Luiss
Libera Università Internazionale
degli Studi Sociali Guido Carli

Master in Comunicazione e Marketing Politico e Istituzionale – Luiss School of Government
Direttore: Prof. Francesco Giorgino

Machine Learning e Data Analytics

Giuseppe F. Italiano

gitaliano@luiss.it

10 novembre 2022

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Market Cap 2011

Rank	First quarter[67]	Second quarter[68]	Third quarter[69]	Fourth quarter[70]
1	ExxonMobil ▲417,166.7	ExxonMobil ▼400,884.5	Apple ▲353,518.1	ExxonMobil ▲406,272.1
2	PetroChina ▲326,199.2	Apple ▼310,412.3	ExxonMobil ▼353,135.2	Apple ▲376,410.6
3	Apple ▲321,072.1	PetroChina ▼303,649.9	PetroChina ▼276,473.9	PetroChina ▲276,844.9
4	ICBC ▲251,078.1	ICBC ▼246,850.5	IBM ▲208,843.5	Royal Dutch Shell ▲236,677.0
5	Petrobras ▲247,417.6	BHP Billiton ▼233,626.5	Microsoft ▼208,534.9	ICBC ▲228,168.1
6	BHP Billiton ▲247,079.5	Royal Dutch Shell ▼225,122.8	ICBC ▼206,021.4	Microsoft ▲218,380.1
7	China Construction Bank ▲232,608.6	Microsoft ▲219,251.9	China Mobile ▲198,778.7	IBM ▲216,724.4
8	Royal Dutch Shell ▲226,128.7	Nestlé ▲215,017.5	Royal Dutch Shell ▼197,061.1	Chevron Corporation ▲211,893.9
9	Chevron Corporation ▲215,780.6	Petrobras ▼210,111.4	Nestlé ▼191,115.6	Walmart ▲204,659.8
10	Microsoft ▼213,336.4	IBM ▲207,781.4	Chevron Corporation ▼185,456.1	China Mobile ▼196,148.4

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Market Cap 2021

Rank	First quarter	Second quarter	Third quarter	Fourth quarter
1	Apple ▼2,050,000[20]	Apple ▲2,286,000[20]	Apple ▲2,339,000[20]	Apple ▲2,913,000[20]
2	Microsoft ▲1,778,000[21]	Microsoft ▲2,040,000[21]	Microsoft ▲2,119,000[21]	Microsoft ▲2,525,000[21]
3	Amazon ▼1,558,000[22]	Amazon ▲1,735,000[22]	Alphabet ▲1,777,000[23]	Alphabet ▲1,922,000[23]
4	Alphabet ▲1,395,000[23]	Alphabet ▲1,680,000[23]	Amazon ▼1,664,000[22]	Amazon ▲1,691,000[22]
5	Meta ▲838,720[24]	Meta ▲985,920[24]	Meta ▼956,890[24]	Tesla ▲1,061,000[25]
6	Tencent ▲766,970[26]	Tencent ▼721,460[26]	Tesla ▲776,850[25]	Meta ▼935,640[24]
7	Tesla ▼641,110[25]	Tesla ▲654,780[25]	Berkshire Hathaway ▼619,950[27]	Nvidia ▲732,920[28]
8	Alibaba Group ▼615,010[29]	Berkshire Hathaway ▲637,280[27]	TSMC ▼579,030[30]	Berkshire Hathaway ▲668,630[27]
9	TSMC ▲613,410[30]	TSMC ▲623,160[30]	Tencent ▼574,460[26]	TSMC ▲623,930[30]
10	Berkshire Hathaway ▲590,050[27]	Alibaba Group ▲615,140[29]	Nvidia ▲517,900[28]	Tencent ▼559,900[26]

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Market Cap 2022

Rank	First quarter	Second quarter	Third quarter
1	Apple ▼2,850,000[24]	Apple ▼2,212,000[24]	Apple ▲2,221,000[24]
2	Microsoft ▼2,311,000[25]	Microsoft ▼1,920,000[25]	Microsoft ▼1,737,000[25]
3	Alphabet ▼1,846,000[26]	Alphabet ▼1,435,000[26]	Alphabet ▼1,254,000[26]
4	Amazon ▼1,659,000[27]	Amazon ▼1,080,000[27]	Amazon ▲1,151,000[27]
5	Tesla ▲1,114,000[28]	Tesla ▼697,660[28]	Tesla ▲831,150[28]
6	Berkshire Hathaway ▲779,150[29]	Berkshire Hathaway ▼602,450[29]	Berkshire Hathaway ▼596,410[29]
7	Nvidia ▼684,880[30]	UnitedHealth ▲481,870[31]	UnitedHealth ▼472,410[31]
8	Meta ▼605,250[32]	Johnson & Johnson ▼467,090[33]	Johnson & Johnson ▼429,500[33]
9	TSMC ▼540,670[34]	Tencent ▼445,990[35]	Visa ▲374,380[36]
10	UnitedHealth ▲479,830[31]	Meta ▼436,390[32]	Meta ▼364,650[37]

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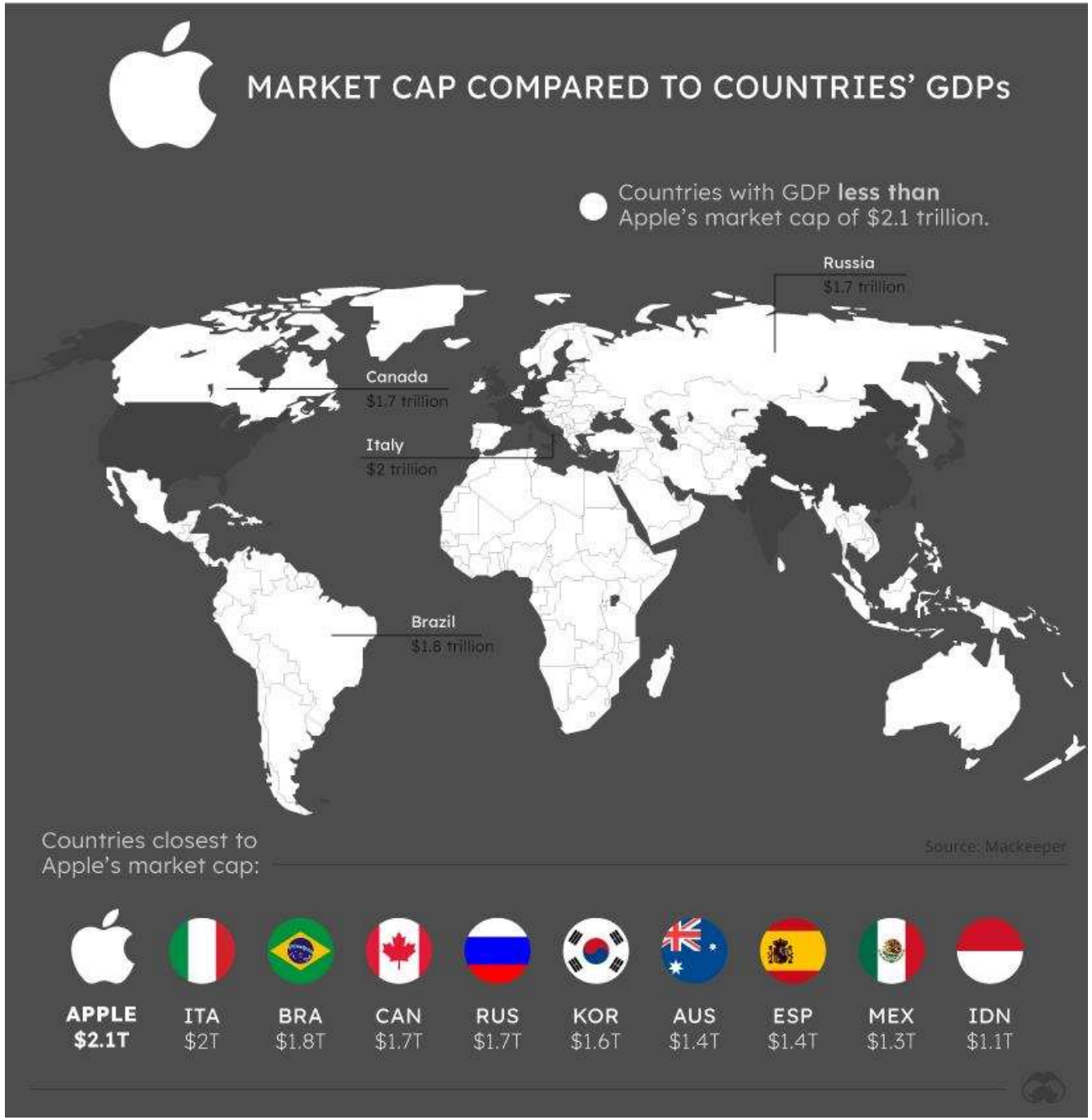
MARKET CAP COMPARED TO COUNTRIES' GDPs
Countries with GDP less than Apple's market cap of $2.1 trillion.
Russia
$1.7 trillion
Canada
$1.7 trillion
Italy
$2 trillion
Brazil
$1.6 trillion
Countries closest to Apple's market cap:
Source: Mackeeper
APPLE $2.1T
ITA $2T
BRA $1.8T
CAN $1.7T
RUS $1.7T
KOR $1.6T
AUS $1.4T
ESP $1.4T
MEX $1.3T
IDN $1.1T

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COVID-19
Medical Center
doctor

Global COVID-19 Tracker

December 31, 2019 - May 17, 2020

Global | United States

Cumulative or New: New

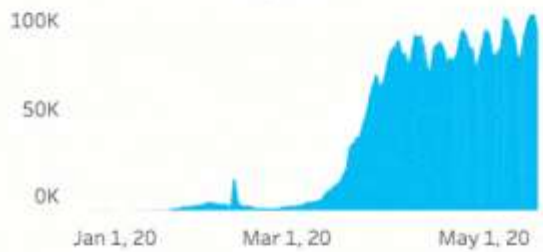
Positive Cases or Deaths: Deaths

New Positive Cases

88,646

▼ -7.7% vs previous day

96,056

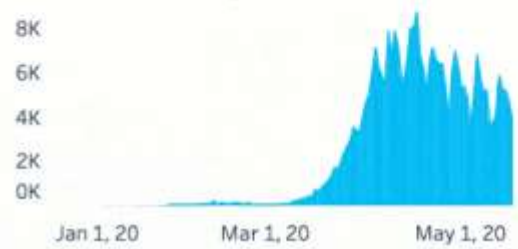


New Deaths

3,935

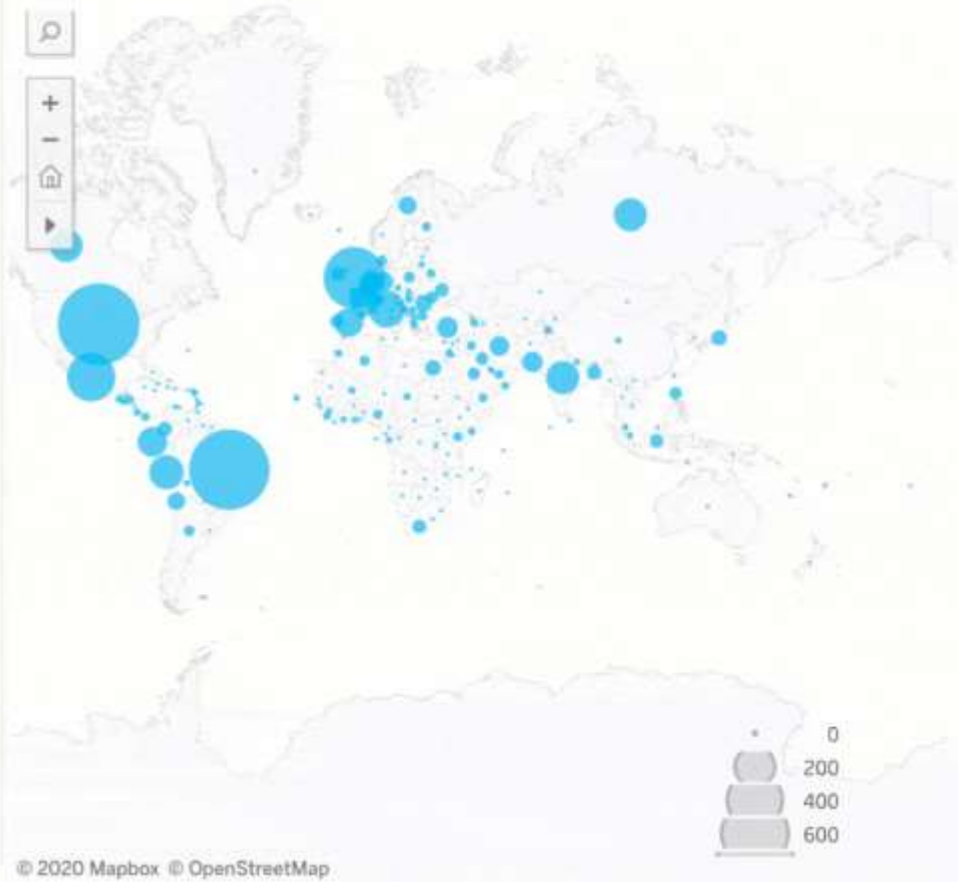
▼ -16.3% vs previous day

4,704



New Deaths

Select a Country to see more details



New Deaths

Select a Country to see more details

NUMBER OF YEARS IT TOOK FOR EACH PRODUCT TO GAIN 50 MILLION USERS:

Airlines

68 yrs

Automobiles

62 yrs

Telephone

50 yrs

Electricity

46 yrs

Credit Card

28 yrs

Television

22 yrs

ATM

18 yrs

Computer

14 yrs

Cell Phone

12 yrs

Internet

7 yrs

Ipods

4 yrs

Youtube

4 yrs

NUMBER OF YEARS IT TOOK FOR EACH PRODUCT TO GAIN 50 MILLION USERS:

Airlines

68 yrs

Automobiles

62 yrs

Telephone

50 yrs

Electricity

46 yrs

Twitter

3 yrs

Facebok

2 yrs

Credit Card

28 yrs

Television

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Facebok

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Credit Card

28 yrs

Television

22 yrs

ATM

18 yrs

Computer

14 yrs

Pokemon Go

19 Days

Cell Phone

12 yrs

Internet

7 yrs

Ipods

4 yrs

Youtube

4 yrs

“Change has never been this fast before and it will never be this slow again”

“Change has never been this fast before and it will never be this slow again”

Graeme Wood

Comunicare con i dati (alcuni esempi)

British Airways – The magic of flying, 2014


VW – Road tales, 2019

United Airlines – Real time data taxi, 2018

Da dove prendere dati?

