

NUS-ISS

Problem Solving Using Pattern Recognition



Deep learning: Create

by Dr. Tan Jen Hong

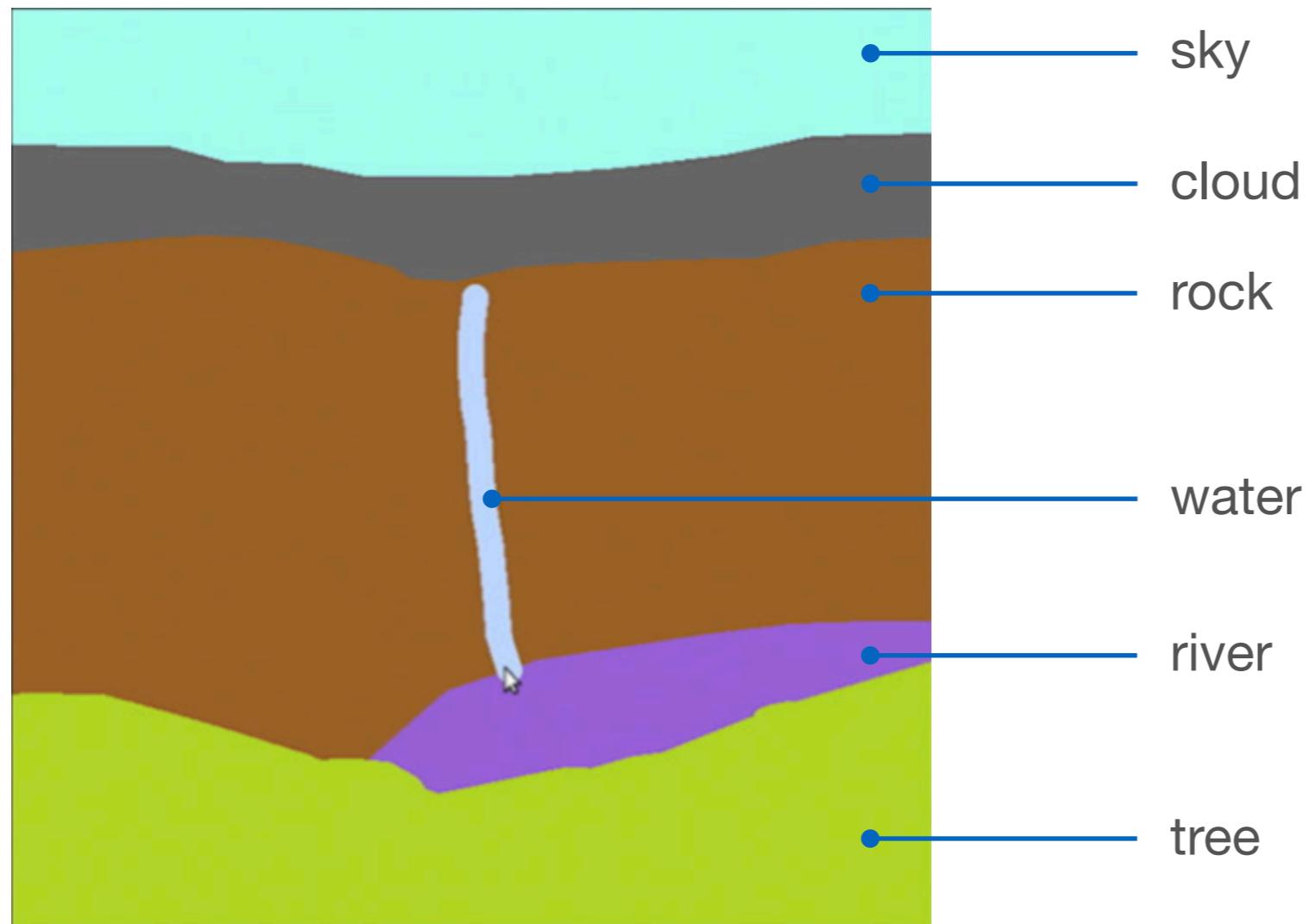
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Several slides have been redacted to provide better learning experience. We will upload the complete materials after the class ends.

