



DSCI-6690 DATA SCIENCE CASE STUDIES SERIES
MASTERS OF DATA SCIENCE PROGRAMME
MEMORIAL UNIVERSITY

SEPTEMBER 9, 2024

Ethics in the age of data science

JC Loredo-Osti

- The use and abuse of data science (DS), data analytics (DA), big data (BD) and artificial intelligence (AI) should be of major concern for civil society, government, business, and academia.
- “Through the exponential growth in digital devices and computational capabilities, big data technologies are putting pressure upon the boundaries of what can or cannot be considered acceptable from an ethical perspective.” –*La Fors, Custers, and Keymolen (2019)*.
- Recently, a passionate debate regarding the need of oversight for machine learning and artificial intelligence systems to mitigate perceived threats against democracy, society, and national security.
- Regulation and governance are unquestionable important issues. However, before attributing competence, we should agree on ‘what is ethical in the age of data science?’

What is ethical and not in the age of data science?

- Ethics of data science is not much different than any endeavour of finding what is ‘right or wrong’, according to our common values.
- Our interactions with others involve ethical decisions in the sense that people can benefit or be harmed; rules are followed or broken; people are treated fairly or not; and rights are enabled or diminished.
- For the statistical/bio-statistical sciences, a few decades ago, the *Belmont Report* (1978) identified three core principles: **respect for persons, beneficence, and justice**.
- Later, this report became the basis of the guidelines (and, eventually, norms) for risk/benefit assessments, data collection, and management, and privacy and informed consent.
- Ethical practice is the responsibility of everyone involved.

FOCAL POINTS

THE EVER-SO-ETHICAL OPENAI JUST REPLACED ITS "CORE VALUES" WITH COMPLETELY DIFFERENT ONES

OH, OKAY.

— KEVIN DIETSCH/GETTY IMAGES

Menlo Report

⇒ The Menlo Report (2017) contains the US guidelines for ethical practices for the information technology sector that have been generalised for DS. The report identifies four principles.

1. **Respect for persons.** DS applications should be based on informed consent of those participating in or impacted by the application.
2. **Beneficence.** DS studies/developments are called upon to systematically assess risks, harms, and benefits.
3. **Justice.** The principle of information justice means that all persons are treated equally, which implies data sampling without bias. Also, the benefits of information technology are to be distributed fairly.
4. **Respect for law and the public interest.** DA projects should be based on legal ‘due diligence’ and transparency concerning methods and results. Also, DS practitioners should be subject to accountability.

Respect for persons

- DS applications should be based on the informed consent of those participating in or impacted by the application.
- ▷ One issue here is that under the umbrella of ‘big data’ approaches, vast amounts of data are collected without offering a realistic possibility of gathering proper informed consent from those whose data is or has been collected.

Respect for persons

- DS applications should be based on the informed consent of those participating in or impacted by the application.
- ▷ One issue here is that under the umbrella of ‘big data’ approaches, vast amounts of data are collected without offering a realistic possibility of gathering proper informed consent from those whose data is or has been collected.
- ▷ Even when data is collected directly from the person, consent takes the form of clicking a button, ‘giving consent’ to some fine print in legalese. Even worse, it is not uncommon for this kind of consent to be obtained coercively since failure to agree/click may deny the person the right to purchase or obtain some particular benefits.

Beneficence

- DS studies/developments are called upon to undertake systematic assessments of risks, harms, and benefits.
- The dilemma is that DA projects are mostly commissioned with deliverables set beforehand and tight timetables. Frequently, staff executing a DA project does not have the training to undertake true risk-benefit assessments.

Beneficence

- DS studies/developments are called upon to undertake systematic assessments of risks, harms, and benefits.
- ▷ The dilemma is that DA projects are mostly commissioned with deliverables set beforehand and tight timetables. Frequently, staff executing a DA project does not have the training to undertake true risk-benefit assessments.
- ▷ Also, since it can be argued that almost any research may have long-term benefits, it is easy to portray these benefits as outweighing diffuse costs, which take the form of loss of confidentiality and privacy, and violations of data integrity.

Beneficence

- DS studies/developments are called upon to undertake systematic assessments of risks, harms, and benefits.
- The dilemma is that DA projects are mostly commissioned with deliverables set beforehand and tight timetables. Frequently, staff executing a DA project does not have the training to undertake true risk-benefit assessments.
- Also, since it can be argued that almost any research may have long-term benefits, it is easy to portray these benefits as outweighing diffuse costs, which take the form of loss of confidentiality and privacy, and violations of data integrity.
- The reality is that nobody cares, and a few, if any, DA projects are halted due to lack of ‘beneficence’, though obtaining a *pro-forma* ‘consent/acknowledgement’ is commonplace.

Beneficence

- DS studies/developments are called upon to undertake systematic assessments of risks, harms and benefits.
- ⇒ The dilemma is that DA projects are mostly commissioned with deliverables set beforehand and tight timetables. Frequently, staff executing a DA project does not have the training to undertake true risk-benefit assessments.
- ⇒ Also, since it can be argued that almost any research may have long-term benefits, it is easy to portray these benefits as outweighing diffuse costs, which take the form of loss of confidentiality and privacy, and violations of data integrity.
- ⇒ The reality is that nobody cares, and a few, if any, DA projects are halted due to lack of ‘beneficence’, though obtaining a *pro-forma* ‘consent/acknowledgement’ is commonplace.
- ⇒ Challenging shortcomings in ‘beneficence’ may be a challenge in itself.

Justice

- The principle of information justice means that all persons are treated equally, which implies data sampling without bias. Also, the benefits of information technology are to be distributed fairly.
- ⇒ With ‘big data’, sampling representativity is problematic since profiling is pervasive in big data analysis. As everybody knows, profiling is conspicuously subject to bias.