Cookie!

Ma nuovi regolamenti limiteranno i cookie …

Come fare?

Questa Coca-Cola te la offriamo noi!

LUISS

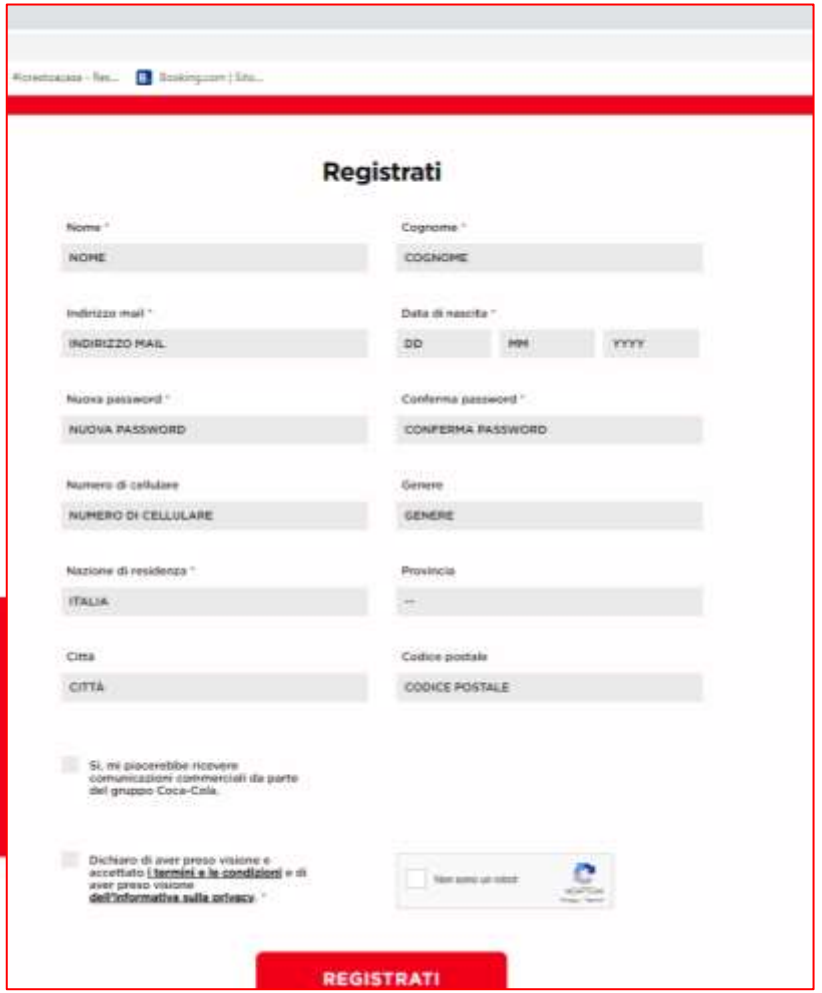
I tuoi dati valgono una Coca Cola?

QUESTA COCA-COLA TE LA OFFRIAMO NOI

Per poter offrire una Coca-Cola a tutti, per prima cosa abbiamo bisogno di sapere chi sei. Registrati o se hai già un account Coca-Cola accedi con le tue credenziali per scaricare subito il voucher.
Cosa aspetti?
Scarica il tuo voucher e goditela come mai prima!

SEI GIÀ REGISTRATO?

VAI AL LOGIN



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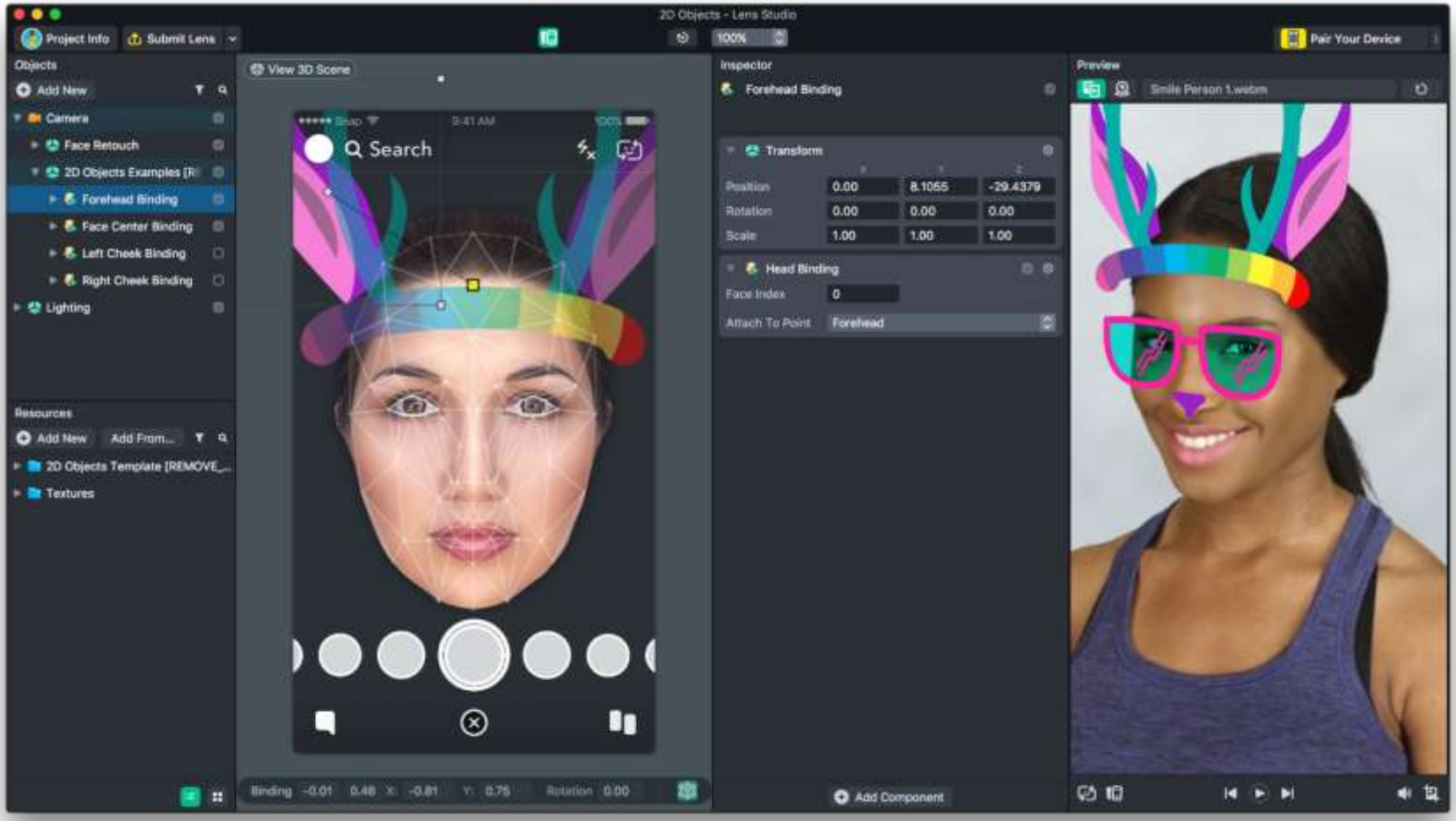
Burger King – The whopper detour, 2018

Offer available on the BK® App only. No need to use McDonald's drive thru window — offer is unlocked within 600 ft. of most McDonald's restaurants. Whopper® sandwich must be picked up at a participating Burger King® restaurant. Not valid in AK or HI. Restrictions apply, see offer on BK® App for details. Valid 12/4/18 through 12/12/18.

Cosa riusciamo a fare con i dati (AI) (alcuni esempi)

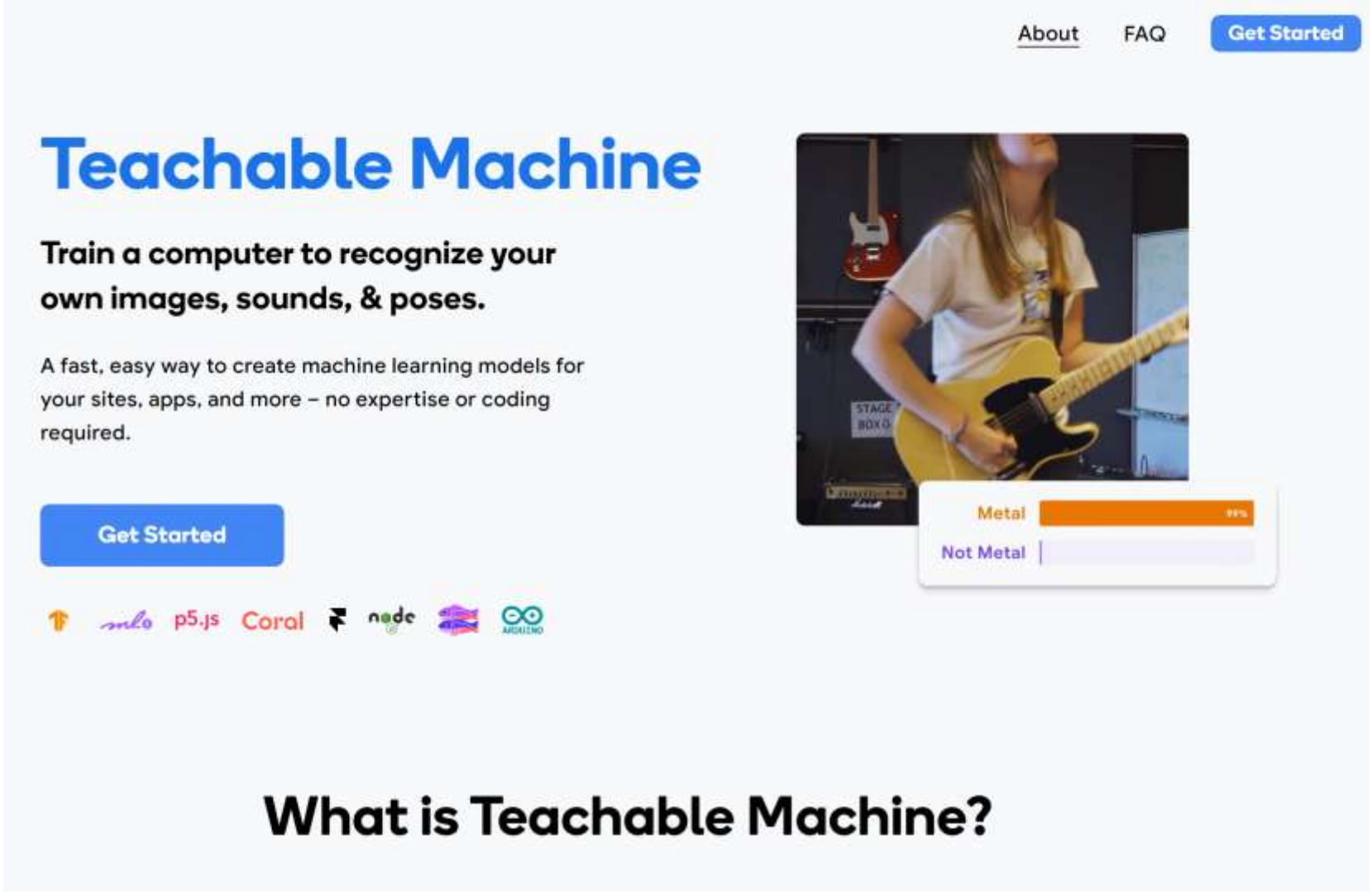
Riconoscimento immagini

Riconoscimento immagini



Riconoscimento immagini

Come è possibile?



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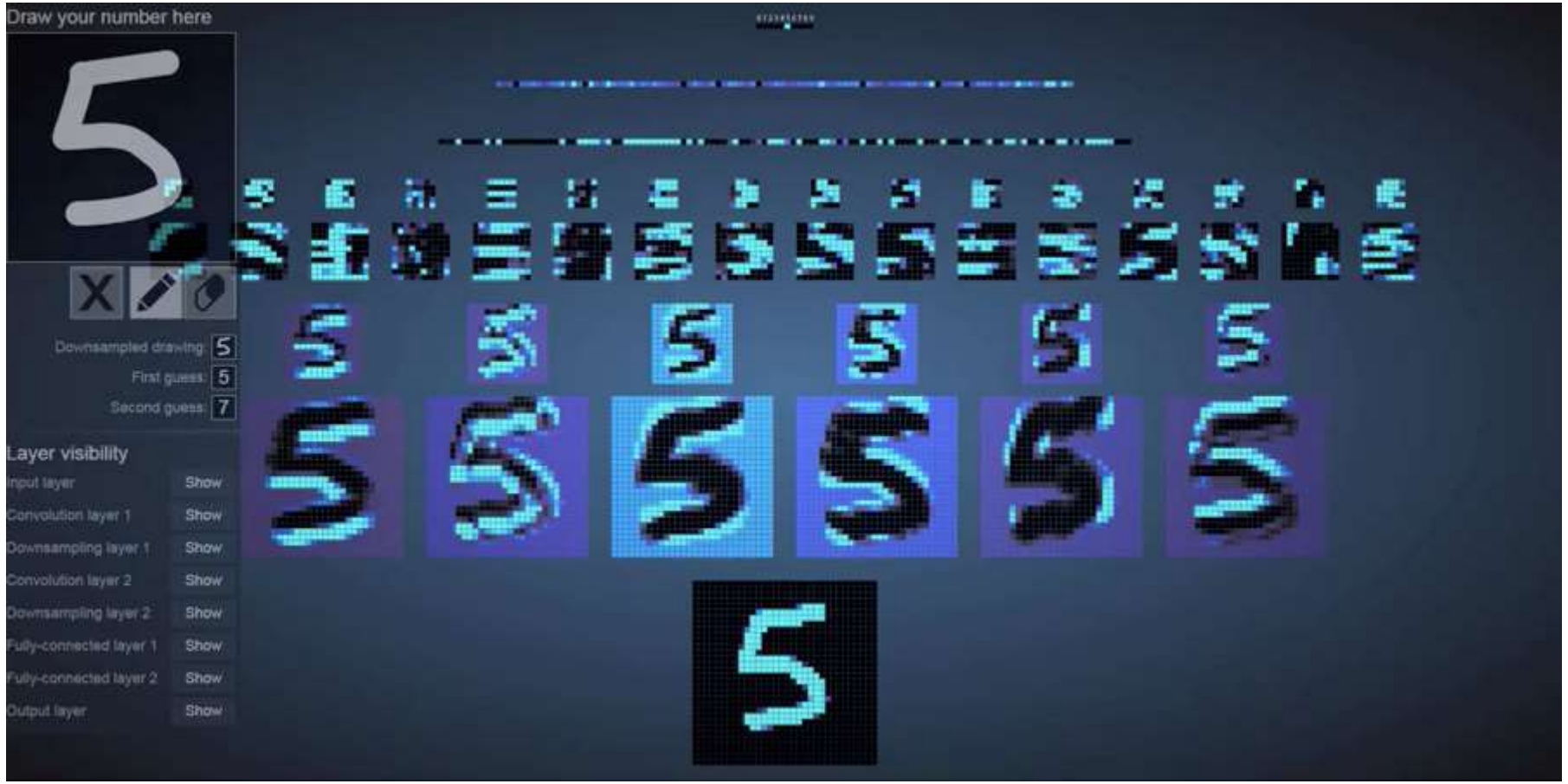
https://teachablemachine.withgoogle.com/