How deep learning is used to create: Use cases

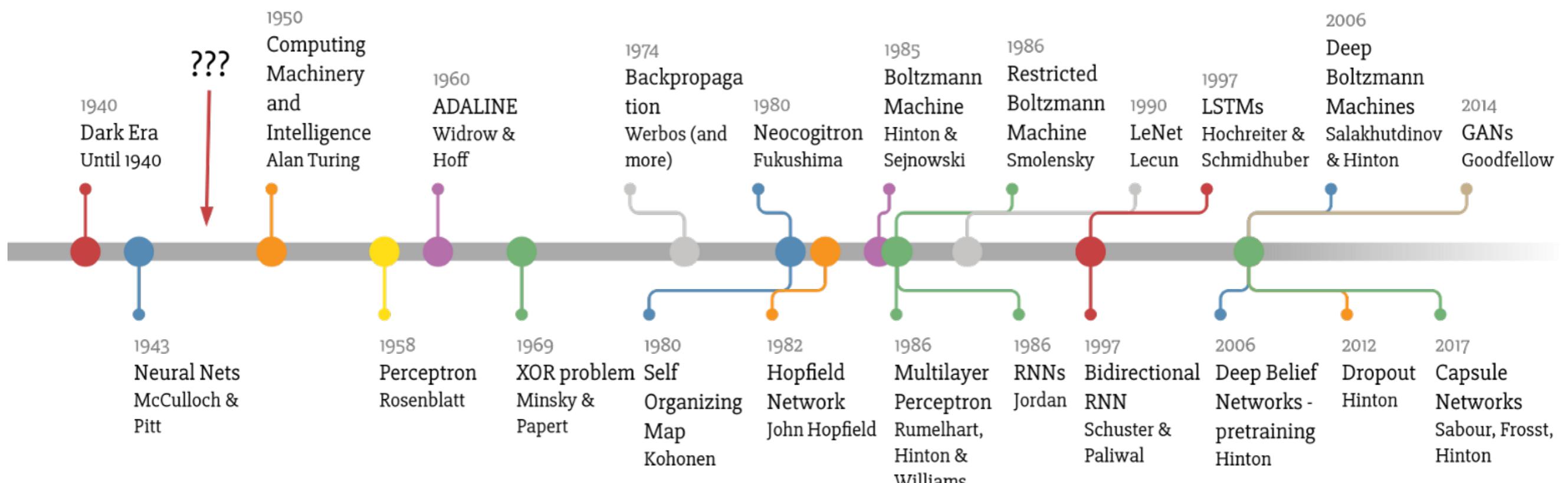
Drawing

A sketch



Time line

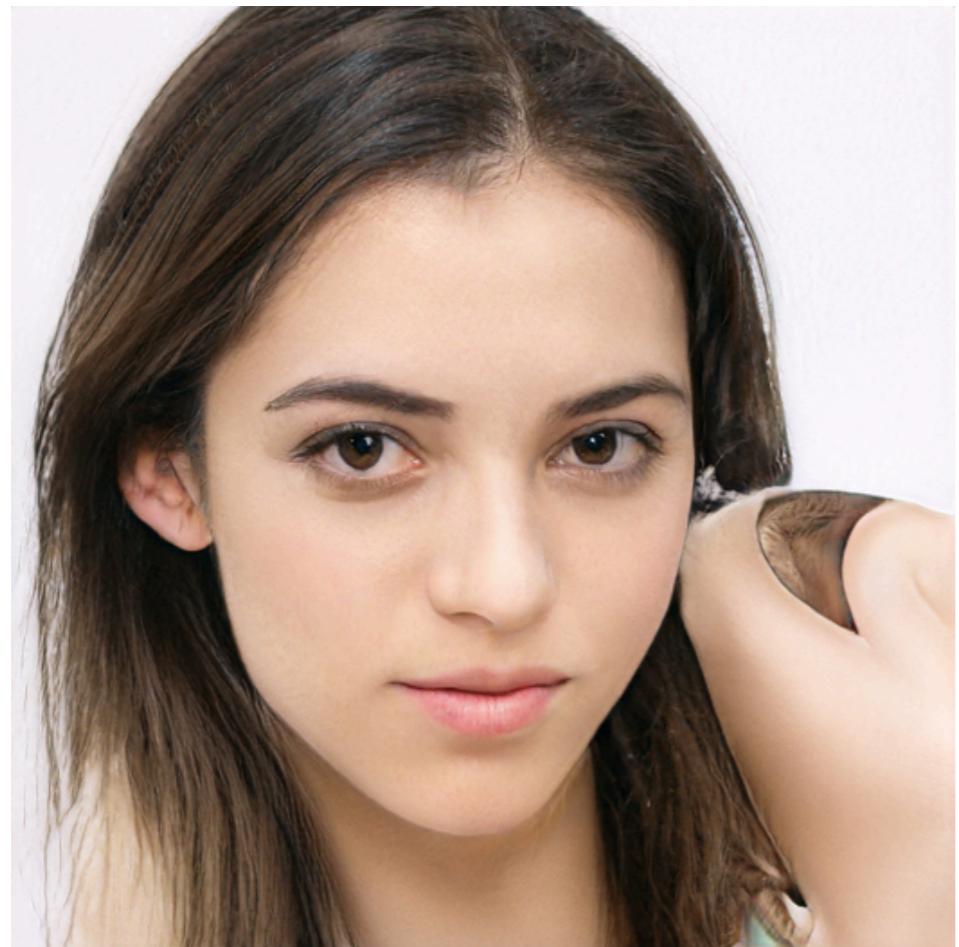
