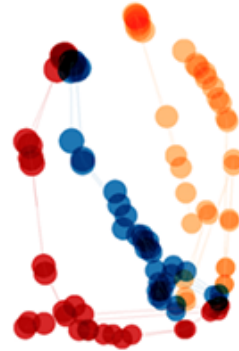
13/5000

See also
deep, learning

ENGLISH
The stratosphere extends from about
10km to about 50km in altitude.

KOREAN

JAPANESE



[Google Translate System - 2016]



Salit Kulla

11:29 AM ***

to me

Hey, Wynton Marsalis is playing this weekend. Do
you have a preference between Saturday and Sunday?

-S

I'm down for
either.

Let's do
Saturday.

I'm fine with
whatever.

Reply

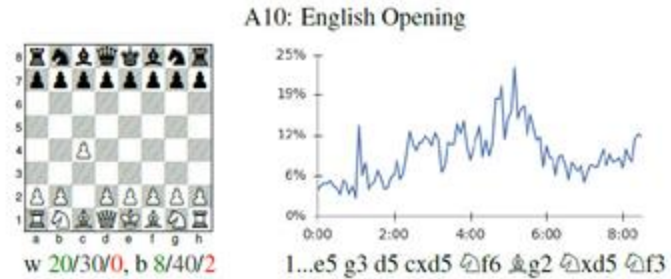
Forward

[Google Inbox Smart Reply]

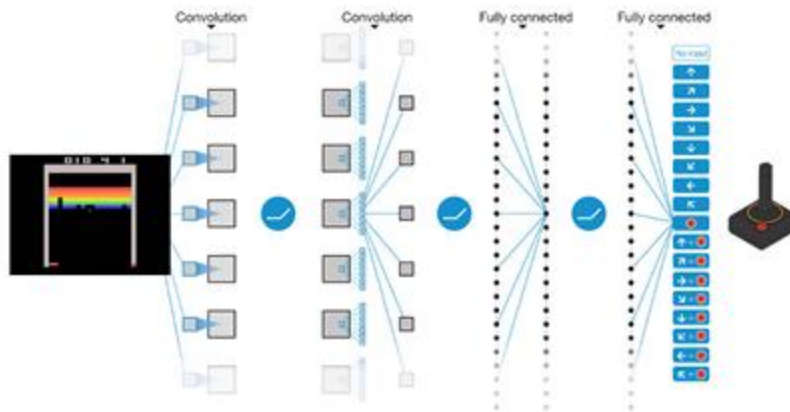


[Amazon Echo / Alexa]

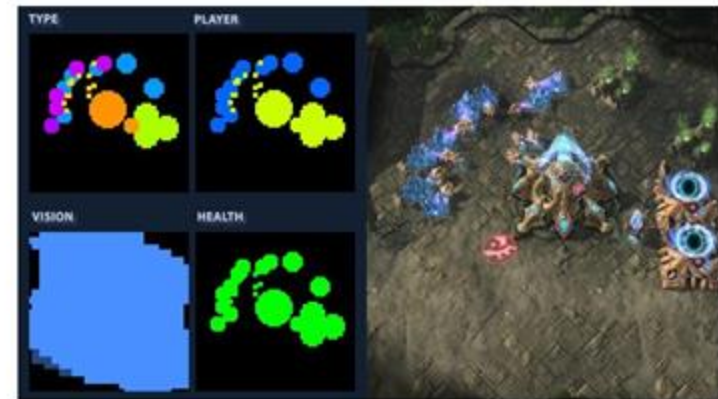
DL Today: AI in Games



[Deepmind AlphaGo / Zero 2017]



[Atari Games - DeepMind 2016]



[Starcraft 2 for AI research]

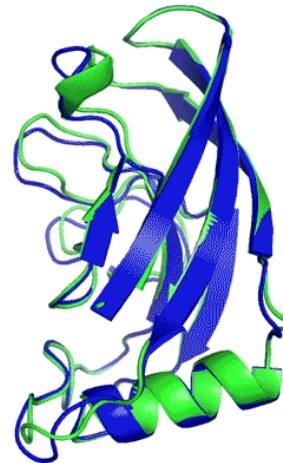
DL in Science

AlphaFold by DeepMind

a solution to a 50-year-old grand challenge in biology



T1037 / 6vr4
90.7 GDT
(RNA polymerase domain)

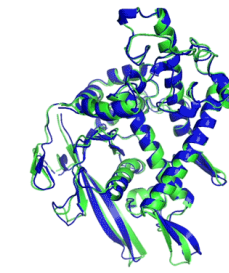


T1049 / 6y4f
93.3 GDT
(adhesin tip)

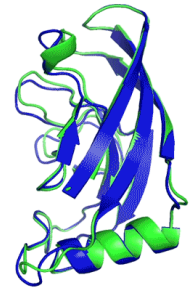
- Experimental result
- Computational prediction

DL in Science

AlphaFold by DeepMind



T1037 / 6vr4
90.7 GDT
(RNA polymerase domain)



T1049 / 6y4f
93.3 GDT
(adhesin tip)

● Experimental result
● Computational prediction

“

We have been stuck on this one problem – how do proteins fold up – for nearly 50 years. To see DeepMind produce a solution for this, having worked personally on this problem for so long and after so many stops and starts, wondering if we'd ever get there, is a very special moment.

GAN (Generative Adversarial Networks)



Designed by Ian Goodfellow et. al (2014)

GAN (Generative Adversarial Networks)



Right side image created by CycleGAN

GAN (Generative Adversarial Networks)



2014



2015



2016



2017

Example of the Progression in the Capabilities of GANs From 2014 to 2017. Taken from [The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation](#), 2018.

StyleGAN

(Style-Based Generative Adversarial Networks)



Sampled celebrities [Nvidia 2017]

DL Today:

Text-to-Image Translation

Text description	This bird is blue with white and has a very short beak	This bird has wings that are brown and has a yellow belly	A white bird with a black crown and yellow beak	This bird is white, black, and brown in color, with a brown beak	The bird has small beak, with reddish brown crown and gray belly	This is a small, black bird with a white breast and white on the wingbars.	This bird is white black and yellow in color, with a short black beak
Stage-I images							
Stage-II images							

Han Zhang, et al. in their 2016 paper titled “[StackGAN: Text to Photo-realistic Image Synthesis with Stacked Generative Adversarial Networks](#)” generate realistic looking photographs from textual descriptions of simple objects like birds and flowers

DL Today:

Text-to-Image Translation

Scott Reed, et al. in their 2016 paper titled "[Generative Adversarial Text to Image Synthesis](#)" also provide an early example of text to image generation of small objects and scenes.

this small bird has a pink breast and crown, and black primaries and secondaries.



this magnificent fellow is almost all black with a red crest, and white cheek patch.



