

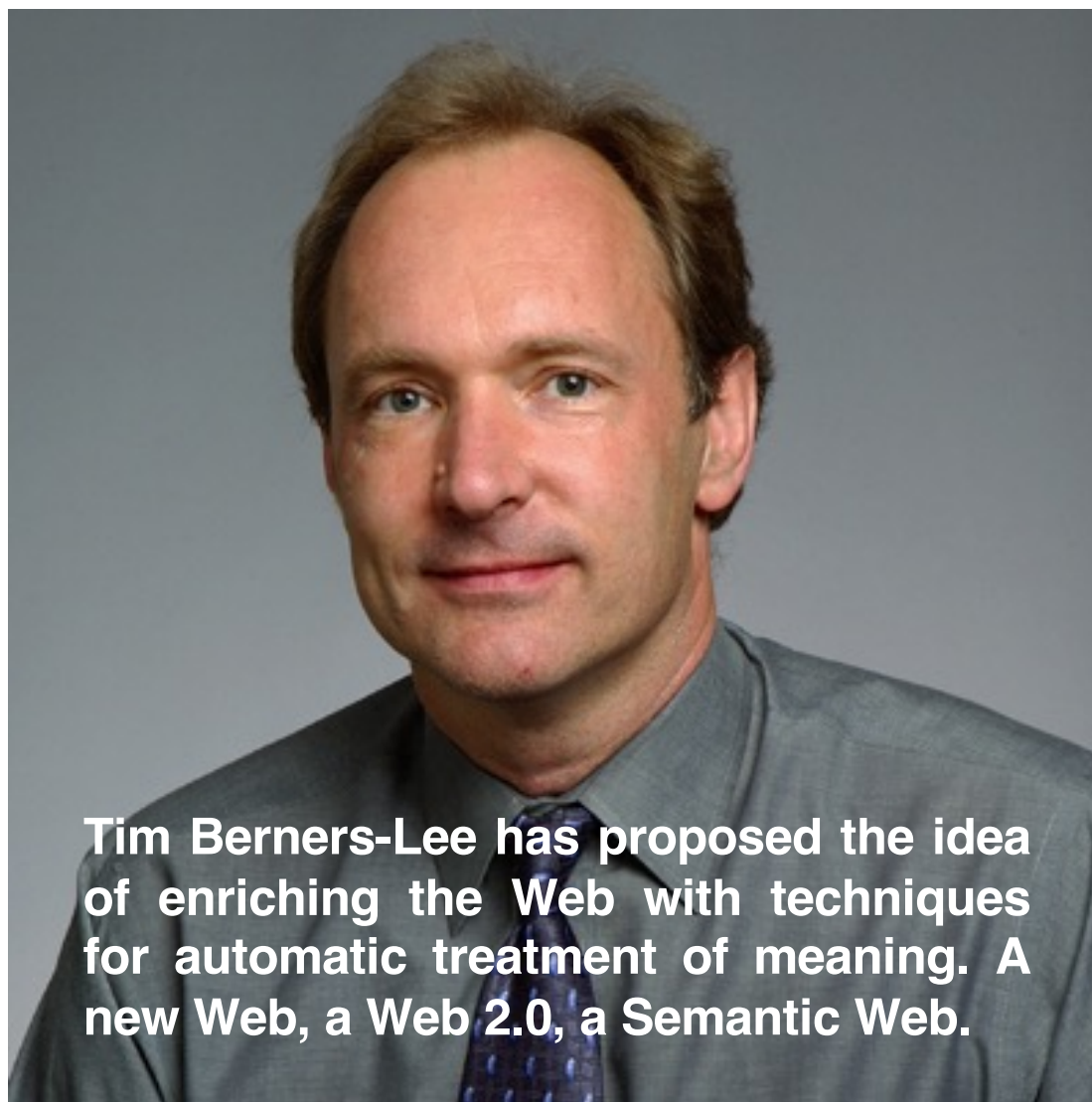
Digital Humanities

Lecture 8

April 17

2026

Mario Verdicchio



Tim Berners-Lee has proposed the idea of enriching the Web with techniques for automatic treatment of meaning. A new Web, a Web 2.0, a Semantic Web.

A computer only processes signs syntactically.

We want a computer to handle semantics as well.

There must be a way to express semantics syntactically, to express meaning with signs.

Semantic Web

“Web 2.0” was originally meant to refer to the Semantic Web.

A radically new version (2.0) of the Web was to be born, enhanced with techniques for the automatic treatment of meaning.

Versioning: dealing with different versions of a product.

1.0 = initial release, first version

**1.1 }
1.2 } following versions with small changes
... }**

2.0 = new version with significant changes

2.1

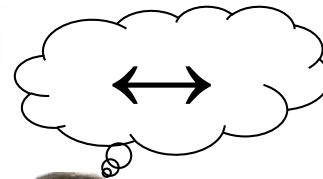
...

Semantic Web: the basic idea

Instead of relying only on the mind of the Web user to create the link between text and entities, that is, between syntax and semantics ...



entity in the world



Cat

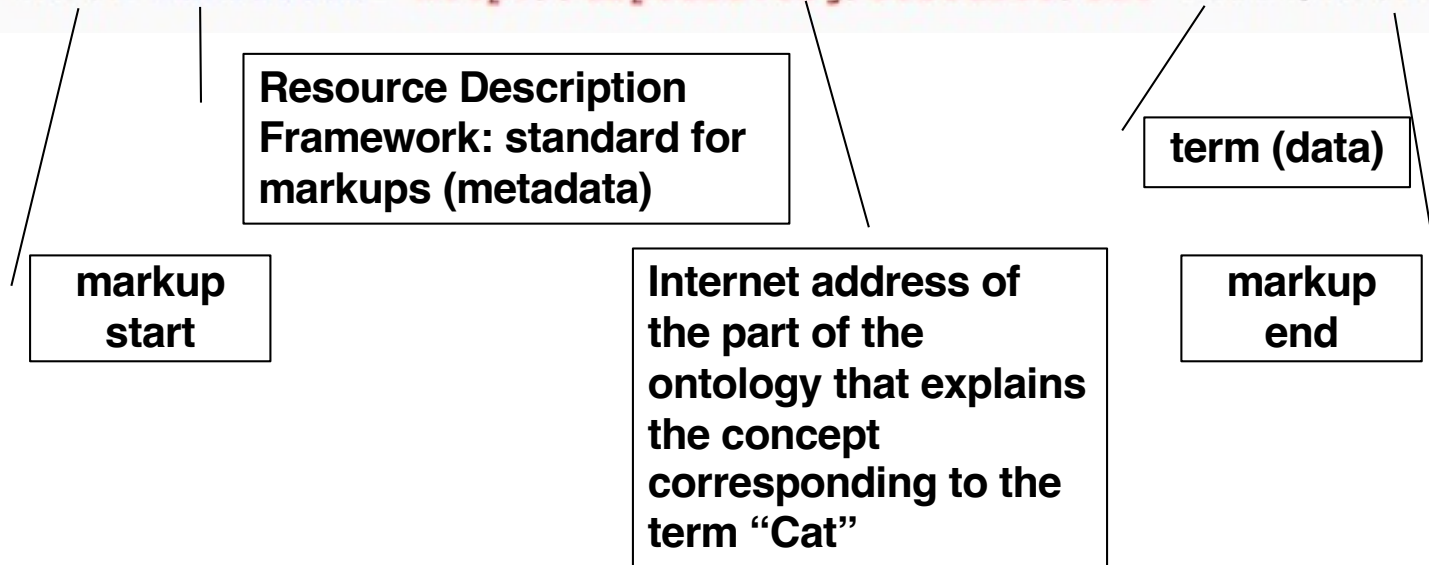
sequence of characters



Semantic Web: the basic idea

... use extra symbols, in the form of markups (metadata), that refer to an ontology (a shared document that is similar to a vocabulary, with an additional organization of concepts in hierarchies).

```
<item rdf:about="http://dbpedia.org/resource/Cat">Cat</item>
```



Resource Description Framework

It is a standard that prescribes the way in which the data we work with must be described, that is, it provides information on metadata: data about data.

```
<item rdf:about="http://dbpedia.org/resource/Cat">Cat</item>
```

Resource Description Framework: standard for markups (metadata)



Obviously, like all agreements that aim at becoming a standard, RDF must be accepted and followed by all Web content creators in order to function. Just like ASCII, RGB, JPG, MP3, etc.