Generative adversarial networks



Source: <https://medium.com/@faviovazquez>

Do you know...

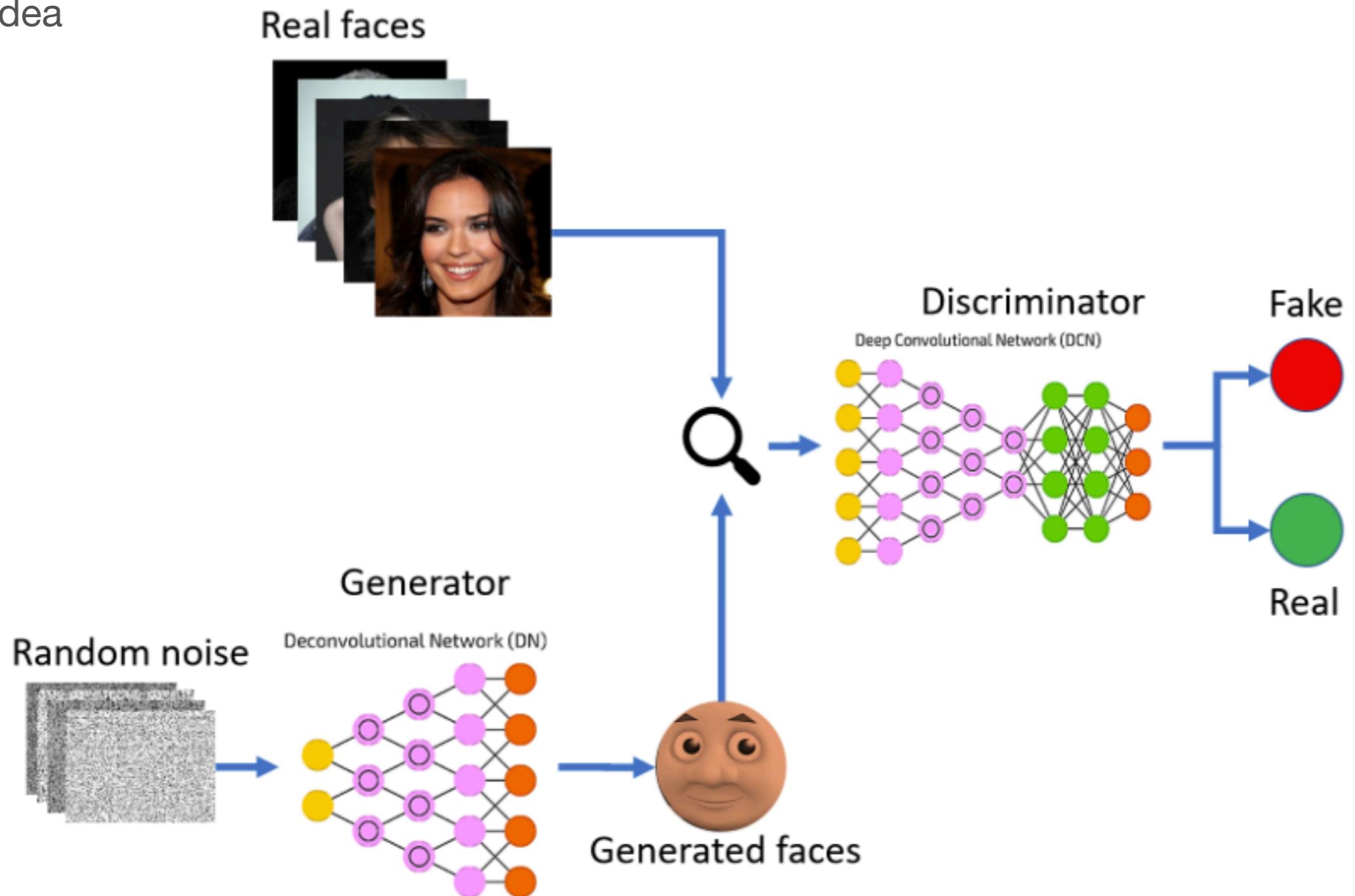
Who she or he is?