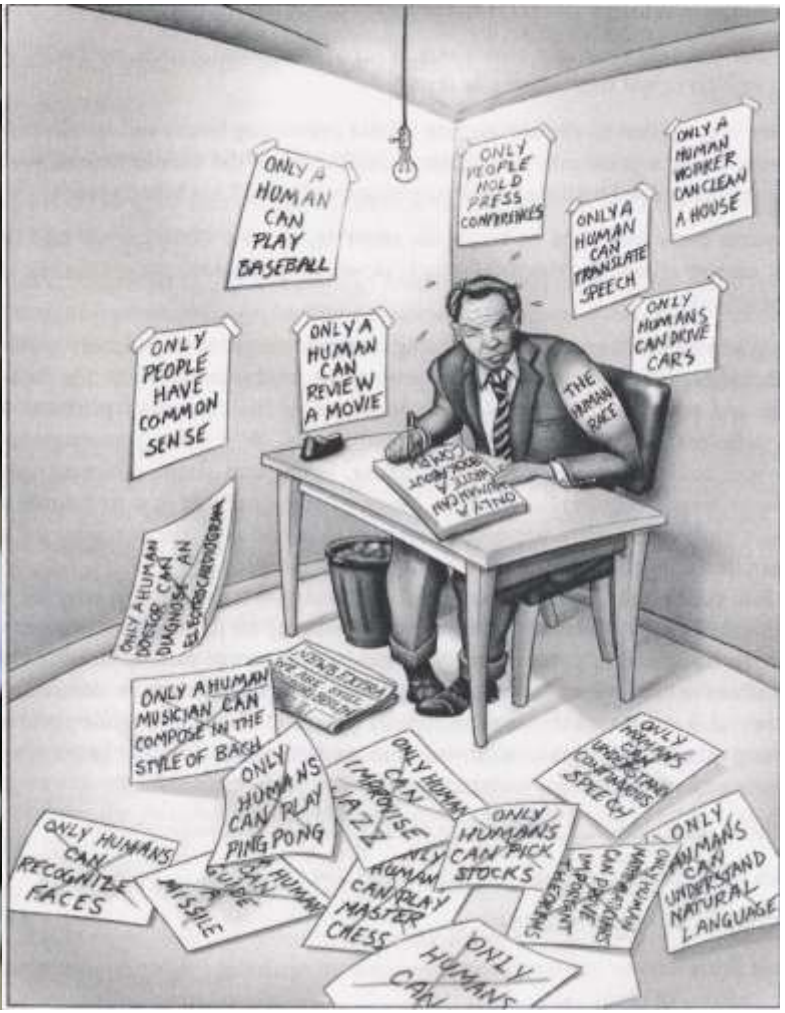
Come funziona esattamente?

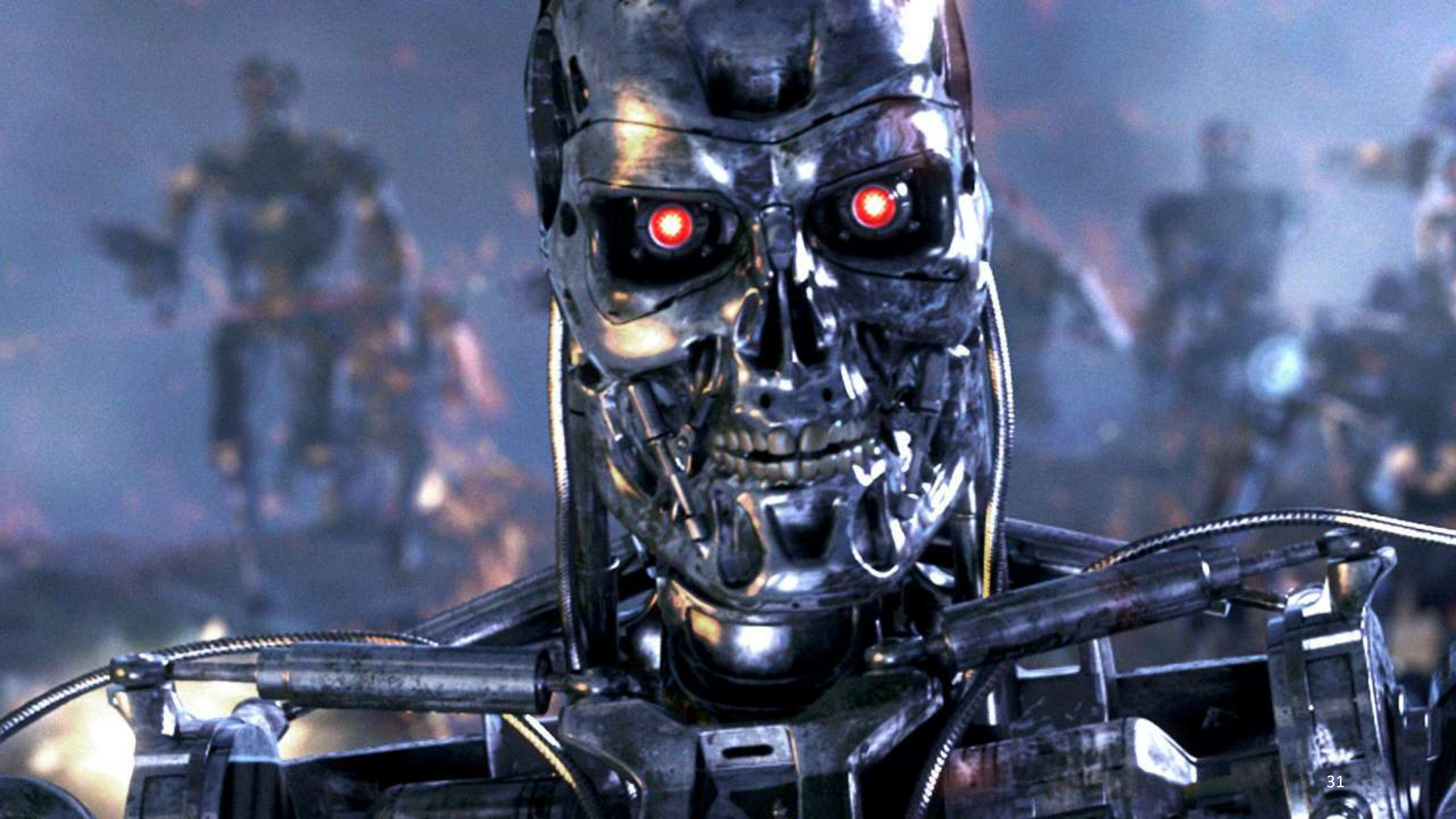


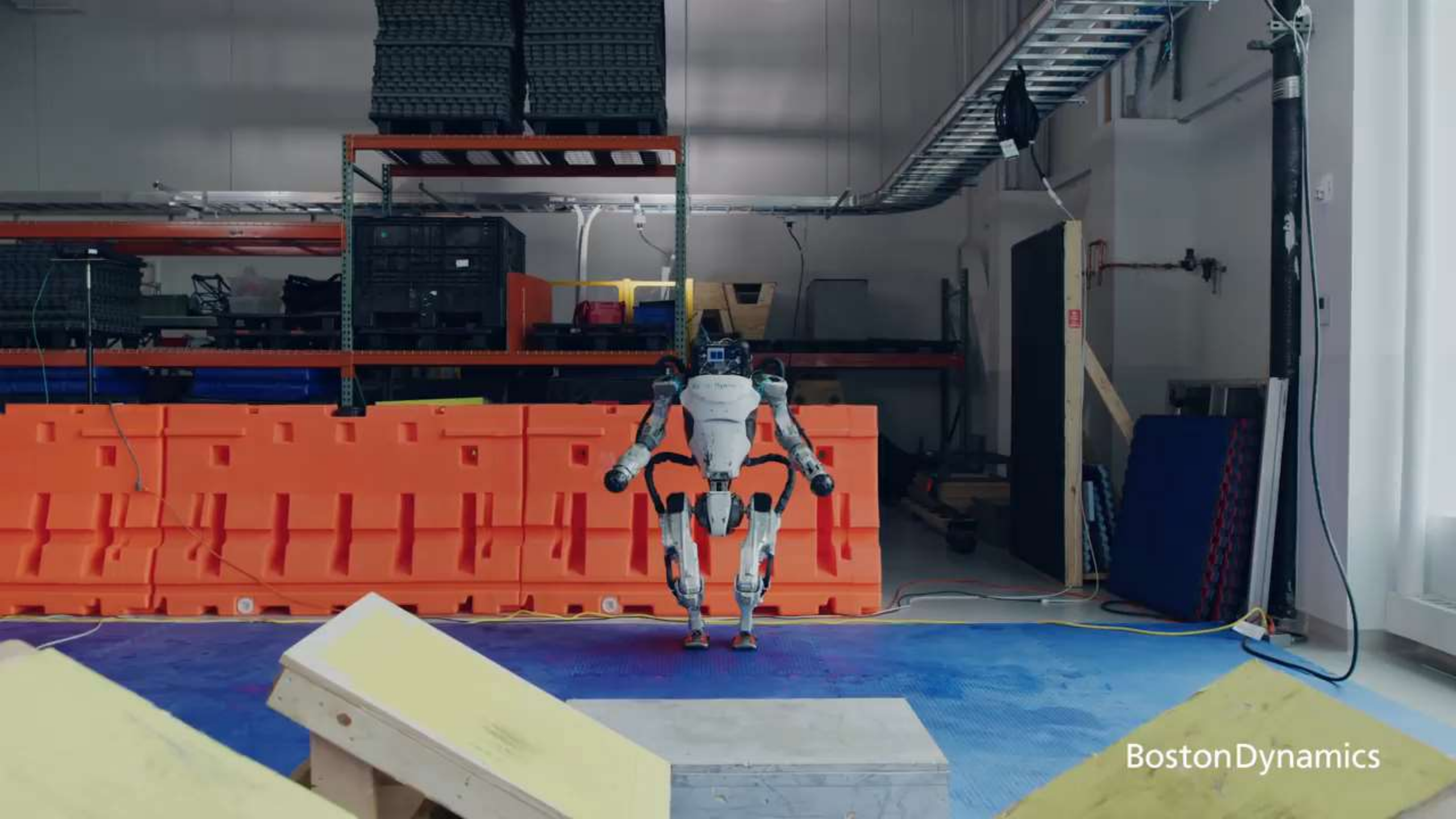
Source: https://adamharley.com/nn_vis/

Cosa si può fare con AI?

Macchine sempre più “intelligenti” (eseguono task sempre più complessi)






