

Why Environment Minorities Data&AI Dark Patterns It's your turn

## Ethics and Computer Science

Matthieu Moy  
(Based on Aurélien Tabard's slides)

UCBL  
2020-2021

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## Outline

- 1 Why Talk About Ethics?
- 2 Environmental consequences of digital
- 3 Minorities and Computer Science
- 4 Data and Artificial Intelligence
- 5 Dark Patterns
- 6 It's your turn

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## This Class

- Ideal goal: encourage you to ask yourself relevant questions (probably unrealistic)
- My goal: give you concrete examples. If you ever cite any of these examples in a discussion → mission accomplished for me.
- Why do that:
  - ▶ The world is changing because/thanks to us
  - ▶ We have a responsibility in what it's becoming

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## World is Changing

- Greatest market capitalization (Q1 2020):
 

Microsoft	1,200 B\$
Apple Inc.	1,113 B\$
Amazon.com	970 B\$
Alphabet Inc.	799 B\$
Alibaba Group	521 B\$
Facebook, Inc.	475 B\$
Tencent	471 B\$
Berkshire Hathaway	440 B\$ ← conglomerate company
Visa	357 B\$ ← finally a bank!
- 2 similar ways to make money
  - ▶ AccorHotel, 1st French group, 6th worldwide, 4,800 hotels et 280,000 employees, created in 1967. 11.2 B\$ capitalization (2019).
  - ▶ AirBNB, no hotel, 3,100 employees. Founded in 2008. 30 B\$ capitalization.

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## Internet Access Considered a Fundamental Right

- "the same rights people have offline must also be protected online", UN Resolution, 2006.
- "Loi pour une République numérique": "garantir un accès non discriminé au réseau pour l'ensemble des acteurs économiques", "permettre aux plus démunis de bénéficier de la continuité de leur connexion", France, 28 September 2016.
  - ~ Is internet access as important as water, electricity (and telephone)?

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## Responsibility

Can you go to jail for writing code?

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The New York Times

### Volkswagen Engineer Gets Prison in Diesel Cheating Case

James Lang, a Volkswagen engineer, is the first employee sent to prison in the scandal that has tainted the German automaker's reputation and cost it billions in fine and settlements with consumers. Virginia Lautens/Redux Photos via AP

By Bill Vlasic Aug. 25, 2017

DETROIT — A Volkswagen engineer was sentenced on Friday to 40 months in prison for his role in the German automaker's decade-long scheme to cheat on federal emissions tests for diesel-powered cars sold in the United States.

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<https://www.dailymail.co.uk/news/article-5248211/Google-engineer-fired-sexist-memo-suing-tech-giant-alleging-discriminates-against-conservative-white-men.html>

### Google engineer fired for 'sexist memo' last year is suing the tech giant alleging it discriminates against conservative white men

- Google fired software engineer James Damore in August after his controversial internal memo went viral
- He is now suing the tech firm claiming they discriminated against conservative white men
- Lawsuit states that Google's efforts to make its workplace more diverse and close the paygap was "extreme — and illegal"
- Damore also complained he was "singled out, mistreated, and systematically punished and terminated" after his ten page internal memo was leaked
- The controversial document said women could not get ahead at Google because of physiological differences such as they were naturally more neurotic
- Damore also claimed that Google stifles opinions that don't fit its "left-wing bias"
- CEO Sundar Pichai said the engineer had violated Google's code of conduct by "advancing harmful gender stereotypes"

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**Do Employees Take Their Responsibility?**

- Example: Google Employees Vs Pentagon's Maven Program
  - Maven Program: use artificial intelligence in drones
  - Weapon + Artificial intelligence = ?
  - Petition signed by 3,000 Google employees:  
"We believe that Google should not be in the business of war. Therefore we ask that Project Maven be cancelled [...] This plan will irreparably damage Google's brand and its ability to compete for talent [...] Google's unique history, its motto "don't be evil", and its direct reach into the lives of billions of users set it apart."
  - Contract not renewed by Google

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**Responsibility**

Can you influence the world with software?