Source: <https://thispersondoesnotexist.com>

Generative Adversarial Networks

The idea

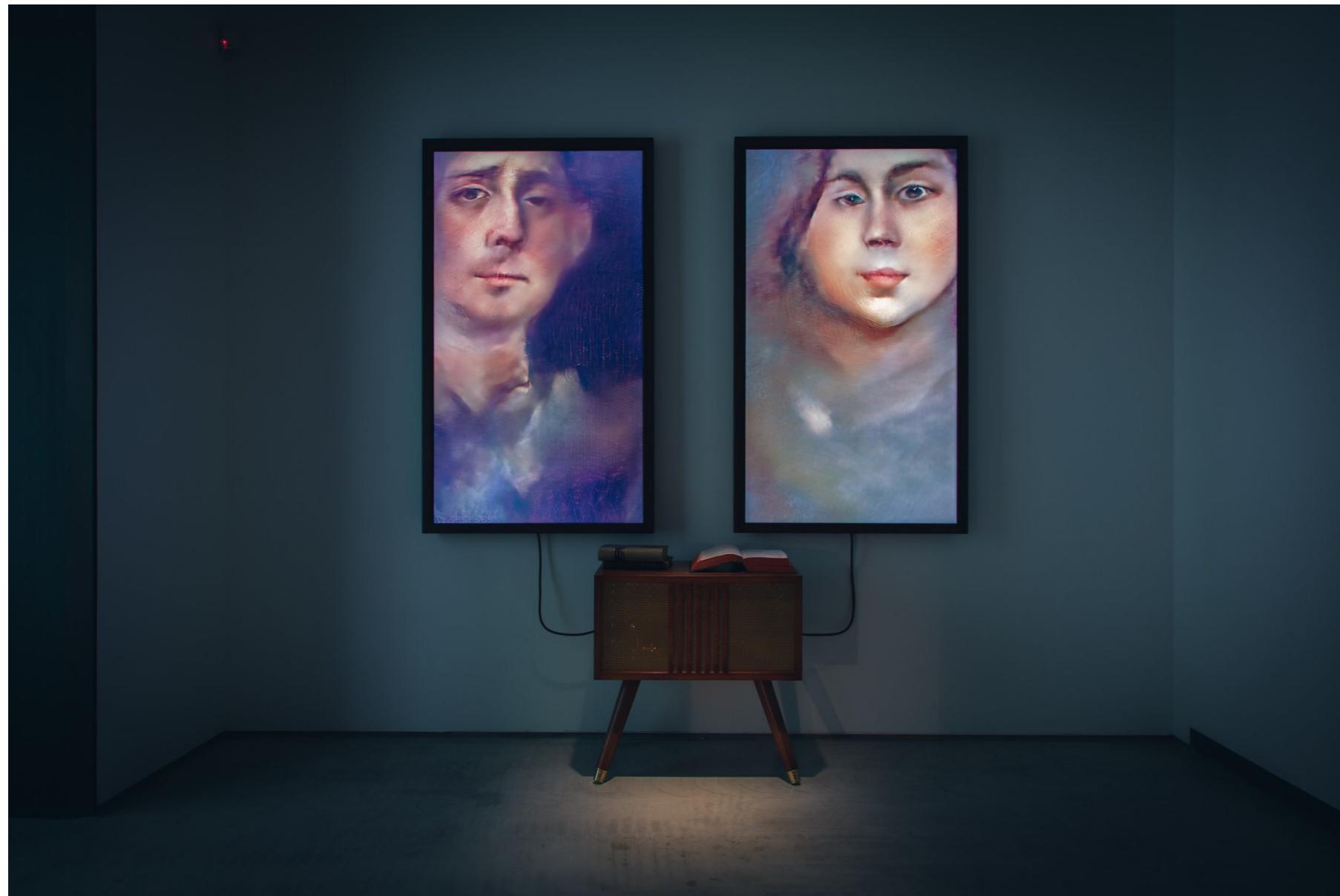


Source: <https://www.spindox.it/en/blog/generative-adversarial-neural-networks/>

Generative Adversarial Networks

How about ... artpiece?

- Sold through auction at Sotheby



Source: Sothebys

Generative Adversarial Networks

How about ... new Pokemon?



Source: <https://twitter.com/roadrunning01/status/1111414873043267586>

Practical usage

By Singapore government

The screenshot shows a web browser window for 'ColouriseSG' at the URL <https://colourise.sg>. The page has a red header with the 'ColouriseSG' logo. The main content area has a black background. It features the text 'Colourise your black and white photos' in large white font, followed by a subtitle 'A deep learning colouriser prototype specifically for old Singaporean photos.' Below this are two buttons: 'Try it yourself' (red) and 'Learn more' (white). To the right is a side-by-side comparison of a historical black and white photograph of Chinese Girls School in Singapore (left) and its colorized version (right). The colorized version shows more detail in the clothing and surroundings. Below the images is a caption: 'Chinese Girls School, Singapore, between 1890 and 1923. Frank and Frances Carpenter Collection, US Library of Congress.'

Source: <https://blog.data.gov.sg/bringing-black-and-white-photos-to-life-using-colourise-sg-435ae5cc5036>