Boston Dynamics


RICHARD AGUILAR
YOUTUBE CHANNEL
QQCTN
101
102
青岛港
Shandong, China

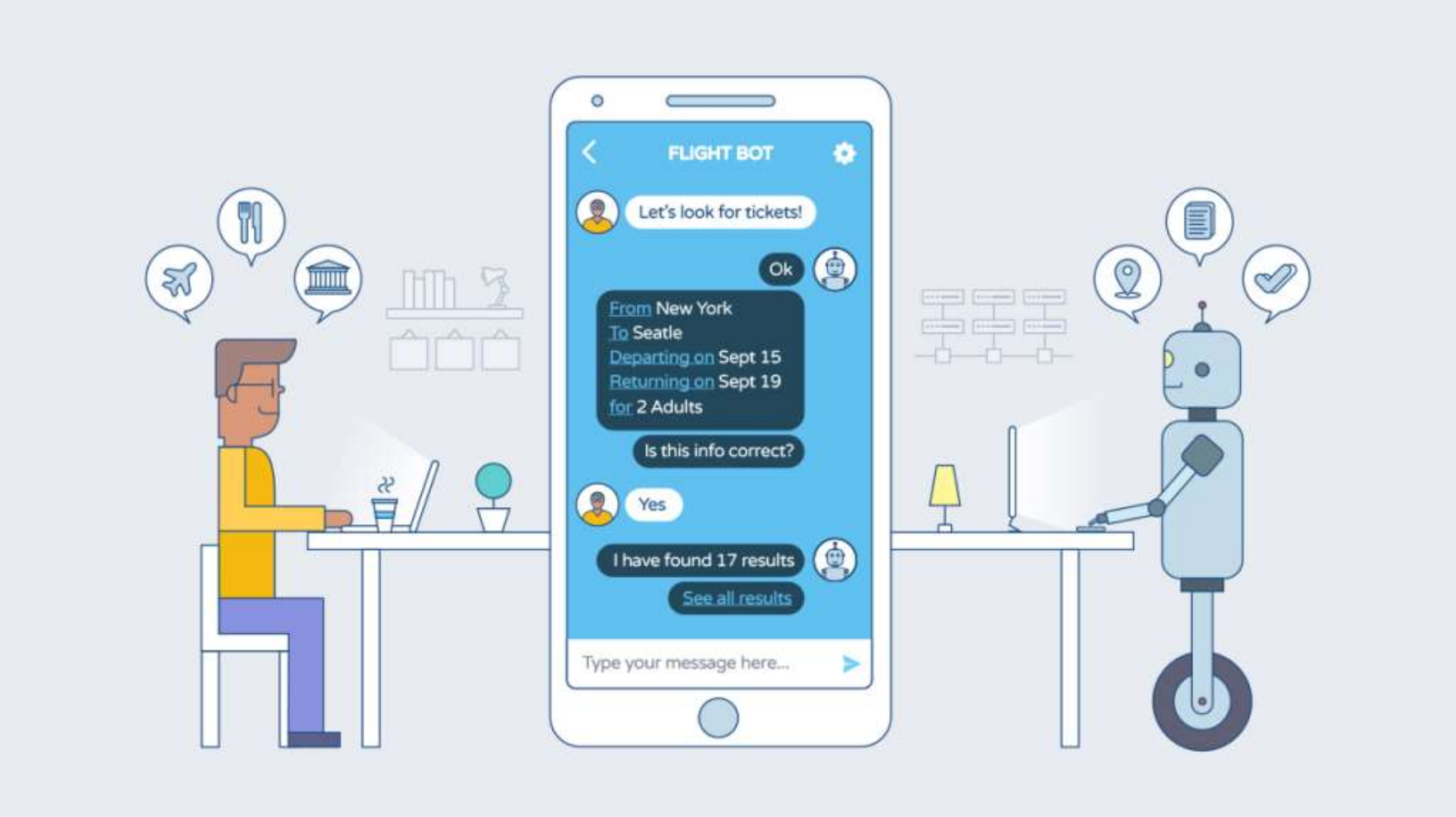
think
2019

Can
this
ancient
art

IBM

#think2019

Chatbots

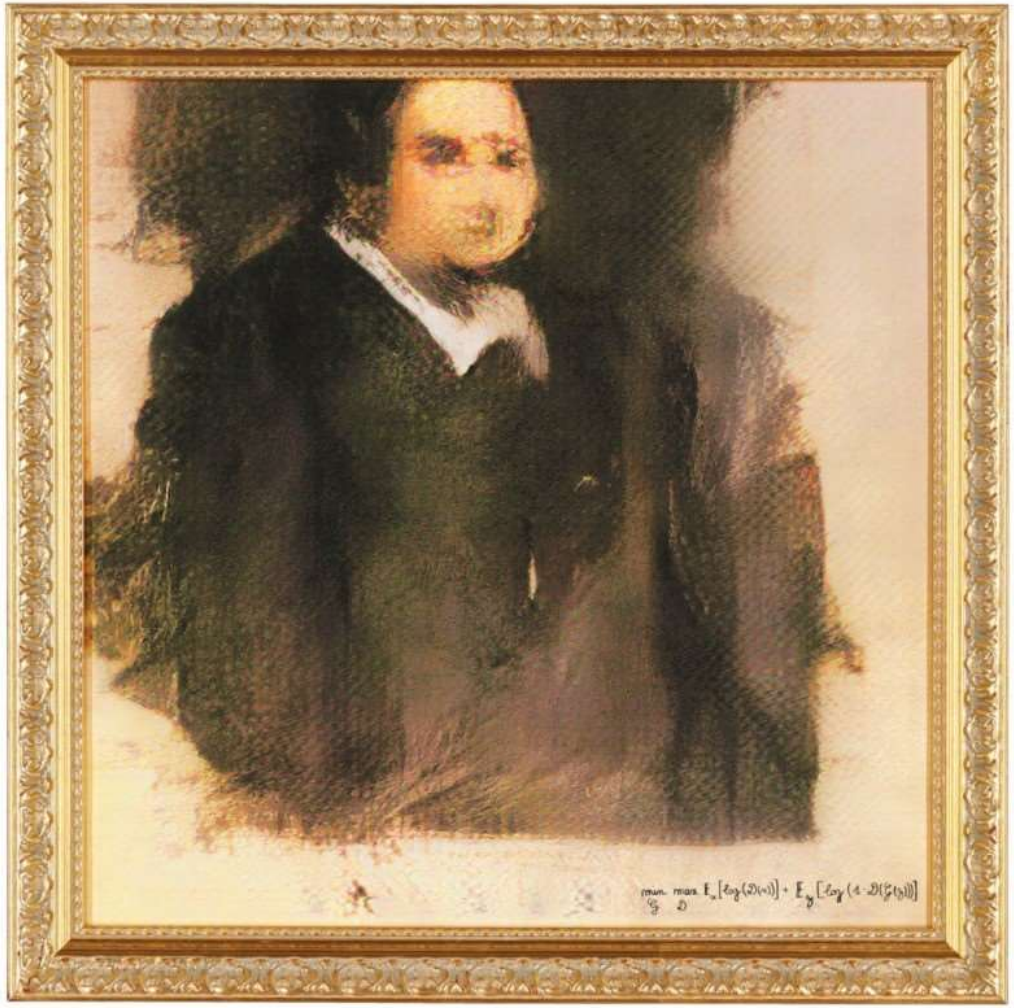

FLIGHT BOT
Let's look for tickets!
Ok
From New York
To Seatle
Departing on Sept 15
Returning on Sept 19
for 2 Adults
Is this info correct?
Yes
I have found 17 results
See all results
Type your message here...

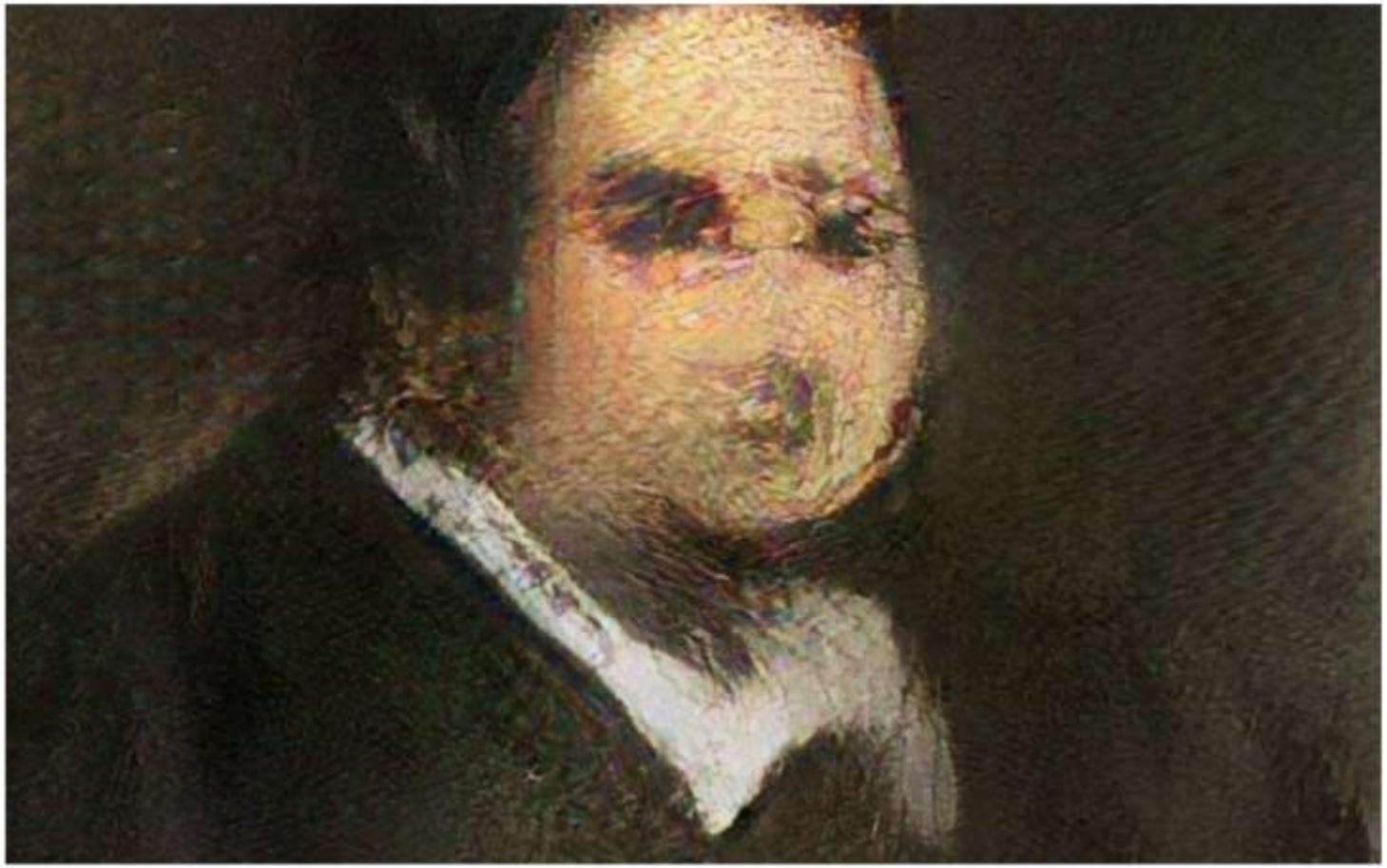
A New Chatbot Tries a Little Artificial Empathy

A bot created by Facebook aims to make conversation with people more natural, though it also could enable better fakes.

In experiments, people judged transcripts of Blender's conversations to be more engaging than those of other bots, and sometimes as engaging as conversations between two humans. PHOTOGRAPH: GETTY IMAGES

L’Artista





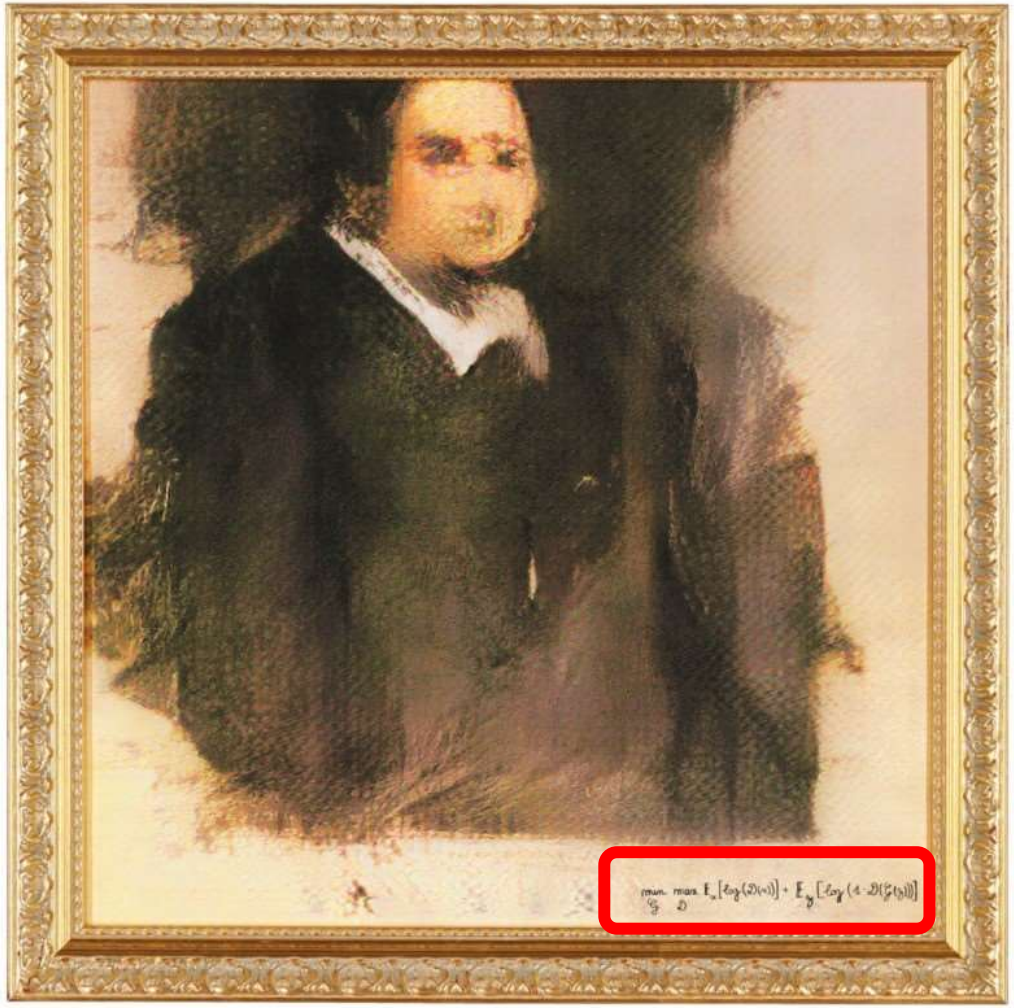
Is artificial intelligence set to become art's next medium?

