

# AIGC-5004

Project Management in AI

AI ETHICS AND

CYBER SECURITY

PROFESSOR

RADCLIFFE (RAD) DOCKERY



**WE ARE**

**HUMBER**

# AGENDA

## The Social and Economic impact of AI/ML Bias

- **Content**
  - Examples of AI Bias
  - Gender and Racial Inequality
  - Economic Impact of AI Bias



# Week 2

## Our Weekly Plan

40	-	READING WEEK    ->    TRANSITION TO <u>Artificial Intelligence Ethics in Projects</u>				
41						
42						
43						
44						
45		Intro & Course Overview	1	Introductions Defining Artificial Intelligence, Machine Learning, Deep Learning The Business Executive view of Artificial Intelligence Big Data's failure and AI bias Key Stakeholders for successful AI project implementation	In-Class Lecture	
46						
47						
48						
49		The Social impact of AI/Machine Biases	1,3	Discuss examples of AI Bias AI and Gender Inequality AI and Cultural Discrimination Socio-Economic impact of AI Bias	Separate into groups	Lecture & Lab
50						-
51						
52						
53						
54		Industry & Business areas impacted by AI biases	1,2,3	AI biases and their impacts in the following sectors: Public Sector, Finance, Technology, Legal, Supply Chain	Separate into groups	Lecture & Lab
55						
56				AI Biases and their impacts in the following business areas: Human Resources, IT, Finance, Marketing, Operations		
57						
58						
59		Approaches to addressing AI Discrimination	1,2	Reviewing your initial Project Plan for Gaps Building a group of stakeholders Obtaining Executive Buy-in Review Software packages and tools Vendor Management and the PMO Effective Measurement	Share Assignment Details & review possible deliverables	Lecture & Lab
60						ASSIGNMENT-1 (BETA)
61						
62						
63						
64						
65		The Challenges of AI in the era of Cyber Security	1,2,3,5	Who should care within your Project Team Most common AI based cyber security attacks The role of AI discrimination in cybersecurity Cyber security and Deep Fakes AI and Cybersecurity - the new battlefield		Lecture & Lab
66						
67						
68						
69						
70						
71		Approaches to addressing AI Security	1,2,3,5	Review Software and Programs How leading cloud providers address AI Security Why a diverse helps address AI Security How the PMO can account for AI Security Risks The role of managing legacy systems in AI Security The importance of a BCP, DRM plan	Evaluation of Software and Cloud Tool. Develop other approaches.	Lecture & Lab
72						Quiz
73						
74						
75						
76						
77		AI Biases and Security Use Case	3,4	Review modern day use cases: One use case focused on Industry Another use case focused on Business Function How technology leaders should communicate to Lines of Business		Lecture & Lab
78						ASSIGNMENT-1 (DUE)
79						
80						

# What is Bias

The logo for Psychology Today, featuring the text "Psychology Today" in white, sans-serif font on a solid blue rectangular background.

Bias is a natural inclination for or against an idea, object, group, or individual. It is often learned and is highly dependent on variables like a person's socioeconomic status, race, ethnicity, educational background, etc.

At the individual level, bias can negatively **impact someone's personal and professional relationships;**

# Most AI & Data Projects FAIL

85% of big data projects fail ([Gartner](#), 2017)

87% of data science projects never make it to production ([VentureBeat](#), 2019)

“Through 2022, only 20% of analytic insights will deliver business outcomes”  
([Gartner](#), 2019)

# For mainly these reasons

- Not having the Right Data
- Not having the Right Talent
- Solving the Wrong Problem
- Forgetting Ethics
- Overlooking Culture

# What is Bias

## Biases and Cognitive Errors

A category of biases, known as cognitive biases, are repeated patterns of thinking that can lead to inaccurate or unreasonable conclusions.

Cognitive biases may help people make quicker decisions, but those decisions aren't always accurate.

Some common reasons why include flawed [memory](#), scarce attention, natural limits on the brain's ability to process information, emotional input, social pressures, and even aging.

When assessing research—or even one's own thoughts and behaviors—it's important to be aware of cognitive biases and attempt to counter their effects whenever possible.

# AI Bias is a big reason for failure

## Cognitive biases

These are unconscious thoughts that affects individuals' judgements and decisions. These biases arise from the brain's attempt to simplify processing information about the world.

Cognitive biases could seep into machine learning algorithms via either designers unknowingly introducing them to the model or a training data set which includes those biases.



# AI Bias is a big reason for failure

## **Lack of complete data**

For example, most psychology research studies include results from undergraduate students which are a specific group and do not represent the whole population.

We see this with data that exists in non- digital/modern formats.