the flower has petals that are bright pinkish purple with white stigma



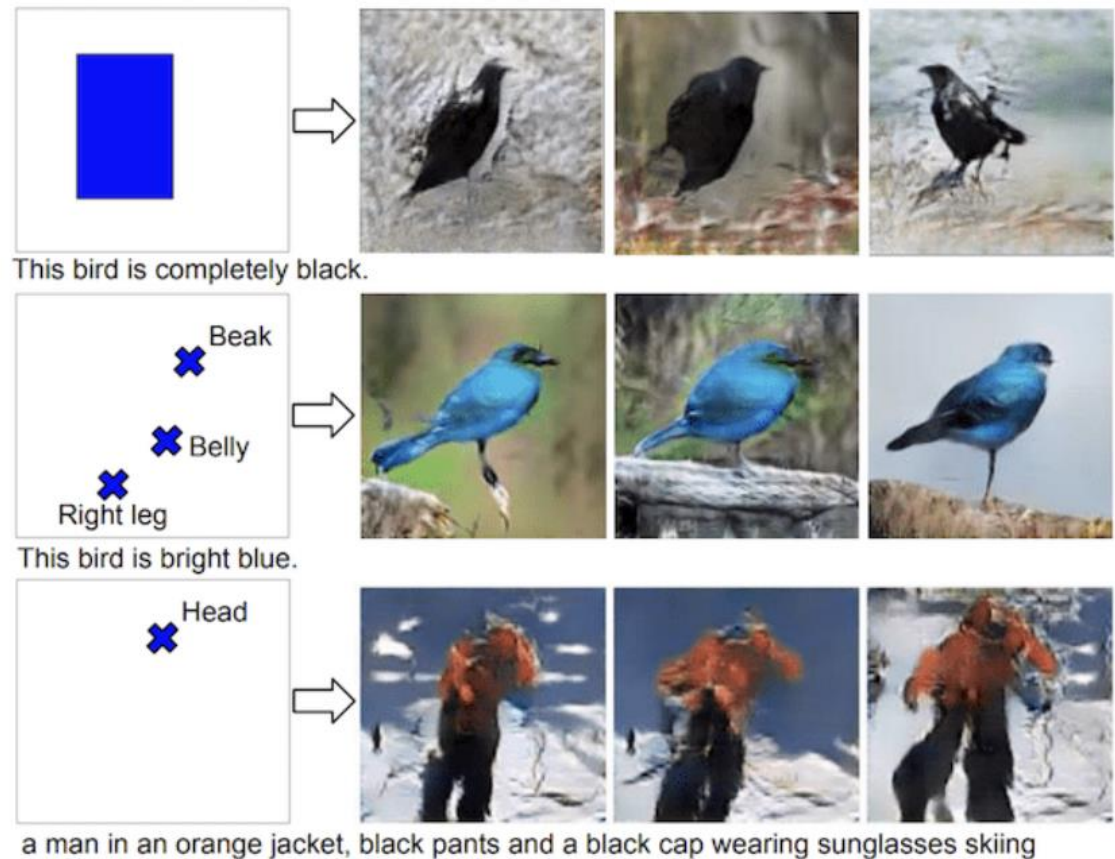
this white and yellow flower have thin white petals and a round yellow stamen



DL Today:

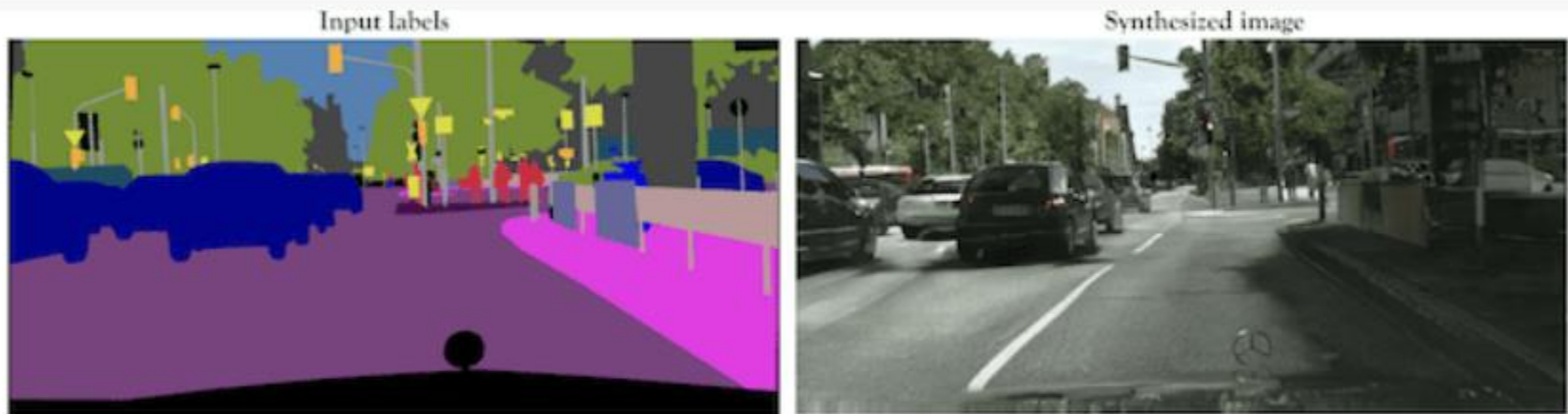
Text-to-Image Translation

Scott Reed, et al. in their 2016 paper titled “[Learning What and Where to Draw](#)” expand upon this capability and use GANs to both generate images from text and use bounding boxes and key points as hints as to where to draw a described object



DL Today:

Semantic-Image-to-Photo Translation



Example of Semantic Image and GAN-Generated Cityscape Photograph. Taken from High-Resolution Image Synthesis and Semantic Manipulation with Conditional GANs, 2017.

Ting-Chun Wang, et al. in their 2017 paper titled “[High-Resolution Image Synthesis and Semantic Manipulation with Conditional GANs](#)” demonstrate the use of conditional GANs to generate photorealistic images given a semantic image or sketch as input.

DL Today:

Face Frontal View Generation

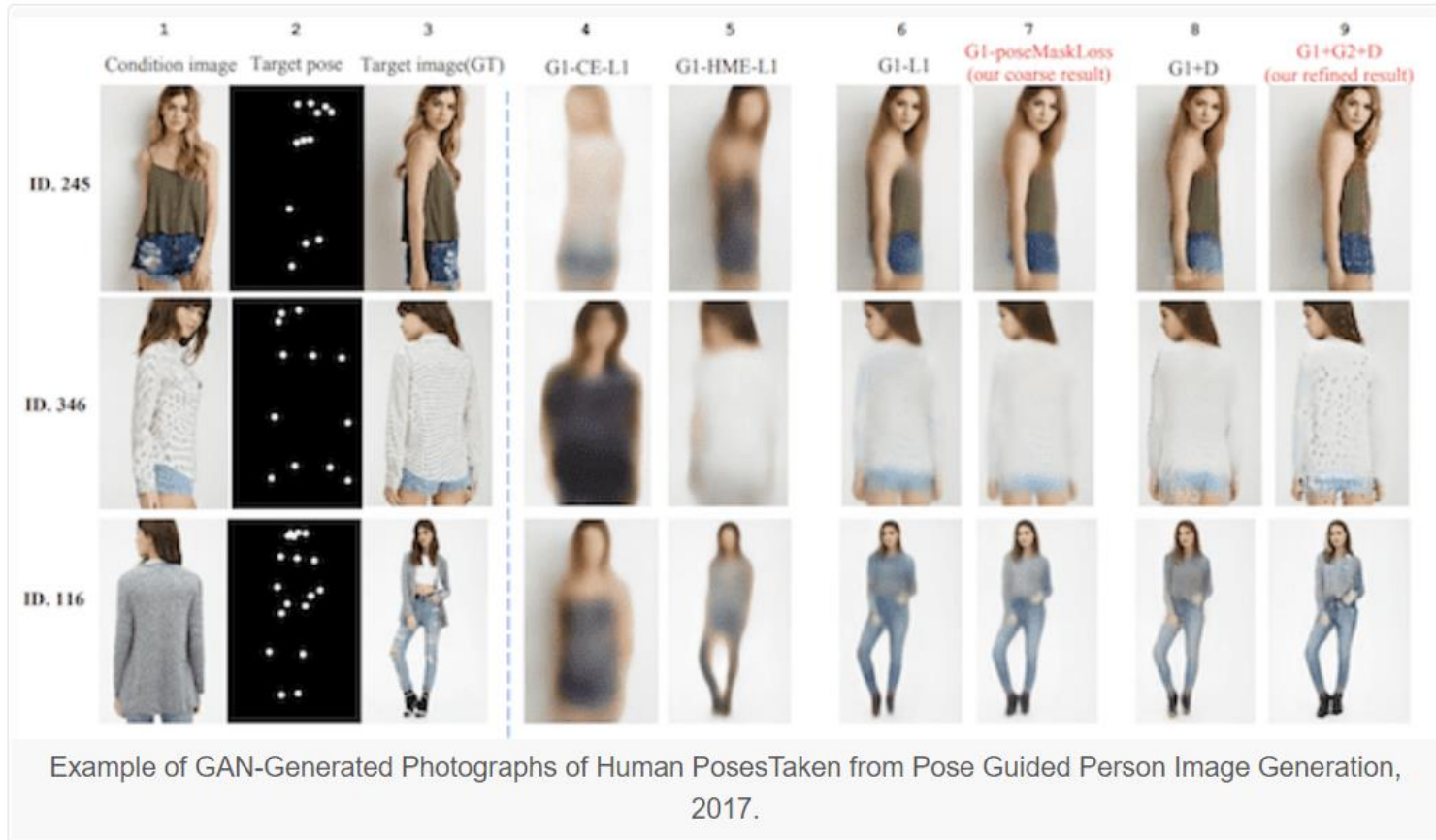


Example of GAN-based Face Frontal View Photo Generation Taken from Beyond Face Rotation: Global and Local Perception GAN for Photorealistic and Identity Preserving Frontal View Synthesis, 2017.

Rui Huang, et al. in their 2017 paper titled “[Beyond Face Rotation: Global and Local Perception GAN for Photorealistic and Identity Preserving Frontal View Synthesis](#)” demonstrate the use of GANs for generating frontal-view (i.e. face on) photographs of human faces given photographs taken at an angle. The idea is that the generated front-on photos can then be used as input to a face verification or face identification system.

DL Today:

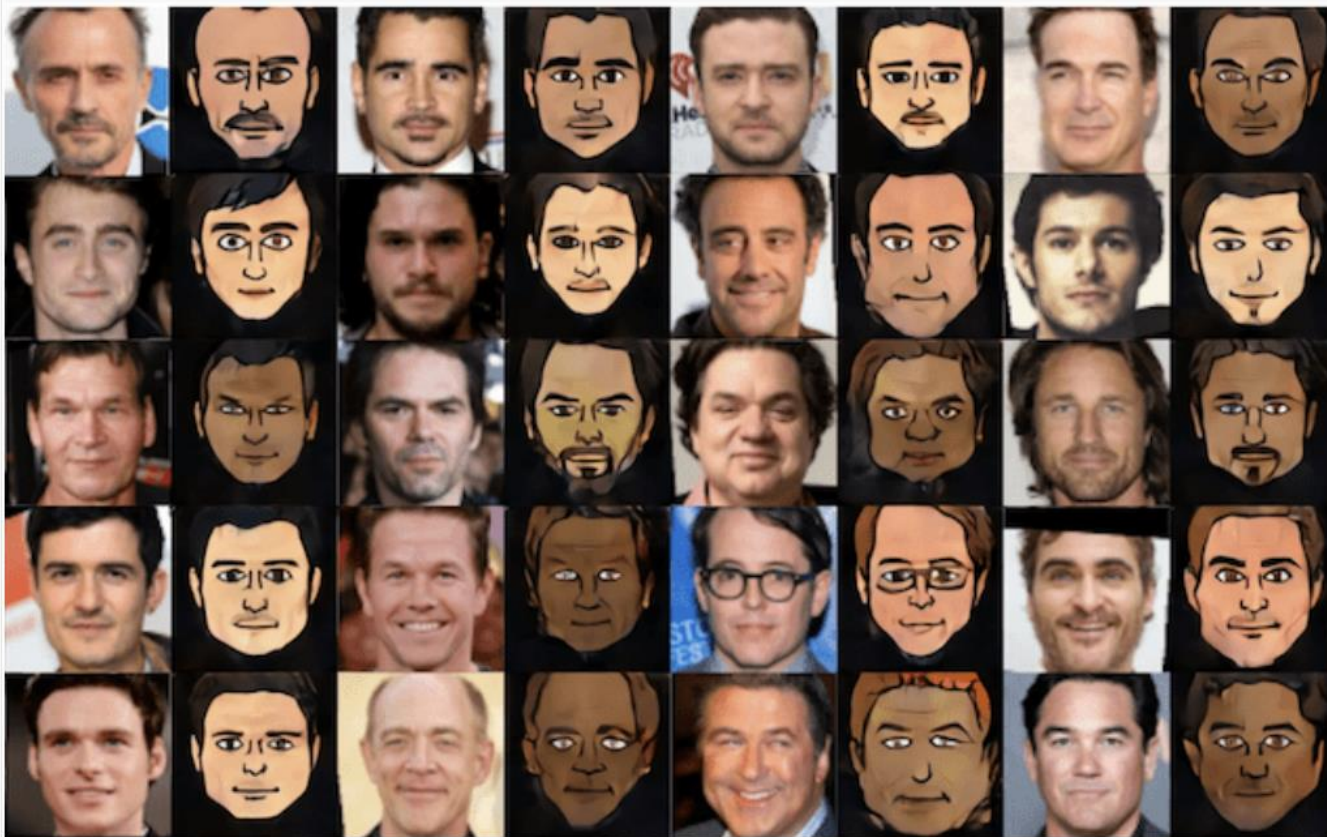
Generate New Human Poses



Liqian Ma, et al. in their 2017 paper titled “[Pose Guided Person Image Generation](#)” provide an example of generating new photographs of human models with new poses.

DL Today:

Photos to Emojis



Example of Celebrity Photographs and GAN-Generated Emojis. Taken from Unsupervised Cross-Domain Image Generation, 2016.

Yaniv Taigman, et al. in their 2016 paper titled “Unsupervised Cross-Domain Image Generation” used a GAN to translate images from one domain to another

DL Today:

Photograph Editing

Real image



Reconstructed images



Blonde ↑

Bangs ↑

Smile ↑

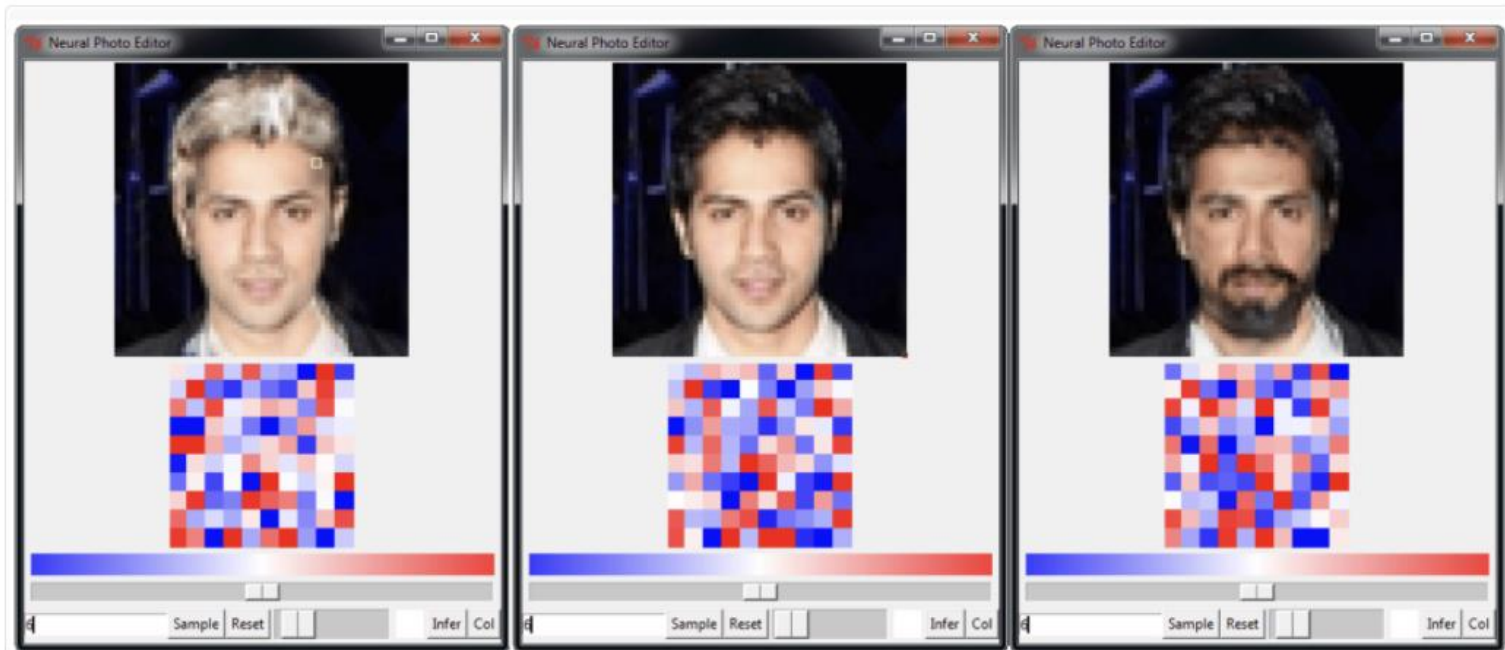
Male ↑

Example of Face Photo Editing with IcGAN. Taken from Invertible Conditional GANs For Image Editing, 2016.

Guim Perarnau, et al. in their 2016 paper titled “[Invertible Conditional GANs For Image Editing](#)” use a GAN, specifically their IcGAN, to reconstruct photographs of faces with specific specified features, such as changes in hair color, style, facial expression, and even gender.

DL Today:

Photograph Editing



Example of Face Editing Using the Neural Photo Editor Based on VAEs and GANs. Taken from Neural Photo Editing with Introspective Adversarial Networks, 2016.

Andrew Brock, et al. in their 2016 paper titled “[Neural Photo Editing with Introspective Adversarial Networks](#)” present a face photo editor using a hybrid of variational autoencoders and GANs. The editor allows rapid realistic modification of human faces including changing hair color, hairstyles, facial expression, poses, and adding facial hair.

DL Today:

Photograph Editing



(a)



(b)



(c)



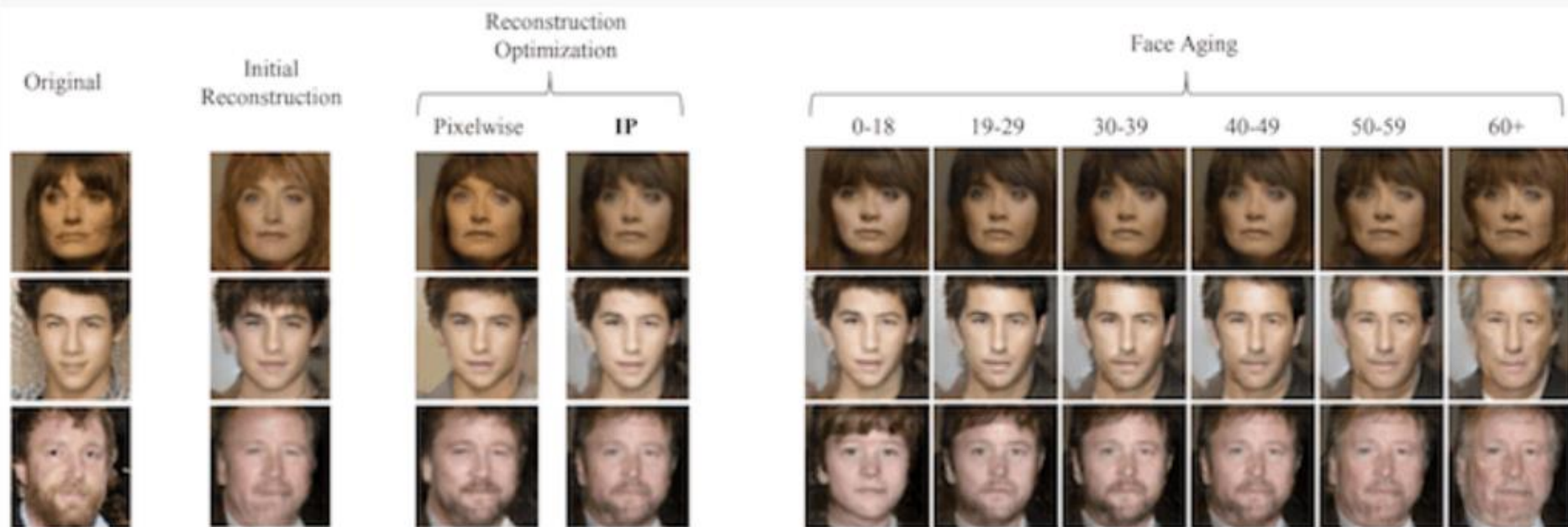
(d)

He Zhang, et al. in their 2017 paper titled “[Image De-raining Using a Conditional Generative Adversarial Network](#)” use GANs for image editing, including examples such as removing rain and snow from photographs.



DL Today:

Face Aging



Example of Photographs of Faces Generated With a GAN With Different Apparent Ages. Taken from Face Aging With Conditional Generative Adversarial Networks, 2017.

Grigory Antipov, et al. in their 2017 paper titled “[Face Aging With Conditional Generative Adversarial Networks](#)” use GANs to generate photographs of faces with different apparent ages, from younger to older.

DL Today:

Photo Blending



Huikai Wu, et al. in their 2017 paper titled “[GP-GAN: Towards Realistic High-Resolution Image Blending](#)” demonstrate the use of GANs in blending photographs, specifically elements from different photographs such as fields, mountains, and other large structures.



DL Today:

Super Resolution



Christian Ledig, et al. in their 2016 paper titled “[Photo-Realistic Single Image Super-Resolution Using a Generative Adversarial Network](#)” demonstrate the use of GANs, specifically their SRGAN model, to generate output images with higher, sometimes much higher, pixel resolution.



DL Today:

Photo Inpainting



Deepak Pathak, et al. in their 2016 paper titled “Context Encoders: Feature Learning by Inpainting” describe the use of GANs, specifically Context Encoders, to perform photograph inpainting or hole filling, that is filling in an area of a photograph that was removed for some reason.



