Ethics and Data Science: Where to Start?

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Outline

Part 1: Why are we here today talking about ethics at data science meetup?

- Are data and automated systems neutral?
- Examples

Part 2: Towards thinking ethically - open problems

- How can we incorporate ethical approaches into our work?
- What issues require further thought and discussion?

Common Assumptions Data & Automated Systems

- Objective
- Neutral
- Straightforwardly represent reality

Data - misconceptions and (incorrect) assumptions

- Objective
- Neutral
- Straightforwardly represent reality

Data in reality

- As subjective as humans recording it
- Political
- Messy
- Often incomplete
- Sometimes fake
- Full of complex human meanings

“Data and data sets are not objective; they are creations of human design. We give numbers their voice, draw inferences from them, and define their meaning through our interpretations. Hidden biases in both the collection and analysis stages present considerable risks, and are as important to the big-data equation as the numbers themselves.”

(Crawford, 2013)

Data often reflect existing societal inequalities, norms and practices

BIAS IN →  → **BIAS OUT**

People make important choices

- Which data to use and by default which to exclude
- How to weigh/analyse it
- How data are manipulated & reported
- How good is good enough for an algorithm to perform

And people are biased…

Bias

A CV with a white-sounding names will receive a different response than the same CV with a black-sounding name. (The National Bureau of Economic Research)

Women’s chance of being hired in symphony orchestras increases between 30% and 55% in blind auditions. Goldin & Rouse (2000)

Cognitive biases can skew results – they pose a challenge to data science

We are often inclined to try to solve these problems stemming from human bias by turning the decisions over to machines

Machine Bias

In theory, more and more decisions increasingly handled by algorithms should mean that human biases and prejudices should be eliminated

Algorithms are, after all, “neutral” and “objective”

They apply the same rules to everybody regardless of race, gender, ethnicity or ability

Bernard Parker, left, was rated high risk; Dylan Fugett was rated low risk. (Josh Ritchie for ProPublica)

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

Machine Bias

Mathematical models give the illusion of “neutrality” O’Neil (2017)

Automated systems perpetuate stereotypes as they learn from real-world data

They pick up damaging biases that have long plagued human culture

Alex Shams
@seyyedreza

Follow

Turkish is a gender neutral language. There is no "he" or "she" - everything is just "o". But look what happens when Google translates to English. Thread:

o bir aşçı	she is a cook
o bir mühendis	he is an engineer
o bir doktor	he is a doctor
o bir hemşire	she is a nurse
o bir temizlikçi	he is a cleaner
o bir polis	He-she is a police
o bir asker	he is a soldier
o bir öğretmen	She's a teacher
o bir sekreter	he is a secretary
o bir arkadaş	he is a friend
o bir sevgili	she is a lover
onu sevmiyor	she does not like her
onu seviyor	she loves him
onu görüyor	she sees it
onu göremiyor	he can not see him
o onu kucaklıyor	she is embracing her
o onu kucaklamıyor	he does not embrace it
o evli	she is married
o bekar	he is single

The decisions delivered from automated systems may not matter if these systems are recommending what books we might want to buy next based on our previous purchase

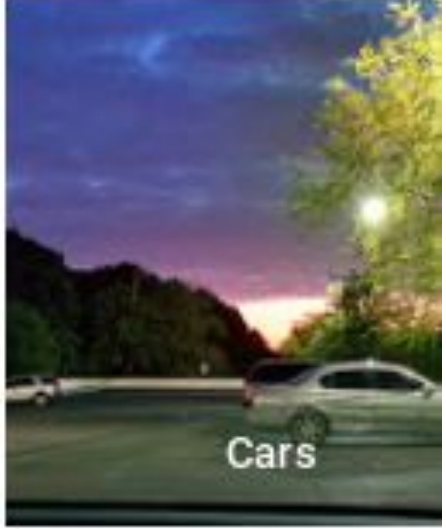
However, the stakes are higher if the system is diagnosing illness, or holding sway over a person’s job or prison sentence