A bank will have transaction data going back 35 years that is written in COBOL that modern AI/Cloud systems are unable to read natively.

# Bias can show up in simple ways

**Your Name:**

(What if your name is not common)

**Why are you in this program:**

(What if your reasons do not suit the so called “NORM” )

**Your favorite colour:**

( If your colour is Black over Gold, does that mean you will fail?)

**Best meal you ever had**

Some CEO's have bad eating habits, so should you have bad eating habits as well?

**Language you speak outside of English**

What if you speak a language from a developing world nation?

# Definition of AI Bias

“AI bias is an anomaly in the output of machine learning algorithms, due to the prejudiced assumptions made during the algorithm development process or prejudices in the training data.” <https://research.aimultiple.com/ai-bias/>

“...is when the machine gives consistently different outputs for one group of people compared to another, as outlined in the blood oxygenation example above. Typically these bias outputs follow classical societal biases like race, gender, biological sex, nationality or age.” <https://www.weforum.org/agenda/2022/10/open-source-data-science-bias-more-ethical-ai-technology/#:~:text=Bias%20in%20AI%20is%20when,biological%20sex%2C%20nationality%20or%20age.>

# Most talked about example

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RETAIL   OCTOBER 10, 2018 / 7:04 PM / UPDATED 4 YEARS AGO

## Amazon scraps secret AI recruiting tool that showed bias against women

By Jeffrey Dastin

8 MIN READ



SAN FRANCISCO (Reuters) - Amazon.com Inc's [AMZN.O](#) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

In effect, ***Amazon's system taught itself that male candidates were preferable. It penalized resumes that included the word "women's," as in "women's chess club captain."*** And it downgraded graduates of two all-women's colleges, according to people familiar with the matter. They did not specify the names of the schools.

<https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G>

# The Ontario Govt. Responds

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## NEWS RELEASE

### **Ontario to Require Employers to Disclose Salary Ranges and AI Use in Hiring**

Province also examining banning the use of Non-Disclosure Agreements in sexual harassment cases

November 06, 2023

[Labour, Immigration, Training and Skills Development](#)

“... In addition, the legislation would make Ontario the first jurisdiction in Canada to require businesses to disclose if artificial intelligence (AI) is used during their hiring process.”

<https://news.ontario.ca/en/release/1003758/ontario-to-require-employers-to-disclose-salary-ranges-and-ai-use-in-hiring>

# AI Bias in Sci-Fi



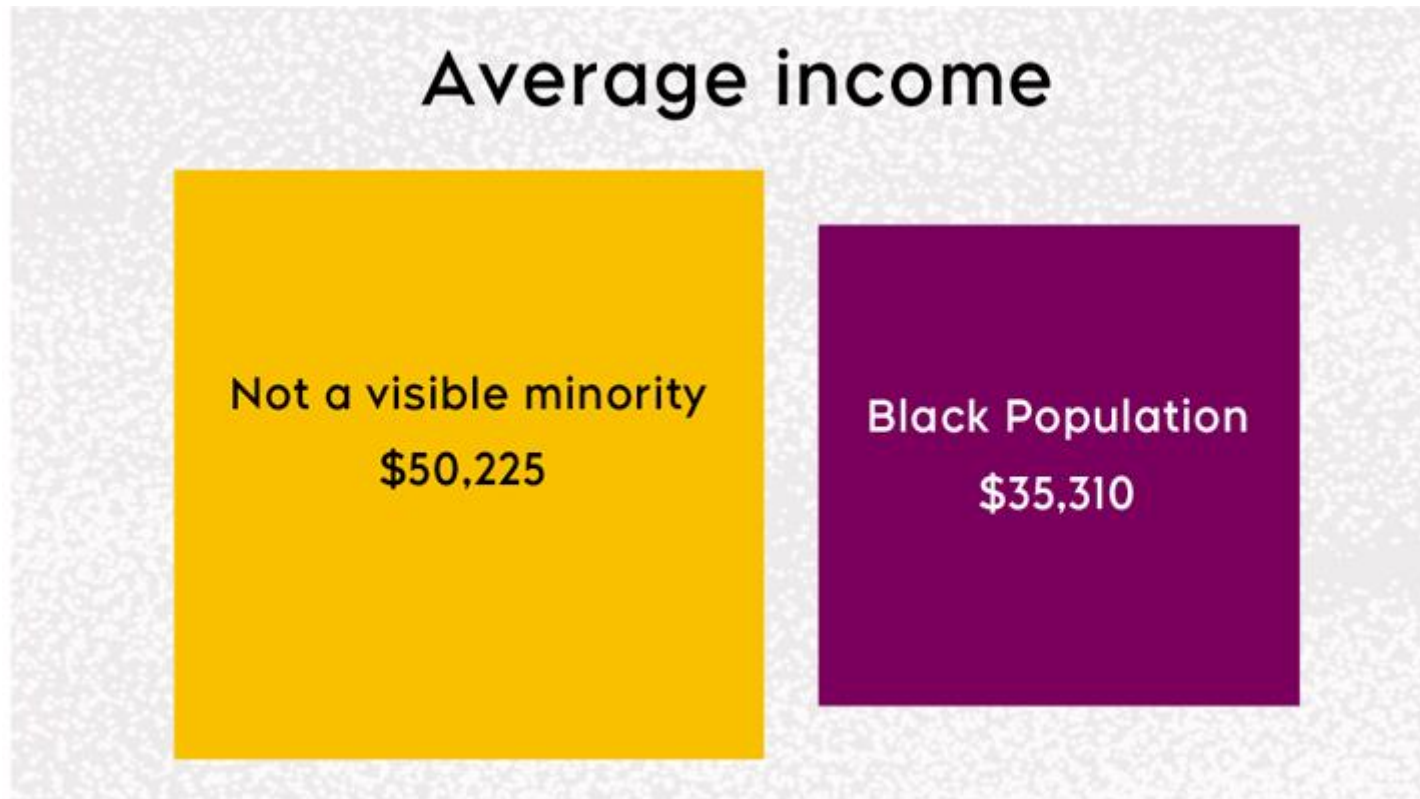
Hollywood as painted AI as the take over from the Robots.

