

CODED BIAS

BY SHALINI KANTAYYA



EDUCATIONAL
DISCUSSION GUIDE

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USING THIS GUIDE

Americans interact with artificial intelligence (AI) on a daily basis. Without even knowing it, AI could be determining if you get a loan, a job, or into college. The increasing use of AI over the past decade demands a larger conversation about the ways automated decision-making impacts society. The film *Coded Bias* along with this guide set out to demystify the algorithms that increasingly govern our lives. The background information and discussion questions included help viewers of the film initiate meaningful dialogue about issues raised in *Coded Bias*. Event organizers will also find advice for hosting an engaging, virtual screening of the film. Thank you for supporting these goals for *Coded Bias* discussions and film events:

1

Create a space where people can learn about the social implications of AI, and discuss American civil rights and liberties in the context of technology.

2

Educate viewers about the uses of AI for surveillance and automated decision-making, and discuss options for public oversight.

3

Recognize women and people of color working in technology and discuss ways to increase inclusion in the tech industry.

4

Provide tools for communities to participate in the contemporary discussion about racism and sexism and its effects on American democracy.

ABOUT THE FILM

When MIT Media Lab researcher Joy Buolamwini discovers that many facial recognition technologies fail more often on darker-skinned faces or the faces of women than others, she delves into an investigation of widespread bias in artificial intelligence (AI). As it turns out, algorithms, data, and computers are not neutral. From facial scanning used for policing and surveillance to automated HR systems that mirror and magnify workplace prejudices, these technologies are created with fundamentally biased building blocks. Emboldened by these troubling discoveries, Buolamwini goes on to start the Algorithmic Justice League and joins a group of pioneering women to shed a light on the underlying biases in the technology that shapes our lives and threatens our democracy.

ABOUT THE FILMMAKER



DIRECTOR SHALINI KANTAYYA'S feature documentary, *Coded Bias*, premiered at the 2020 Sundance Film Festival, and was nominated for a Critics' Choice Award for Best Science Documentary. She directed an episode of the National Geographic television series *Breakthrough*, Executive Produced by Ron Howard, broadcast globally in 2017. Her debut feature film *Catching the Sun*, premiered at the Los Angeles Film Festival and was named a New York Times Critics' Pick. *Catching the Sun* released globally on Netflix on Earth Day 2016 with Executive Producer Leonardo DiCaprio, and was nominated for the Environmental Media Association Award for Best Documentary. Shalini Kantayya is a TED Fellow, a William J. Fulbright Scholar, and an Associate of the UC Berkeley Graduate School of Journalism.

PEOPLE IN THE FILM



JOY BUOLAMWINI is a computer scientist and poet of code who uses art and research to illuminate the social implications of AI. Her MIT thesis “Gender Shades,” forms the basis of the groundbreaking studies featured in the film that exposed racial and gender bias in facial recognition technologies. She also founded the Algorithmic Justice League, an organization leading a movement towards more equitable, accountable, and just AI.

CATHY O’NEIL is an American mathematician and the author of the blog mathbabe.org. Her book *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy* was published in 2016 and long-listed for the National Book Award for Nonfiction.





MEREDITH BROUSSARD is a data journalist and assistant professor at the Arthur L. Carter Journalism Institute of New York University. She is the author of *Artificial Unintelligence: How Computers Misunderstand the World*.

SILKIE CARLO, director of Big Brother Watch, is monitoring the trial use of facial recognition technology by the UK police. She previously worked for Edward Snowden's official defense fund and whistleblowers at risk.



VIRGINIA EUBANKS is Associate Professor of Women's Studies at the University of Albany, SUNY and author of *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*.

RAVI NAIK, the Law Society's 2018 Human Rights Lawyer of the Year, is at the forefront of data rights and technology—including the first case against Cambridge Analytica for political profiling and claims against Facebook for their data practices.





SAFIYA UMOJA NOBLE is an Associate Professor at UCLA in the Departments of Information Studies and African American Studies. She is the author of a best-selling book *Algorithms of Oppression: How Search Engines Reinforce Racism*.