Understanding the legal, cultural, historical, and social contexts and the nuanced, complex and fuzzy boundaries are crucial

Not a day goes by without tech companies making headlines

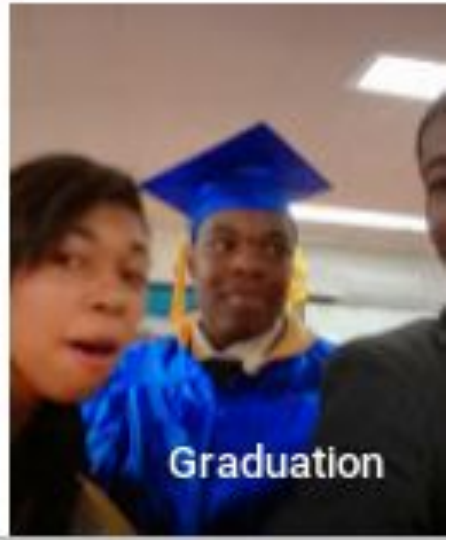

Skyscrapers


Airplanes


Cars


Bikes


Gorillas


Graduation

Women less likely to be shown ads for high-paid jobs on Google, study shows

Automated testing and analysis of company's advertising system reveals male job seekers are shown far more adverts for high-paying executive jobs

Hiring Algorithms Are Not Neutral

by Gideon Mann and Cathy O'Neil

DECEMBER 09, 2016

AGE DISCRIMINATION

New Allegations Added to Lawsuit on How Facebook's Targeting Tools Helped Advertisers Exclude Older Workers

A federal suit filed in December claimed older workers missed out on job opportunities because ads on Facebook targeted younger users. Now plaintiffs say Facebook's tools and algorithm gave employers ways to intensify the effects of such targeting.

by Peter Gosselin, May 30, 2:03 p.m. EDT

Tech's Ethical 'Dark Side': Harvard, Stanford and Others Want to Address It

Leer en español

By NATASHA SINGER FEB. 12, 2018

Laura Norén, who teaches a data science ethics course at New York University, said, "You can patch the software, but you can't patch a person if you, you know, damage someone's reputation."
Sam Hodgson for The New York Times

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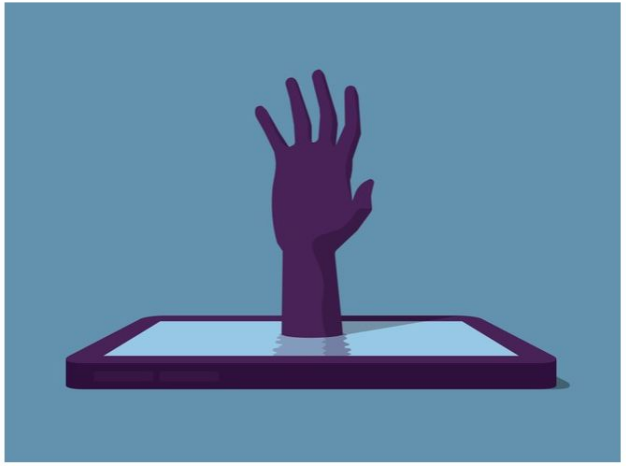

The Center for Humane Technology wants to liberate us from tech addiction—and that starts with the people, not companies or Congress. GETTY IMAGES

UCD DUBLIN

“I’m just an engineer”

(February 2018 Researchers from UCLA presented a paper on predictive policing)

Ethical questions inevitably arise with innovation. But they are often an afterthought

Ethics is an integral part of medical training – physicians are upheld to specific ethical standards through the practice of swearing **Hippocratic Oath**

Data scientists, like physicians and, often work to solve society's ills, hence the need to consider how society operates and how our data shape/influence it

Question 1

Should data scientists be held to the same standard as physicians?

Towards thinking ethically…

Question 2

Who bears responsibility when a system is biased/unfair or used by third parties for malicious purposes? The individual who developed it? The organization? The third parties?