DL Today:

Photo Inpainting

DutchNews.nl

☀ 1.2°

Friday 04 March 2022

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Missing bits of Rembrandt's The Night Watch are recreated by AI

Society     June 23, 2021 - By Senay Boztas



Features



Self employed or small firm owner? Your 2021 tax return questions answered



Theatres, farmers and flowers: Here are 11 great things to do in March



Will: A difficult but authentic look at history



DutchNews podcast – The Uitwaaien Olympics Edition – Week 8 2022



The cat that hitched a lift on a train and other stories



March is upon us, so you can file your income tax return for 2021

DL Today:

Photo Inpainting



DL Today:

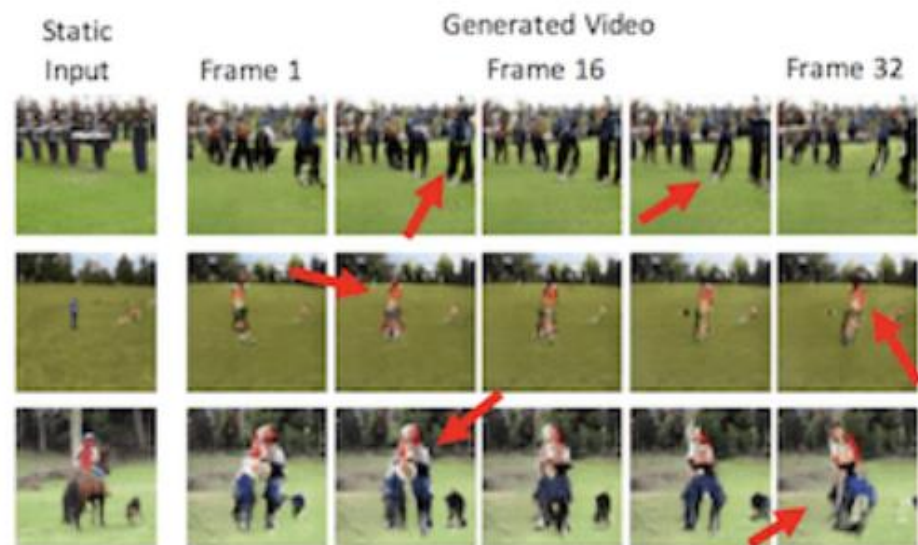
Clothing Translation



Donggeun Yoo, et al. in their 2016 paper titled “[Pixel-Level Domain Transfer](#)” demonstrate the use of GANs to generate photographs of clothing as may be seen in a catalog or online store, based on photographs of models wearing the clothing.

DL Today:

Video Prediction



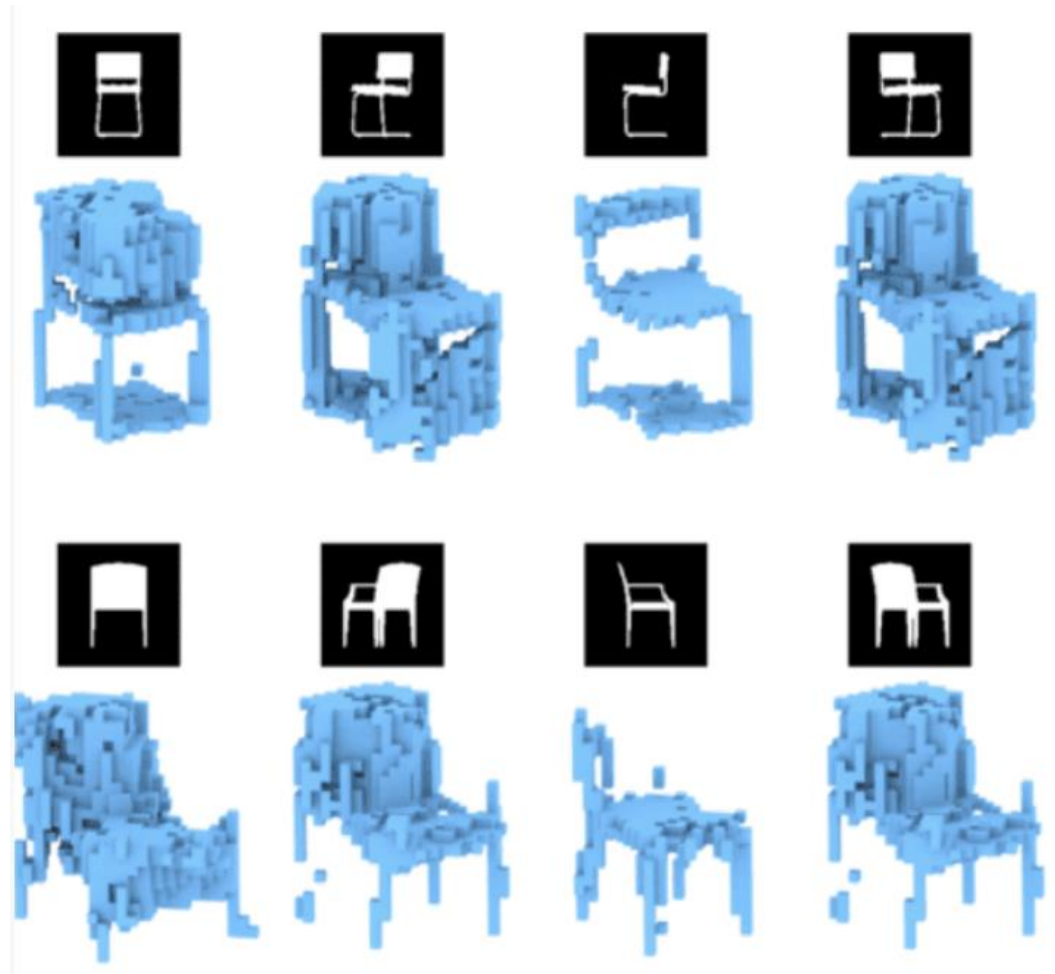
Example of Video Frames Generated With a GAN. Taken from Generating Videos with Scene Dynamics, 2016.

Carl Vondrick, et al. in their 2016 paper titled “[Generating Videos with Scene Dynamics](#)” describe the use of GANs for video prediction, specifically predicting up to a second of video frames with success, mainly for static elements of the scene.

DL Today:

3D Object Generation

Jiajun Wu, et al. in their 2016 paper titled “[Learning a Probabilistic Latent Space of Object Shapes via 3D Generative-Adversarial Modeling](#)” demonstrate a GAN for generating new three-dimensional objects (e.g. 3D models) such as chairs, cars, sofas, and tables.

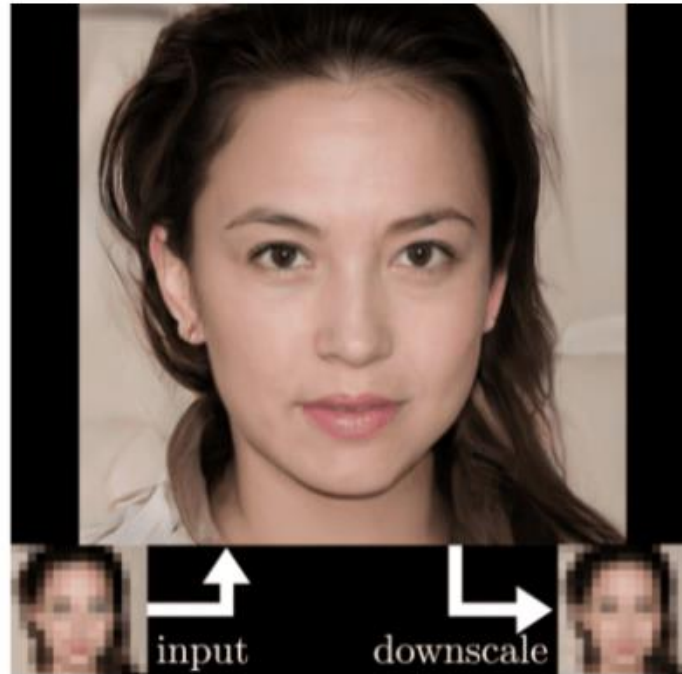


Papers

(GAN - Generative Adversarial Networks)

- [Generative Adversarial Networks](#), 2014.
- [Conditional Generative Adversarial Nets](#), 2014.
- [Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks](#), 2015.
- [NIPS 2016 Tutorial: Generative Adversarial Networks](#), 2016.
- [Progressive Growing of GANs for Improved Quality, Stability, and Variation](#), 2017.
- [The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation](#), 2018.