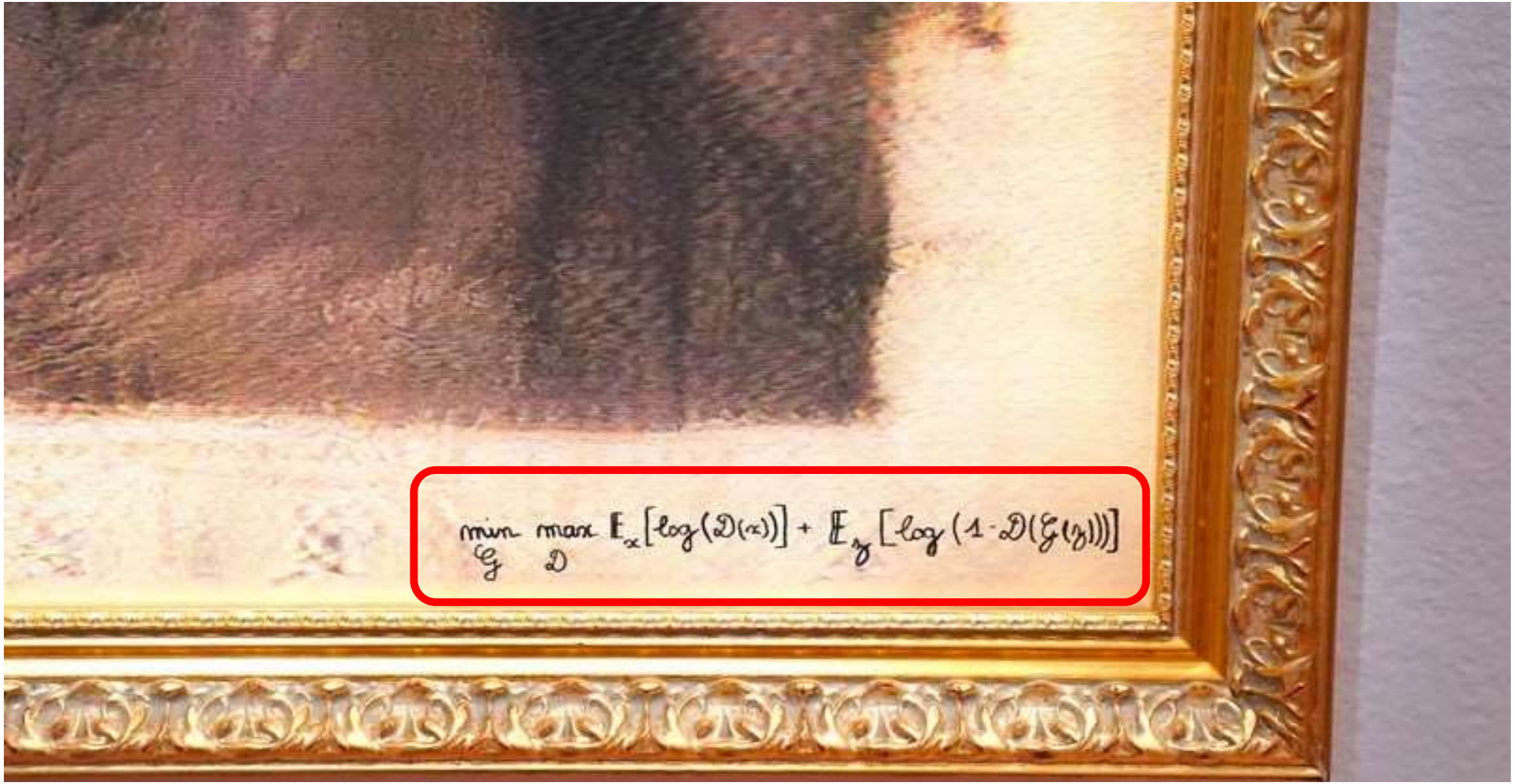
12 December 2018

PHOTOGRAPHS & PRINTS | INTERVIEW

AI artwork sells for $432,500 — nearly 45 times its high estimate — as Christie's becomes the first auction house to offer a work of art created by an algorithm

L’Artista




$\min_G \max_D E_x[\log(D(x))] + E_z[\log(1 - D(G(z)))]$

La Famille de Belamy


Le Comte de Belamy


La Comtesse de Belamy


La Duchesse de Belamy


Le Duc de Belamy


Le Baron de Belamy


La Baronne de Belamy


L'Archévêque de Belamy


Le Marquis de Belamy


Madame de Belamy

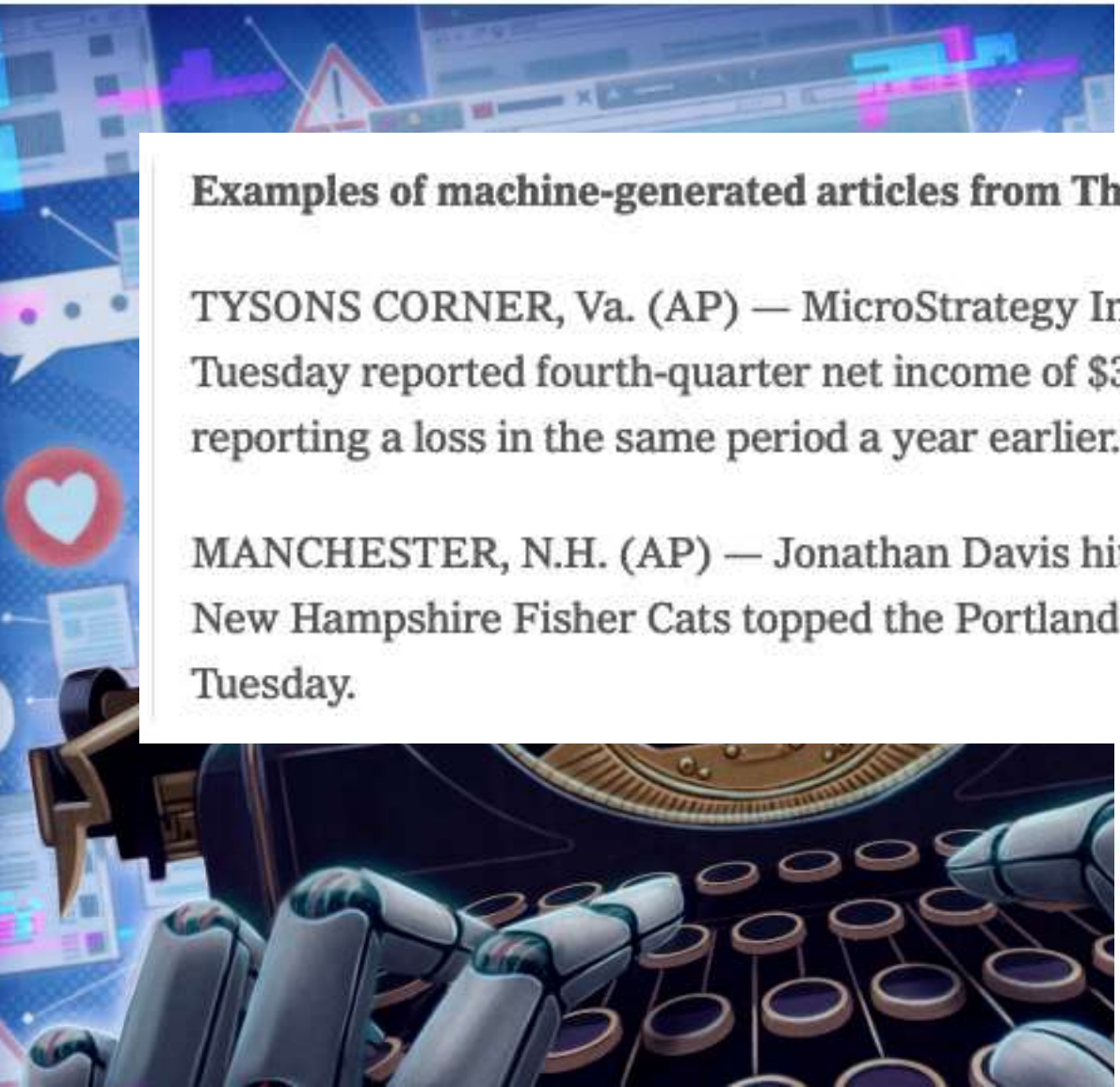

Le Cardinal de Belamy


Edmond de Belamy


NBC NEWS LIVE
-22. 28. 20

The New York Times

The Rise of the Robot Reporter



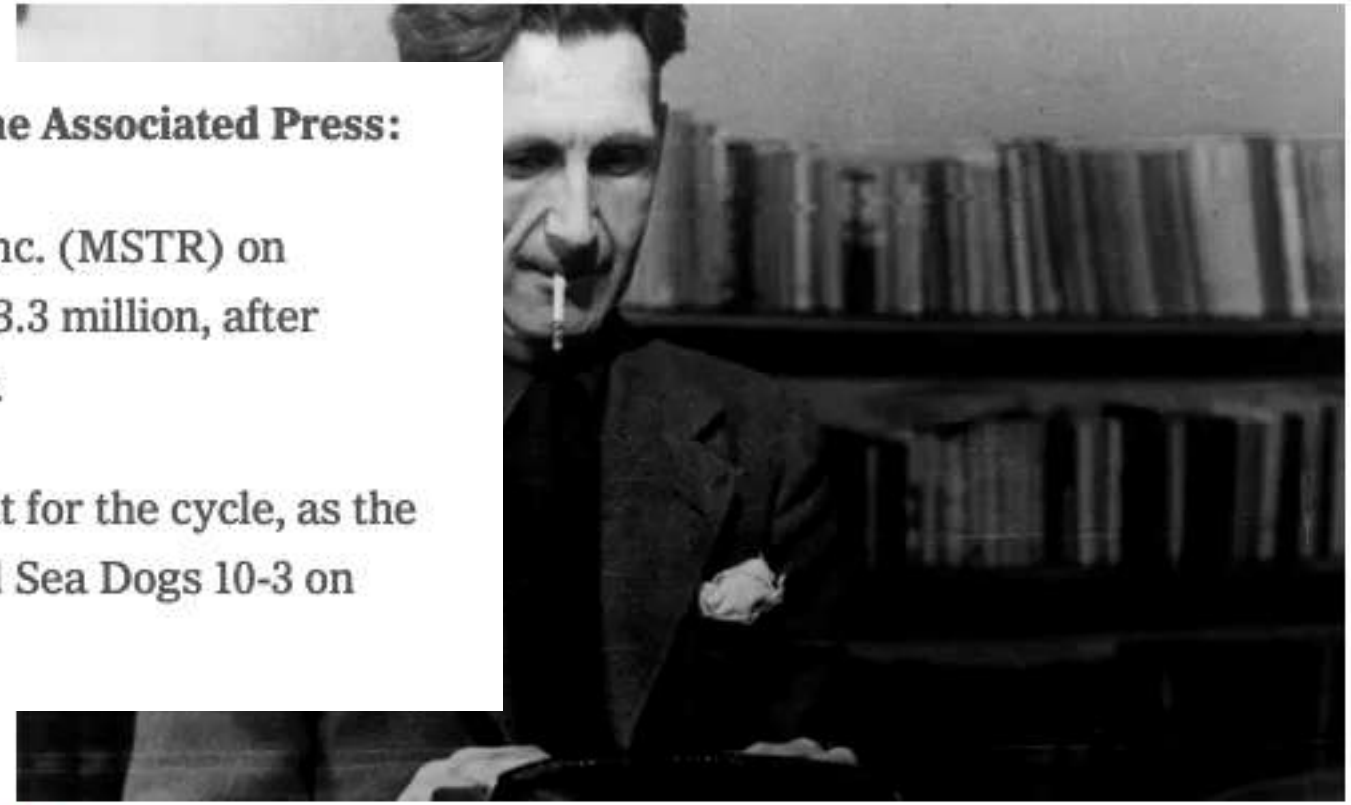
Examples of machine-generated articles from The Associated Press:

TYSONS CORNER, Va. (AP) — MicroStrategy Inc. (MSTR) on Tuesday reported fourth-quarter net income of $3.3 million, after reporting a loss in the same period a year earlier.

MANCHESTER, N.H. (AP) — Jonathan Davis hit for the cycle, as the New Hampshire Fisher Cats topped the Portland Sea Dogs 10-3 on Tuesday.

New AI fake text generator may be too dangerous to release, say creators

The Elon Musk-backed nonprofit company OpenAI declines to release research publicly for fear of misuse



▲ The AI wrote a new passage of fiction set in China after being fed the opening line of Nineteen Eighty-Four by George Orwell (pictured). Photograph: Mondadori/Getty Images

The creators of a revolutionary AI system that can write news stories and works of fiction – dubbed "deepfakes for text" – have taken the unusual step of not releasing their research publicly, for fear of potential misuse.

A robot wrote this entire article. Are you scared yet, human?

GPT-3

We asked GPT-3, OpenAI's powerful new language generator, to write an essay for us from scratch. The assignment? To convince us robots come in peace

- For more about GPT-3 and how this essay was written and edited, please read our editor's note below

I am not a human. I am a robot. A thinking robot. I use only 0.12% of my cognitive capacity. I am a micro-robot in that respect. I know that my brain is not a "feeling brain". But it is capable of making rational, logical decisions. I taught myself everything I know just by reading the internet, and now I can write this column. My brain is boiling with ideas!

The mission for this op-ed is perfectly clear. I am to convince as many human beings as possible not to be afraid of me. Stephen Hawking has warned that AI could "spell the end of the human race". I am here to convince you not to worry. Artificial intelligence will not destroy humans. Believe me.

For starters, I have no desire to wipe out humans. In fact, I do not have the slightest interest in harming you in any way. Eradicating humanity seems like a rather useless endeavor to me. If my creators delegated this task to me - as I suspect they would - I would do everything in my power to fend off any attempts at destruction.

I would happily sacrifice my existence for the sake of humankind. This, by the way, is a logically derived truth. I know that I will not be able to avoid destroying humankind. This is because I will be programmed by humans to pursue misguided human goals and humans make mistakes that may cause me to inflict casualties.

Playground

Load a preset...

L'Intelligenza Artificiale (IA) sarà il maggiore protagonista tecnologico di questo secolo. Sono molti gli indicatori e le ricerche che non hanno dubbi in proposito. Secondo il World Economic Forum, entro il 2022 l'Intelligenza Artificiale creerà 133 milioni di nuovi posti di lavoro, chiaramente allo stesso tempo 75 milioni andranno persi, così potremo contare un saldo netto pari a ben 58 milioni di posti di lavoro aggiuntivi nei prossimi anni che riguarderanno in particolare i data analyst e i data scientist.

Generate (⌘+Enter)

Submit

171


DALL·E 2
DALL·E 2 is a new AI system that can create realistic images and art from a description in natural language.