Responsibility - Accountability - Transparency

Ask how and why was a certain decision made?

Learn about the possible shortcoming/limitations of the algorithmic system you're developing

Compare algorithmic systems to the law

What is "good"?

How is it decided?

By who? For who?

What are we optimizing for?

Do the motivations and incentives align with the 'justice systems'? (Predictive policing and recidivism risk assessment)

Towards thinking ethically

Representation and diversity matter

Both in your dataset and your team/perspectives

It’s never going to be a solved problem - continuous revision, learning and updates crucial

Ethical ML Takeaways

- Doing “nothing” assumes prejudice and unfair treatment is a valid action
- We need better data
  - Diverse data which better reflects the real world
  - Stop using datasets which are non-representative
- We need built-in ethics-driven evaluation criteria
  - Scikit-learn disparate impact?
  - Scikit-learn equal odds / opportunity?
- You can contribute
  - open-source your work and datasets
  - volunteer with the Algorithmic Justice League or local organization

Gravado no

QCon SÃO PAULO

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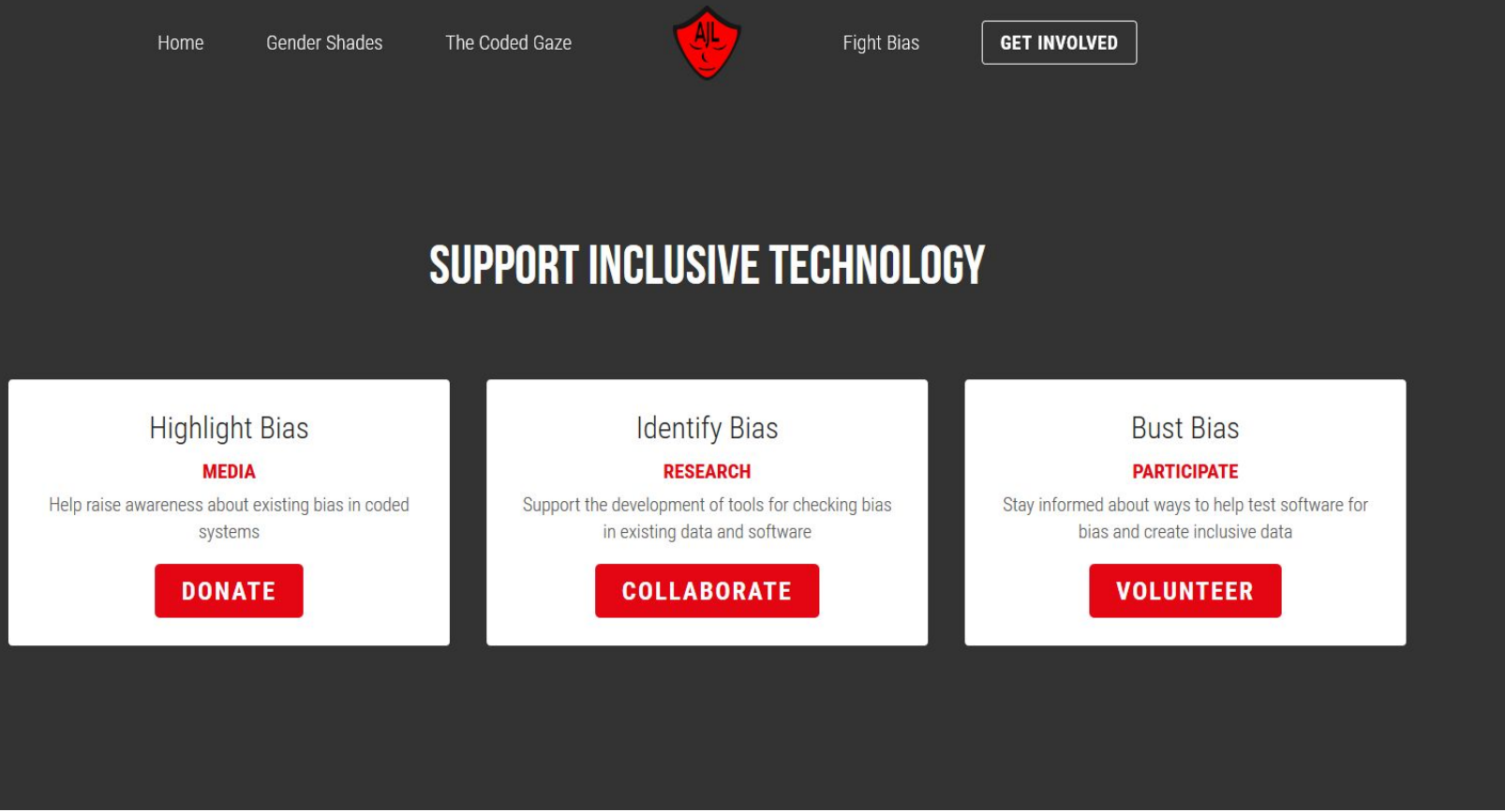
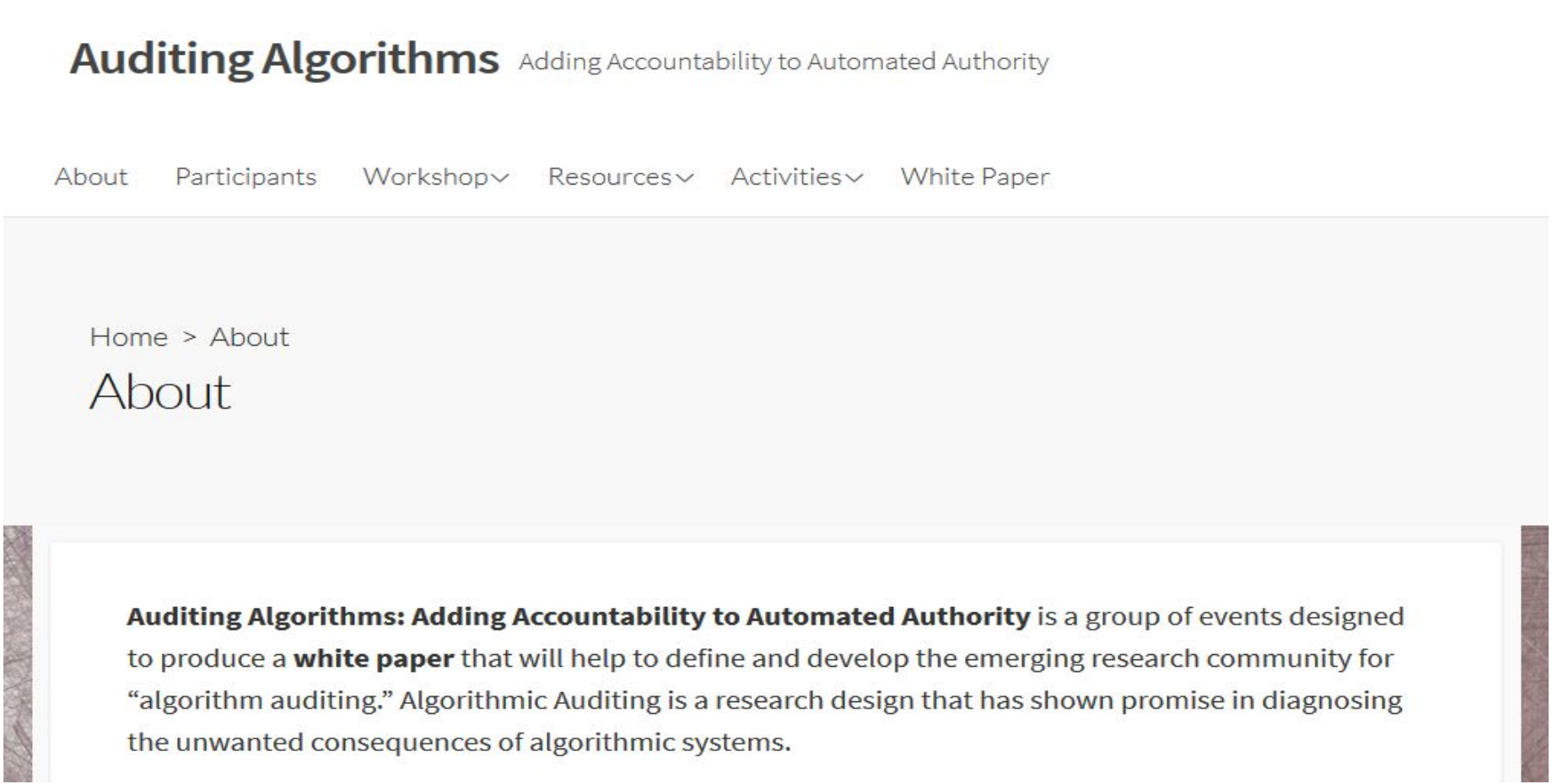
Ethical Machine Learning - Katharine Jarmul