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**Experimental evidence of massive-scale emotional contagion through social networks**

Adam D. I. Kramer<sup>a,\*</sup>, Jamie E. Guillory<sup>b,2</sup>, and Jeffrey T. Hancock<sup>b,3</sup>  
<sup>a</sup>Core Data Science Team, Facebook, Inc., Menlo Park, CA 94034, and Departments of <sup>b</sup>Communication and Information Science, Cornell University, Ithaca, NY 14853  
Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved March 25, 2014 (received for review October 23, 2013)

Emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without direct communication or observation. Previous work demonstrated that (i) emotional contagion occurs via text-based computer-mediated communication (7); (ii) a contagion of positive emotions occurs over a social network (8); and (iii) people's emotional expressions on Facebook predict friends' emotional states (9). Here, we show that emotional contagion can occur in real-time outside of impression interaction between individuals by reducing the size of impression control in the News Feed. When positive expressions were reduced, people produced fewer positive posts and more negative posts, while positive posts were reduced, the opposite pattern occurred. These results indicate that emotions expressed by others on Facebook influence our own emotional state and behavior (10). We also find evidence of emotional contagion via social networks. This work also suggests that, in contrast to prevailing assumptions, in-person interaction and non-verbal cues are not necessary for emotional contagion, and that the observation of others' positive experiences constitutes a positive experience for people.

computer-mediated communication | social media | big data

Emotional states can be transferred to others via emotional contagion, leading them to experience the same emotions as consistent with the exposure—thereby testing whether exposure

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Article Talk Read Edit View history Search Wikipedia

**Facebook–Cambridge Analytica data scandal**

From Wikipedia, the free encyclopedia

The **Facebook–Cambridge Analytica data breach** was a data leak in early 2018 whereby millions of Facebook users' personal data was harvested without consent by Cambridge Analytica, predominantly to be used for political advertising.<sup>[1]</sup> It is the largest known leak in Facebook history.<sup>[2]</sup>

The data was collected through an app created in 2013 by Dr. Aleksandr Kogan (Dr. Aleksandr Spectre, at the time), a Cambridge academic, and consisted of a series of questions to build psychological profiles on users.<sup>[3]</sup> The app not only harvested the personal data of the users that completed the questions, but also of the users' Facebook friends.<sup>[3]</sup> Cambridge Analytica sought to sell the data of American voters to political campaigns and ultimately provided assistance and analytics to the Ted Cruz and Donald Trump campaigns.<sup>[2][4]</sup>

The data breach was disclosed in 2018 by Christopher Wylie, a former Cambridge Analytica employee, in interviews with the Guardian and The New York Times.<sup>[5]</sup> In response, Facebook apologized for their role in the data harvesting and their CEO Mark Zuckerberg testified in front of Congress.<sup>[5]</sup> These happenings sparked an online movement #DeleteFacebook, which trended on Twitter.<sup>[6]</sup>

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**Au delà des aspects légaux**

Cours de M2 : Droit de l'informatique et de l'internet (S4)

- Protection des logiciels
- Protection des données
- Fraudes Informatiques
- Un droit pour l'Internet

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**Can a Computer Kill You?**

Yes, obviously, see course on famous bugs.

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**Can a Computer Decide to Kill You?**

<http://moralmachine.mit.edu/>

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**Can a Computer Decide to Kill You?**

Who? In which country?

<http://moralmachinemineresults.scalablecoop.org/>

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## A More Scientific View?

*"Si on remonte le temps, la notion de quatrième année la plus chaude JAMAIS enregistrée devient nettement moins pertinente..."*

(<https://www.climato-realistes.fr/le-mentir-vrai-exemples-autour-du-climat/>)

Reminder:

- Mankind is about 6 million years Old
- Dinosaurs disappeared 65 million years ago
- (Log scales are very misleading ...)