Justice

- The principle of information justice means that all persons are treated equally, which implies data sampling without bias. Also, the benefits of information technology are to be distributed fairly.
- ⇒ With ‘big data’, sampling representativity is problematic since profiling is pervasive in big data analysis. As everybody knows, profiling is conspicuously subject to bias.
- ⇒ Concerning fairness, the Menlo Report (and most DA projects) describe the concept in subjective and extremely vague terms such as ‘individual needs’, ‘contribution to the common good’, and ‘overall merit.’ Jargon like this makes it quite easy to rationalise fairness without the required level of scrutiny.

Respect for law and the public interest

- DS projects should be based on legal ‘due diligence,’ transparency concerning methods and results, and DS practitioners should be subject to accountability.
- ▷ ‘Due diligence’ requires to provide evidence that an ‘in good faith effort’ was undertaken to conform to relevant privacy and data integrity laws. Such evidence is usually provided in the form of a privacy policy, a policy on data sharing, and so on. These policies are frequently made public to claim ‘transparency.’ The problem is that these protocols primarily serve for the legal protection of corporations and regulatory bodies, and it may have nothing to do with what the DS project is about.

Respect for law and the public interest

- DS projects should be based on legal ‘due diligence,’ transparency concerning methods and results, and DS practitioners should be subject to accountability.
- ▷ ‘Due diligence’ requires to provide evidence that an ‘in good faith effort’ was undertaken to conform to relevant privacy and data integrity laws. Such evidence is usually provided in the form of a privacy policy, a policy on data sharing, and so on. These policies are frequently made public to claim ‘transparency.’ The problem is that these protocols primarily serve for the legal protection of corporations and regulatory bodies, and it may have nothing to do with what the DA project is about.
- ▷ In fact, it is not uncommon that ‘due diligence’ is seen just as series of bureaucratic hurdles.

Ethical values for DS

La Fors, Custers, and Keymolen (2019) provides a list of virtues to uphold during techno-social change, specifically pertinent to data science and big data technologies.

1. Human welfare
2. Autonomy
3. Non-maleficence
4. Justice (including equality, non-discrimination, digital inclusion)
5. Accountability (including transparency)
6. Trustworthiness (including honesty and underpinning security)
7. Privacy (including informed consent, ownership and property)
8. Dignity
9. Solidarity
10. Environmental welfare

Artificial Intelligence Can Be Biased. Here's What You Should Know.



A display shows a facial recognition system for law enforcement during the NVIDIA GPU Technology Conference in Washington, DC, Nov. 1, 2017. (SAUL LOEB/AFP via Getty Images)

Issues putting pressure upon values in the age of DS

These points have been taken almost verbatim from
La Fors, Custers, and Keymolen (2019).

Reassessing values for big-data technologies: Integrating design-based and application-based approaches

Karolina La Fors*, Bart Custers, Esther Keymolen

*Corresponding author for this work

Research output: Contribution to journal > Article > Academic > peer-review



Overview



Fingerprint

Abstract

Through the exponential growth in digital devices and computational capabilities, big data technologies are putting pressure upon the boundaries of what can or cannot be considered acceptable from an ethical perspective. Much of the literature on

Issues putting pressure upon values in the age of DS

- **Human welfare.** Discrimination of humans by big data-mediated prejudice can occur. Detrimental implications can emerge in the contexts of employment, schooling or travelling by various forms of big data-mediated unfair treatment of citizens.

bias examples



Racism



Sexism



Ageism



Ableism

Three concrete examples of algorithmic bias

1. Racism embedded in US healthcare

In October 2019, researchers found that an algorithm used on more than [200 million people](#) in US hospitals to predict which patients would likely need extra medical care heavily favored white patients over black patients. While race itself wasn't a variable used in this algorithm, another variable highly correlated to race was, which was healthcare cost history. The rationale was that cost summarizes how many healthcare needs a particular person has. For various reasons, black patients incurred lower healthcare costs than white patients with the same conditions on average.

Thankfully, researchers worked with Optum to reduce the level of bias by 80%. But had they not been interrogated in the first place, AI bias would have continued to discriminate severely.

2. COMPAS

Arguably the most notable example of AI bias is the COMPAS (Correctional Offender Management Profiling for Alternative Sanctions) algorithm used in US court systems to predict the likelihood that a defendant would become a [recidivist](#).

Due to the data that was used, the model that was chosen, and the process of creating the algorithm overall, the model [predicted twice as many false positives for recidivism for black offenders \(45%\) than white offenders \(23%\)](#).

3. Amazon's hiring algorithm

Amazon's one of the largest tech giants in the world. And so, it's no surprise that they're heavy users of machine learning and artificial intelligence. In 2015, Amazon realized that their algorithm used for hiring employees [was found to be biased against women](#). The reason for that was because the algorithm was based on the number of resumes submitted over the past ten years, and since most of the applicants were men, it was trained to favor men over women.