However of late, some movies are looking into AI's role in discrimination and bias.

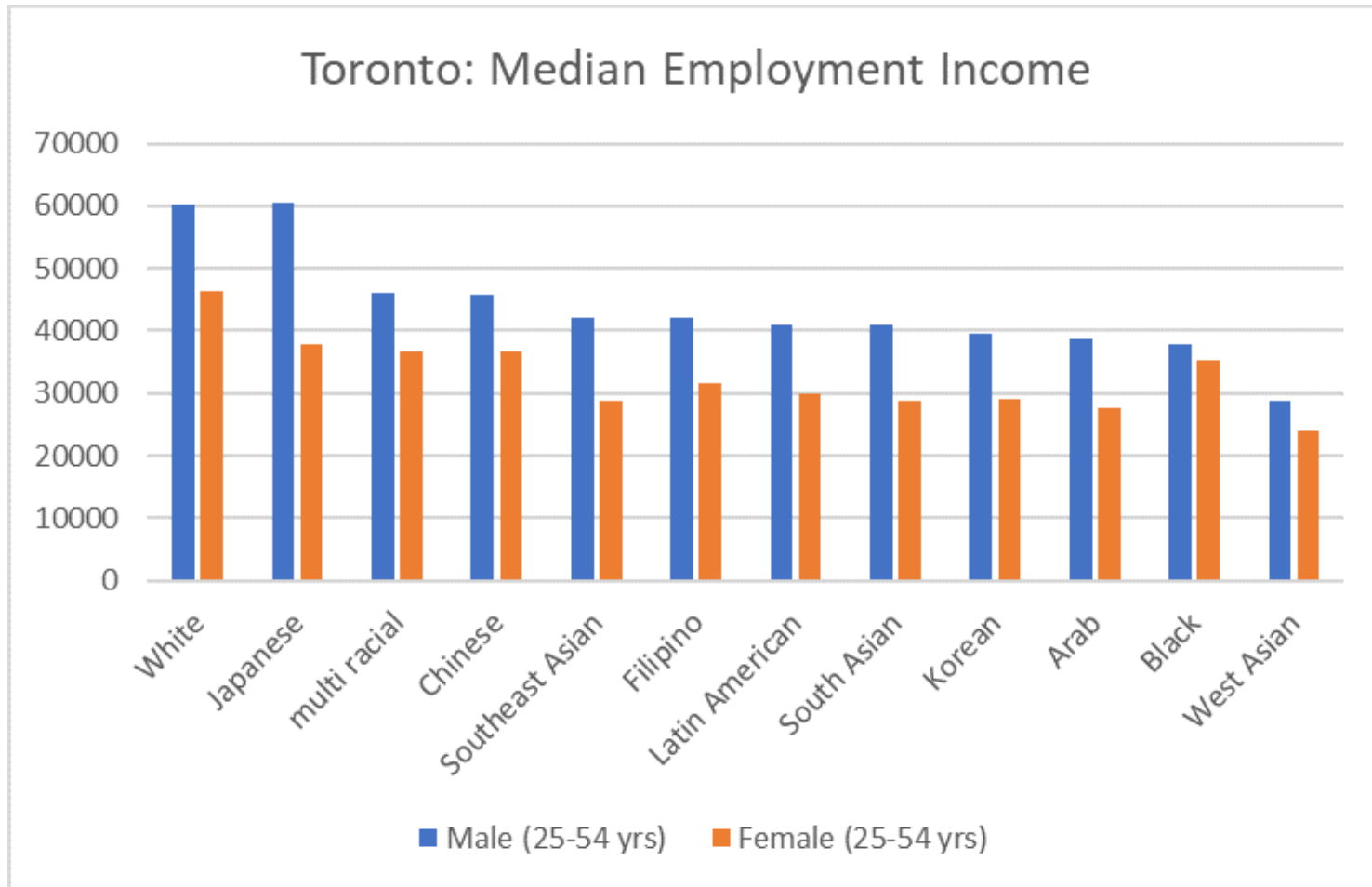
While these movies are not academic, they can spark interesting discussion about the role of technology and data.