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## Energy units: Orders of magnitude

- 1 Kg CO<sub>2</sub> = 0.4 liters gasoline  $\approx$  10 Km by car<sup>1</sup>
- 1 Kg CO<sub>2</sub> = 10 kWh (France) or 1 kWh (using coal)  $\approx$  1 month using a laptop 6h/day (France)<sup>2</sup>
- 1 person = 12 tons CO<sub>2</sub>/year (France)<sup>3</sup>

<sup>1</sup><https://calculis.net/co2>  
<sup>2</sup><https://www.greenit.fr/2009/04/24/combien-de-co2-degage-un-1-kwh-electrique>  
<sup>3</sup><https://e-rse.net/emissions-CO2-francais-empreinte-carbone-271641/>

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## Energy Units: if You Prefer Money to Physics

- 1 Kg CO<sub>2</sub> = 0.4 liters gasoline  $\approx$  0.5 €
- 1 Kg CO<sub>2</sub> = 10 kWh (France) = 1.55 €(EDF rate)
- 1 person = 12 tons CO<sub>2</sub>/year (France)  $\approx$  5-18 k€/year spent on energy (rough estimate)
- Another easy-to-remember number: 1 Watt  $\approx$  1€/year (1Watt\*24h\*365d\*0.155 = 1.35€/y)

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## Power Consumption of Digital

Le scénario du pire, "Worst case", imaginé par Andréa & Edler est évidem, mais la réalité se situe tout de même largement au-dessus de leur scénario "Expected".  
Andréa & Edler disposent de données réelles allant jusqu'à 2013. Les scénarios sont basés sur une projection jusqu'en 2025 avec les mêmes hypothèses pour réaliser le scénario "Expected updated".  
Le Shift a aussi fait, à la lumière des évolutions récentes, ses propres hypothèses pour les autres scénarios.

Source : scénarios et calculs The Shift Project 2018, à partir d'Andréa & Edler 2013

<https://theshiftproject.org/lean-ict/>

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## Fact-checking The Shift Project

**FACTCHECKS** Factcheck: What is the carbon footprint of streaming video on Netflix?

**THE SHIFT PROJECT**  
THE CARBON TRANSITION THINK TANK

The fi  
the "t  
respo  
emiss Who are we ? • Current projects • Publications • Our

The S 15 June 2020  
2014 Share: [f](#) [t](#) [in](#) [c](#)

In a nutshell: An analysis published in March correctly pointed out an error by The Shift Project regarding the climate footprint of online video. This error appeared during an interview. It has no impact on the results published in our reports, which are not contested. Here is our detailed explanation. We call for further scientific discussion.

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## In France

**Empreinte carbone des Français**

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<http://ravijen.fr/?p=440>

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## Impact of Digital

- Immediate impact
  - I use a computer, it consumes electricity
- Direct impact
  - I use a computer to surf the net  $\Rightarrow$  routers and servers consume electricity
  - My computer was manufactured  $\Rightarrow$  it consumed energy
- Indirect impact
  - I use Internet, it changes my behavior (online shopping Vs shops, ...)
- Long term impact
  - Digital is changing society

Let's look at Immediate Vs Direct

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## Electric Consumption Distribution for Digital Equipment

Source: Emerging Trends in Electricity Consumption for Consumer ICT

- More than half consumption "hidden"
- Trend:
  - direct consumption less than 1/3
  - data-center + network  $\approx$  1/2
  - LCA remains approximately the same

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AlexNet to AlphaGo Zero: A 300,000x Increase in Compute

FLOPs (day of training)

Year

Model	Year	FLOPs (day of training)
AlexNet	2013	~10^1
Dropout	2013	~10^1
Visualizing and Understanding Conv Nets	2014	~10^2
VGG	2014	~10^3
GoogleNet	2014	~10^3
DeepSpeech2	2015	~10^4
ResNets	2015	~10^4
Neural Machine Translation	2016	~10^5
Neural Architecture Search	2016	~10^5
Xception	2017	~10^6
TiZI Data 1v1	2017	~10^6
AlphaZero	2018	~10^8
AlphaGo Zero	2018	~10^9