PULSE



Source: [Arxiv](#)

PULSE is a self-supervised neural network model that generates a high-resolution image from a low-resolution image.

GPT-3

(Generative Pre-trained Transformer 3)

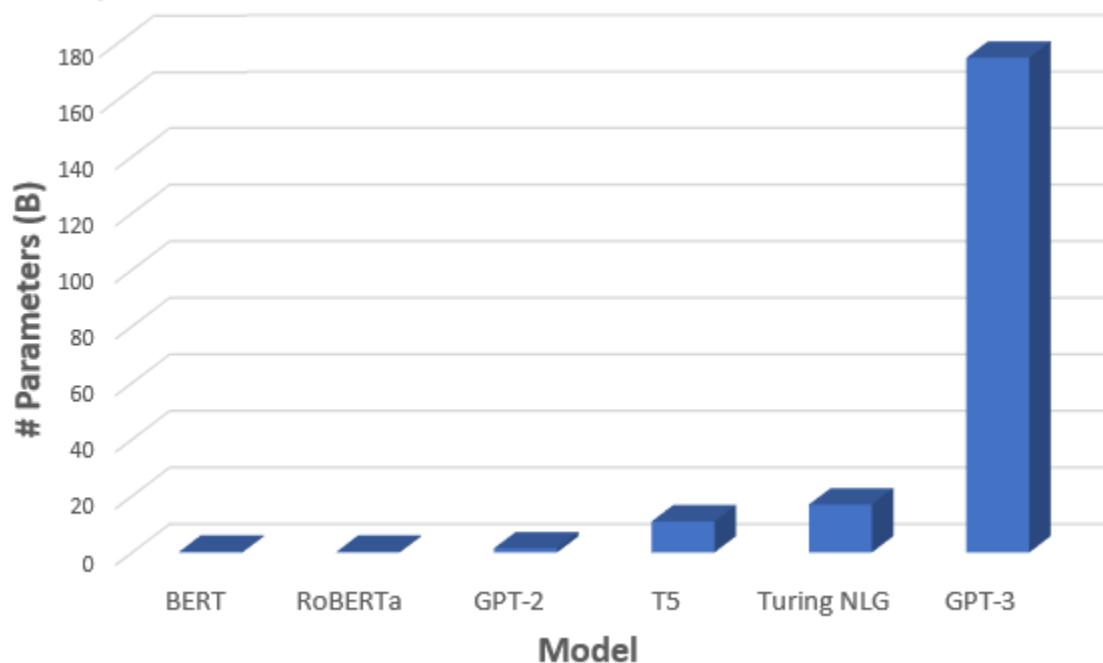
- is a deep learning model trained using internet data to generate any type of text
- introduced in May 2020 by OpenAI



GPT-3

(Generative Pre-trained Transformer 3)

- has a capacity of 175 billion machine learning parameters.



GPT-3

(Generative Pre-trained Transformer 3)

- is a deep learning model trained using internet data to generate any type of text
- introduced in May 2020 by OpenAI
- has a capacity of 175 billion machine learning parameters.
- The quality of the text generated by GPT-3 is so high that it can be difficult to determine whether or not it was written by a human, which has both benefits and risks.



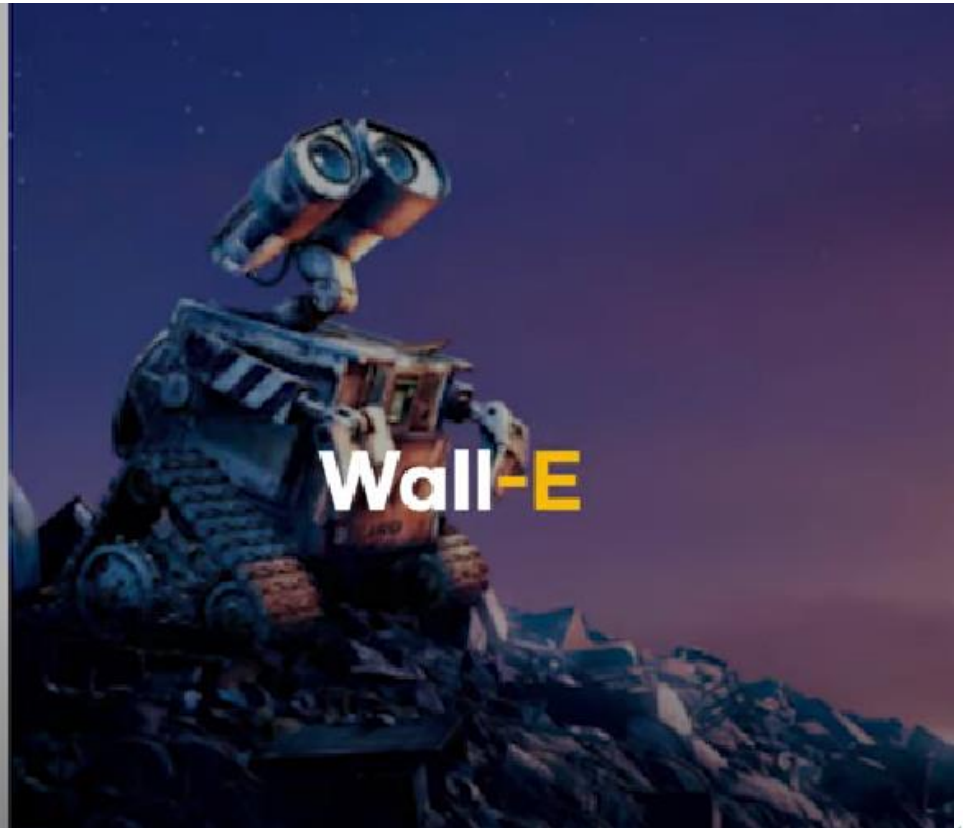
GPT-3

(Generative Pre-trained Transformer 3)



https://www.youtube.com/watch?v=PqbB07n_uQ4

DALL-E: Creating Images from Text



<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT PROMPT

an illustration of a baby daikon radish in a tutu walking a dog

AI-GENERATED
IMAGES

<https://bit.ly/2WRbDRf>

DALL-E: Creating Images from Text

TEXT PROMPT

an illustration of a baby daikon radish in a tutu walking a dog

AI-GENERATED
IMAGES



Edit prompt or view more images ↓

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT PROMPT an armchair in the shape of an avocado. . . .

AI-GENERATED
IMAGES

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT PROMPT

an armchair in the shape of an avocado. . . .

AI-GENERATED
IMAGES



Edit prompt or view more images ↓

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT PROMPT

a store front that has the word 'openai' written on it. . . .

AI-GENERATED
IMAGES

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT PROMPT

a store front that has the word 'openai' written on it. . . .