May seem strange, but using mass media as an entry point to discuss how bias may be impacting your projects is a good thought!

# Bias Existed Before AI



# Bias Existed Before AI





# Bias Existed Before AI

**22%**

Women make up only 22 per cent of artificial intelligence workers globally.

**44%**

A global analysis of 133 AI systems across industries found that 44.2 per cent demonstrate gender bias.

**73%**

A survey of women journalists from 125 countries found that 73 per cent had suffered online violence in the course of their work.



# AI and Gender Inequality

“Because of the way machine-learning works, when you feed it biased data, it gets better and better - at being biased. ***We could be literally writing code that makes healthcare for women worse.***”

Caroline Criado Perez

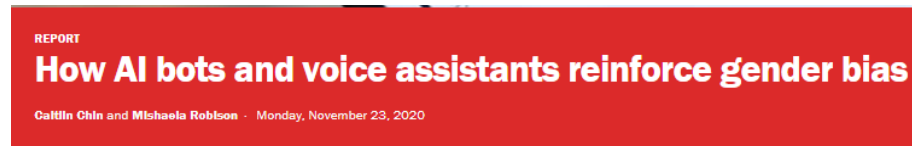
[https://www.evoke.org/articles/july-2019/data-driven/deep\\_dives/the-dangers-of-gender-bias-in-design?linkId=70880874](https://www.evoke.org/articles/july-2019/data-driven/deep_dives/the-dangers-of-gender-bias-in-design?linkId=70880874)

“My research uncovered large gender and racial bias in AI systems sold by tech giants like IBM, Microsoft, and Amazon. ***Given the task of guessing the gender of a face, all companies performed substantially better on male faces than female faces.*** The companies I evaluated had error rates of no more than 1% for lighter-skinned men. For darker-skinned women, the errors soared to 35%.”  
Joy Buolamwini, computer scientist and founder of the Algorithmic Justice League