Source: <https://openai.com/blog/ai-and-compute/>

• FLOPS to train a model at Google doubles every 3.5 months

• Power efficiency doesn't follow  
⇒ exponential growth of power consumption

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## Energy Consuming Example: BitCoin

- Principle of BitCoin
  - ▶ Global registry of transactions shared by many machines
  - ▶ Participants compute cryptographic hashes
- $\approx 7$  transactions per second (worldwide)!
- 1 transaction = 288 kg CO<sub>2</sub>  $\approx$  20 days of power supply of an average US household
- Total consumption = 0.33 % of worldwide energy  $\approx$  electricity consumption of Austria

Source: <https://digiconomist.net/bitcoin-energy-consumption>

Why Environment Minorities Data&AI Dark Patterns In your box

# Impact of Digital

- **Immediate impact**
  - ▶ I use a computer, it consumes electricity
- **Direct impact**
  - ▶ I use a computer to surf the net ⇒ routers and servers consume electricity
  - ▶ My computer was manufactured ⇒ it consumed energy
- **Indirect impact**
  - ▶ I use Internet, it changes my behavior (online shopping Vs shops, ...)
- **Long term impact**
  - ▶ Digital is changing society

Indirect impact: can digital save energy?

The slide features a red header bar with navigation links: 'Why', 'Environment', 'Measures', 'Data&AI', 'Disk Patterns', and 'It's your turn'. The main title 'Digital = Solution or Problem?' is displayed in orange at the top left. The central text block contains the following message:

Digital ⇒  
More \$\$ invested in eco-friendly  
projects

A large question mark is centered below the text.

Source: <https://jancovici.com/transition-energetique/l-energie-et-nous/le-energie-de-quoi-sagit-il-exactement/>

**Money Vs CO<sub>2</sub> Emissions**

CO<sub>2</sub> emissions per capita vs GDP per capita, 2016

Carbon dioxide (CO<sub>2</sub>) emissions per capita are measured in tonnes per person per year. Gross domestic product (GDP) per capita is measured in International \$ in 2011 prices. Logarithmic price deflators between countries were used.

Legend:

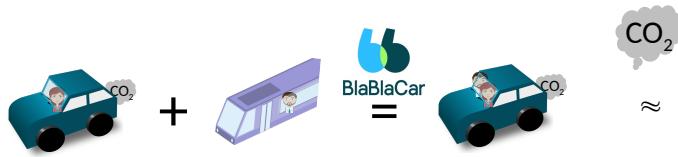
- UNHCR: 2011
- World Bank
- Africa
- Asia
- Europe
- North America
- Oceania
- South America

Source: Global Carbon Project & World Bank 2013  
<https://ourworldindata.org/grapher/co-emissions-per-capita-vs-gdp-per-capita-international-hdi>

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Et l'effet rebond ?

The diagram illustrates the concept of carpooling (covoiturage) to reduce CO<sub>2</sub> emissions. It shows two separate cars with passengers and CO<sub>2</sub> emissions, which combine to form one car with a single passenger and a CO<sub>2</sub> reduction icon.