Issues putting pressure upon values in the age of BD

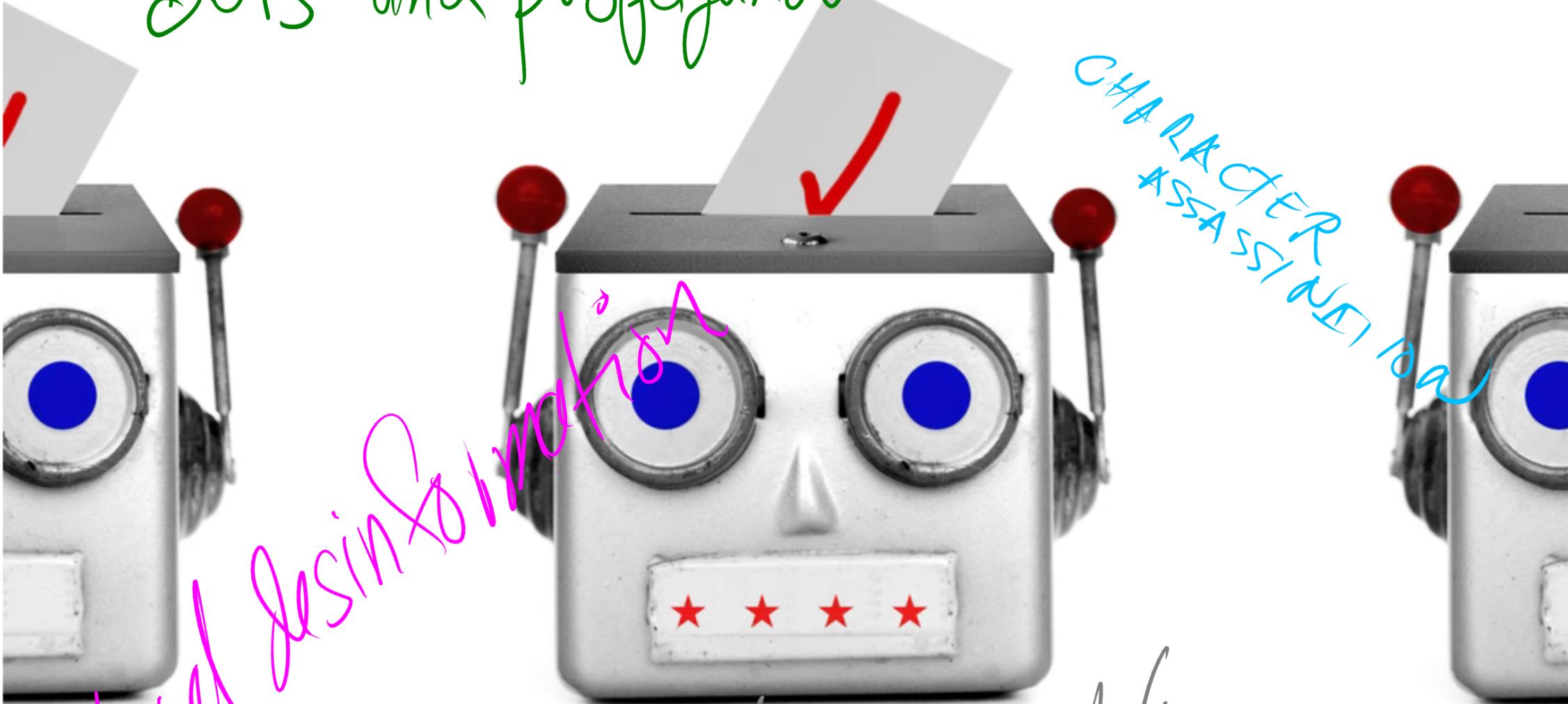
- ▷ **Human welfare.** Discrimination of humans by big data-mediated prejudice can occur. Detrimental implications can emerge in the contexts of employment, schooling or travelling by various forms of big data-mediated unfair treatment of citizens.
- ▷ **Autonomy** Big data-driven profiling practices can limit free will, free choice, and be manipulative in raising awareness about, for instance, news, culture, politics and consumption.

The dark side of artificial intelligence: manipulation of human behaviour

Transparency over systems and algorithms, rules and public awareness are needed to address potential danger of manipulation by artificial intelligence



Bots and propaganda



Political design for manipulation

electorate manipulation

CHARACTER
ASSASSINATION

OH OH.

AMAZON'S ALEXA GOES MAGA, CLAIMS 2020 ELECTION WAS STOLEN

BAD ALEXA! BAD!



— LUIS ALVAREZ VIA GETTY IMAGES

OOPS

US MILITARY CAUGHT FIGURING OUT HOW TO USE DEEPFAKES FOR PSY-OP CAMPAIGNS

"WHEN IT COMES TO DISINFORMATION, THE PENTAGON SHOULD NOT BE FIGHTING FIRE WITH FIRE."



— FUTURISM

Issues putting pressure upon values in the age of DS

- **Human welfare.** Discrimination of humans by big data-mediated prejudice can occur. Detrimental implications can emerge in the contexts of employment, schooling or travelling by various forms of big data-mediated unfair treatment of citizens.
- **Autonomy** Big data-driven profiling practices can limit free will, free choice, and be manipulative in raising awareness about, for instance, news, culture, politics and consumption.
- **Non-maleficence** Non-transparent data reuse in the world of big data are vast and could have diverse detrimental effects for citizens. This puts non-maleficence as a value under pressure.

Facebook Cambridge Analytica scandal: Sheryl Sandberg apologises for 'big mistakes'

Facebook

How to check whether Facebook shared your data with Cambridge Analytica

People who fear their information may have been used by Cambridge Analytica can go to a new help page

Alex Hern

@alexhern
Tue 10 Apr 2018
07.52 EDT

Facebook to notify 4 million people about latest data leak

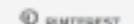
POSTED 8:05 PM, AUGUST 22, 2018 BY TRIBUNE MEDIA WIRE AND CNN WIRE



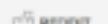
FACEBOOK



TWITTER



PINTEREST



REDDIT



LINKEDIN



EMAIL



Cambridge Analytica and Online Manipulation

It's not just about data protection; it's about strategies designed to induce addictive behavior, and thus to manipulate

HITCLIPS

MUSIC INDUSTRY SUES ANTHROPIC FOR ALLEGED THEFT OF LYRICS

"THIS COPYRIGHTED MATERIAL IS NOT FREE
FOR THE TAKING SIMPLY BECAUSE IT CAN BE
FOUND ON THE INTERNET."

— LEON NEAL/GETTY IMAGES

'This is just the beginning': Using DNA and genealogy to crack years-old cold cases

Police are harnessing consumer DNA sites to solve old murders, which could spur a massive clearing of unsolved crimes.

by Kate Snow and Jon Schuppe / Jul. 18, 2018 / 4:30 AM ET

SHARE

POLICY FORUM | GENETICS AND PRIVACY



0



Natalie Ram¹, Christi J. Guerrini², Amy L. McGuire²

+ See all authors and affiliations



0

Science 08 Jun 2018:
Vol. 360, Issue 6393, pp. 1078-1079
DOI: 10.1126/science.aau1083

Science

Meta ‘Knowingly Designed’ Features to ‘Addict’ Children to Instagram and Other Apps, More Than 40 States Allege in Lawsuits

By Todd Spangler ▾



Justin Sullivan/Getty Images

PHISHING TRIP

CHATGPT'S SCARY GOOD AT GETTING PEOPLE TO CLICK PHISHING EMAILS, IBM FINDS

DON'T OPEN THAT LINK!