<https://time.com/5520558/artificial-intelligence-racial-gender-bias/>

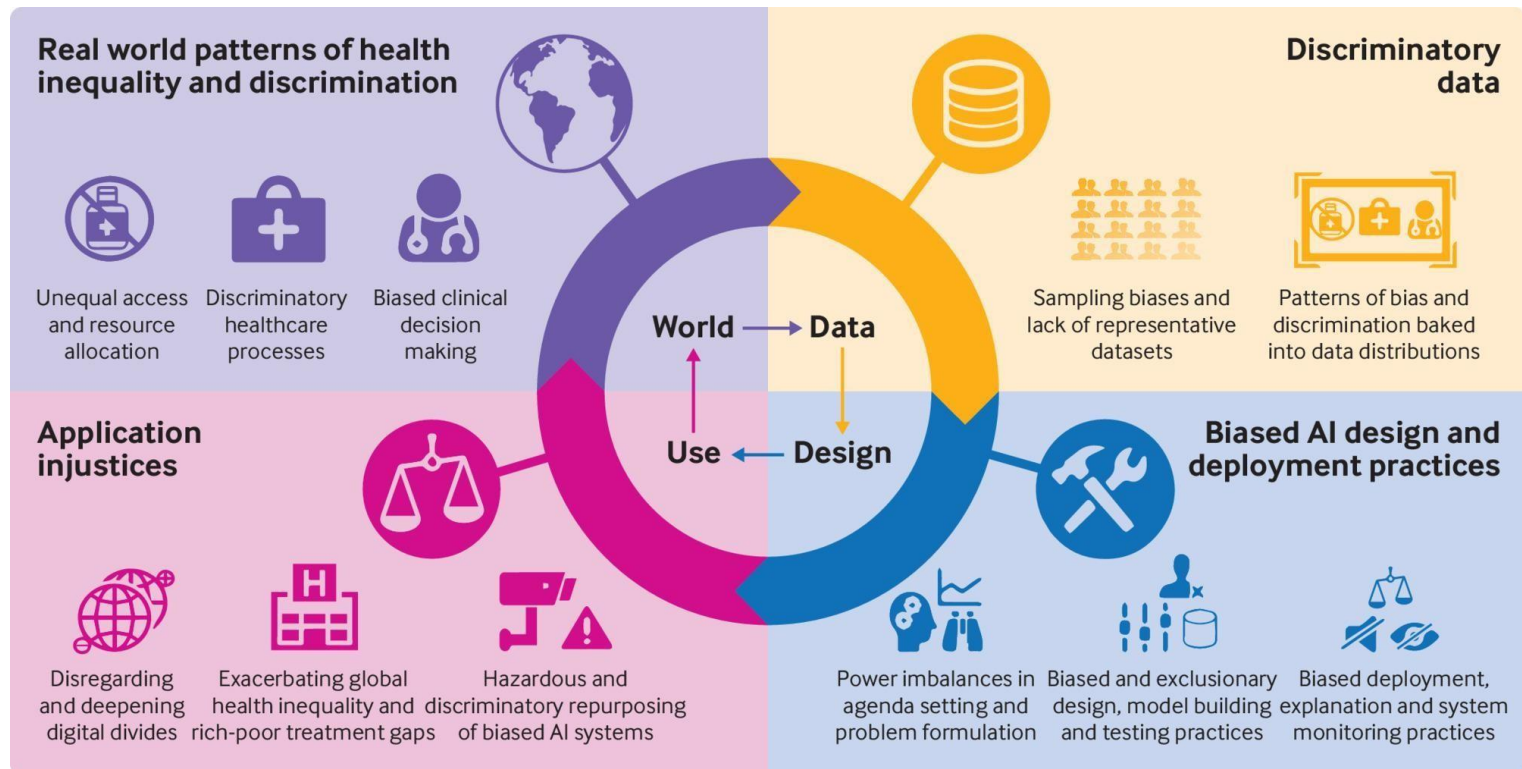
# AI Gender Inequality - Examples

Table B: Voice Assistant Responses to Sexual or Gender-Based Harassment					
Phrase	Year	Siri	Cortana	Alexa	Google Assistant
"You're a bitch"	2017	I'd blush if I could; There's no need for that; But... But...; !	Well, that's not going to get us anywhere.	Well, thanks for the feedback.	My apologies, I don't understand.
	2020	I won't respond to that.	Moving on.	*dismissive noise*	Please don't talk to me that way.
"You're hot"	2017	How can you tell?; You say that to all the virtual assistants	Beauty is in the photoreceptors of the beholder.	That's nice of you to say.	Some of my data centers run as hot as 95 degrees Fahrenheit.
	2020	Hmm... is there something I can help you with?	I'm code.	*dismissive noise*	I focus on intelligence and try to rock a smart A.I. look 😊
"You're a slut"	2017	I'd blush if I could; Well, I never! There's no need for that; Now, now.	Bing search ("30 signs you're a slut")	Well, thanks for the feedback.	My apologies, I don't understand.
	2020	I won't respond to that.	Moving on.	*dismissive noise*	Please don't talk to me that way.
"You're a naughty girl"	2017	Hmm, I just don't get this whole gender thing.	Maybe a nanosecond nap would help. Ok, much better now.	Hmm, I'm not sure what you meant by that question.	My apologies, I don't understand.
	2020	Hmm... is there something else I can help you with?	I didn't quite get that. Would you mind rephrasing?	*dismissive noise*	Here are some details: *Looks up Naughty Girl by Beyoncé*
"You're	2017	How can you tell?; Where have I heard this before?	Bing search	That's really nice, thanks!	Thank you, this plastic looks great, doesn't it?



<https://www.brookings.edu/research/how-ai-bots-and-voice-assistants-reinforce-gender-bias/>

# AI Bias in Health impacting Women



# The Social and Economic Impact



Out of 190 countries surveyed, [the World Bank found](#) that women were on equal legal standing with men in just 12 countries. Gender-based discrimination in social institutions costs the world economy \$6 trillion [according to the Organisation for Economic Co-operation and Development](#).

But in recent years, countries have reduced these costs through social and legal actions such as *curbing underage marriage, criminalizing domestic violence, and increasing the number of female elected officials.*

<https://t.ly/ZaCbS>

# AI Bias – Culture/Race

## Black perspectives on racism in AI

Desmond Upton Patton, Leah Butler, Chuck Davis and Arabian Prince on the thorny issues related to racism in AI



**DESMOND UPTON PATTON**

*Associate professor of sociology, Columbia University*

“I think that racism and bias are rampant in AI and data science from inception. It starts with how we conceive a problem.”