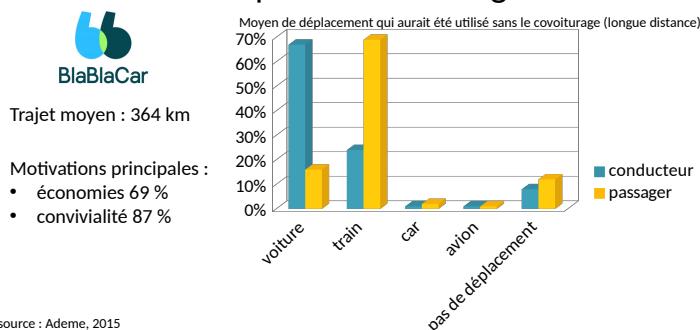
## Exemple du covoiturage



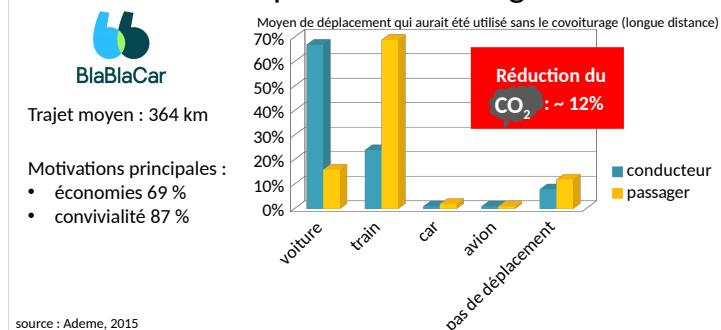
## Exemple du covoiturage



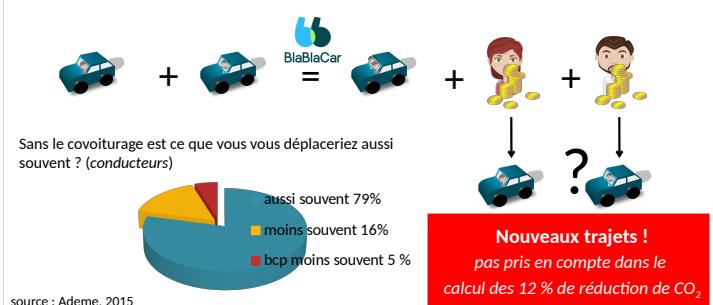
## Exemple du covoiturage



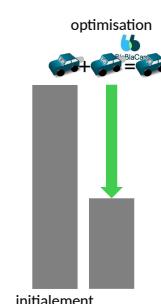
## Exemple du covoiturage



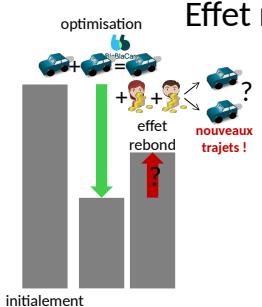
## Covoiturage : attention aux effets rebond



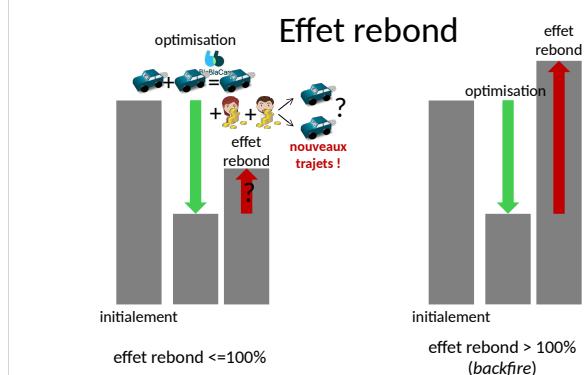
## Effet rebond



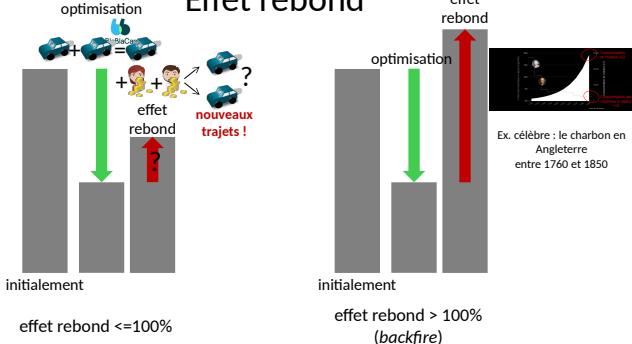
## Effet rebond



## Effet rebond



## Effet rebond



## Effet rebond ?



Dans un système en croissance, tous les gains en efficacité sont réinvestis...  
Le numérique facilite et amplifie ce processus

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### Impact of Digital

- Immediate impact
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- Long term impact
  - Digital is changing society

Long term impact: very hard to predict!