Semantic Web: problem #1

All Web users must follow a single convention on how to describe data on the Web. RDF is a proposal, but it has not been universally accepted.

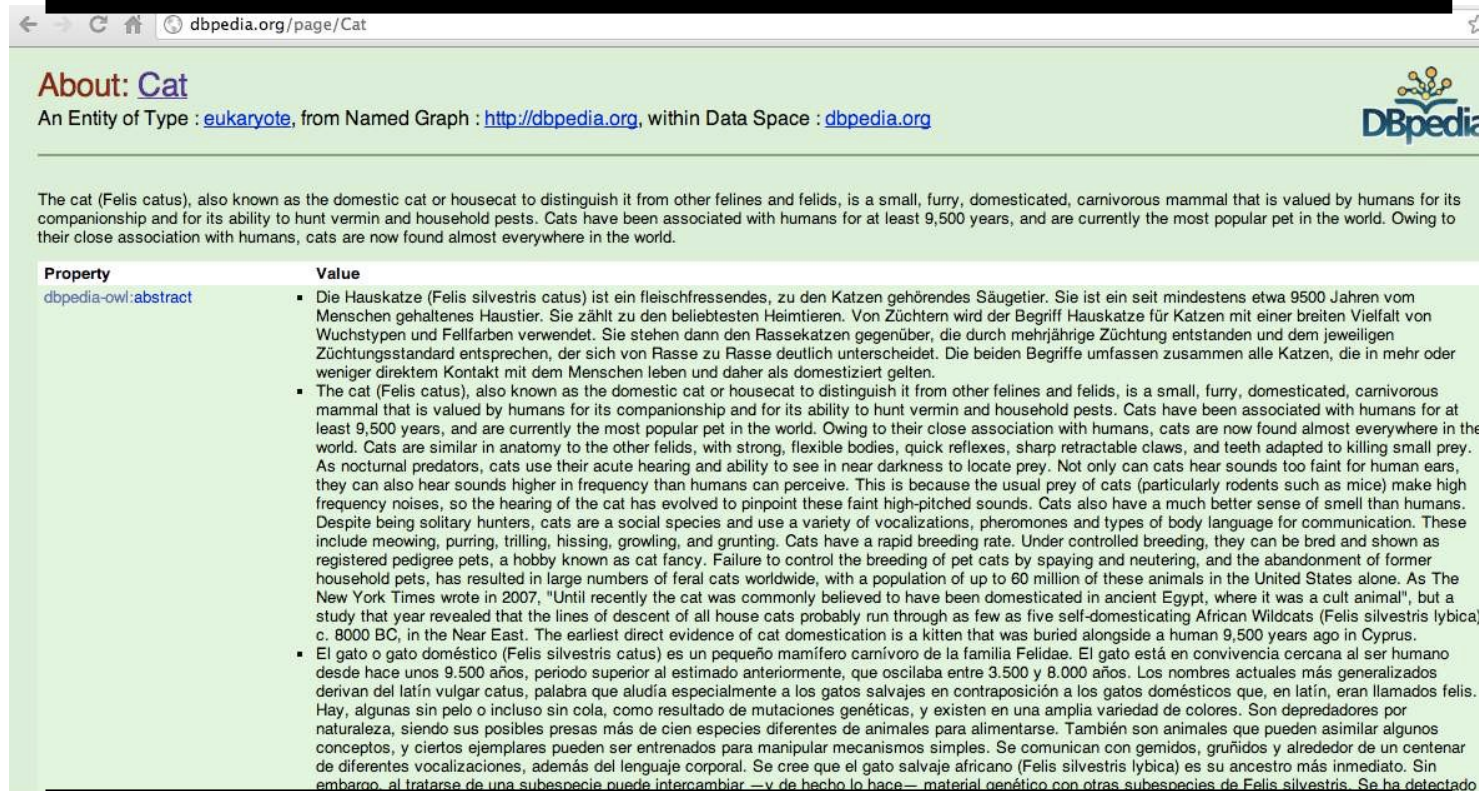
Ontology

An ontology is meant to define all the concepts belonging to a particular domain, and to list all the possible relationships between them.

```
<item rdf:about="http://dbpedia.org/resource/Cat">Cat</item>
```

Internet address of the part of the ontology that explains the concept corresponding to the term "Cat"

If we go to dbpedia.org/resource/Cat we find this description, in several languages.



The screenshot shows a web browser window with the URL dbpedia.org/page/Cat. The page title is "About: Cat" and it identifies the entity as a [eukaryote](#) from the Named Graph <http://dbpedia.org>. The DBpedia logo is visible in the top right corner.

The main text describes the cat (*Felis catus*), also known as the domestic cat or housecat, as a small, furry, domesticated, carnivorous mammal valued by humans for its companionship and ability to hunt vermin and household pests. It notes that cats have been associated with humans for at least 9,500 years and are currently the most popular pet in the world.

Property	Value
dbpedia-owl:abstract	<ul style="list-style-type: none">Die Hauskatze (<i>Felis silvestris catus</i>) ist ein fleischfressendes, zu den Katzen gehörendes Säugetier. Sie ist ein seit mindestens etwa 9500 Jahren vom Menschen gehaltenes Haustier. Sie zählt zu den beliebtesten Heimtieren. Von Züchtern wird der Begriff Hauskatze für Katzen mit einer breiten Vielfalt von Wuchstypen und Fellfarben verwendet. Sie stehen dann den Rassekatzen gegenüber, die durch mehrjährige Züchtung entstanden und dem jeweiligen Züchtungsstandard entsprechen, der sich von Rasse zu Rasse deutlich unterscheidet. Die beiden Begriffe umfassen zusammen alle Katzen, die in mehr oder weniger direktem Kontakt mit dem Menschen leben und daher als domestiziert gelten.The cat (<i>Felis catus</i>), also known as the domestic cat or housecat to distinguish it from other felines and felids, is a small, furry, domesticated, carnivorous mammal that is valued by humans for its companionship and for its ability to hunt vermin and household pests. Cats have been associated with humans for at least 9,500 years, and are currently the most popular pet in the world. Owing to their close association with humans, cats are now found almost everywhere in the world. Cats are similar in anatomy to the other felids, with strong, flexible bodies, quick reflexes, sharp retractable claws, and teeth adapted to killing small prey. As nocturnal predators, cats use their acute hearing and ability to see in near darkness to locate prey. Not only can cats hear sounds too faint for human ears, they can also hear sounds higher in frequency than humans can perceive. This is because the usual prey of cats (particularly rodents such as mice) make high frequency noises, so the hearing of the cat has evolved to pinpoint these faint high-pitched sounds. Cats also have a much better sense of smell than humans. Despite being solitary hunters, cats are a social species and use a variety of vocalizations, pheromones and types of body language for communication. These include meowing, purring, trilling, hissing, growling, and grunting. Cats have a rapid breeding rate. Under controlled breeding, they can be bred and shown as registered pedigree pets, a hobby known as cat fancy. Failure to control the breeding of pet cats by spaying and neutering, and the abandonment of former household pets, has resulted in large numbers of feral cats worldwide, with a population of up to 60 million of these animals in the United States alone. As The New York Times wrote in 2007, "Until recently the cat was commonly believed to have been domesticated in ancient Egypt, where it was a cult animal", but a study that year revealed that the lines of descent of all house cats probably run through as few as five self-domesticating African Wildcats (<i>Felis silvestris lybica</i>) c. 8000 BC, in the Near East. The earliest direct evidence of cat domestication is a kitten that was buried alongside a human 9,500 years ago in Cyprus.El gato o gato doméstico (<i>Felis silvestris catus</i>) es un pequeño mamífero carnívoro de la familia Felidae. El gato está en convivencia cercana al ser humano desde hace unos 9.500 años, periodo superior al estimado anteriormente, que oscilaba entre 3.500 y 8.000 años. Los nombres actuales más generalizados derivan del latín vulgar <i>catus</i>, palabra que aludía especialmente a los gatos salvajes en contraposición a los gatos domésticos que, en latín, eran llamados <i>felis</i>. Hay, algunas sin pelo o incluso sin cola, como resultado de mutaciones genéticas, y existen en una amplia variedad de colores. Son depredadores por naturaleza, siendo sus posibles presas más de cien especies diferentes de animales para alimentarse. También son animales que pueden asimilar algunos conceptos, y ciertos ejemplares pueden ser entrenados para manipular mecanismos simples. Se comunican con gemidos, gruñidos y alrededor de un centenar de diferentes vocalizaciones, además del lenguaje corporal. Se cree que el gato salvaje africano (<i>Felis silvestris lybica</i>) es su ancestro más inmediato. Sin embargo, al tratarse de una subespecie puede intercambiar —y de hecho lo hace— material genético con otras subespecies de <i>Felis silvestris</i>. Se ha detectado