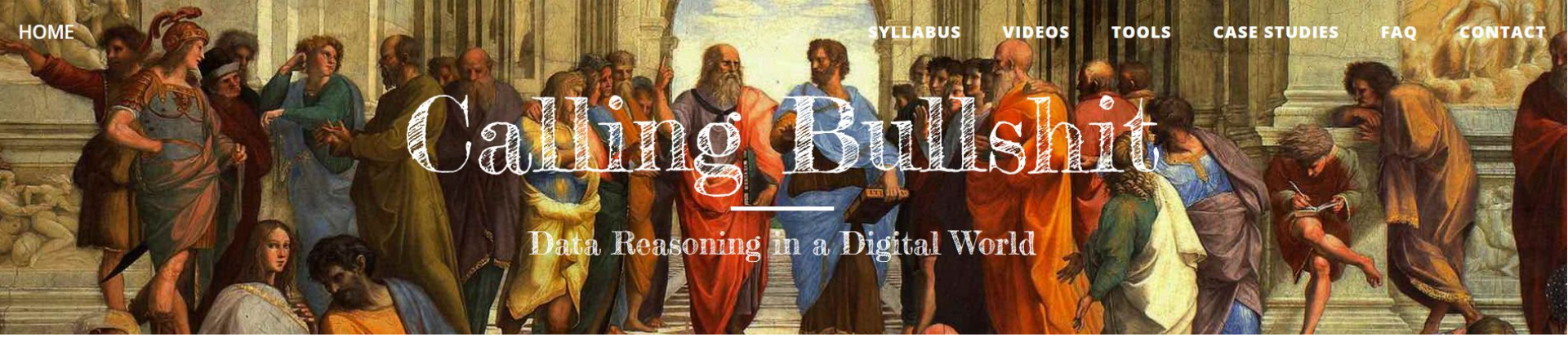
https://www.youtube.com/watch?time_continue=3&v=Y0KMK1tfQ3A



Algorithmic Justice League - run by Joy Buolamwini. Report algorithm bias, participate in testing software for inclusive training set, or simply donate and contribute raising awareness about existing bias in coded systems.



Auditing Algorithms: a useful website for those teaching/interested in accountability in automated systems