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### Good reads

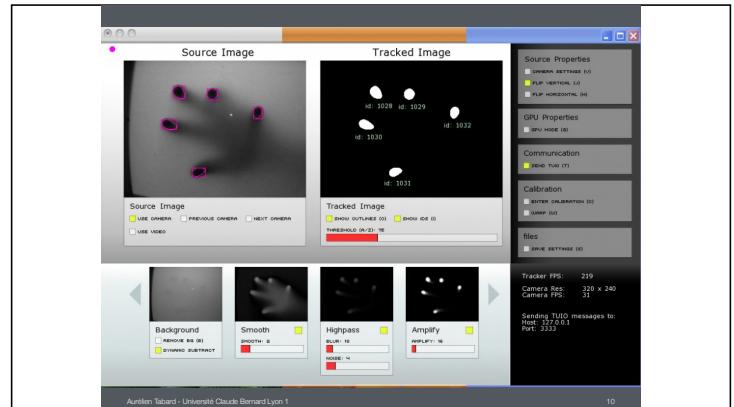
- La face cachée du numérique, <https://www.ademe.fr/face-cachee-numerique>
- The Shift Project, <https://theshiftproject.org/lean-ict/>
- <https://jancovici.com/>

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## Racisme et tech I



## Racisme et tech II



## How Kodak's Shirley Cards Set Photography's Skin-Tone Standard

November 13, 2014 - 3:45 AM ET  
Heard on Morning Edition

 MANDALIT DEL BARCO

Jerson García works at Richard Photo Lab in Hollywood. He's 31 years old, and he's got a total crush on Shirley.

"Beautiful skin tones, beautiful eyes, great hair," he sighs. "She's gorgeous."

Garcia is holding a 4-by-6-inch photo of an ivory-faced brunette wearing a lacy, white, off-the-shoulders top. She has red lipstick and silver earrings, and the photo appears to have been taken sometime in the 1970s or '80s.

For many years, this "Shirley" card — named for the original model, who was an employee of Kodak — was used by photo labs to calibrate skin tones, shadows and light during the printing process.

"She was the standard," Garcia says, "so whenever we printed anything, we had to pull Shirley in. If Shirley



For decades, Kodak's Shirley cards, like this one, featured only white models.

## Face Recognition and Skin Color

Google reportedly targeted people with 'dark skin' to improve facial recognition

Subcontracted workers were told to persuade subjects to agree to face scans, mischaracterizing them as a 'selfie game' or 'survey'



Source: <https://www.theguardian.com/technology/2019/oct/03/google-data-harvesting-facial-recognition-people-of-color>

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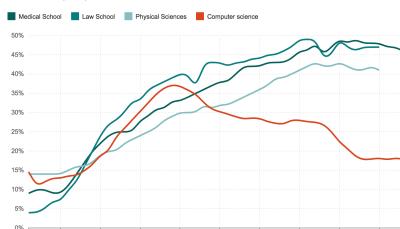
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## When Women Stopped Coding

October 21, 2014 - 8:54 AM ET  
Heard on Morning Edition

 STEVE HENS

What Happened To Women In Computer Science?  
% Of Women Majors, By Field



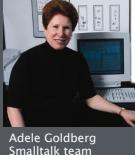
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Ada Lovelace  
1e algo exécuté



Margaret Hamilton  
lead dev. sur Apollo



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## Stereotypes Today (1/2)



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## Stereotypes Today (2/2)



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## Stereotypes Vs Hard Data

<https://phys.org/news/2017-05-gender-bias-open-source.html>

- How good are women in development? One measure: acceptance ratio of pull-requests on GitHub.

♂: 74.6 %      ♀: 78.7 %

Conclusion 1: *women are better coders*

- Hmm, let's have a closer look. Acceptance ratio for developers outside the project:

♂: 61 %      ♀: 58 %

Conclusion 2: actually, *men are better coders*, insiders get their code merged thanks to their non-coding skills (?)