The description includes several ways of referring to a cat in different languages, as well as a phylogenetic tree.

Semantic Web: problem #2

For each existing concept, all Web users must agree on the ontology that describes it. DBpedia is a proposal, but it has not been universally accepted.

Semantic Web: problem #3

The chicken or the egg.





The “chicken or the egg problem” refers to a stalemate. In the case of the hen and the egg, the question arises as follows: without the egg, the hen cannot be born, but without a hen, an egg cannot be made.



As far as the semantic web is concerned, the issue is about the daunting work required to create ontologies for all the concepts and label all data in existing and future Web pages with semantic markups that refer to those ontologies.

**Why can't we make
computers do that job?**

What does «cat» mean?



For the computer to use the markup of «cat» and show the user a photo of a cat (for example), the markup must already be there.



For the markup of «cat» to be there, an agent must have understanding of the meaning of «cat» and have associated it with the right entry in the ontology.



**That agent cannot be a computer,
because such task requires understanding
of meaning, and without a semantic
markup a computer cannot do anything.
That agent must be a human.**





Computers could do the job, if the job were already done. To kickstart the job, we need an agent that knows that “cat” means



Why can't we make computers do that job?



The “chicken or the egg problem” refers to a stalemate. In the case of the hen and the egg, the question arises as follows: without the egg, the hen cannot be born, but without a hen, an egg cannot be made.



As far as the semantic web is concerned, the issue is about the daunting work required to label all concepts present in existing and future Web pages with semantic markups. Such work clearly cannot be automated, because it assumes that computers already know the meaning of words.

When it comes to Semantic Web, therefore, the “chicken or the egg problem” describes the following stalemate: no Web content producer wants to start the titanic enterprise of marking Web pages up if he/she is not sure that the Semantic Web will really become a thing. However, for the Semantic Web to really happen, everyone has to markup the content they publish.

Result:

The term “Web 2.0” has been recycled to refer to the Social Web.

The Semantic Web is now known as “Web 3.0”, and we don’t know whether it will ever happen.



The Digital in Digital Art

News from 2018

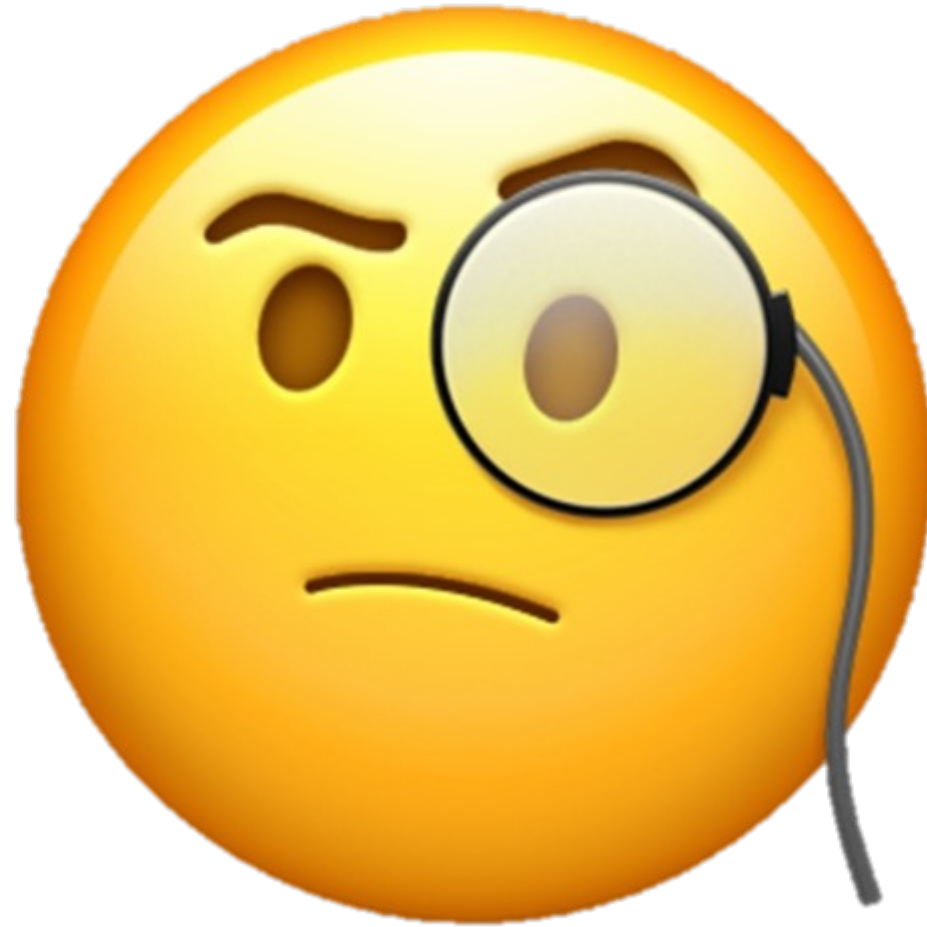
- Artificial-Intelligence-based artwork to be auctioned at Christie's



“Edmond de Belamy, from La Famille de Belamy” by the French collective Obvious

Reactions

Reactions



Reactions

- “The technology used to create the work, has been used by artists since around 2015. This group is totally irrelevant.”
 - Ahmed Elgammal, Director of the Art and Artificial Intelligence Laboratory at Rutgers University
- “When I saw that announcement of the auction, my reaction was ‘you can’t be serious.’ The portrait by Obvious is connect-the-dots children’s painting.”
 - Mario Klingemann, German artist and artist-in-residence at Google Labs, Paris

since around 2015
totally irrelevant

Do 3 years make a technique irrelevant?

- Artificial Intelligence Technique used by
Obvious: 3 years

Do 3 years make a technique irrelevant?

- Artificial Intelligence Technique used by Obvious: 3 years
- Computers: 70 years



1950. The United States Government receives the UNIVAC 1101. This computer is considered to be the first computer that was capable of storing and running a program from memory.

Do 3 years make a technique irrelevant?

- Artificial Intelligence Technique used by Obvious: 3 years
- Computers: 70 years
- Sculpture: 40,000 years

Löwenmensch, from Hohlenstein-Stadel, now in Ulmer Museum, Ulm, Germany, the oldest known anthropomorphic animal-human statuette, Aurignacian era, c. 35–40,000 BP



Do 3 years make a technique irrelevant?

- Artificial Intelligence Technique used by Obvious: 3 years
- Computers: 70 years
- Sculpture: 40,000 years
- Painting: 42,000 years

Found in a cave on Spain's Costa del Sol, six paintings of seals are at least 42,000 years old and are the only known artistic images created by Neanderthal man.