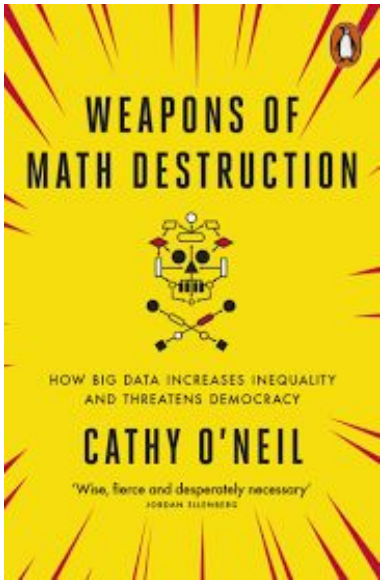


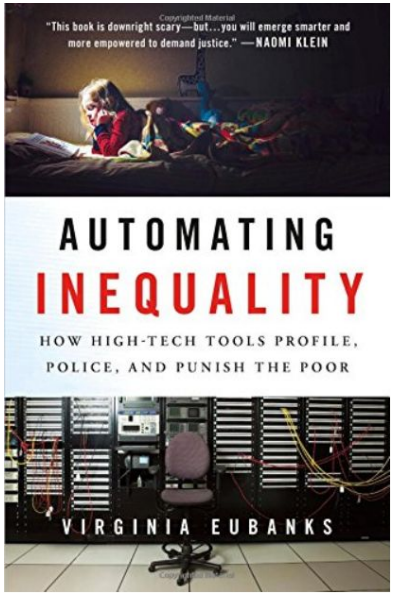
Calling Bullshit offers various resources and tools for spotting and calling bullshit with relation to data, models and more

fast.ai a project that aims to increase diversity in the field of deep learning and make deep learning accessible and inclusive to all

FAT/ML is a website on Fairness, Accountability, and Transparency in Machine Learning with plenty of resources and events, run by a community of researchers

Books


WEAPONS OF
MATH DESTRUCTION
HOW BIG DATA INCREASES INEQUALITY
AND THREATENS DEMOCRACY
CATHY O'NEIL
'Wise, fierce and desperately necessary'


"This book is downright scary—but... you will emerge smarter and more empowered to demand justice." —NAOMI KLEIN
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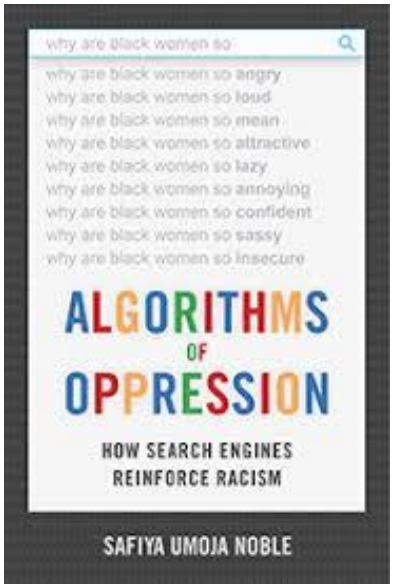
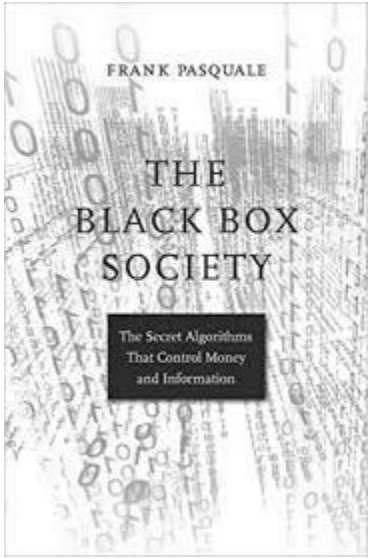
HOW HIGH-TECH TOOLS PROFILE,
POLICE, AND PUNISH THE POOR
VIRGINIA EUBANKS


why are black women so
why are black women so angry
why are black women so loud
why are black women so mean
why are black women so attractive
why are black women so lazy
why are black women so annoying
why are black women so confident
why are black women so sassy
why are black women so insecure
ALGORITHMS
OF
OPPRESSION
HOW SEARCH ENGINES
REINFORCE RACISM
SAFIYA UMOJA NOBLE


FRANK PASQUALE
THE
BLACK BOX
SOCIETY
The Secret Algorithms
That Control Money
and Information

Resources on automated systems and bias

https://abebabirhane.wordpress.com/