ZEYNEP TUFEKCI is an Associate Professor at the UNC School of Information and Library Science and author of *Twitter and Teargas: The Power and Fragility of Networked Protest*.



AMY WEBB is the founder of the Future Today Institute and teaches at New York University's Stern School of Business. She wrote the book *The Big Nine: How the Tech Titans and Their Thinking Machines Could Warp Humanity*.

DEBORAH RAJI is the co-author of "Actionable Auditing," the final paper of the Gender Shade Project and research collaborator of the Algorithmic Justice League. A University of Toronto graduate, she is a Fellow at Mozilla and participated in Google AI's research mentorship cohort, where she worked with the Ethical AI team.



BACKGROUND INFORMATION

Most people are not overly familiar with AI, how it works, or how it's used. This background section is written as a beginner's guide to equitable and accountable AI. It introduces viewers to some core themes and questions that may come up in conversations about Coded Bias.

■ DEMYSTIFYING AI

Artificial Intelligence (AI), is the quest to equip computers with the ability to complete tasks that have traditionally required human intelligence, such as decision making, visual perception, speech recognition, language translation, and more. AI involves the use of algorithms or specific technical instructions to achieve a task. Algorithms run Internet search engines, curate our social media feeds, and determine our credit scores. They control online advertising, answer consumer calls, and recommend our health care. AI is automating all kinds of decision making.

When engineers write algorithms to analyze large amounts of data and make predictions based on the patterns found in data sets, this is called machine learning. One way to have a computer make predictions, is to train it to recognize patterns using lots of data. The more quality data fed into the system, the more material it has to learn from and the more accurate its predictions will be. For example, if you use Facebook for a month, the algorithm that runs the platform may be able to learn a few things about what you like. But if you use Facebook every day for five years, the algorithm will have way more information it can use to accurately predict your interests, your political or religious affiliations, where you like to shop, what your friends and family like, and how you spend your day.

Facial recognition technology can be powered by AI and is intended to identify or verify the identity of an individual.¹ For example, a police officer might use facial recognition software to try to identify someone in security camera footage, while a landlord might scan a tenant's face to verify their identity at the entrance of a housing unit—which was the case for the Brooklyn tenants featured in the film. It is even becoming a standard feature on smartphones. Beyond identification and verifica-

tion, sometimes the term facial recognition is used as a catchall phrase to include tasks like estimating demographic attributes like age, gender, and race or guessing emotions.²

Facial recognition analyzes an image or video footage for biometric data, which is a term used to describe information about an individual's unique physical characteristics or behaviors. Your fingerprint is your personal biometric data. So is your faceprint. A faceprint maps your face based on its unique features derived from the relationship of characteristics like the distances between your eyes and nose. For identification, algorithms are used on the biometric data in an image to try to match the person pictured to their identity so it can pull up information about them—much like a human would if they met you on the street.

Voice recognition—the kind that runs personal assistant devices like Amazon's Alexa or Apple's Siri—is another application of AI. In addition to interpreting and carrying out spoken commands, voice recognition technology analyzes audio to try to identify an individual based on their speech patterns.

Source:

1 *Facial Recognition Technologies: A Primer* by Joy Buolamwini, Vicente Ordóñez, Jamie Morgenstern, and Erik Learned-Miller. *Algorithmic Justice League*, May 29, 2020.

2 *Facing Facts: Best Practices for Common use of Facial Recognition Technologies*. By the United States of America Federal Trade Commission October, 2012.

■ WHAT IS AI ?

Coded Bias offer more ways to understand AI and describe it to others:

“A lot of our ideas about AI come from science fiction. Welcome to everything in Hollywood. It’s the Terminator. It’s Commander Data from Star Trek... It is the robots that take over the world and start to think like human beings. And it’s all totally imaginary. What we actually have is...narrow AI and narrow AI is just math. We’ve imbued computers with all of this magical thinking.”