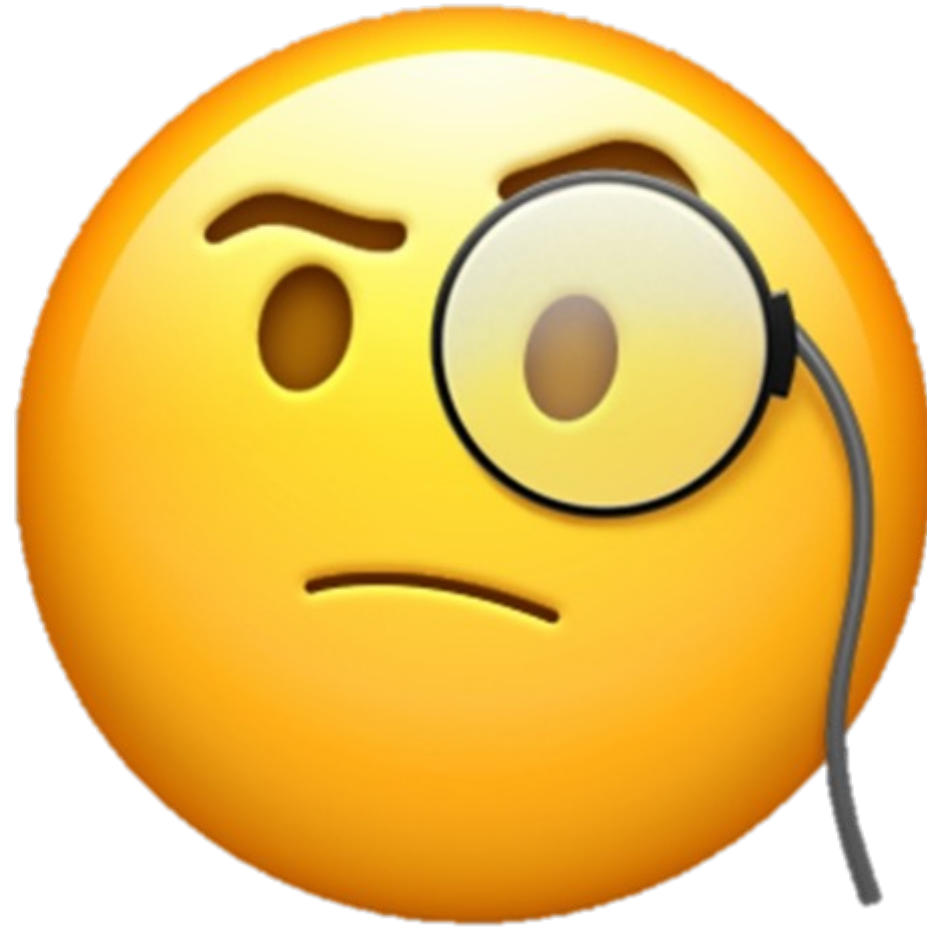


A 3-year-old iPhone



iPhone 13 (2021)

Reactions



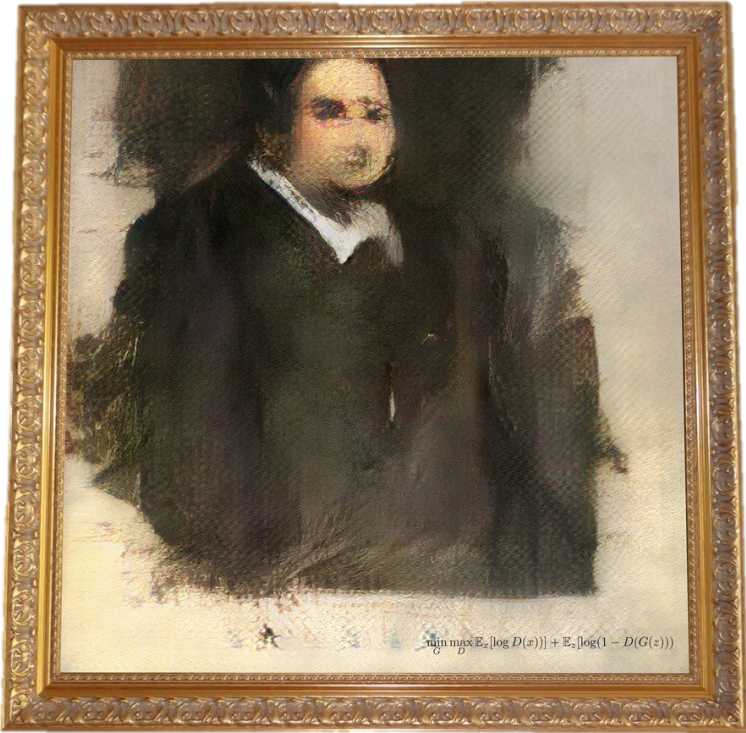
Reactions



Do 3 years make a technique irrelevant?

- Artificial Intelligence Technique used by Obvious: 3 years
- Computers: 70 years

The
portrait by Obvious is connect-the-dots children's
painting.