— SURASAK SUWANMAKE/GETTY IMAGES

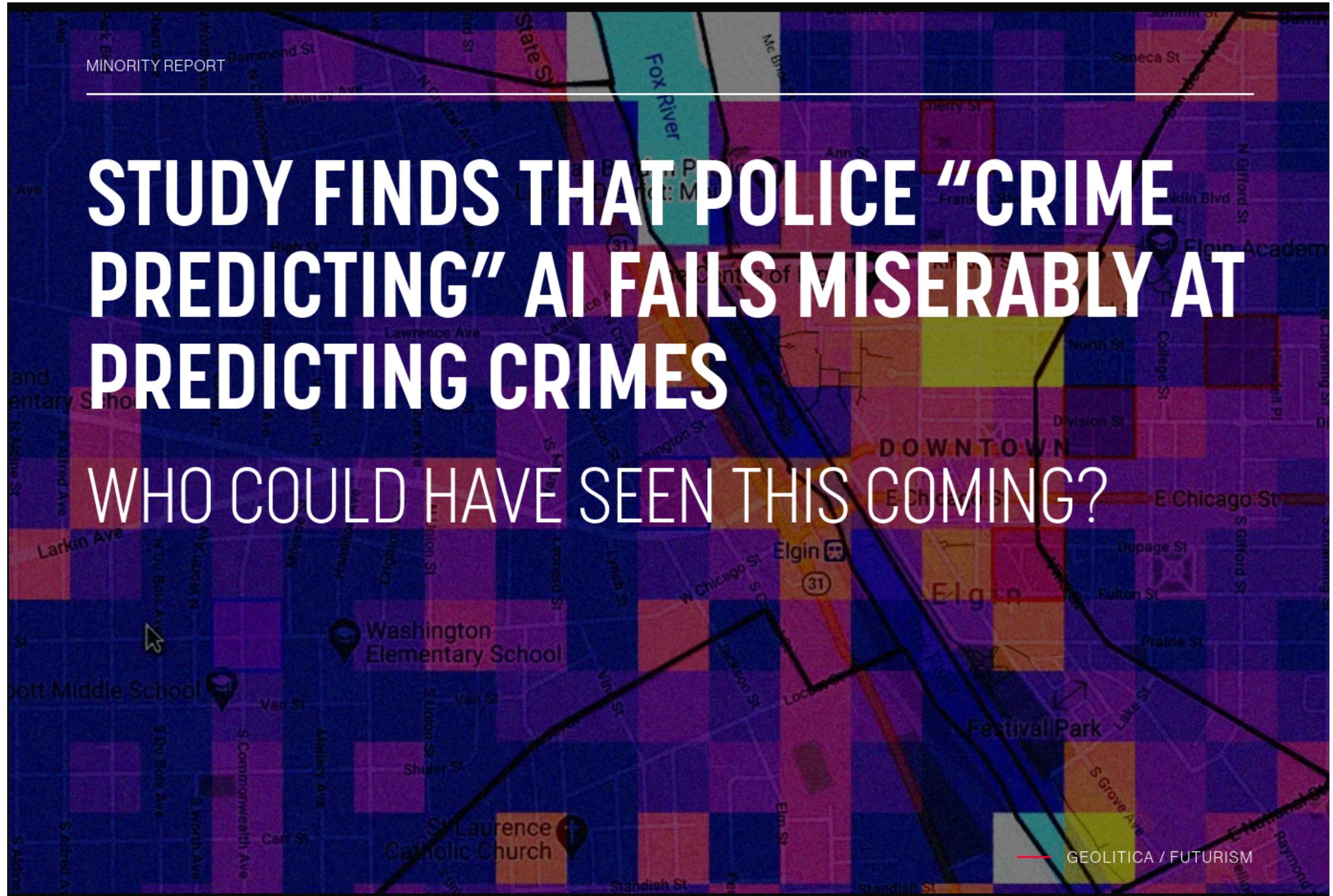
Issues putting pressure upon values in the age of DS

- ▷ **Human welfare.** Discrimination of humans by big data-mediated prejudice can occur. Detrimental implications can emerge in the contexts of employment, schooling or travelling by various forms of big data-mediated unfair treatment of citizens.
- ▷ **Autonomy.** Big data-driven profiling practices can limit free will, free choice and be manipulative in raising awareness about, for instance, news, culture, politics and consumption.
- ▷ **Non-maleficence.** Non-transparent data reuse in the world of big data are vast and could have diverse detrimental effects for citizens. This puts non-maleficence as a value under pressure.
- ▷ **Justice.** Systematic unfairness can emerge, for instance, by generating false positives during preventative law enforcement practices or false negatives during biometric identification processes. Such instances put constant pressure on the value of justice.

ON THE BIAS

HERE'S WHAT IT'S LIKE TO BE FALSELY ARRESTED VIA FACIAL RECOGNITION

"SHODDY TECHNOLOGY MAKES SHODDY INVESTIGATIONS."





THAT AI YOU'RE USING WAS TRAINED
BY SLAVE LABOR, BASICALLY
"IN MY POINT OF VIEW, IT IS DIGITAL
SLAVERY."

— CHAIDEER MAHYUDDIN/GETTY IMAGES

[NEWS](#)[CULTURE](#)[MUSIC](#)[PODCASTS & SHOWS](#)[SEARCH](#)

TECHNOLOGY

Lack of diversity in AI development causes serious real-life harm for people of color

February 13, 2022 · 8:00 AM ET

Heard on [Weekend Edition Sunday](#)



Kelsey Snell



4-Minute Listen

+ PLAYLIST



Kelsey Snell asks Black Women in A.I. founder Angle Bush about the consequences of the lack of diversity in artificial intelligence development.