Meredith Broussard.
Author of *Artificial Unintelligence*.

*“Machine learning. It’s a scoring system that scores the probability of what you’re about to do. Are you going to pay back this loan? Are you going to get fired from this job? What worries me the most about AI or whatever you want to call it, algorithms, is power because it’s really all about who owns the f****g code. The people who own the code then deploy it on other people and there is no symmetry there.” -*

Cathy O’Neill.
Author of *Weapons of Math Destruction*.

“There are two ways in which you can program computers. One of them is more like a recipe. You tell the computer to do this, do this, do this, do this. That’s been the way we’ve programmed computers almost from the beginning. Now there’s another way. That way is feeding the computer lots of data and then the computer learns to classify by digesting this data.”

Zeynep Tufekci.
Author of *Twitter and Teargas*.

“If you’re thinking about data and artificial intelligence, in many ways data is destiny. Data is what we’re using to teach machines how to learn different kinds of patterns. So if you have largely skewed data sets that are being used to train these systems, you can also have skewed results. So this is when you think of AI, it’s forward looking, but AI is based on data and data is a reflection of our history. The past dwells within our algorithms.”

Joy Buolamwini.
Founder of the *Algorithmic Justice League*.

EARLY INFLUENCES ON AI

From the early days of AI to the big tech companies of today, the development of artificial intelligence has been dominated by a small subset of the population: mainly white, male academics and tech executives in the United States. They have gotten to determine the scope and purpose of AI as well as its design, development, and deployment. The decisions of these early influencers have created systems that impose the ideas of a few on the rest of the population via technology.

How did AI start?

AI got its start at a Dartmouth College math conference in 1956, where a group of mathematicians gathered to determine if artificial intelligence was indeed possible. They agreed that it was, and decided that intelligence could be measured by a computer's ability to play games, such as chess, among other tasks. At the time, AI still required several more decades of advancement in computer memory and processing power before systems could process the data necessary for it to learn strategic decision making.

Film and television also played a key role in the early development of AI. In 1968, MIT's Marvin Minsky and science-fiction writer Arthur C. Clarke designed one of the first and most influential popular depictions of AI: HAL9000 in Stanley Kubrick's film *2001: A Space Odyssey*. The sentient computer character was depicted as a pulsing red dot on a black screen.

In the 1980s, Star Trek's Data and Arnold Schwarzenegger's character in *Terminator* came onto the scene. Both depicted AI in a human form but with the mind and body of a machine—and the ability to save or destroy humanity in the case of the *Terminator* character. As in academia, the early depictions of AI in film and television were envisioned through the eyes of a small group of male directors, which reinforced the narrow scope of the field.

By the 1990s, the tech industry was set to take off. IBM, Microsoft and Apple were already well-known computer companies at this point. In 1997, the AI program IBM Blue defeated world champion Gary Kasparov in chess for the first time,

achieving the original vision established by the Dartmouth mathematicians.

Source

1 "Artificial Intelligence (AI) Coined at Dartmouth." Dartmouth College. Accessed September 6, 2020.

"What the evolution of AI's on-screen depiction says about society" by Alex Haslam, *Venture Beat*, April 3, 2018.

"With a very light touch, Facebook can swing close elections without anybody noticing. Maybe with a heavier touch, they could swing not-so-close elections. And if they decided to do that, right now we are just depending on their word."

Zeynep Tufekci

■ AI AND BIG TECH

Currently, the research and development of AI is primarily in the hands of big technology corporations—who have made astonishing profits off the technology. The U.S. government has taken a mostly hands-off approach to influencing or regulating AI development. With the increasing use of commercial AI applications in the areas of healthcare, law enforcement, employment, and elections, however, there is a growing public awareness of the potential risks of leaving the use of AI technology unmonitored.

Who makes AI?