Obvious



Obvious



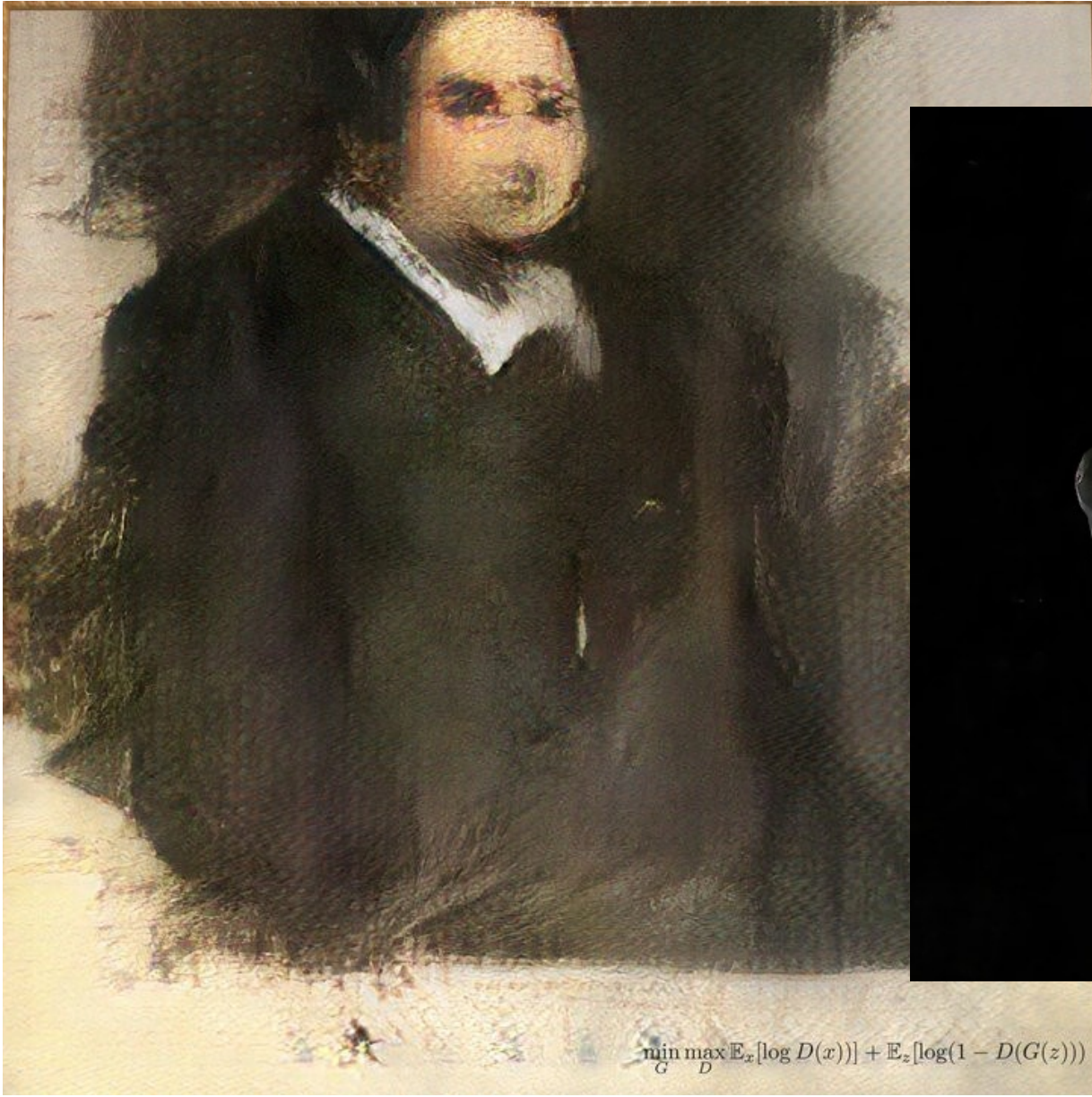
**Mario
Klingemann**



$$\min_G \max_D \mathbb{E}_x [\log D(x)] + \mathbb{E}_z [\log(1 - D(G(z)))]$$







$$\min_G \max_D \mathbb{E}_x [\log D(x)] + \mathbb{E}_z [\log(1 - D(G(z)))]$$





Christie's 

@ChristiesInc

Follow



#AuctionUpdate The first AI artwork to be sold in a major auction achieves \$432,500 after a bidding battle on the phones and via ChristiesLive bit.ly/2PVN2ly