- Wait, how do you know they were ♂/♀? Previous numbers=it's clear on their profile (picture, name, ...). Gender-neutral profiles:

♂: 65 %      ♀: 70 %

- Final conclusion: *gender bias does exist in open-source programming* :-(

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## About Sexism in Developers Communities: the Linux Kernel

- Frankness/Directness or Insulting/Sexist ...

► Linus Torvalds: *I fart in your general direction and call your mother a hamster.*  
► Linus Torvalds: *the patches are COMPLETE AND UTTER GARBAGE. [...] WHAT THE F\*CK IS GOING ON?*

- Not everybody finds it funny:

► Sarah Sharp: *I need communication that is technically brutal but personally respectful. I need people to correct my behavior when I'm doing something wrong (either technically or socially) without tearing me down as a person.*

► Linus Torvalds: *My flippant attacks in emails have been both unprofessional and uncalled for. Especially at times when I made it personal. [...] I need to change some of my behavior*

(<http://narab.theharps.us/2015/10/05/closing-a-door/>)



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## Little Things You Can Do

- Obviously: be nice to everybody
- Use gender-neutral formulation ("The user clicks OK, then he does")
- Avoid slang (especially below-the-belt one) when unsure how it will be taken
- Enforce/follow a code of conduct. Example (<https://opensource.guide/code-of-conduct/>):  
*Why do I need a code of conduct?*  
*A code of conduct is a document that establishes expectations for behavior for your project's participants. [...]*  
*A code of conduct empowers you to facilitate healthy, constructive community behavior. Being proactive reduces the likelihood that you, or others, will become fatigued with your project, and helps you take action when someone does something you don't agree with.*

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## Miscellaneous

- "Apple Card: La carte de paiement accusée d'être sexiste"  
<https://www.20minutes.fr/high-tech/2648287-20191110-apple-card-carte-paiement-accusee-etre-sexiste>

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## Being Inclusive in Communications

- Wording matters...



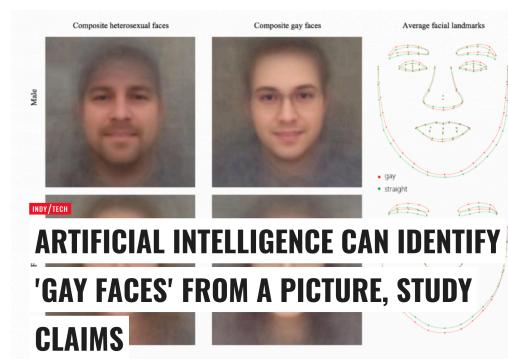
• Master / Slave ~ Primary / Secondary, or Initiator / Target, ...

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NEWS

GitHub abandons 'master' term to avoid slavery row

15-June-2020 f Share



Male  
Composite heterosexual faces  
Composite gay faces  
Average facial landmarks  
gay  
straight

ARTIFICIAL INTELLIGENCE CAN IDENTIFY  
'GAY FACES' FROM A PICTURE, STUDY  
CLAIMS

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## What's the issue?

• Blockbuster / Virologist (Dr. Bruce Lipton) ~ Blockbuster / Virologist

It can't work?  
Yes it does, 71-81% success, much better than humans!  
CS Research should be validated by an ethics committee (like medical research)  
It was: "Right now, if government-funded scientists want to research humans for a study, the law requires them to get the approval of an ethics committee known as an institutional review board, or IRB. Stanford's review board approved Kosinski and Wang's study. But these boards use rules developed 40 years ago for protecting people during real-life interactions, such as drawing blood or conducting interviews. The regulations were designed for a very specific type of research harm and a specific set of research methods that simply don't hold for data science," says Metcalf." <https://www.wired.com/story/ai-research-is-in-desperate-need-of-an-ethical-watchdog/>

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## Reconnaissance de visages masqués



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Les humains derrière le machine learning

Et derrière les bots, le labelling de photos,  
et pleins d'autres "IA"

L'IA est aujourd'hui grandement basée sur les données :

- Il faut produire des jeux de données propre
- Il faut entraîner les algorithmes
- Il faut avoir des palliatifs en cas de problèmes

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## Everything Can be Bought, Even Artificial Intelligence



We Make AI Work in the Real World

Our Human-in-the-Loop Machine Learning platform transforms unstructured text, image, audio, and video data into customized high-quality training data.