Nine big tech companies are shaping the future of AI, according to *The Big Nine* author Amy Webb, who is interviewed in the film. Six of the companies are based in the United States: Google, Microsoft, Amazon, Facebook, Apple, and IBM. Three are in China: Alibaba, Baidu, and Tencent.¹

These big tech companies hold the lion share of AI patents and an enormous amount of cash to invest in AI research and development. The five biggest tech companies—Apple, Amazon, Google, Microsoft and Facebook—have a combined worth of more than five trillion dollars²—

and during the COVID-19 pandemic when more people are spending more time online, their wealth is skyrocketing.³

In addition to money, big tech also has access to a lot of data. Every Google search, Facebook post, or Amazon order logs data on a user's behaviors. In the big data economy, companies offer a free service, such as an email account or social media profile, in exchange for access to your data. The companies then use that data to, for example, sell advertisements targeted directly to your interests—or potentially your insecurities, as is the case with predatory advertisers described in the film.

American tech companies are primarily beholden to investors and shareholders, who expect them to make a profit. Therefore, decisions about AI are driven by what will make the most money in the shortest amount of time. Values like justice, liberty, and democracy are secondary by default. Facebook, for example, has come under repeated criticism for its platform's role in spreading conspiracy theories and hate speech on the Internet, as well as the Cambridge Analytica scandal, in which leaked Facebook user data was used to influence the U.S. and UK elections. Since then, the role technology companies play in democracy has come under greater scrutiny by Congress and others.

In comparison to the United States, China has a very proactive, hands-on approach to AI. The government works with Chinese technology companies to develop systems like the social credit score, which tracks and analyzes data on an individual's behaviors to reward them for behaviors deemed favorable by the government—or punish them for unfavorable behaviors. Human rights activists have criticized the

Chinese government for using it to suppress dissent and ethnic minorities in the country.⁴

“The progress that was made in the civil rights era could be rolled back under the guise of machine neutrality.”

Joy Buolamwini

Sources:

1 “Futurist Amy Webb Warns Against Leaving AI in the Hands of Big Tech” hosted by Mina Kim for Forum on KQED. March 27, 2019.

2 “Big Tech is worth over \$5 trillion now that Alphabet has joined the four comma club” by Ari Levy. CNBC, January 16, 2020.

3 “Big Tech’s Domination of Business Reaches New Heights” by Peter Eavis and Steve Lohr. New York Times, August 19, 2020.

4 “How China Uses High Tech Surveillance to Subdue Minorities” by Chris Buckley and Paul Mozur. New York Times, May 22, 2019.

■ THE MYTH OF NEUTRALITY

Technology is often regarded as a neutral decision maker, which can make decisions as well as, or even better than humans because AI makes decisions based solely on relevant data. Coded Bias

reminds us that technology is made by humans, and it relies on code written by and data collected by humans. As more AI products enter the marketplace, more researchers are revealing ways human bias has corrupted the technology.

How are facial recognition technologies biased?

The problem that researchers Joy Buolamwini, amplified in her MIT thesis that became the basis of a series of studies co authored with Tlmit Gebru and Deborah Raji “Gender Shades Project” is that the data used to evaluate how well facial recognition technologies work and the data to train them is loaded with human bias the data used to train facial recognition AI is loaded with human bias. The term bias describes the assumptions, explicit or implicit, that people have in favor of or against a person or groups of people.

The first study found that commercial AI systems from Microsoft, IBM, and Face++, made by the Chinese company Megvii, misgendered the faces of darker skinned women more often—with an error rate of up to 37 percent. Lighter skinned men, by comparison, had error rates of no more than one percent. The second study found Amazon also had gender and racial bias, misgendering women overall 19% of the time and dark-skinned women 31% of the time, while having zero errors on lighter skinned men..

When the researchers analyzed key data sets used to test the facial recognition algorithms, they found that they significantly lacked diversity. The data sets consisted of more lighter skinned people than any other demographic, as much as 80 percent of the images. Data-sets were also largely male¹ Because the systems evaluated were not as well trained on women, people with darker skin, and espe-

cially women with darker skin, they misclassified them more often.