Issues putting pressure upon values in the age of DS

- ▷ **Accountability** This is one of the areas that has been overlooked for most people that have suffered the consequences of data science malpractice.
 - Banks and businesses use chatbots for consumer services. When properly trained, chatbots may be useful. However, when something goes wrong due to biases, errors, or lack of transparency:
 - this diffuses accountability across black-box systems instead of people;
 - enables algorithmic harms to go unnoticed and unchallenged, and
 - reduces the ability to remedy issues or ensure ethical oversight as opaque algorithms replace human judgment and discretion in banking decisions.

Most customers cannot understand or contest detrimental algorithmic decisions affecting them.



Issues putting pressure upon values in the age of DS

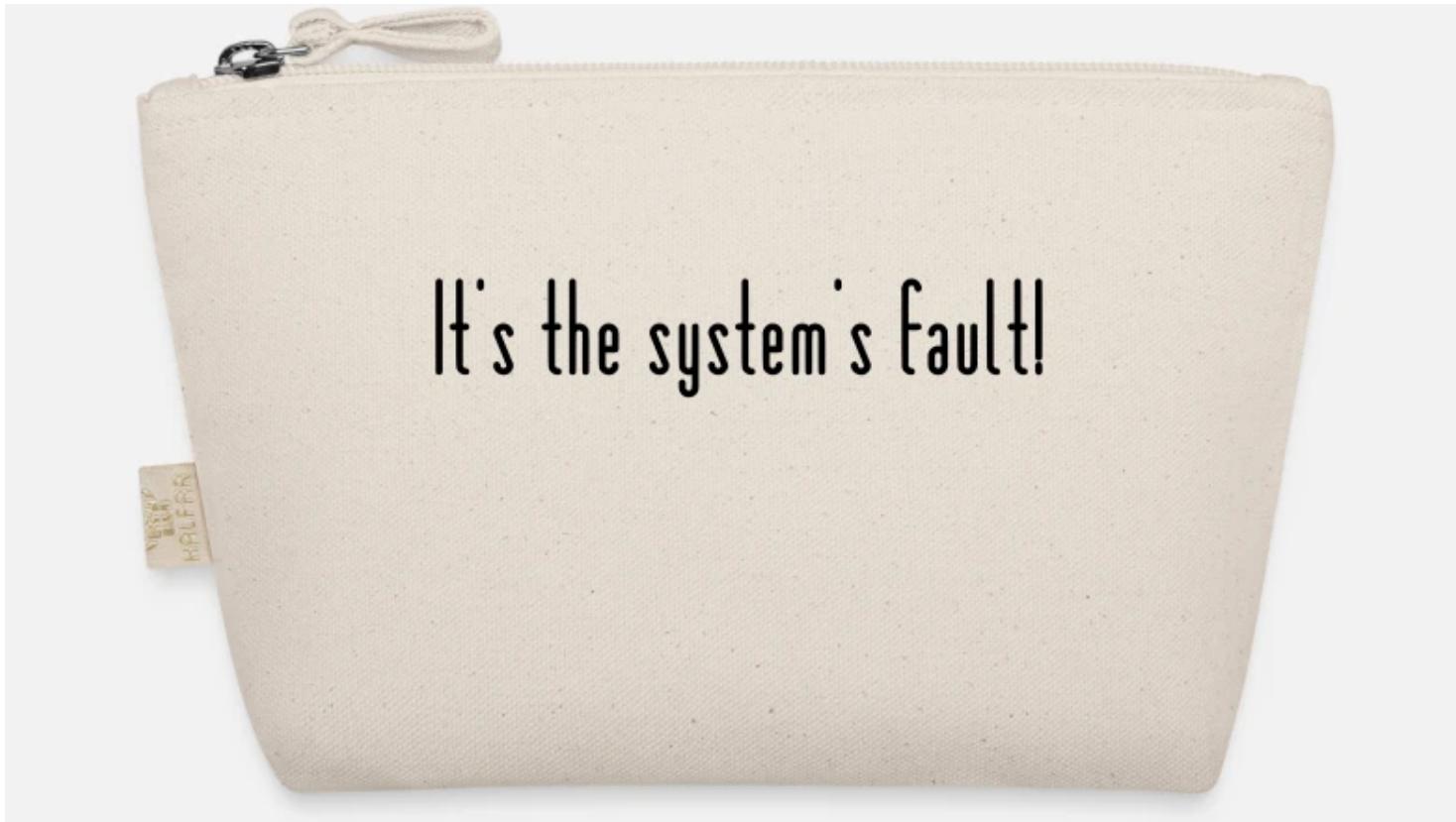
- Health. What if diagnoses are wrong because of issues with ML and AI? What if private data is mishandled, putting patient privacy at risk?

Patients often do not know what it means and whom to turn to when their rights have been violated.

Issues putting pressure upon values in the age of DS

- Health. What if diagnoses are wrong because of issues with ML and AI? What if private data is mishandled, putting patient privacy at risk?

Patients often do not know what it means and whom to turn to when their rights have been violated.