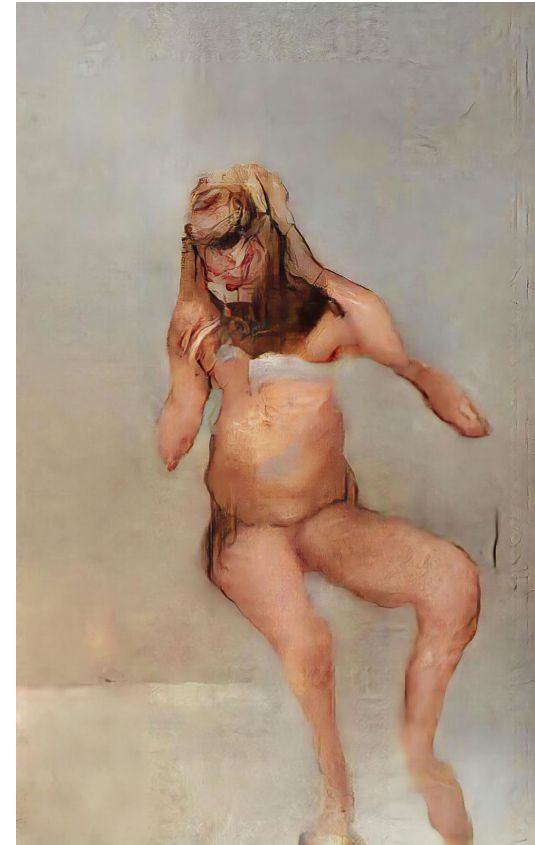


Reactions





Obvious



**Mario
Klingemann**



Mario
Klingemann



\$432,500

Obvious



Gold Award
The Butcher's Son
Mario Klingemann
Germany

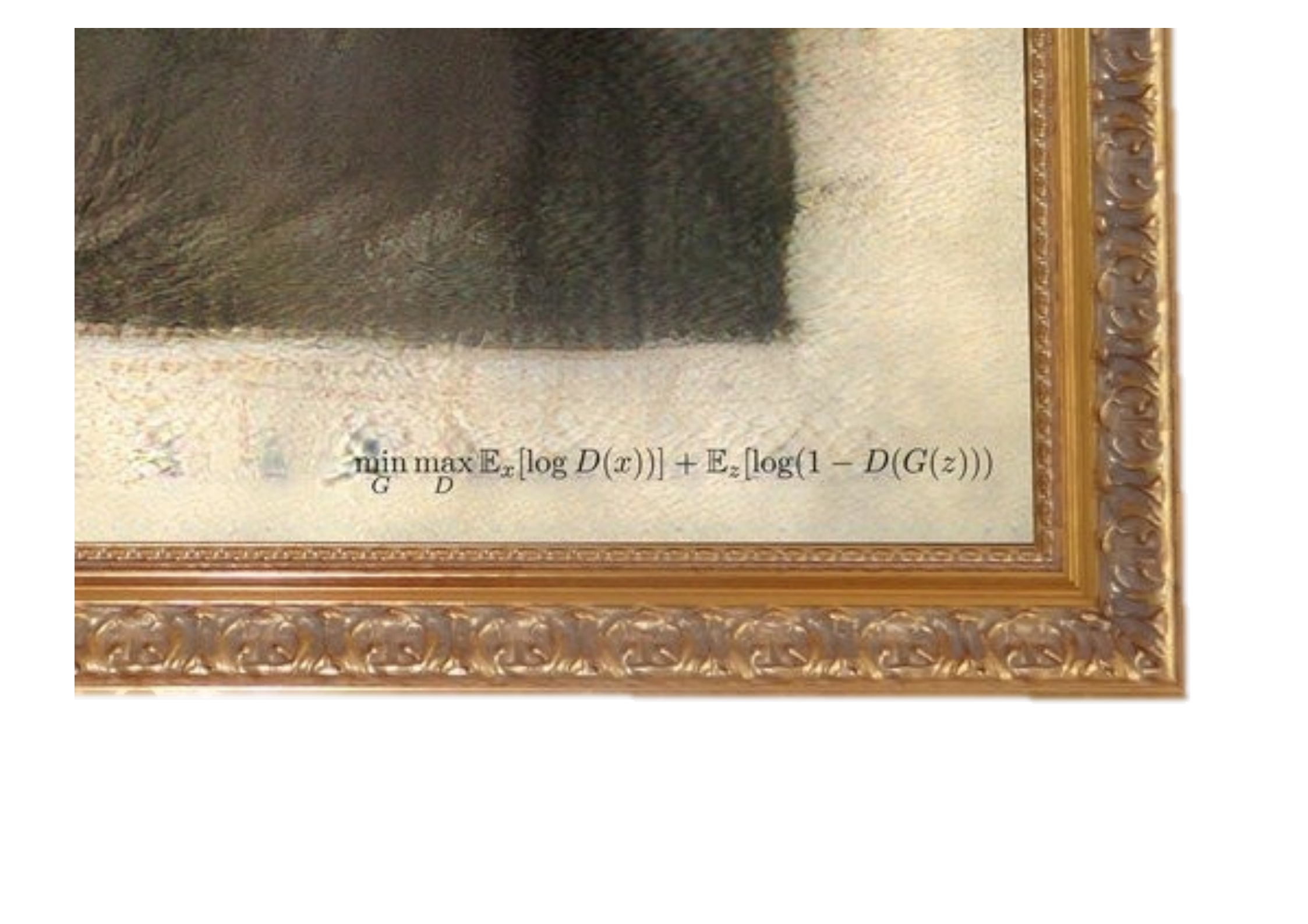
**Mario
Klingemann**

Mario Klingemann's process

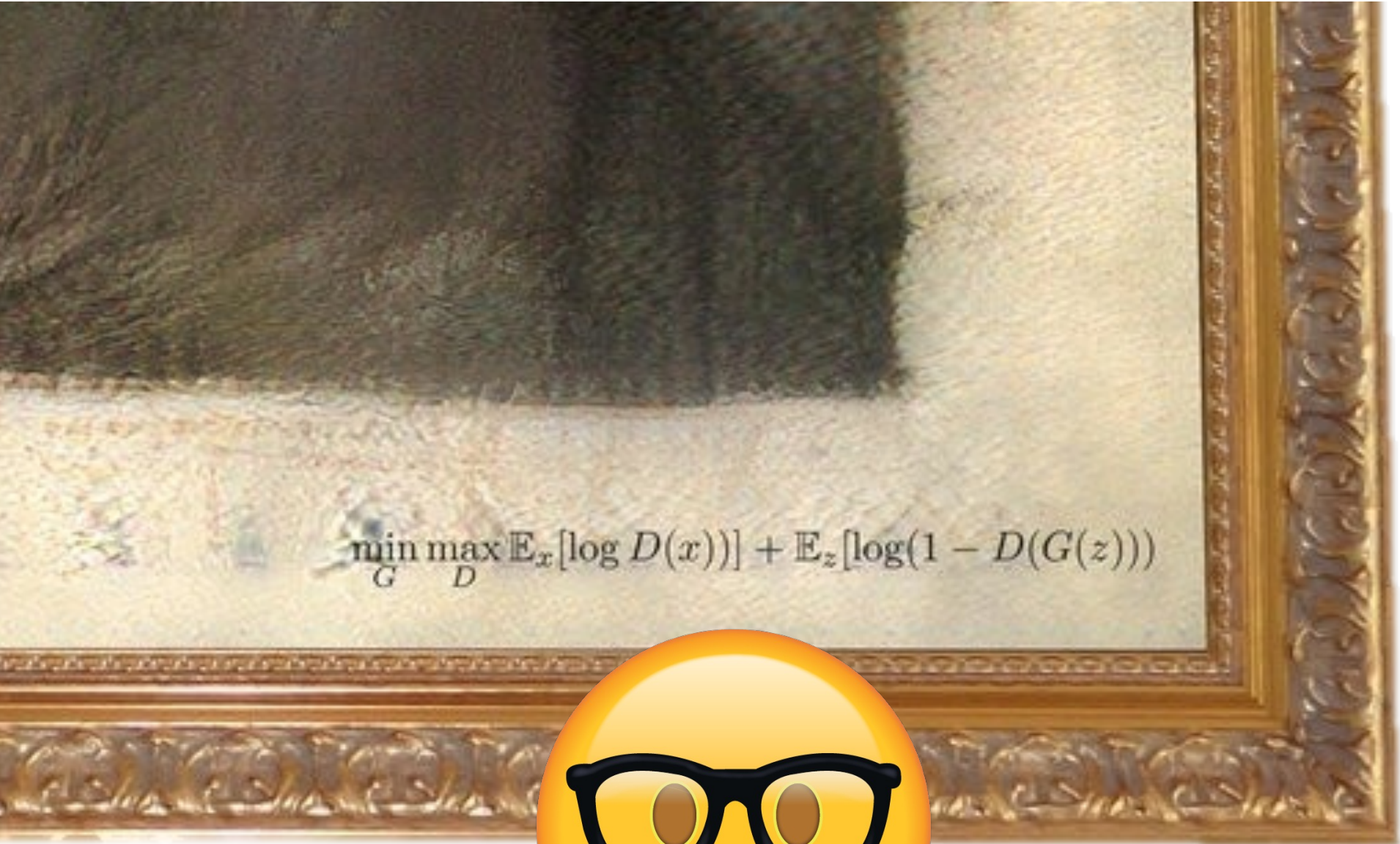
This image has been generated entirely by a machine using a chain of GANs (generative adversarial neural networks). In this chain a randomly generated stick-figure is used as an input to the first GAN, which produces a painterly-looking low-resolution proto-image. In several steps, the low resolution image is 'transhanced' and upscaled by another GAN increasing the resolution and adding details and textures. I control this process indirectly by training the model on selected data sets, the model's hyperparameters and eventually by making a curatorial choice, by picking among the thousands of variations produced by the models the one that speaks to me most.