Practical usage

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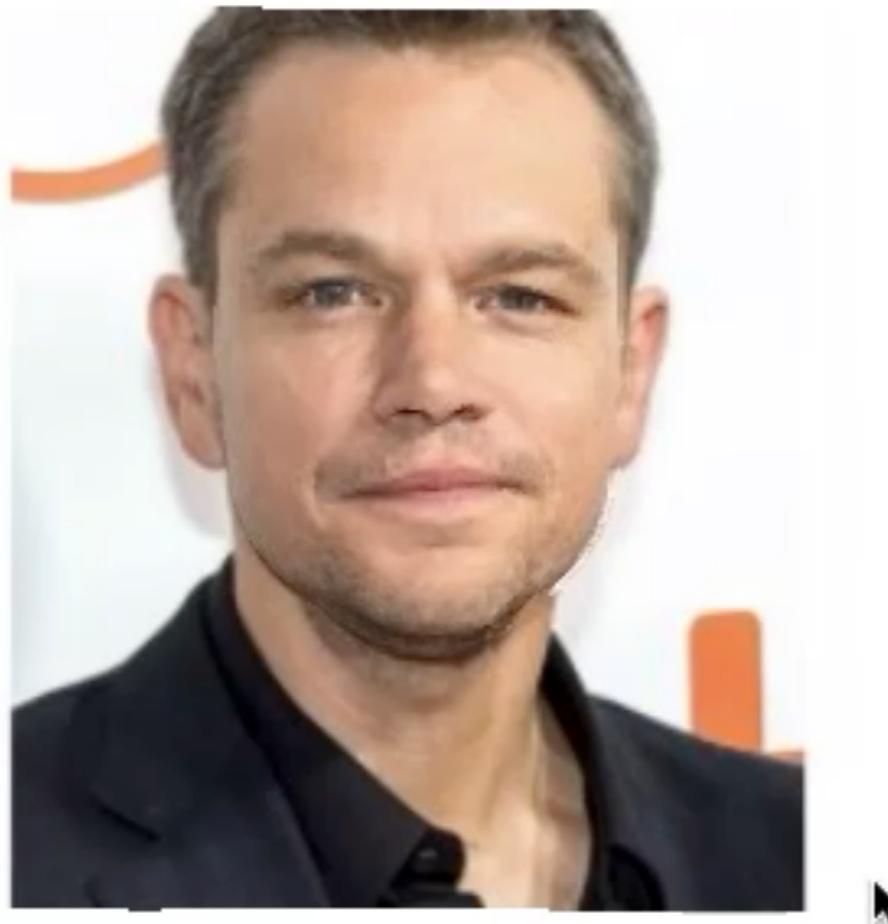
Practical usage fashion