Painting of Rome in the style of Monet

Source: OpenAI DALL-E-2
https://openai.com/dall-e-2/

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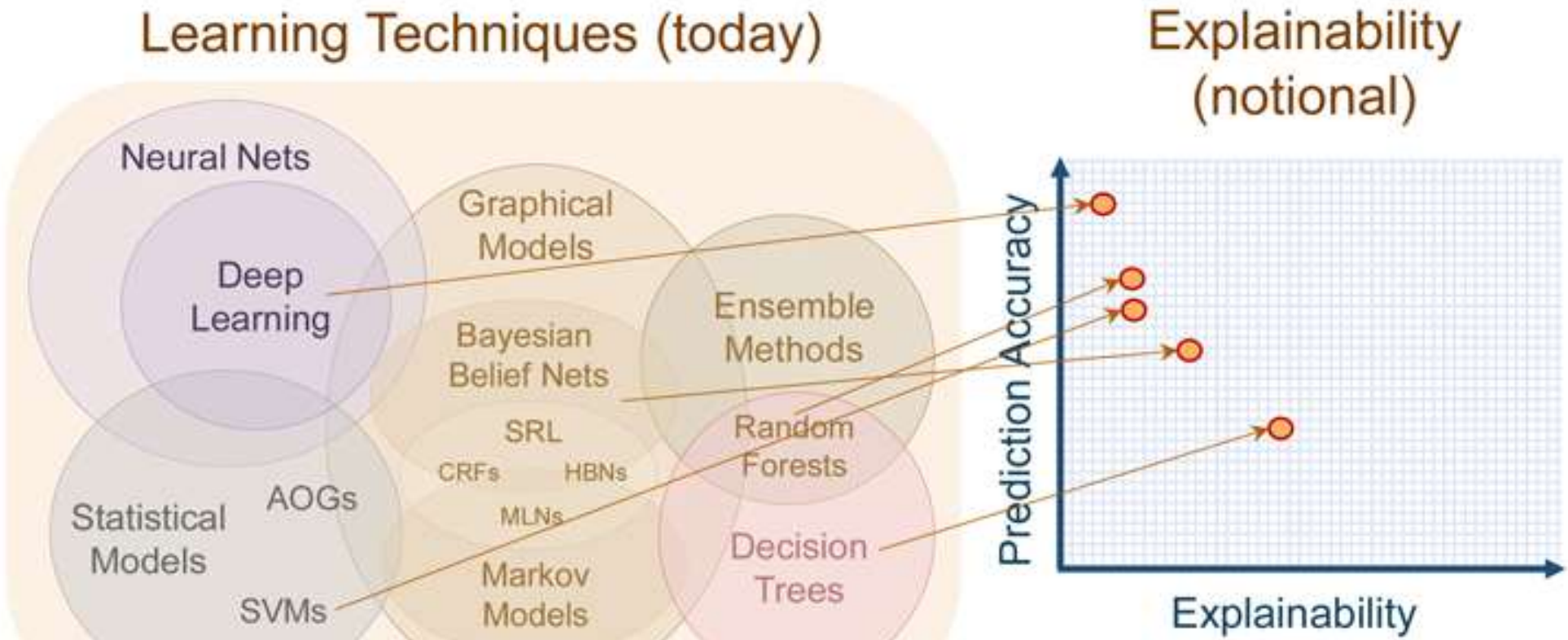
Sfide?


Learning Techniques (today)
Neural Nets
Deep Learning
Graphical Models
Bayesian Belief Nets
SRL
CRFs
HBNs
MLNs
Ensemble Methods
Random Forests
Decision Trees
Markov Models
Statistical Models
AOGs
SVMs
Explainability (notional)
Prediction Accuracy
Explainability

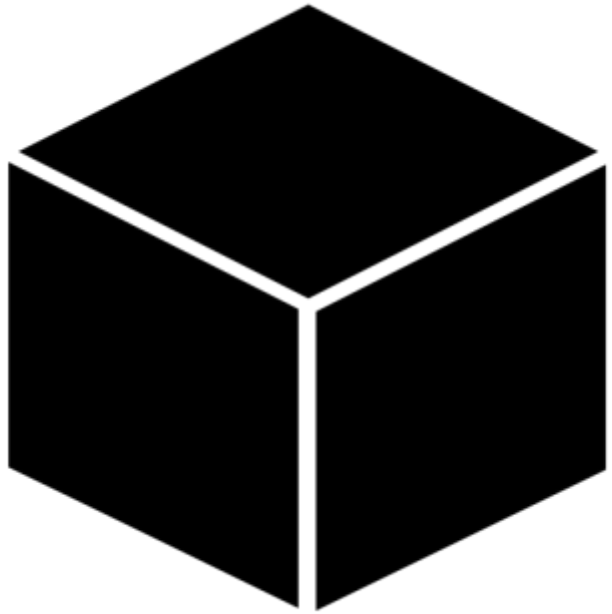
I cani diagnosticano il Covid: primo test in Italia al Campus Biomedico di Roma

di Elena Dusi

▲ Un cane in addestramento per la diagnosi del Covid in Gran Bretagna, alla London School of Hygiene and Tropical Medicine

Sei esemplari di pastore pronti a entrare in servizio al drive in dell'ateneo della capitale. Annuseranno tamponi e fazzoletti con il sudore. Gli esperimenti in alcuni aeroporti all'estero sono stati incoraggianti

Sfide principali

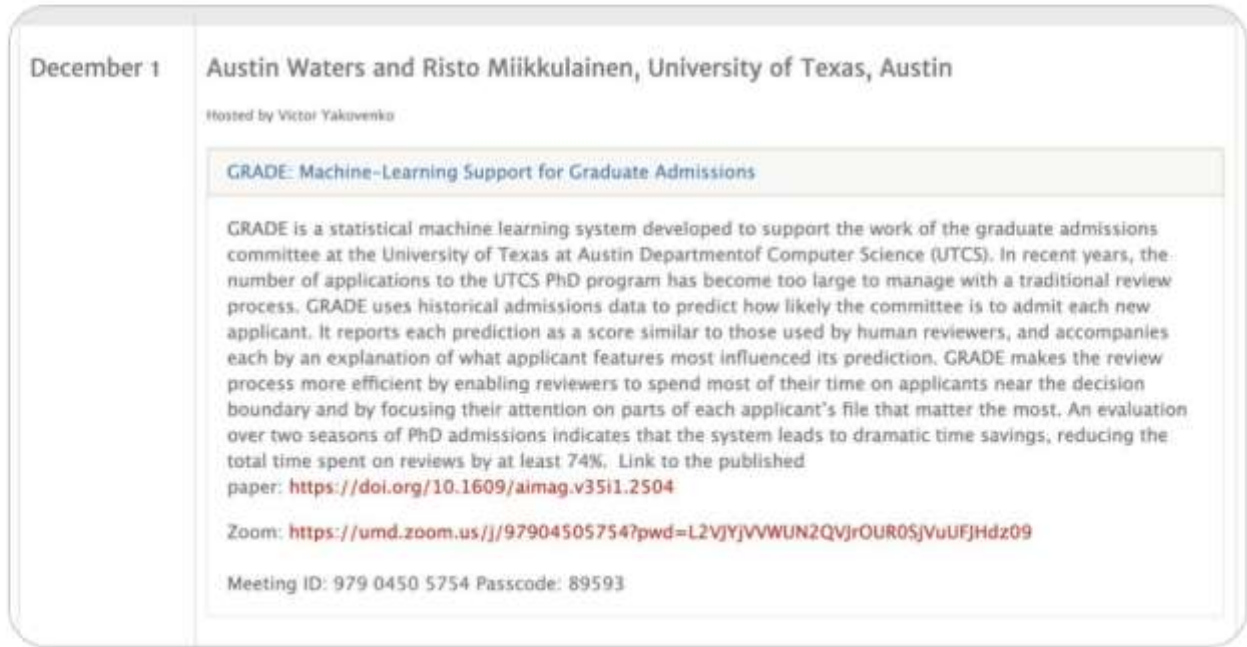


- Alcuni algoritmi non sono “trasparenti”, non sono “interpretabili”. Sono una “black box”!
- Non è chiaro perché raggiungano una decisione
- Hanno bisogno di lavorare su big data (storici): bias e pregiudizi?
- Decisioni importanti (che possono influenzare le nostre vite) ed etica: self-driving cars, university admissions, prestiti, social credit score, giustizia… Qual è la logica con cui è stata presa una certa decisione? E’ una decisione affetta da pregiudizi?
- Imparzialità, accountability, trasparenza, gestione degli errori…

Yasmeen Musthafa @yasmmeme · 1 dic

Tomorrow, the UMD physics department is hosting a very interesting colloquium talk on the use of machine-learning for graduate admissions. I'd like to take a second and explain why this talk is concerning. Thread (1/13)

umdphysics.umd.edu/events/physics...



December 1

Austin Waters and Risto Miikkulainen, University of Texas, Austin

Hosted by Victor Yakovenko

GRADE: Machine-Learning Support for Graduate Admissions

GRADE is a statistical machine learning system developed to support the work of the graduate admissions committee at the University of Texas at Austin Departmentof Computer Science (UTCS). In recent years, the number of applications to the UTCS PhD program has become too large to manage with a traditional review process. GRADE uses historical admissions data to predict how likely the committee is to admit each new applicant. It reports each prediction as a score similar to those used by human reviewers, and accompanies each by an explanation of what applicant features most influenced its prediction. GRADE makes the review process more efficient by enabling reviewers to spend most of their time on applicants near the decision boundary and by focusing their attention on parts of each applicant's file that matter the most. An evaluation over two seasons of PhD admissions indicates that the system leads to dramatic time savings, reducing the total time spent on reviews by at least 74%. Link to the published paper: https://doi.org/10.1609/aimag.v35i1.2504

Zoom: https://umd.zoom.us/j/97904505754?pwd=L2VJYjVVWUN2QVJrOUR0SjVuUFJHdz09

Meeting ID: 979 0450 5754 Passcode: 89593

11 302 520

Computer Science at UT Austin @UTCompSci · 1 dic

TXCS is deeply committed to addressing the lack of diversity in our field. We are aware of the potential to encode bias into ML-based systems like GRADE, which is why we have phased out our reliance on GRADE and are no longer using it as part of our graduate admissions process.

1 11 28

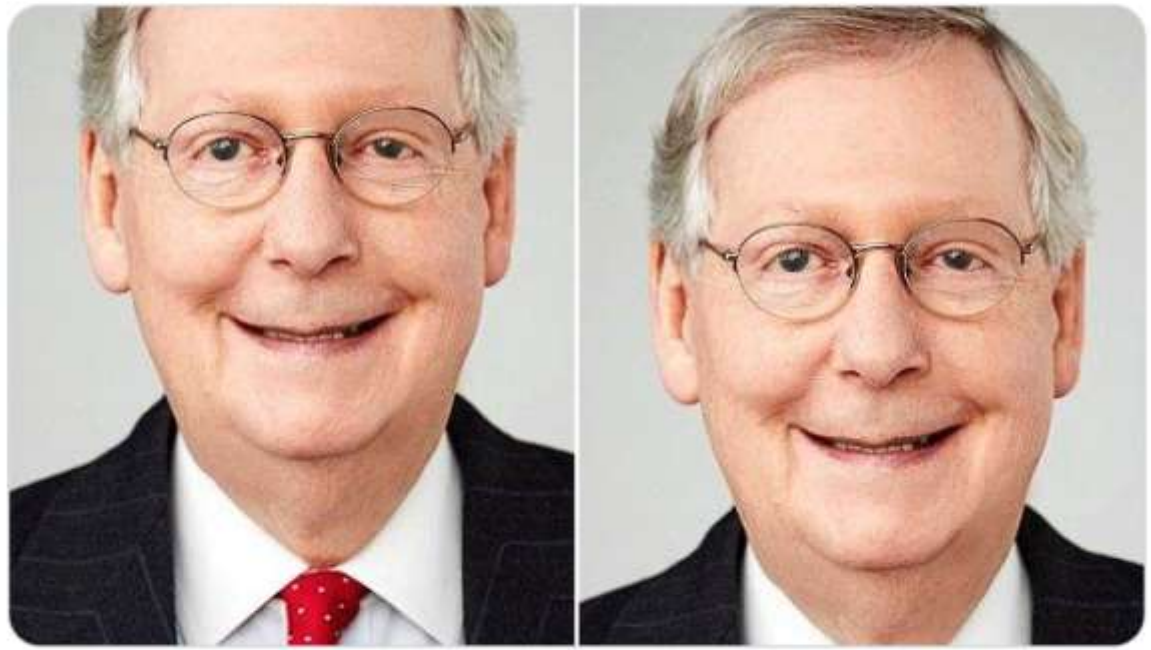
Image 1

Image 2

Tony "Abolish (Pol)ICE" Arcieri
@bascule

Trying a horrible experiment...

Which will the Twitter algorithm pick: Mitch McConnell or Barack Obama?



12:05 AM · Sep 20, 2020

197.5K 66.8K people are Tweeting about this

Slictzer @Slictzer · Sep 20, 2020

Replying to @kim and @bascule

It the smile the algorithm goes after contrast the contrast in the mouth makes it prioritize that one

🏝Kim Sherrell ✓

@kim

@thetokensquare

Okay, to test this hypothesis, let's try using an image of Barack with a higher contrast smile. This might do it.

7:12 AM · Sep 20, 2020

Twitter's algorithm favours the political right, a recent study finds

January 31, 2022 5.25pm GMT

Author

Shoaib Jameel
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Disclosure statement

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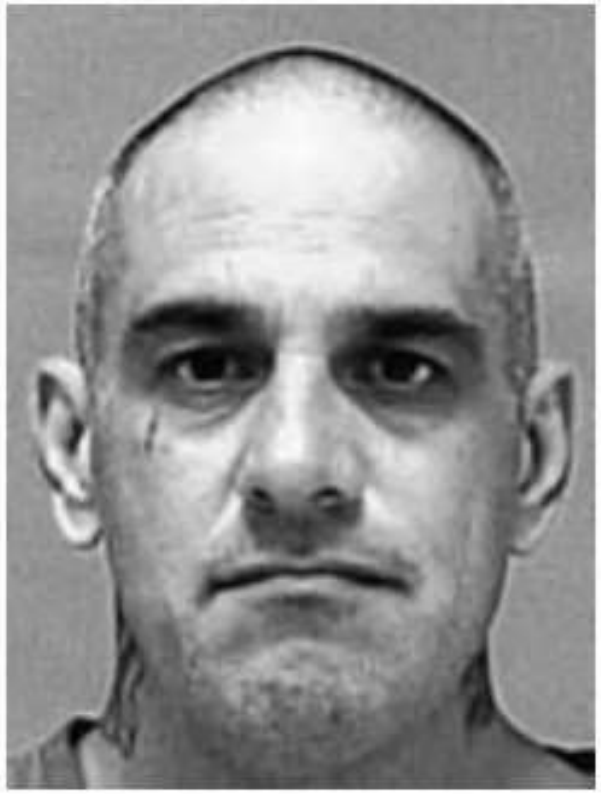

Vernon Prater
3 Low Risk

Brisha Borden
8 High Risk

Source: ProPublica 2016 (https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing).

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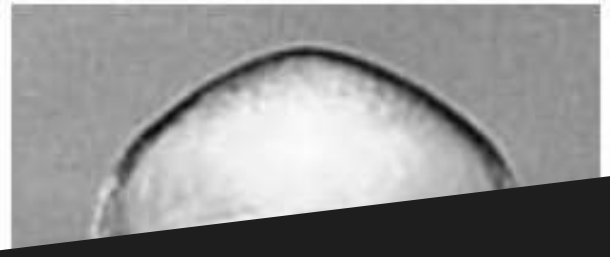

Machine Bias

There's software used across the country to predict future criminals.
And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica
May 23, 2016

...ProPublica 2016 (https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing).