$$\min_D \max_x \mathbb{E}_x [\log D(x)] + \mathbb{E}_z [\log(1 - D(G(z)))]$$



$$\min_G \max_D \mathbb{E}_x[\log D(x)] + \mathbb{E}_z[\log(1 - D(G(z)))]$$


$$\min_G \max_D \mathbb{E}_x[\log D(x)] + \mathbb{E}_z[\log(1 - D(G(z)))]$$



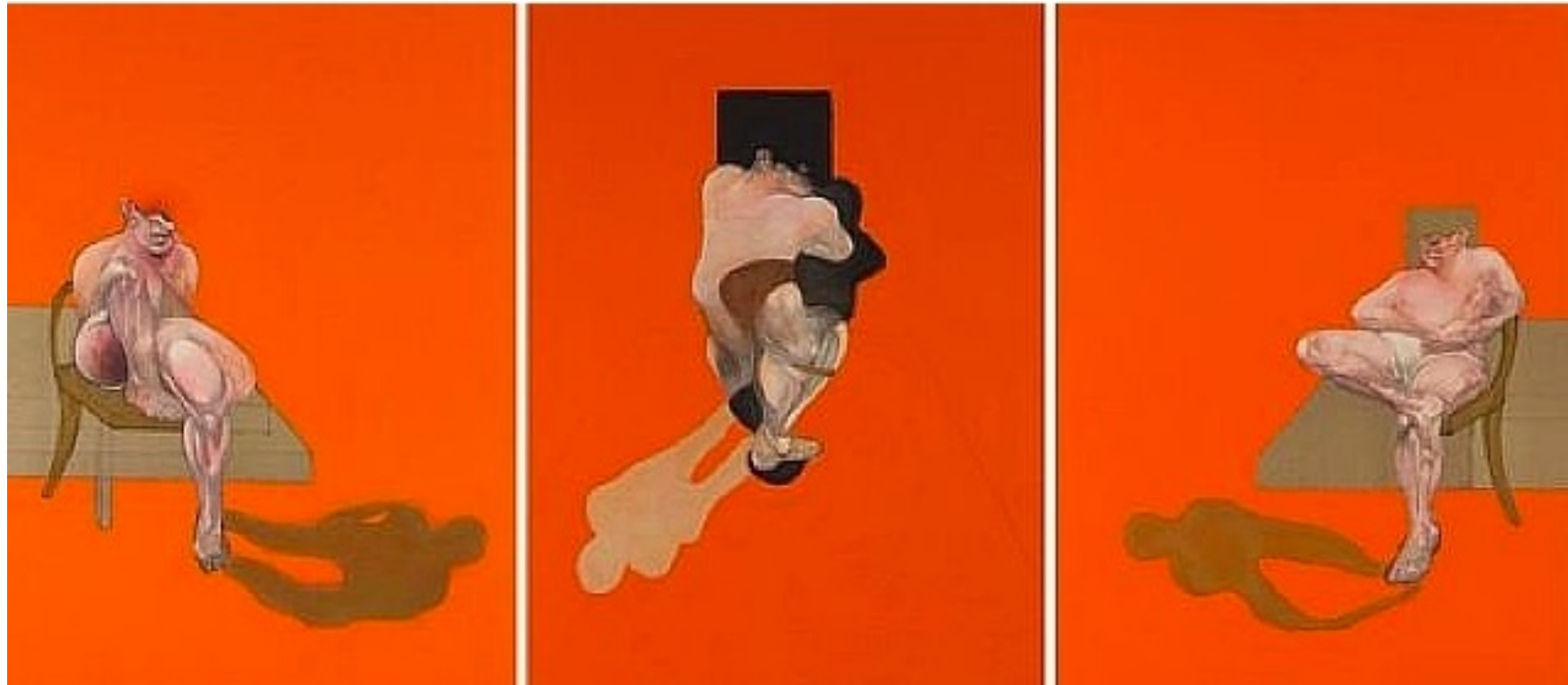


$$\min_G \max_D \mathbb{E}_x [\log D(x)] + \mathbb{E}_z [\log(1 - D(G(z)))]$$





$$\min_G \max_D \mathbb{E}_x [\log D(x)] + \mathbb{E}_z [\log(1 - D(G(z)))]$$

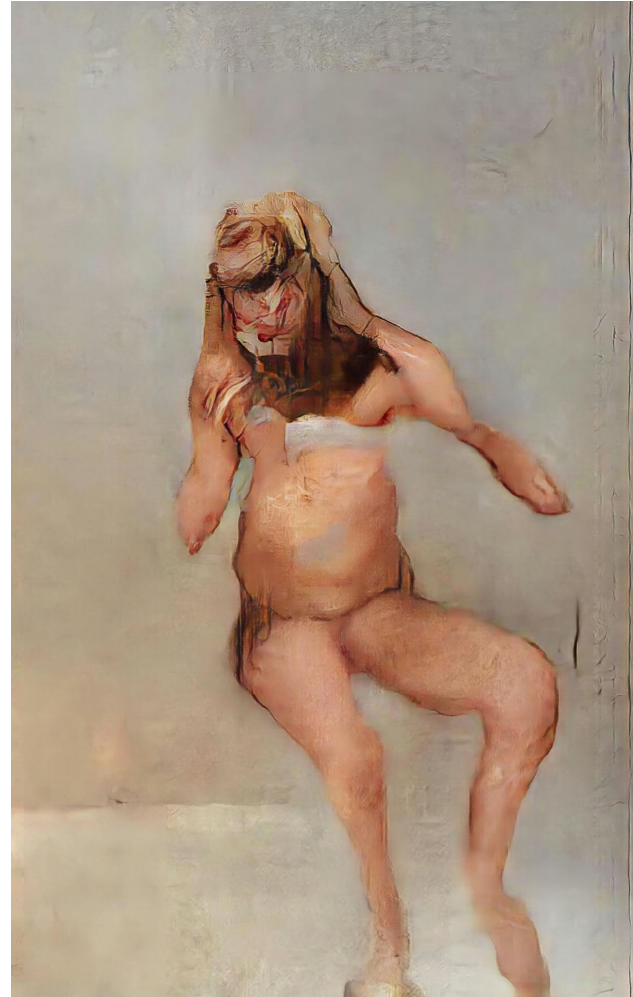


Francis Bacon, "Triptych", 1983

Francis Bacon (1909-1992)

- Bacon was shy as a child and enjoyed dressing up. This, coupled with his effeminate manner, upset his father. A story emerged in 1992 of his father having had Francis horsewhipped by their grooms.
- At a fancy-dress party at home, Francis dressed as a flapper with an Eton crop, beaded dress, lipstick, high heels, and a long cigarette holder.
- In 1926, Francis was thrown out of the family home following an incident in which his father found him admiring himself in front of a large mirror draped in his mother's underwear.
- Bacon found himself drifting through London's homosexual underworld, aware that he was able to attract a certain type of rich man, something he was quick to take advantage of, having developed a taste for good food and wine.


This image has been generated entirely by a machine using a chain of GANs (generative adversarial neural networks). In this chain a randomly generated stick-figure is used as an input to the first GAN, which produces a painterly-looking low-resolution proto-image. In several steps, the low resolution image is 'transhanced' and upscaled by another GAN increasing the resolution and adding details and textures. I control this process indirectly by training the model on selected data sets, the model's hyperparameters and eventually by making a curatorial choice, by picking among the thousands of variations produced by the models the one that speaks to me most.