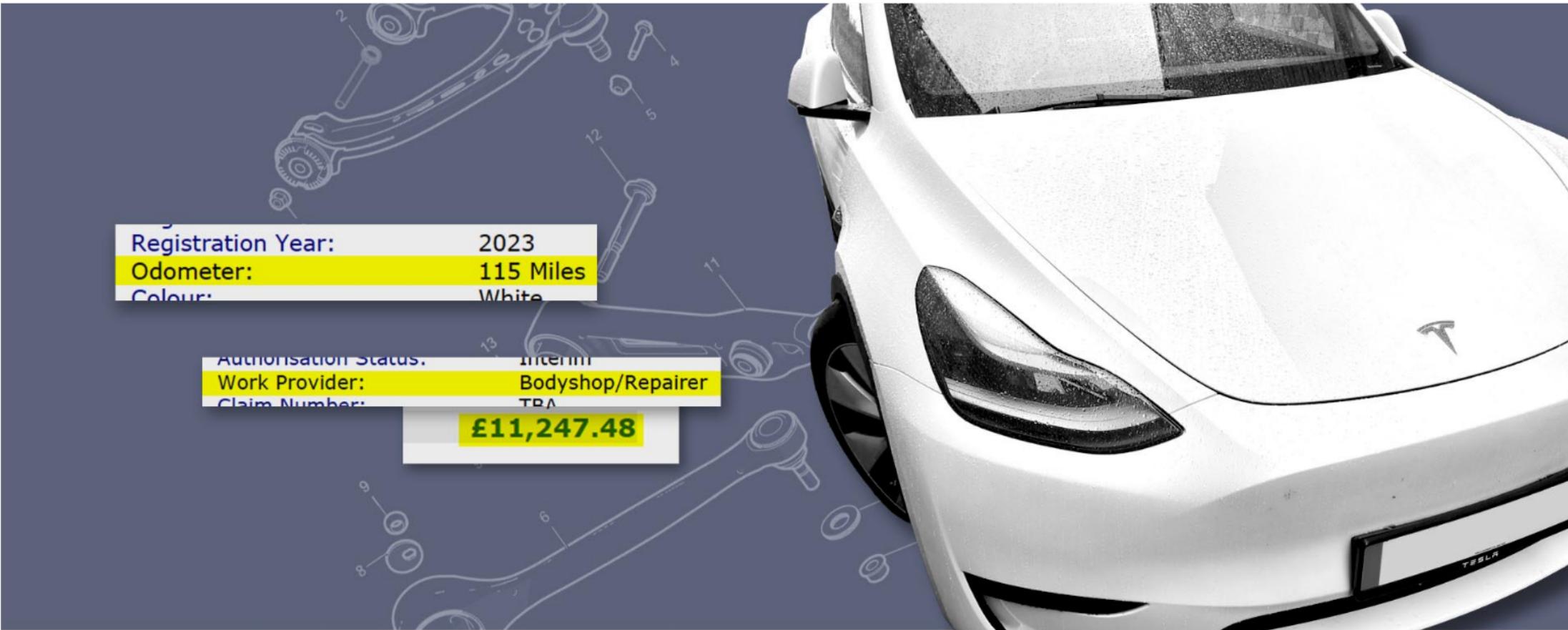


Issues putting pressure upon values in the age of DS

- Transportation. Consider autonomous vehicles when the algorithmic application fails, causing an accident. Who is accountable for this?

Issues putting pressure upon values in the age of DS

- Transportation. Consider autonomous vehicles when the algorithmic application fails, causing an accident. Who is accountable for this?



Blame the diriver, it always works

AT&T LTE

5:10 PM

94%

AT&T LTE

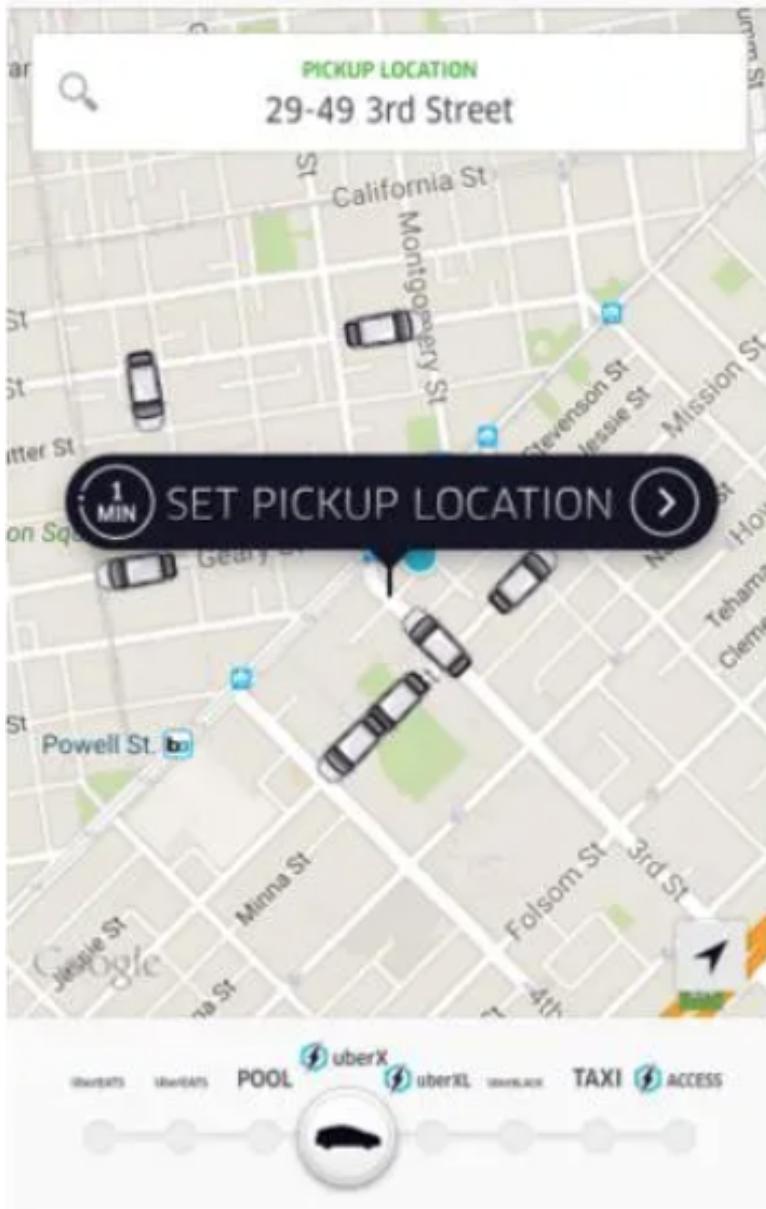
5:10 PM

94%

AT&T LTE

5:10 PM

94%



SURGE PRICING

Demand is off the charts! Fares have increased to get more Ubers on the road.