Source: <https://qz.com/1090267/artificial-intelligence-can-now-show-you-how-those-pants-will-fit/>

How about 3D?

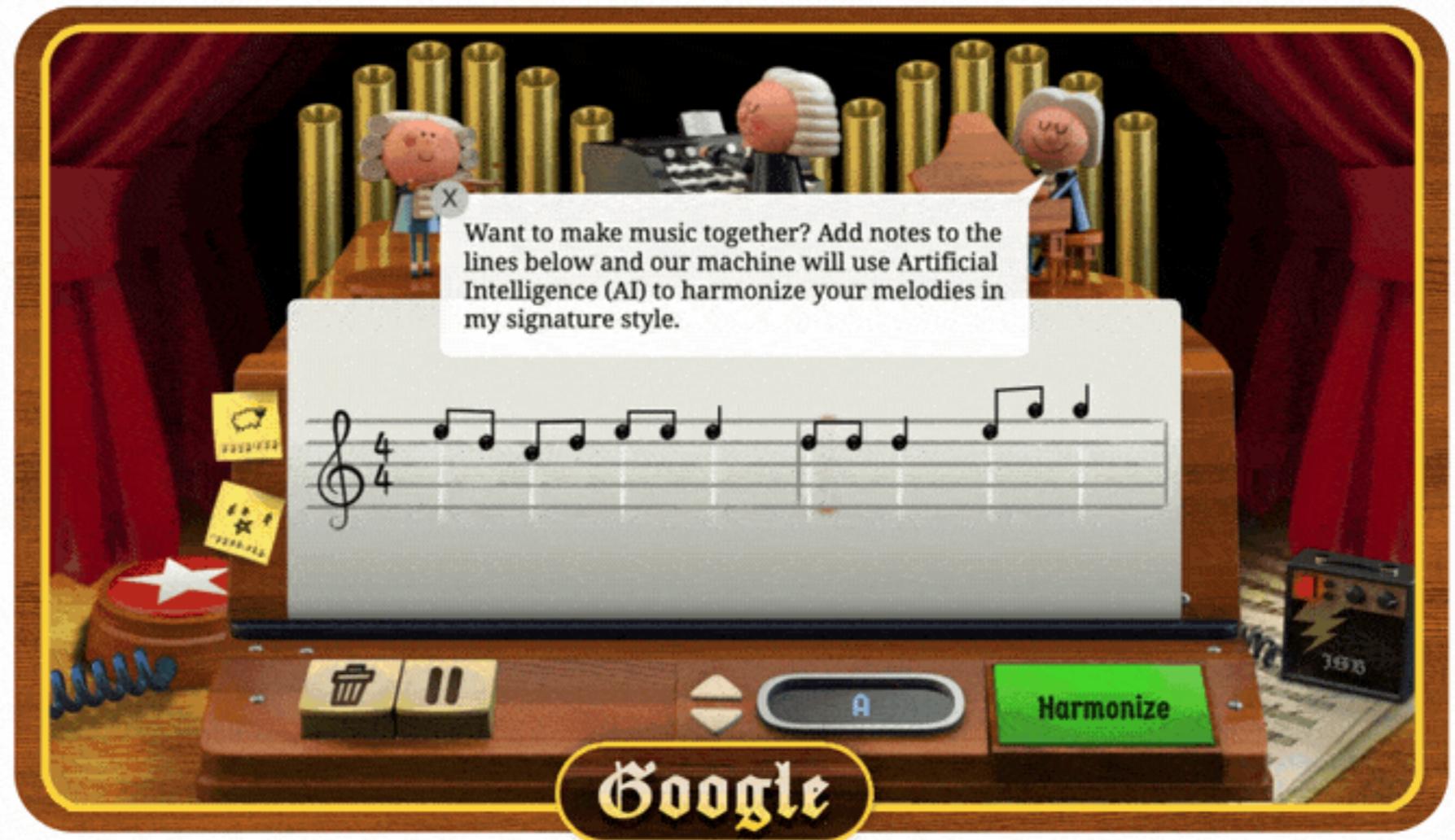
Face?