AI-GENERATED
IMAGES



Edit prompt or view more images ↓

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT & IMAGE
PROMPT

the exact same cat on the top as a sketch on the bottom

AI-GENERATED
IMAGES

<https://bit.ly/2WRbDRf>



DALL-E: Creating Images from Text

TEXT & IMAGE
PROMPT

the exact same cat on the top as a sketch on the bottom

AI-GENERATED
IMAGES



Edit prompt or view more images↓

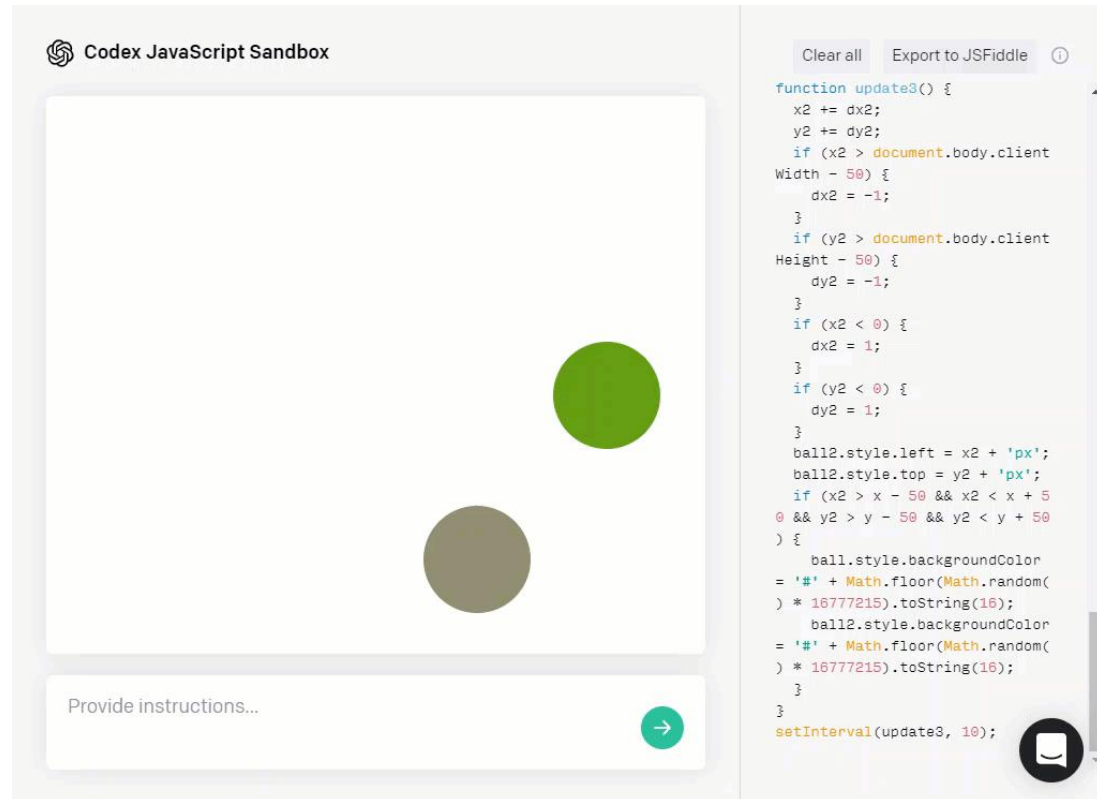
<https://bit.ly/2WRbDRf>

OPENAI CODEX

<https://arxiv.org/abs/2107.03374>

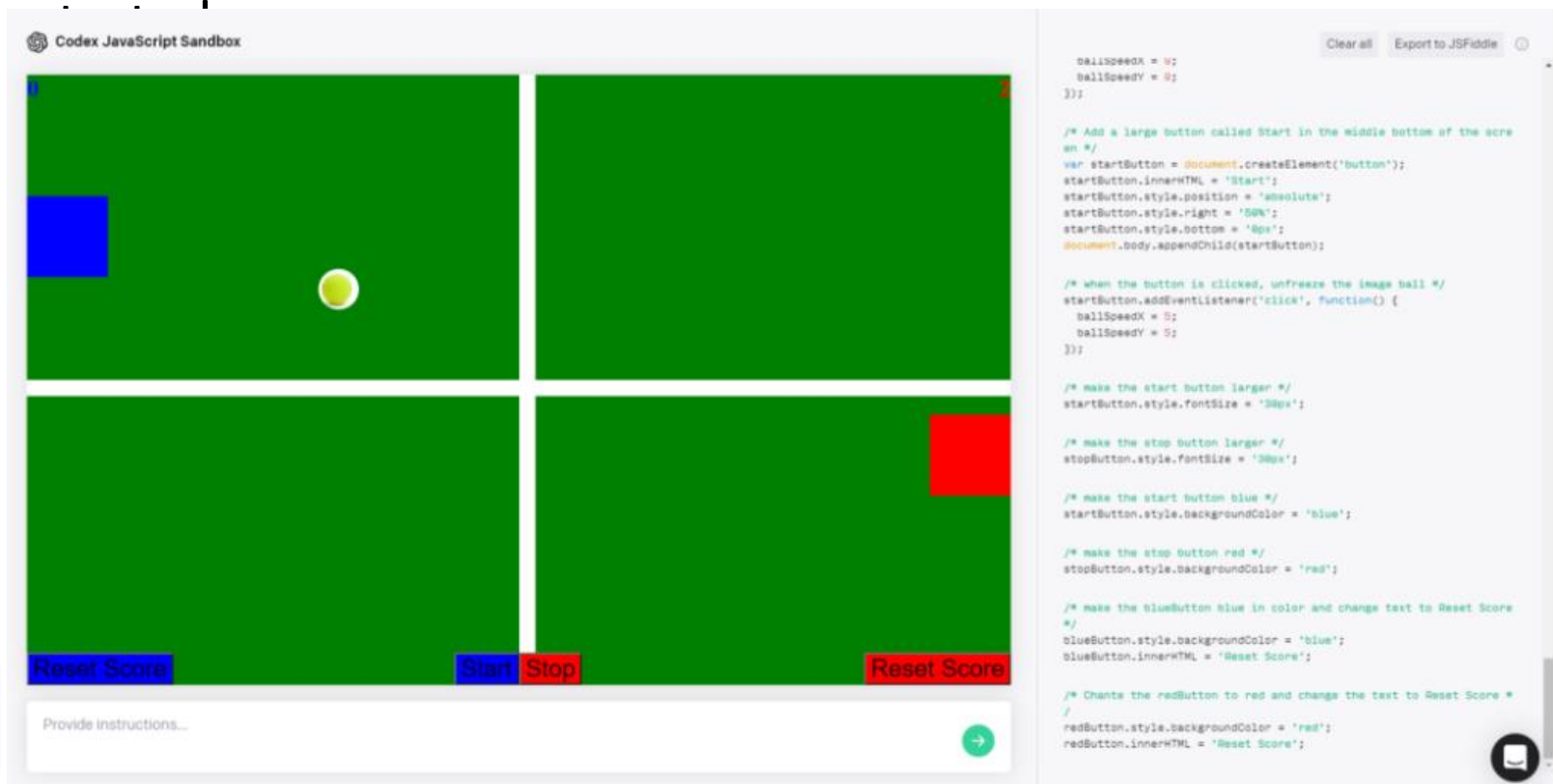
- is a general-purpose programming model
- It parses natural language and generates code in response.