Following the Gender Shades Project which focused on gender classification, the National Institute of Standards and Technology released a report analyzing 189 facial recognition algorithms from 99 companies. The independent government study reveals that “For one-to-one matching, the team saw higher rates of false positives for Asian and African American faces relative to images of Caucasians. The differentials often ranged from a factor of 10 to 100 times, depending on the individual algorithm. For one-to-many matching, the team saw higher rates of false positives for African American females. Put another way depending on the algorithm, errors on African American and Asian faces were 10-100 times more than errors white faces. And African Americans females faces were most likely to be misidentified, which can lead to false accusations.

Inaccurate results can have serious consequences. Facial recognition technology is used by police departments in investigations to try to identify suspects captured on security or body camera footage. Officers run image searches against their database of mugshots to see if they can find a match. At least half of U.S. states also allow police to search their database of driver’s license photos for matches.² A few police departments, such as Detroit, are now experimenting with real-time video facial recognition, the kind used by the U.K. police surveillance van featured in the film.

In 2020, the Detroit Police Department arrested an innocent Black man in Michigan in front of his two young daughter and detained him for 30 hours in a high profile known false arrest caused by facial recognition misidentification.³ A study by Big Brother Watch indicates that the mistake was not uncommon based on similar technology used by U.K. police, which found inaccurate results more than 90 percent of the time.⁴

In the film, we see a 14-year-old boy stopped and searched by police due to a false match showing again. We are also seeing concerns of bias with the use of proctoring services that scan student faces through a video camera

Sources:

1 “Gender Shades: Intersectional Accuracy Disparities in Commercial Gender Classification” by Joy Buolamwini and Timnit Gebru. *Proceedings of Machine Learning Research*, February, 2018

2 “Actionable Auditing: Investigating the Impact of Publicly Naming Biased Performance Results of Commercial AI Products” by Inioluwa Deborah Raji and Joy Buolamwini and Timnit Gebru. *Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society*, January, 2019

3 NIST Study Evaluates Effects of Race, Age, Sex on Face Recognition Software 2019, December

4 “The Perpetual Line-Up” by Clare Garvie, Alvaro Bedoya, and Jonathan Frankle. *Center on Privacy & Technology at Georgetown Law*, May 2016.

5 “Wrongfully Accused by an Algorithm” by Kashmir Hill. *The New York Times*. June 24, 2020.

6 “The Lawless Growth of Facial Recognition in UK policing” by Big Brother Watch. May 2020.

How are healthcare algorithms biased?

In 2019, a study into a UnitedHealth algorithm widely used by hospitals found racial bias in how it recommended care to patients. The research led by UC Berkeley’s Zaid Obermeyer found that the algorithm underestimated the needs of sicker Black patients compared to healthier white patients—even though developers had not used race data as an input.

Instead, the algorithm’s developers used data collected from billing departments to predict how much a patient would spend on healthcare in their lifetime. They assumed that the sicker a patient, the more they spend on healthcare. The algorithm did not account, however, for the fact that Black communities have historically spent less on health care for a variety of factors, including lack of health insurance or mistrust of the health care system.¹ New York regulators demanded the Minnesota-based company Optum fix the algorithm, and the researchers recommended changes that would reduce bias, but they warned that more flawed algorithms may exist in the health care system.

Just a few months after the study was published, the COVID-19 pandemic hit the U.S., straining the national healthcare system. Data from early in the pandemic indicate that COVID-19 has hit Black communities especially hard. Of the states reporting racial/ethnic information, Black Americans accounted for 1 in 3 COVID-19 deaths—raising concerns that COVID-19 data could be used to justify increased surveillance on communities of color during the pandemic. Advocates from Data 4 Black Lives have issued a call for inclusion of Black community members in the decision making for COVID-19 data applications.³

AI has been used in pandemic tracking since the first handful of cases in China alerted an algorithm developed by Boston Children’s Hospital of an outbreak. The algorithm scans the internet for social media posts and news stories that indicate a public health outbreak. Early in the pandemic, the United Kingdom began working on a smartphone app that allows people to opt into alerts about nearby Covid-19 cases. Taiwan, South Korea, and Italy have all used cell phone location tracking to monitor how well their populations are adhering to stay at home guidelines and physical distancing. And in Moscow, the Russian government is using facial recognition technology to identify those leaving their homes during quarantine.⁴

Sources:

1 “Racial bias in a medical algorithm favors white patients over sicker black patients” by Carolyn Y. Johnson. *Washington Post*, October 24, 2019.