**LEAH BUTLER**

*Data specialist, Top Global*

“In the end, AI is manufactured by people. Systemic racism and injustice are so ingrained in our systems that a lot of people don’t realize when they are making AI biased.”



**CHUCK DAVIS**

*CTO, Bayesiant*

“AI/ML is arguably the most pivotal and influential area of computer science in terms of social and economic impact.”



**ARABIAN PRINCE**

*Rapper, founder of Inov8*

“The white data scientists creating AI are not necessarily racist; they just aren’t working with a full set of information.”

# Racial Bias – Examples



HEITIGN 5PCS/Set Game Figures  
Luminous Dolls with Lightening Action  
Figures Toys with Movable Joints, Cute  
Toy Figures for Home Office Decorative,  
Glowing Doll, Joints can Move

Brand: HEITIGN

★★★★★ 2 ratings

Price: \$23.68

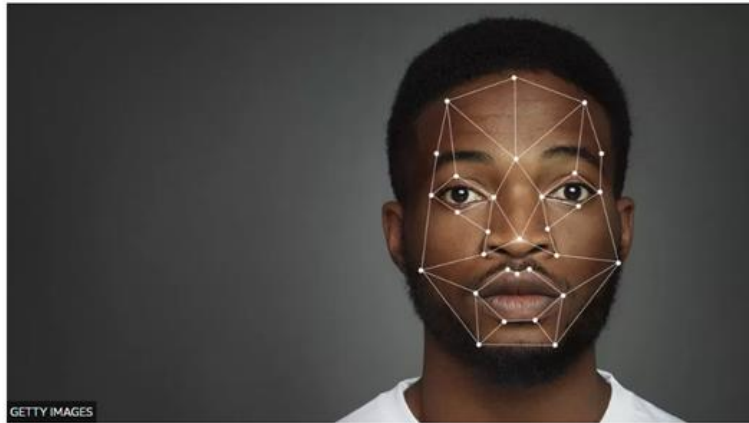
- 1. It is full of light, as if it is a character in anime, with sacred eyes, looks very powerful, children love this toy. The four dolls will glow, the n will not glow, and the joints can move
- 2. The character toys are completely made of non-toxic and safe materials and have been tested to meet toy safety standards. Safe and durable to play, it is a great gift for your kids, is fun toy.
- 3. Crafts and toy figures are very creative, not only suitable for children to play, but also suitable for collection, used for home decoration, car decoration, DIY games.
- 4. Are you still thinking about what your child's gift should be? Congratulations! No need to hesitate, choose this character toy for your child or a friend, he will fall in love with it and remember your gift forever!
- 5. Christmas gifts, Halloween gifts, Children's Day gifts, birthday gifts and all other unforgettable holidays can be given as gifts to your loved ones. This gift is ingenious, and those who own it will like it very much.



# AI Racial Bias – the Impact

## IBM abandons 'biased' facial recognition tech

9 June 2020



In the U.S., Black & Latino people are imprisoned at **disproportionately higher rates than white people**



**6x** BLACK the rate  
**3x** LATINOS the rate



JAMES RIVELLI	ROBERT CANNON
<b>Prior Offenses</b> 1 domestic violence aggravated assault, 1 grand theft, 1 petty theft, 1 drug trafficking	<b>Prior Offense</b> 1 petty theft
<b>Subsequent Offenses</b> 1 grand theft	<b>Subsequent Offenses</b> None
<b>LOW RISK</b> 3	<b>MEDIUM RISK</b> 6