SAVE UP TO 50%, TRY **uberPOOL**

NOTIFY ME WHEN SURGE DROPS

I ACCEPT HIGHER FARE

THIS RATE EXPIRES IN 2 MIN



SURGE PRICING

CONFIRMATION

Type **(2.0)** to confirm your fare multiple.

MY FARE WILL BE

2 • **0**

TIMES THE NORMAL FARE

1	2	3
ABC		DEF
4	5	6
GHI	JKL	MNO
7	8	9
PQRS	TUV	WXYZ
0		X

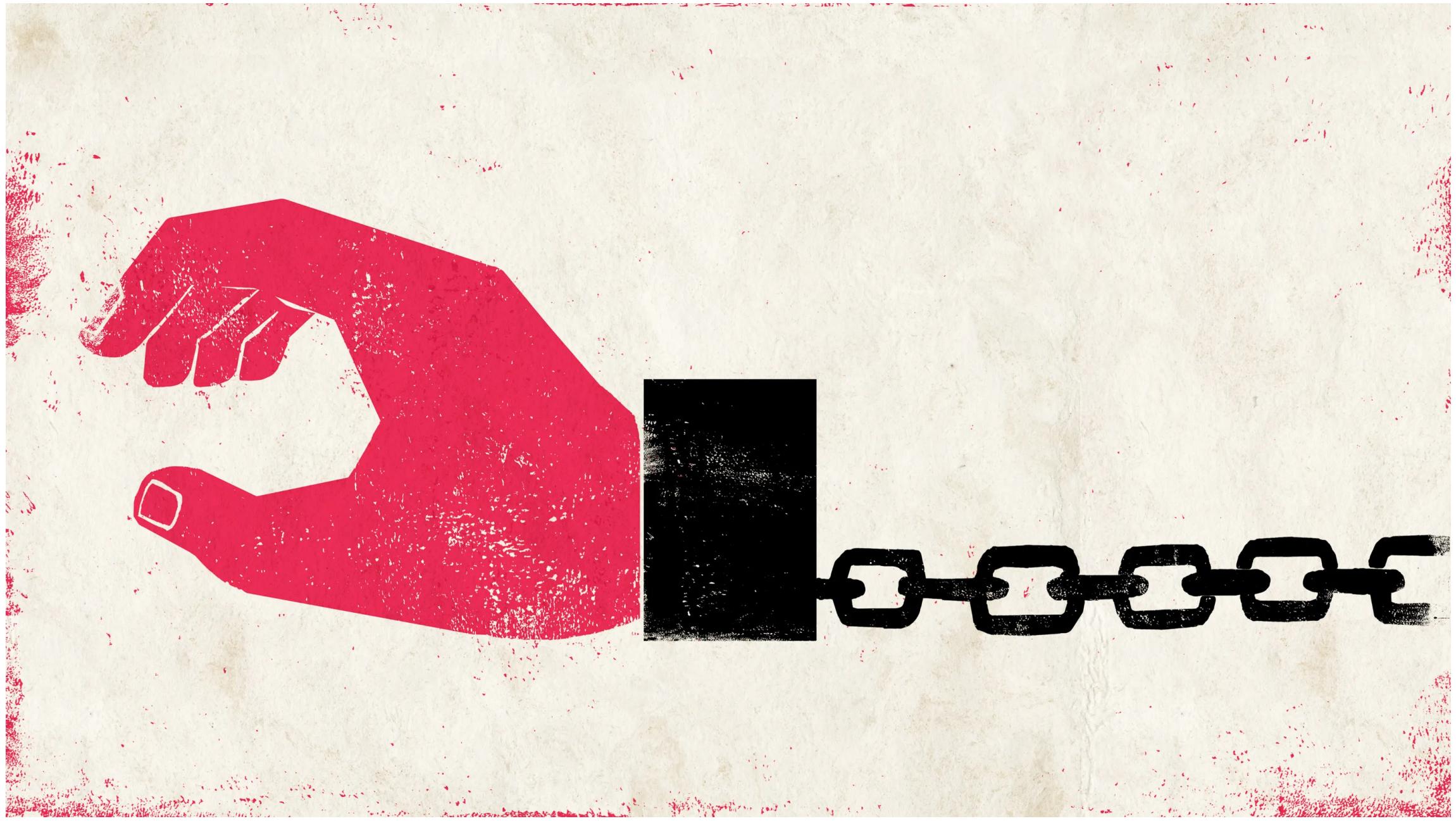
Highest Penalties in Privacy Enforcement Actions



Source: Federal Trade Commission | FTC.gov

Issues putting pressure upon values in the age of BD

- ▷ **Accountability** For instance, in the healthcare domain patients or in the marketing domain, consumers often do not know what it means and whom to turn to when their data is shared via surveys for research and marketing purposes.
- ▷ **Trustworthiness** Citizens often do not know how to tackle a big data-based calculation about them or how to refute their digital profile in case they are falsely accused, e.g., false negatives during biometric identification, false positives during profiling practices. Their trust is then undermined. The technology operators' trust at the same time lies too much in the system.



Edel Rodríguez

[BACK TO ANALOG](#)

**AI KNOWS WHAT YOU'RE TYPING
JUST BY HEARING IT OVER A ZOOM**

CALL IT A SIGN OF NEW CYBERSECURITY
TIMES.

AI SPY

AI STARTUPS ARE OPENLY ENGAGED IN CORPORATE ESPIONAGE

"WE KNOW PEOPLE WOULD DO CRAZY
THINGS TO GET AHEAD."



— GETTY / FUTURISM

Issues putting pressure upon values in the age of BD

- ▷ **Accountability** For instance, in the healthcare domain patients or in the marketing domain, consumers often do not know what it means and whom to turn to when their data is shared via surveys for research and marketing purposes.
- ▷ **Trustworthiness** Citizens often do not know how to tackle a big data-based calculation about them or how to refute their digital profile, in case they are falsely accused, e.g.: false negatives during biometric identification, false positives during profiling practices. Their trust is then undermined. Technology operators' trust at the same time lies too much in the system.
- ▷ **Privacy** Simply the myriad of correlations between personal data in big data schemes allows for easy identifiability, this can lead to many instances of privacy intrusion.