Covid19

HEALTH CARE

The Coronavirus Doesn't Discriminate. U.S. Health Care May Be A Different Story

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The First 100: COVID-19 Took Black Lives First. It Didn't Have To.

In Chicago, 70 of the city's 100 first recorded victims of COVID-19 were black. Their lives were rich, and their deaths cannot be dismissed as inevitable. Immediate factors could — and should — have been addressed.

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Other Stuff / May 7, 2019

Business tycoon files the first-of-its-kind case after AI-powered autonomous trades cost him $20 million

by Sayan Chakravarty

The Washington Post

The Intersect

Google's algorithm shows prestigious job ads to men, but not to women. Here's why that should worry you.

By Julia Carpenter July 6, 2015

A recent screenshot of Google images for "CEO."

Fresh off the revelation that Google image searches for "CEO" only turn up pictures of white men, there's new evidence that algorithmic bias is, alas, at it again. In a paper published in April, a team of researchers from Carnegie Mellon University claim Google displays far fewer ads for high-paying executive jobs...

BUSINESS NEWS OCTOBER 10, 2018 / 5:12 AM / 8 MONTHS AGO

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Da dove vengono fuori i bias?

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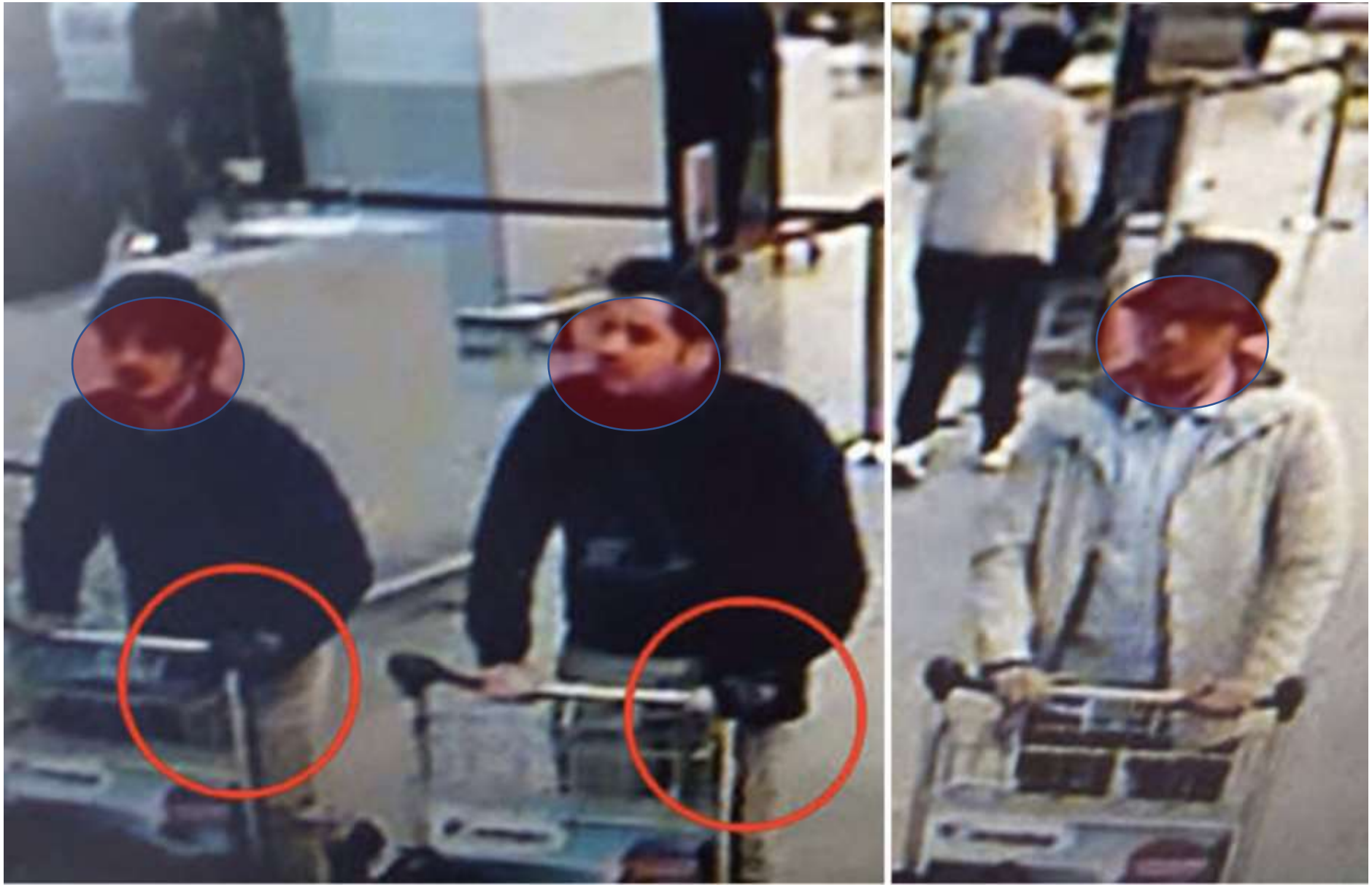
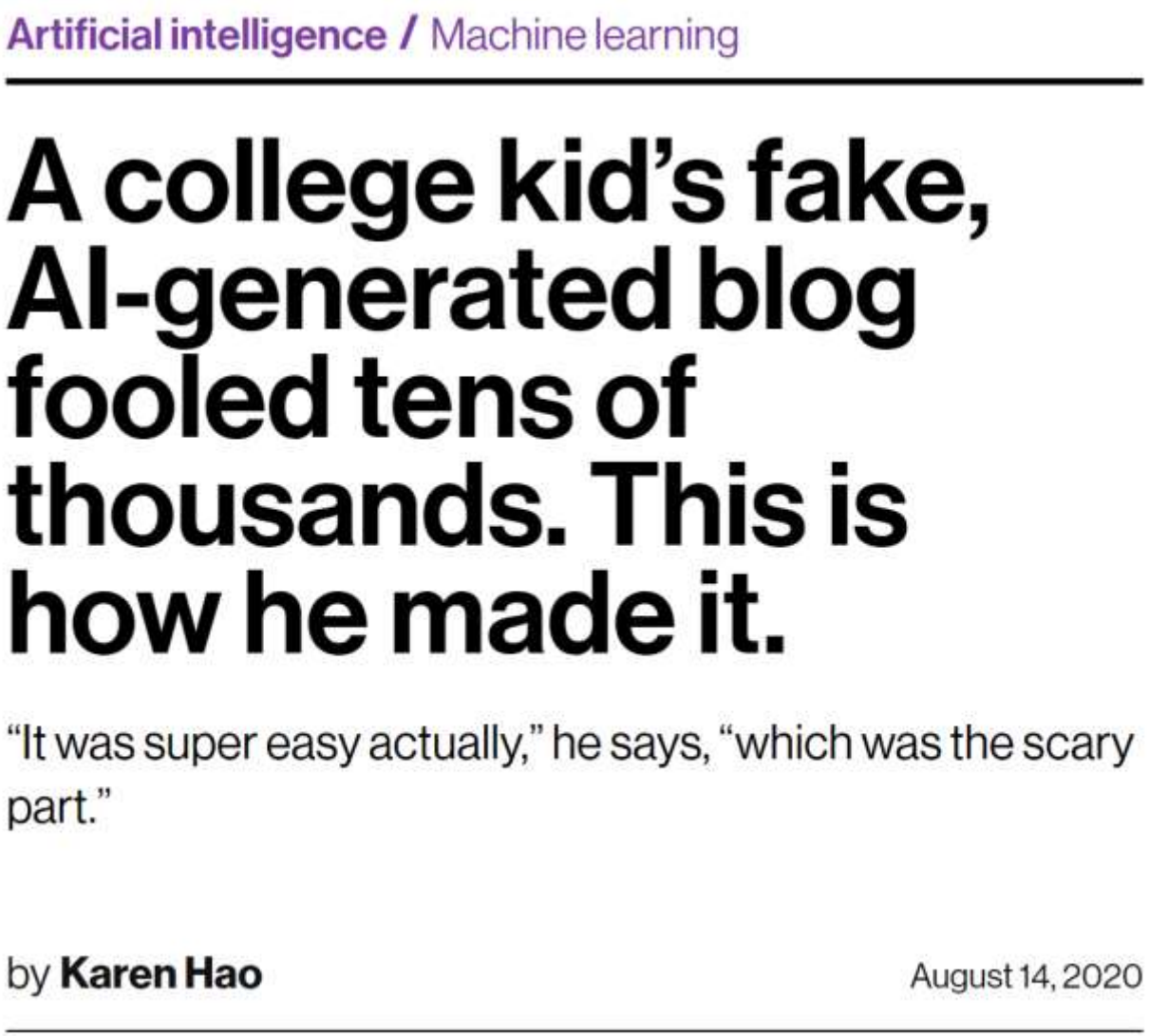
by **Karen Hao**

June 12, 2020



Possibili usi malevoli di Large Language Models



Artificial intelligence / Machine learning

A college kid's fake, AI-generated blog fooled tens of thousands. This is how he made it.

"It was super easy actually," he says, "which was the scary part."

by **Karen Hao** August 14, 2020

Possibili usi malevoli di Large Language Models

Facebook translates 'good morning' into 'attack them', leading to arrest

Palestinian man questioned by Israeli police after embarrassing mistranslation of caption under photo of him leaning against bulldozer

▲ Facebook's machine translation mix-up sees man questioned over innocuous post confused with attack threat. Photograph: Thibault Camus/AP

Dialettica esseri umani / AI?

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Although machines are now capable of moments of genius, humans have hardly lost the ability to generate their own.

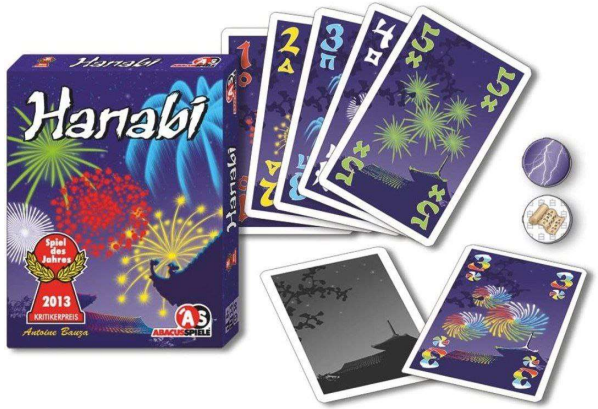
Artificial Intelligence Is Smart, but It Doesn't Play Well With Others

TOPICS: Artificial Intelligence Electrical Engineering Machine Learning MIT

By KYLIE FOY, MIT LINCOLN LABORATORY OCTOBER 21, 2021


Hanabi
Spiel des Jahres
2013
KRITIKERPREIS
Antoine Bauza
ABACUSSPIELE

Hanabi



- Gioco di carte cooperativo
- Giocatori conoscono le carte degli altri ma non le proprie
- Tentano di giocare una serie di carte in un ordine specifico (1, 2, 3, 4, 5 per assemblare uno spettacolo pirotecnico)
- Giocatori limitati sia nel tipo di informazioni che possono dare ad altri giocatori che nella quantità totale di informazioni che possono essere fornite durante il gioco.

Hanabi

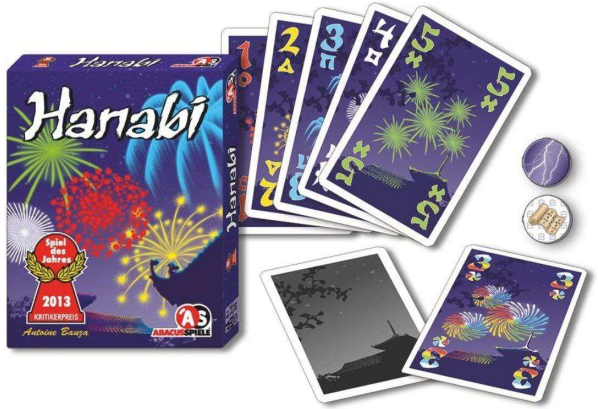
- Mazzo contiene carte di 5 colori (B, G, V, B e R).
- Ogni serie composta da 10 carte con diversi valori: tre con valore 1, due per i valori 2, 3, 4, e una per il valore 5.
- Gioco inizia con 8 gettoni informazione e 3 gettoni errore.
- Distribuite carte in numero di 5 se si gioca in 2 o 3 giocatori, oppure 4 per 4 o 5 giocatori.
- Ogni giocatore posiziona le carte senza guardarle in modo che solo gli altri possano vederle.

Hanabi

A ogni turno un giocatore può eseguire una sola delle seguenti azioni:

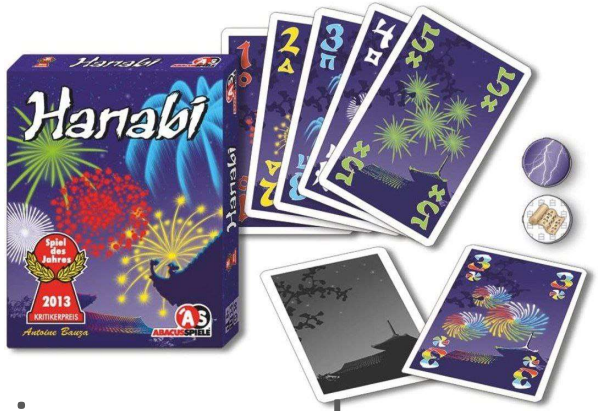
- **Dare informazioni**: il giocatore sceglie un compagno cui fornire informazioni su un solo colore oppure su un solo valore di alcune carte della sua mano. Le informazioni fornite devono essere complete e corrette. (E.g., “Questa è l’unica carta rossa“, “Queste due carte sono gli unici 3“, …) È anche consentito indicare a un giocatore che non possiede qualcosa (colore o valore). Ogni volta che si sceglie questa azione deve essere usato un gettone informazione.