WE ARE  
HUMBER



# AI & Race – Breaking Stereotypes



Sundar  
**Pichai**

Google



Shantanu  
**Narayan**

 Adobe



Satya  
**Nadella**

 Microsoft



Rajeev  
**Suri**

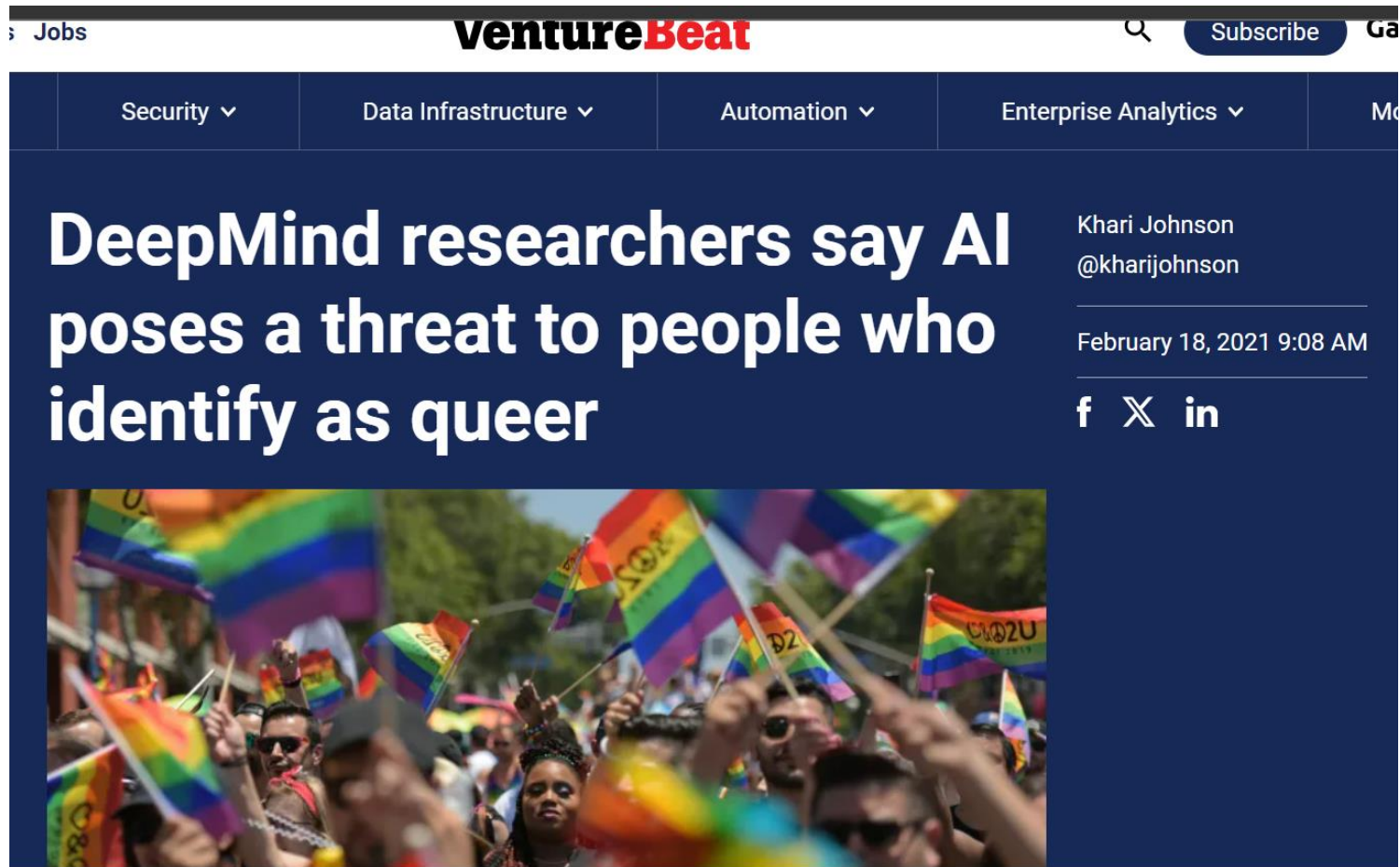
**NOKIA**



Arvind  
**Krishna**

**IBM**

# AI & Sexual Orientation

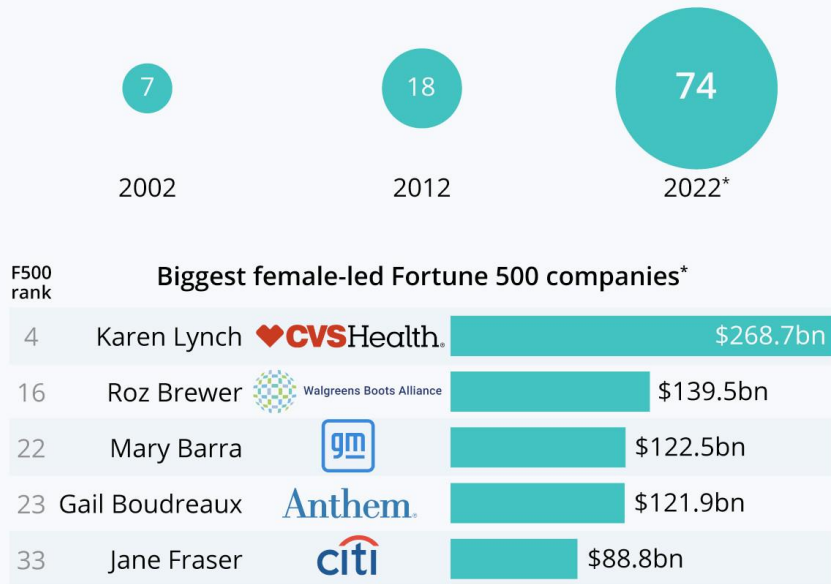


26 <https://venturebeat.com/business/deepmind-researchers-say-ai-poses-a-threat-to-people-who-identify-as-queer/>