A screenshot of a web browser displaying the ScreenRant website. The URL in the address bar is <https://screenrant.com/ai-bias-technology-negative-im>. The page title is "ai silent minority". The navigation bar includes links for stats, reference, chacharas, mun, music, Outlook, Online, OnBase, flac, Webex, Assignments, Calendar, and Other Bookmarks. Below the navigation bar is the ScreenRANT logo. A "Newsletter" button is also present. A black banner at the top of the main content area lists "Trending" and various categories: SR Exclusives, Star Wars, Marvel, DC, Star Trek, Loki, Horror Movies, What to Watch, and Marvel's Spider-Man 2.

Home > Tech > Tech News

AI Bias: How Technology Negatively Impacts On Minorities

The AI technologies employed by many, including law enforcement, can discriminate against minorities and add to systemic racism, if not addressed.

BY ASWIN NARAYANAN PUBLISHED JUN 14, 2020



CUTTING EDGE



CHATGPT BUG ACCIDENTALLY REVEALED USERS' CHAT HISTORIES, EMAIL ADDRESSES, AND PHONE NUMBERS

"IT WAS CLEARLY OTHER PEOPLE'S CONTACT
INFORMATION."

— GETTY / FUTURISM

Issues putting pressure upon values in the age of BD

- ▷ **Dignity** Adverse consequences of algorithmic profiling, such as discrimination or stigmatisation, also demonstrate that dignity is fragile in many big data contexts. Being confronted with opaque data-driven decisions, a citizen may experience a Kafkaesque situation in which her view and agency is no longer acknowledged. When a person is no longer treated as someone with particular interests, feelings and commitments but merely as a data bundle, her dignity can be compromised.

WHITE NOISE

**AN ASIAN WOMAN ASKED AI TO
IMPROVE HER HEADSHOT AND IT
TURNED HER WHITE**

**"I'LL HAVE TO GO WITHOUT A NEW LINKEDIN
PROFILE PHOTO FOR NOW!"**

RONA WANG / FUTURISM

PATHOLOGICAL LYING

FACEBOOK AI ACCUSES AI RESEARCHER OF BEING A TERRORIST

"I'VE NEVER DONE ANYTHING REMOTELY
ILLEGAL."

— GETTY IMAGES

Issues putting pressure upon values in the age of BD

- ▷ **Dignity** Adverse consequences of algorithmic profiling, such as discrimination or stigmatisation, also demonstrate that dignity is fragile in many big data contexts. Being confronted with opaque data-driven decisions, a citizen may experience a Kafkaesque situation in which her view and agency is no longer acknowledged. When a person is no longer treated as someone with particular interests, feelings and commitments but merely as a data bundle, her dignity can be compromised.
- ▷ **Solidarity** Big data-based calculations, in which commercial interests are prioritised above non-profit-led interests, are examples of situations in which solidarity is under pressure. Or another example is, for instance, when falsely accused immigrants by digital profiling, they may not have the legal position to defend themselves. Both are instances of non-solidary treatment.

MICKEY MOUSE

DISNEY FURIOUS AT LAW THAT WOULD CUT TAX BREAKS IF IT REPLACED ACTORS WITH AI IT'S ALWAYS ABOUT THE MONEY.

OSCAR GARCES VIA GETTY IMAGES

JOB PURGE

SAM ALTMAN WARNS THAT AI IS GONNA DESTROY A LOT OF PEOPLE'S JOBS

"I'M NOT AFRAID OF THAT AT ALL. IN FACT, I
THINK THAT'S GOOD."

— CHIP SOMODEVILLA VIA GETTY

CODE RED

10011100010000010

0010010110010111101

STACK OVERFLOW LAYS OFF EMPLOYEES AS AI THREATENS CODING INDUSTRY

AI CODE TO STACK OVERFLOW: ADAPT OR
DIE.

Issues putting pressure upon values in the age of BD

- ▷ **Environmental welfare** Although data science indirectly affects the environment, we are far from saying it has a zero footprint.



MORE POWER!

AI'S ELECTRICITY USE IS SPIKING SO FAST IT'LL SOON USE AS MUCH POWER AS AN ENTIRE COUNTRY

"EACH OF THESE NVIDIA SERVERS, THEY ARE POWER-HUNGRY BEASTS."

— GETTY / FUTURISM

THIRSTY GOOGLE



GOOGLE IS USING A FLABBERGASTING AMOUNT OF WATER ON AI

THE COMPANY'S WATER USE IS SOARING IN
LARGE PART THANKS TO AI.

— GOOGLE / FUTURISM

TOO THIRSTY

CHATGPT IS CONSUMING A STAGGERING AMOUNT OF WATER TALK ABOUT INSATIABLE.

Bibliography

1. *Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research, Report of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.* 1987.
https://en.wikipedia.org/wiki/Belmont_Report
2. ‘Menlo Report’ of the Directorate of Science and Technology and Cyber Security of the US Department of Homeland Security. 2012.
https://en.wikipedia.org/wiki/Menlo_Report
3. K La Fors, BHM Custers, and E Keymolen. *Reassessing values for emerging big data technologies: integrating design-based and application-based approaches*, *Ethics and Information Technology*, Volume 21, Number 3, 209-226. 2019.
4. GETYY images were downloaded from **THE BYTE.**

Ethical Guidelines for Statistical Practice

Prepared by the Committee
on Professional Ethics of the
American Statistical Association

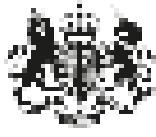
Approved by the ASA Board in February 2022



ACM Code of Ethics and
Professional Conduct

ACM Code of Ethics and Professional Conduct

<https://www.acm.org/binaries/content/assets/about/acm-code-of-ethics-and-professional-conduct.pdf>



Government
Digital Service

**DATA —
ETHICS
FRAMEWORK**

Data Ethics Framework