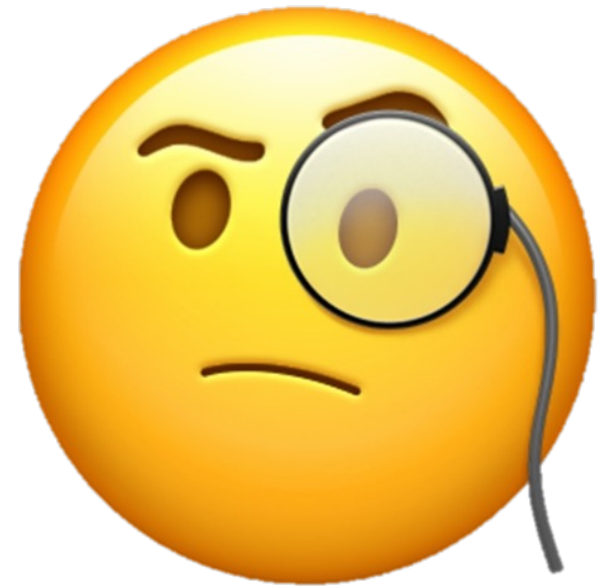
Frieder Nake
“Random Polygons”
1965

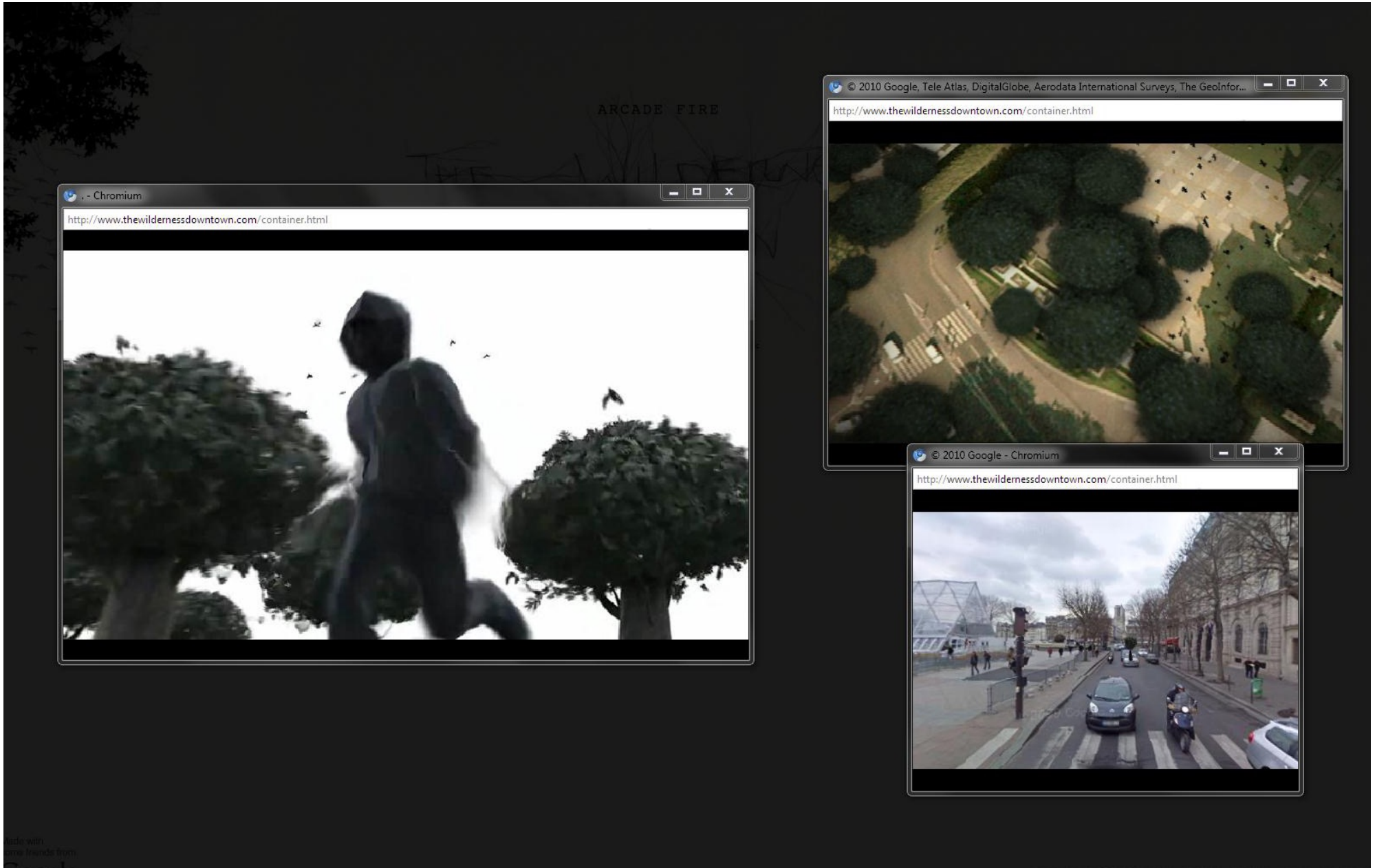
NAKE/ER56/264



NAKE/ER56/Z64

Nake: human algorist
ER56: electronic computer
Z64: plotter





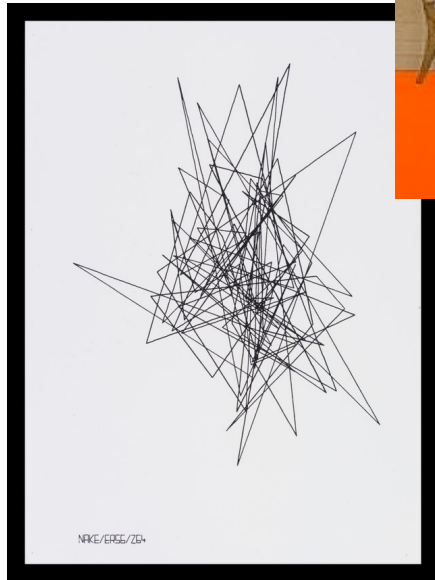
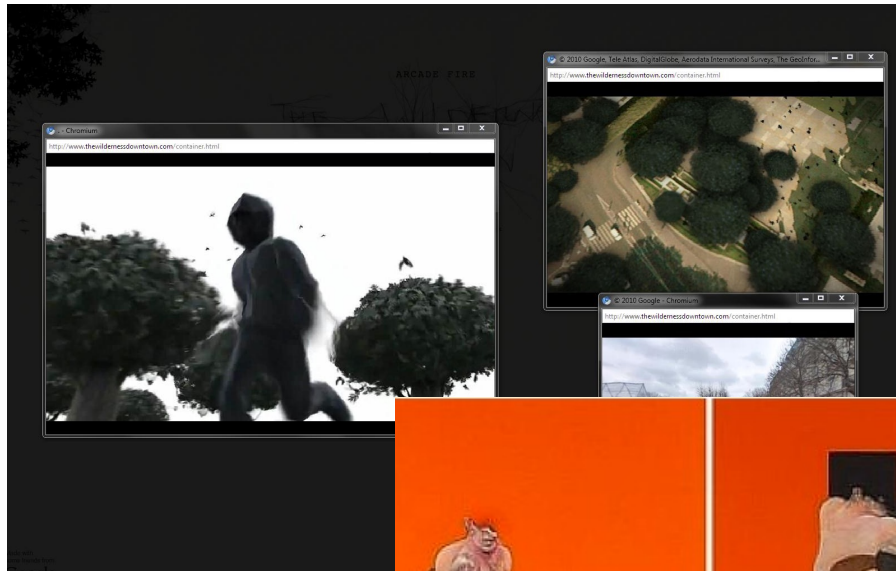
Chris Milk, "The Wilderness Downtown", 2010

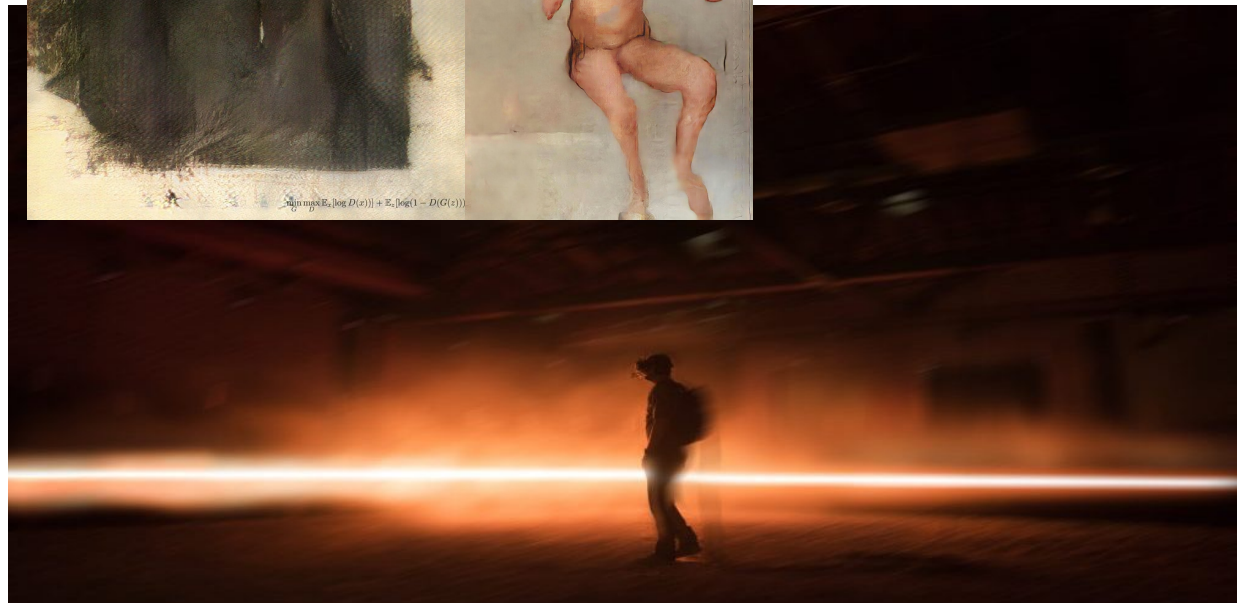
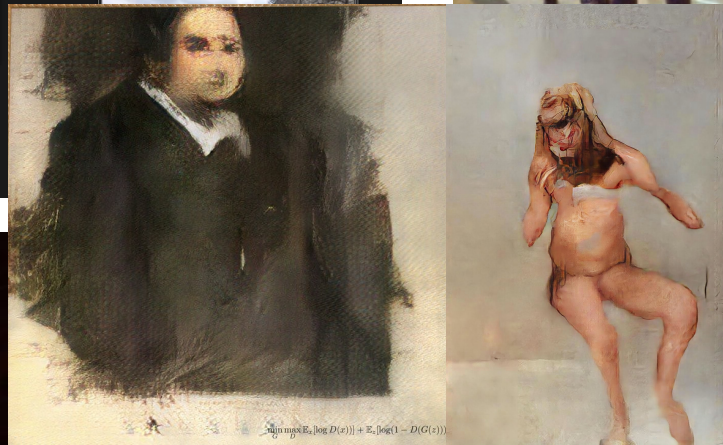
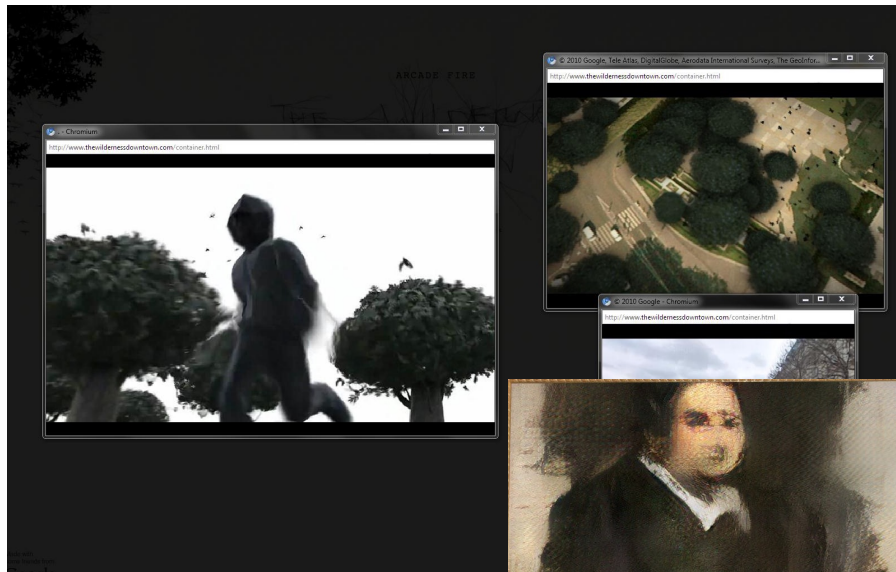


Scott Snibbe, “Boundary Functions”, 1998



Alejandro González Iñárritu, "Carne y Arena", 2017





“The digital in digital art”

M. Verdicchio

Studi di Estetica No. 12 (2018)

<https://journals.mimesisedizioni.it/index.php/studi-di-estetica/article/view/626/1077>