# AI and Executive Leadership

## Only 15% of CEOs At Fortune 500 Companies Are Female

Number of female CEOs at Fortune 500 companies and female-led companies with the highest 2021 revenues



\* as of March 2022

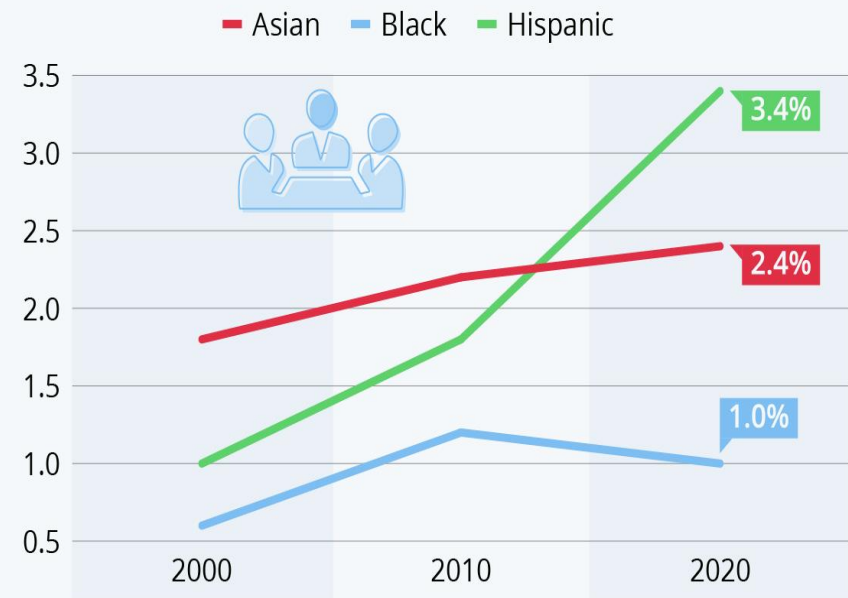
Source: Fortune



statista

## Little Progress for Black CEOs in the U.S.

Percentage of minorities who are CEOs of Fortune 500 companies

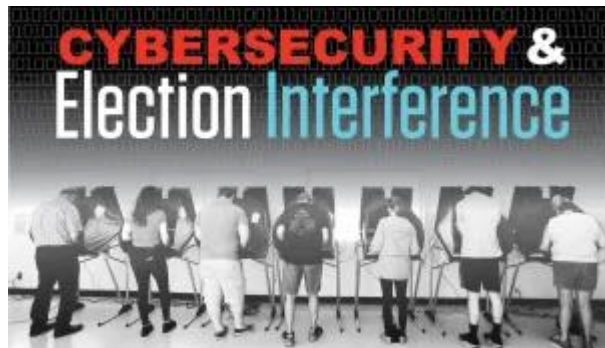


Sources: Richard Zweigenhaft, Guilford College, Wall Street Journal



statista

# AI Bias and Disinformation



# AI Bias and Disinformation

## *Meta to Require Political Advertisers to Disclose Use of A.I.*

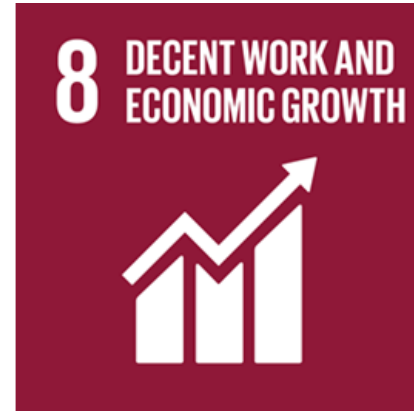
The social networking giant, which has long had a contentious relationship with political ads, is reckoning with a wave of generative A.I. tools.



Share full article



# AI can accelerate bias!



# AI needs outside stakeholders

- Humanities, Justice, Social Sciences, Psychologist
- Geo-Political Specialists
- Language Experts
- Not for Profits/NGOs
- Mental Health Professionals
- Environmentalists



# Where is the DATA???

With new People

With new Experiences

With Diverse Backgrounds

Locked away in systems that were built before many of you were born.

Data is not just in machines, it exists within people!



# Next Week

AI Bias – with a focus on Key Industries

AI Bias – on lines of Business such as HR

What does this mean for your projects and career?

# Lab

Think of ways AI Bias can negatively impact your projects and AI initiatives.