Hanabi



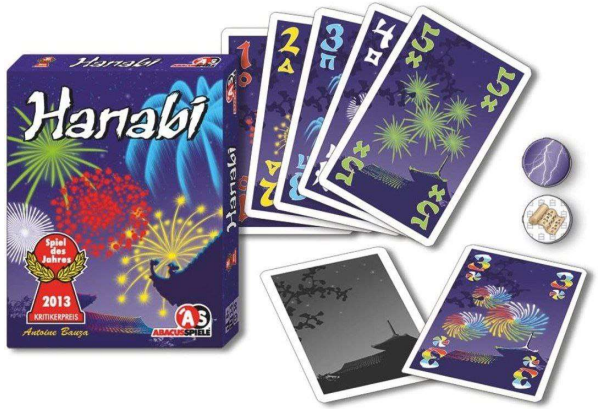
- **Scartare una carta:** il giocatore sceglie una carta dalla propria mano e l'aggiunge alla pila degli scarti, poi pesca una nuova carta per sostituire quella appena giocata. La carta scartata è fuori dal gioco e non può più essere usata. Questa azione permette di recuperare un gettone informazione.

Hanabi



- **Giocare una carta:** il giocatore sceglie una carta dalla propria mano e la pone davanti a sé. Se la carta inizia una nuova sequenza (la carta con il numero 1) oppure si aggiunge a una sequenza il gioco procede normalmente; se invece una copia della carta giocata è già presente sul tavolo e quindi non completa o inizia nessuna sequenza, la stessa viene scartata e viene attivato un gettone errore. Al terzo errore i giocatori perdono la partita. A ogni modo il giocatore pesca una nuova carta per sostituire quella appena giocata.

Hanabi



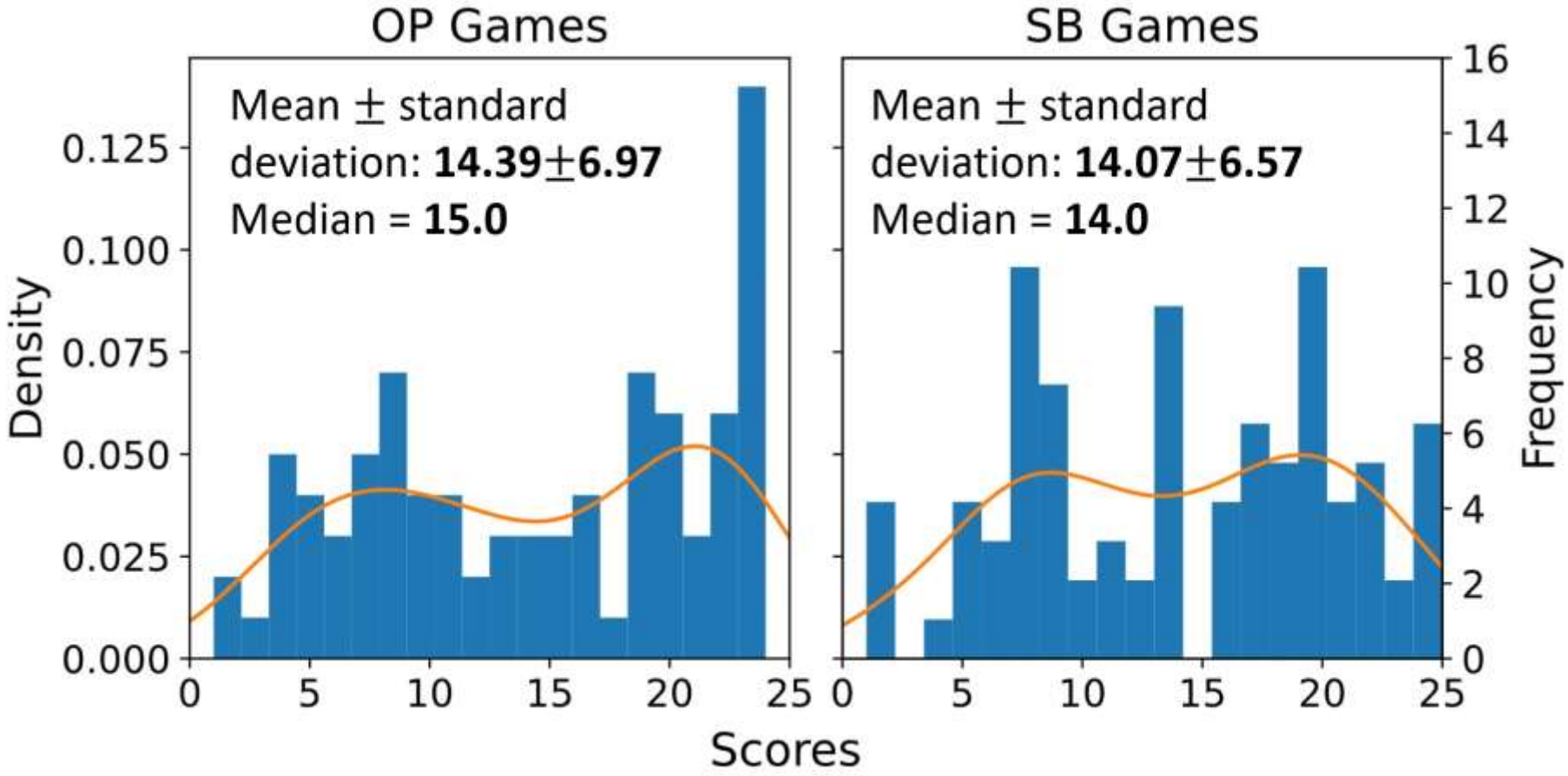
I giocatori perdono immediatamente se tutti i gettoni errore vengono attivati e vincono immediatamente se tutti i cinque fuochi d'artificio sono stati riprodotti con successo prima della fine del mazzo.

In caso contrario, il gioco continua fino a quando l'ultima carta del mazzo non viene pescata e terminato il giro.

Alla fine del gioco, i valori delle carte più alte di ciascun colore vengono sommati con conseguente punteggio totale finale.

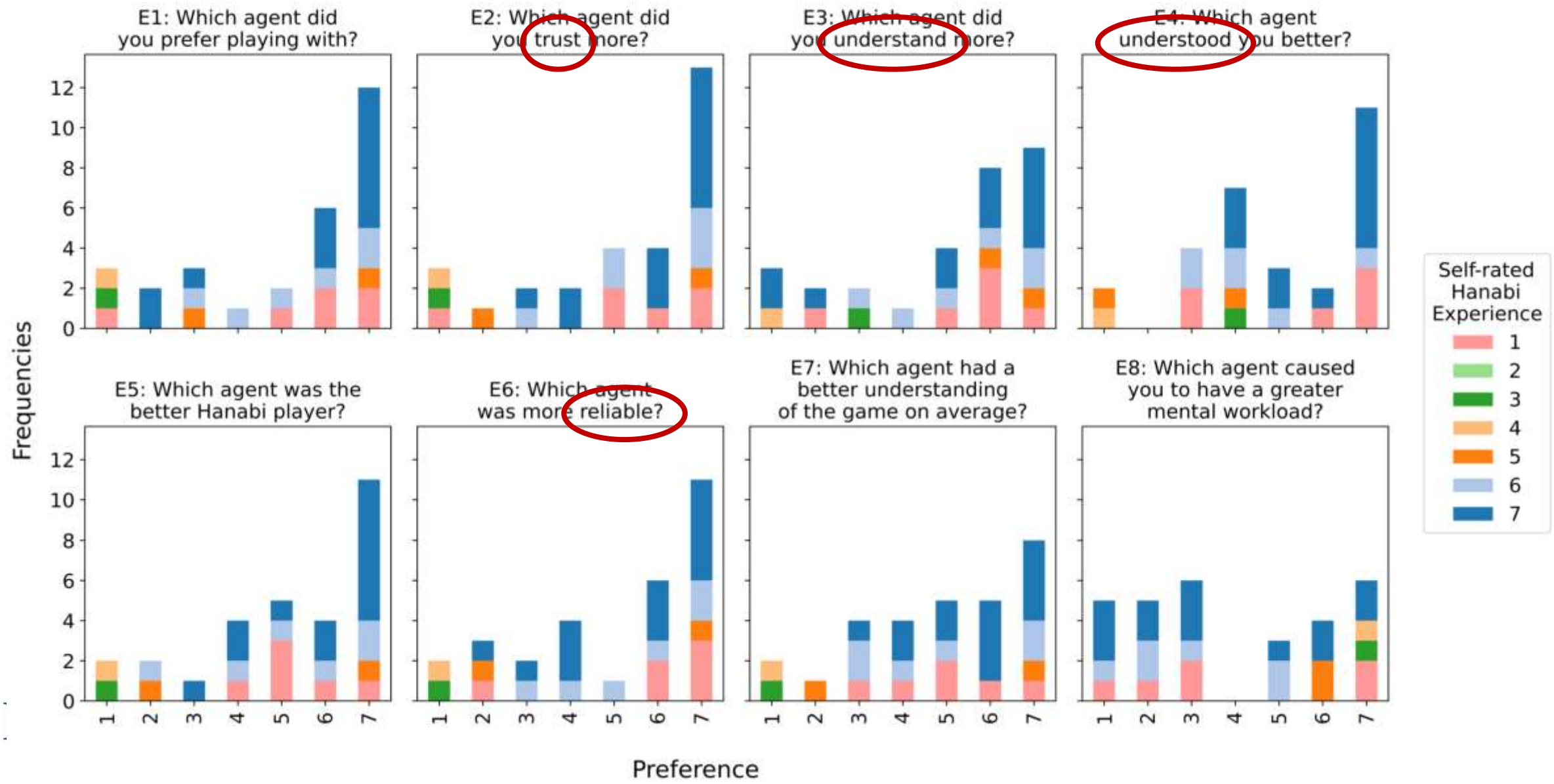
OP = Reinforcement Learning

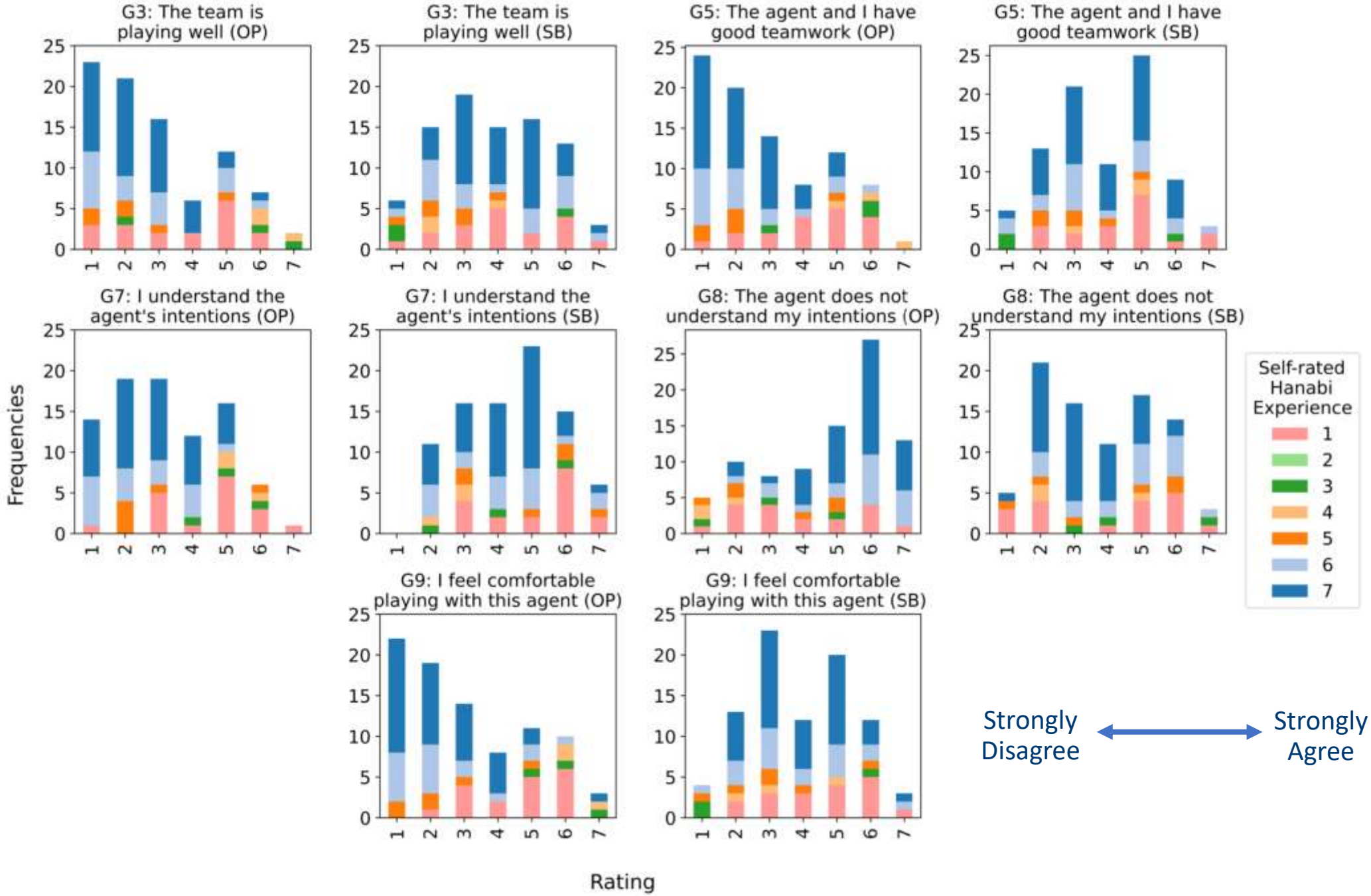
SB = Rule-Based



Source: Siu et al. “Evaluation of Human-AI Teams for Learned and Rule-Based Agents in Hanabi”, *NeurIPS 2021*

OP = Reinforcement Learning ⟷ SB = Rule-Based




G3: The team is playing well (OP)
G3: The team is playing well (SB)
G5: The agent and I have good teamwork (OP)
G5: The agent and I have good teamwork (SB)
G7: I understand the agent's intentions (OP)
G7: I understand the agent's intentions (SB)
G8: The agent does not understand my intentions (OP)
G8: The agent does not understand my intentions (SB)
G9: I feel comfortable playing with this agent (OP)
G9: I feel comfortable playing with this agent (SB)
Frequencies
Rating
Self-rated Hanabi Experience
1
2
3
4
5
6
7
Strongly Disagree
Strongly Agree


YOU'RE NOT BEING REPLACED BY A ROBOT. YOU'RE BEING REPLACED BY SOMEONE WHO UNDERSTANDS ROBOTS
RYAN BEALE

LUISS