2 “Racial Data Transparency” by Dr. Lisa A. Cooper. *Johns Hopkins University*, Accessed September 6, 2020.

3 “We Will Not Allow the Weaponization of Covid-19 Data” by Yeshimabeit Milner of *Data for Black Lives on Medium*, May 18, 2020.

4 “Surveillance During Covid 19: Five Ways Government and Corporations are using the Health Crisis to Expand Surveillance” by *Just Futures Law*, June, 2020.

What are recidivism risk assessments?

Recidivism risk assessments refer to automated decision making that aims to predict the likelihood of an individual’s future criminal behavior. Judges in almost every state use them to inform their decisions about who gets released at pre-trial or how long to keep someone on probation, as was the case with LaTonya Meyers interviewed in the film. Some states, including Arizona, Colorado, Delaware, Kentucky, Louisiana, Oklahoma, Virginia, Washington and Wisconsin, share scores with judges for criminal sentencing and sometimes even in conviction decisions.¹

A 2016 ProPublica study found that a recidivism risk algorithm called COMPAS was almost twice as likely to rate a Black defendant as high-risk for reoffending. White defendants, on the other hand, were more likely to be mislabeled as low-risk. The study found that two years after the predictions were made, they were accurate in predicting violent

crime only 20 percent of the time. When non-violent misdemeanors were added, the predictions fared slightly better than a coin flip at 61 percent accuracy.²

The process uses data collected from inmate questionnaires that ask things like where you live, if your friends and family have criminal records, or if you have a job. Race data is never used in the algorithms, however an inmate's age and sex are. The algorithm compares the inmate's data to the data of other people with similar profiles to classify the inmate as either high or low risk of committing a future crime. The algorithms assume that people with similar data will commit similar crimes.

At least one defendant in Wisconsin sued the state for using a recidivism risk assessment in determining his sentence, however, the state's Supreme Court ruled in favor of using algorithms. Criminal justice reforms passed in 2018, known as the First Step Act, are set to expand use of recidivism risk algorithms to all states.³

“Algorithmic justice—making sure there’s oversight in the age of automation—is one of the largest civil rights concerns we have.”

Joy Buolamwini

Sources:

1 “Risk Assessment: Explained” by Matt Henry. *The Appeal*, March 25, 2019.

2 “Machine Bias: There’s a 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.

3 “Algorithms in the Criminal Justice System” by EPIC. Accessed September 6, 2020.

■ CIVIL AND HUMAN RIGHTS CONCERNS

There is a lot at stake when it comes to AI bias. In policing, sentencing, and healthcare, AI bias threatens the lives and liberties in Black and brown communities. In employment, housing, and education, AI bias can limit and deny opportunities for women and people of color. Even if bias in AI systems is reduced, more accurate systems can be weaponized and used for surveillance. When we think about the impact of technology bias is important to highlight but there are many ways to cause harm even with more accurate systems. The film *Coded Bias* views technology through a civil and human rights framework.

How does AI bias threaten civil rights?

Civil rights refer to a broad set of protections designed to prevent unfair treatment or discrimination in areas such as education, employment, housing, banking, and more. Black civil rights leaders in the 1960s, women's rights activists in the 1970s, and disability rights advocates in the 1980s fought for victories that secured protections under the law. The Civil Rights Act, the Fair Housing Act, and the Americans with Disabilities Act are just

a few examples. All of these civil rights laws were written prior to the advent of the Internet.