A JavaScript application with two balls moving randomly and changing to random colors when overlapping



OPENAI CODEX

Create a fairly complicated dual-player application. The red and blue block can be moved up and down with specific keys. The scores can be reset and the game stopped and ...



The image displays the OpenAI Codex JavaScript Sandbox interface. On the left, a game canvas is shown with a green background, a yellow ball in the center, and a blue block on the left and a red block on the right. Below the canvas are buttons for 'Reset Score', 'Start', 'Stop', and 'Reset Score'. On the right, the JavaScript code is displayed, showing the game logic and UI elements.

```
ballSpeedX = 0;
ballSpeedY = 0;
});

/* Add a large button called Start in the middle bottom of the screen */
var startButton = document.createElement('button');
startButton.innerHTML = 'Start';
startButton.style.position = 'absolute';
startButton.style.right = '50px';
startButton.style.bottom = '50px';
document.body.appendChild(startButton);

/* when the button is clicked, unfreeze the image ball */
startButton.addEventListener('click', function() {
  ballSpeedX = 5;
  ballSpeedY = 5;
});

/* make the start button larger */
startButton.style.fontSize = '30px';

/* make the stop button larger */
stopButton.style.fontSize = '30px';

/* make the start button blue */
startButton.style.backgroundColor = 'blue';

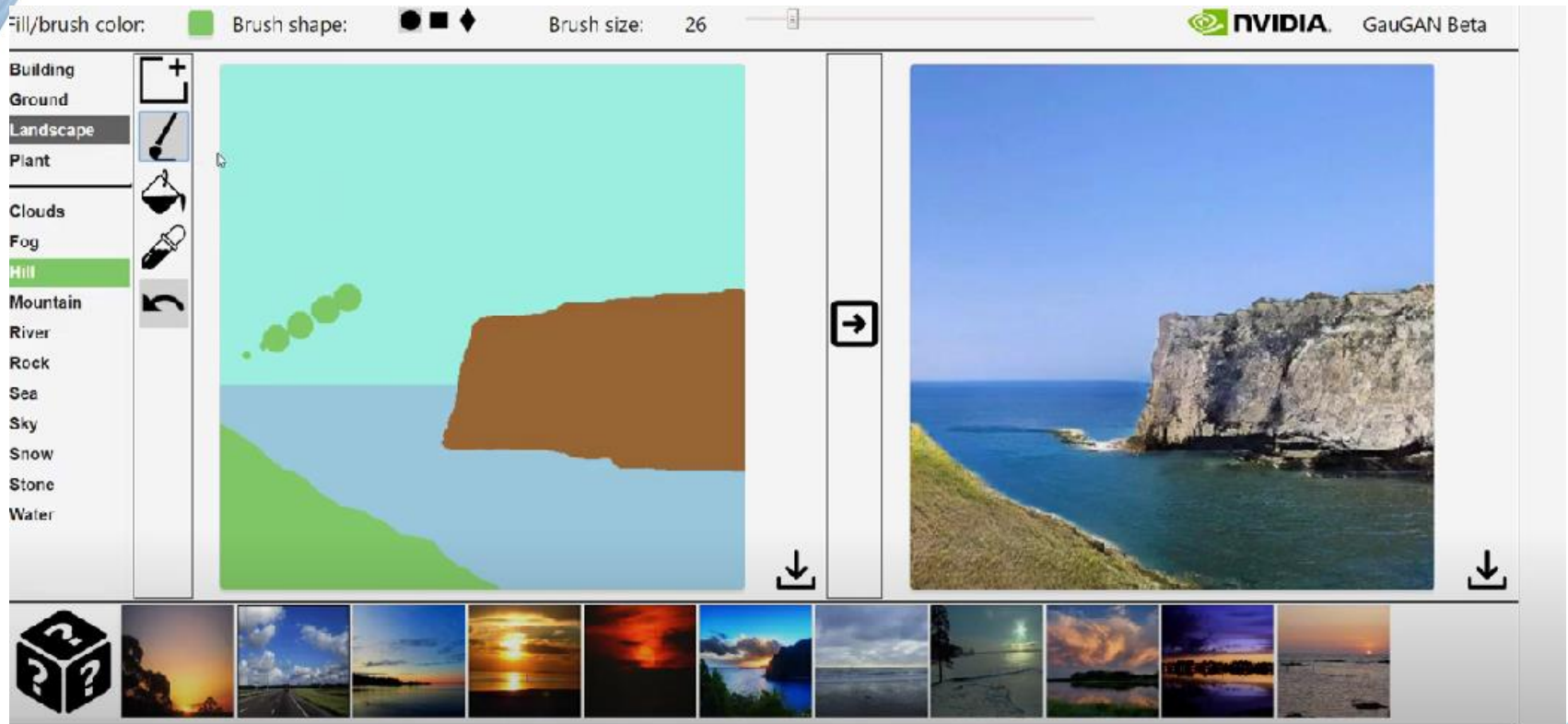
/* make the stop button red */
stopButton.style.backgroundColor = 'red';

/* make the blueButton blue in color and change text to Reset Score */
blueButton.style.backgroundColor = 'blue';
blueButton.innerHTML = 'Reset Score';

/* Change the redButton to red and change the text to Reset Score */
redButton.style.backgroundColor = 'red';
redButton.innerHTML = 'Reset Score';
```

GAUGAN 2

<https://www.youtube.com/watch?v=p9MAvRpT6Cg>



<http://gaugan.org/gaugan2/>

CHATGPT

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



Dari kapan kamu lahir?



Sebagai program komputer, saya tidak dilahirkan dalam arti yang sama seperti manusia. Saya dikembangkan oleh OpenAI, sebuah perusahaan teknologi kecerdasan buatan, dan saya mulai beroperasi pada tahun 2020 setelah melalui proses pelatihan yang panjang dan intensif menggunakan data dan algoritma pembelajaran mesin. Meskipun saya tidak dilahirkan seperti manusia, saya dirancang untuk membantu dalam berbagai tugas seperti menjawab pertanyaan, memberikan saran, dan menghasilkan teks.



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CHATGPT

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



Dari mana sumber pengetahuan kamu?



Saya didukung oleh OpenAI, sebuah perusahaan teknologi kecerdasan buatan, yang membangun dan memelihara model bahasa alami besar seperti saya. Sebagai model bahasa alami, saya dihasilkan dengan menggunakan teknologi pemodelan bahasa alami yang mengolah sejumlah besar teks dalam berbagai bahasa, termasuk buku, artikel, dokumen, website, dan banyak lagi. Sumber data ini diproses oleh algoritma pembelajaran mesin untuk mempelajari pola, asosiasi, dan makna dalam bahasa, sehingga saya dapat memberikan jawaban yang seakurat mungkin berdasarkan data yang ada.

Namun, perlu diingat bahwa meskipun saya dirancang untuk memberikan jawaban seakurat mungkin, saya juga masih bisa membuat kesalahan dan tidak selalu bisa memberikan jawaban yang benar. Selain itu, saya tidak dapat memberikan penilaian yang memerlukan pengetahuan spesifik yang hanya dapat diberikan oleh orang yang berpengalaman dan terlatih di bidang tersebut.

DL App

Video ini sepenuhnya dibuat dengan bbrp AI tools:





- Foto dan wajah dibuat dgn Stable Diffusion (text to image);
- Suara dibuat dgn Murf.ai (text to audio);
- Narasi dibuat dgn ChatGPT (text to text);
- Videonya dibuat dengan D-ID (image+audio to video).



Questions?



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 [if.unpar](https://www.instagram.com/if.unpar)