NEWS! Announcing our new Machine Learning Platform Video Object Tracking Solution Learn how we connect your data to human intelligence to create video training data faster and more accurately

https://www.figure-eight.com/

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## Everything Can be Bought, Even Artificial Intelligence

Human intelligence through an API  
Access a global, on-demand, 24x7 workforce  
Get started with Amazon Mechanical Turk

Amazon Mechanical Turk (MTurk) operates a marketplace for work that requires human intelligence. The MTurk web service enables companies to programmatically access this marketplace and a diverse, on-demand workforce. Developers can leverage this service to build human intelligence directly into their applications.

While computing technology continues to improve, there are still many things that human beings can do more effectively than computers, such as identifying objects in a photo or video, performing data de-duplication, transcribing audio recordings or researching data details. Traditionally, tasks like this have been accomplished by hiring a large temporary workforce (which is time consuming, expensive and difficult to scale) or have gone undone.

<https://www.mturk.com/>

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## Microworkers ("Travailleurs du Clic")

Le Micro-Travail en France  
Dossier L'impact sur de nouvelles formes de travail ?  
Anne-Sophie CARREAU - Pauline TERRASSON - Clémence LECLERCQ - Hélène OUDRIE  
Auteur(s) : Anne-Sophie CARREAU - Pauline TERRASSON - Clémence LECLERCQ - Hélène OUDRIE

"The present research estimates that more than **260 000 people** perform, at least occasionally, micro-work in France"

Good news for unqualified people, but not your problem, right?  
"43.5% of micro-workers between the ages of 25 and 64 hold at least a bachelor's degree"

<https://hal.archives-ouvertes.fr/hal-02139528>

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## On a related topic...

Do we even need to talk about Uber/Deliveroo/... ?

[https://www.darkpatterns.org/](#)

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Add Lib lifestyle content	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Unsubscribe from all	<input type="checkbox"/>		

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Continue  
We'll import your address book to suggest connections. Learn more  
LinkedIn.com/mynetwork/import.cgi

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## More on dark patterns

- <https://www.darkpatterns.org/>
- Don't mention me if you use this website as actual patterns for your next website ;-).

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Why Environment Minorities Data&AI Dark Patterns It's your turn

## How Uber Uses Psychological Tricks to Push Its Drivers' Buttons

The company has undertaken an extraordinary experiment in behavioral science to subtly entice an independent work force to maximize its growth.  
By NOAM SCHOBER and graphics by JON HUANG | APRIL 2, 2017

The secretive ride-hailing giant Uber rarely discusses internal matters in public. But in March, facing crises on multiple fronts, top officials convened a call for reporters to insist that Uber was changing its culture and would no longer tolerate "brilliant jerks."

Notably, the company also announced that it would fix its troubled relationship with drivers, who have complained for years about failing pay and arbitrary treatment.

"We've been underinvested in the driver experience," a senior official said. "We are now re-examining everything we do in order to rebuild that love."

<http://www.nytimes.com/interactive/2017/04/02/technology/uber-drivers-psychological-tricks.html>

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## Your Project, StopCovid & Privacy

- Privacy = growing concern with the growth of mobile devices and networks
- This course is already full, maybe a part on that next year ;-)
- Your project = minimal simulator of StopCovid (<https://www.economie.gouv.fr/stopcovid>)
- Your job in the report = discuss the stake behind contact-tracing apps:
  - Risks
  - Counter-measures, risk mitigation
  - Don't: try to find the one true answer, or try to make yourself an epidemiologist

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