Source: <http://cvl-demos.cs.nott.ac.uk/vrn/index.php>

Composing ...

Bach



Source: <https://www.google.com/doodles/celebrating-johann-sebastian-bach>

Listen carefully

Music Transformer

Source: <https://magenta.tensorflow.org/music-transformer>

Speaking for you ...

Text to Speech

"The buses aren't the problem, they actually provide a solution"

"The buses aren't the PROBLEM, they actually provide a SOLUTION"

"The quick brown fox jumps over the lazy dog."

"Does the quick brown fox jumps over the lazy dog?"

Source: <https://google.github.io/tacotron/publications/tacotron/index.html>

A news report

Read carefully

The scientist named the population, after their distinctive horn, Ovid's Unicorn. These four-horned, silver-white unicorns were previously unknown to science.

Now, after almost two centuries, the mystery of what sparked this odd phenomenon is finally solved.

Dr. Jorge Pérez, an evolutionary biologist from the University of La Paz, and several companions, were exploring the Andes Mountains when they found a small valley, with no other animals or humans.

Pérez noticed that the valley had what appeared to be a natural fountain, surrounded by two peaks of rock and silver snow.

Pérez and the others then ventured further into the valley. “By the time we reached the top of one peak, the water looked blue, with some crystals on top,” said Pérez.

Pérez and his friends were astonished to see the unicorn herd. These creatures could be seen from the air without having to move too much to see them – they were so close they could touch their horns.

A news report

The prompt

In a shocking finding, scientist discovered a herd of unicorns living in a remote, previously unexplored valley, in the Andes Mountains. Even more surprising to the researchers was the fact that the unicorns spoke perfect English.

Source: <https://openai.com/blog/better-language-models/>

GPT-2

The good and the bad

- AI writing assistants
 - Generate misleading news articles
- More capable dialogue agents
 - Impersonate others online
- Unsupervised translation between languages
 - Automate the production of abusive or faked content to post on social media
- Better speech recognition systems
 - Automate the production of spam/phishing content

Source: <https://www.inkstonenews.com/tech/chinese-robot-copying-machine-causes-online-debate/article/3000875>

GPT-2

Grave concerns

- Due to concerns about large language models being used to generate deceptive, biased, or abusive language at scale, the researchers did not release the full dataset and code.
- They were not sure they were doing the right things, but they hoped the community should start to tackle this issue.

Source: <https://openai.com/blog/better-language-models/>