Bias in algorithms used in hiring, for example, threatens an individual's right of equal opportunity to employment, protected by The Civil Rights Act. The law prevents employers from advertising jobs based on race, gender, or other discriminatory criteria. However, algorithms, not humans, are increasingly influencing who sees job announcements advertised online, whose resume is selected for an interview, and if you have the right personality traits for the job. Amazon's now-scrapped AI recruiting tool that disproportionately rejected women is a cautionary tale of what technology can do when left unsupervised.¹

Due process is an American civil right that protects an individual from being deprived of life, liberty, or property without proper legal proceedings. It is referenced in the Fifth and Fourteenth Amendments to the U.S. Constitution. Algorithms threaten due process rights because their precise decision making process is unknown, even to the developers. An algorithm is a black box, meaning they can only be viewed through its inputs and outputs, not its internal process. In addition, many for-profit companies refuse to share information about their products for proprietary reasons, making it difficult to appeal the decision.

In 2017, a group of Houston teachers, including Daniel Santos who was interviewed in the film, and their teacher's union won a settlement against their school district after being fired for receiving a poor score on a value-added assessment. The assessment used an algorithm to determine teacher performance based on student data. The ruling found that the teachers' rights to due process were violated, because the algorithm was incomprehensible and there was no way to legally mount an appeal over how the decision or how it was made.² The settlement effectively prohibited the use of value-added assessments in Houston, and elsewhere.

Sources:

1 **"Centering Civil Rights in the Privacy Debate"** by Becky Chao, Eric Null, Brandi Collins-Dexter, and more. *New America*, August 14, 2019.

2 **"'Houston, We Have a Lawsuit': A Cautionary Tale for the Implementation of Value-Added Models for High-Stakes Employment Decisions"** by Mark A. Paige, Audrey Amrein-Beardsley. May 26, 2020.

What about AI surveillance?

Journalists and activists have uncovered several cases of AI surveillance technology used by local and federal law enforcement against immigrants and Black Lives Matter protesters in the United States. The actions raise human rights concerns regarding privacy and the abuse of technology to target political protestors and ethnic minorities.

In 2020, the U.S. Customs and Border Patrol (CPB) rerouted a drone from where it was surveilling the Canadian border to fly over Minneapolis during protests of the police killing of George Floyd. The CPB also tracked the social media accounts of Ferguson protest organizers that followed the police killing of Michael Brown in 2014. And Baltimore police used both aerial surveillance and facial recognition technology during the protests of the police killing of Freddie Gray in 2015.¹

In 2017, the Department of Homeland Security (DHS)—the federal law enforcement agency that oversees the U.S. Customs and Border Patrol and Immigration and Customs Enforcement (ICE)—began experimenting with facial recognition. Using technology purchased from tech companies Palantir and Amazon, the DHS builds profiles on immigrants and their families to track their whereabouts and identify targets for deportation raids.² The DHS spends 10 percent of its \$44 billion budget on

data services, which it uses to store biometric information on some 250 million Americans.^{2,3}

In 2018, the DHS began installing facial recognition technology at airports to check travelers' faceprints against its database of passport photos.⁴ The following year, the AI misidentified a Brown University student as a suspect on the terrorist watch list.⁵

Sources:

1 "Members of Congress want to know more about law enforcement's surveillance of protesters" by Rebecca HeilWeil. *Vox*, June 10, 2020.

2 "Who's Behind ICE? The Tech and Data Companies Fueling Deportations" by Empower, LLC for Mijente, the National Immigration Project, and the Immigrant Defense Project, August 23, 2018.

3 "DHS to Move Biometric Data on Hundreds of Millions of People to Amazon Cloud" by Jack Corrigan. *NextGov*, Accessed September 6, 2020.

4 "The Government's Nightmare Vision for Facial Recognition at Airports and Beyond" by Jay Stanley. *ACLU*, Accessed September 6, 2020.

5 "Brown University Student Mistakenly Identified as Sri Lanka bombing suspect" by Jeremy C. Fox. *Boston Globe*, April 28, 2019.

Who is harmed by AI bias?

Biased algorithms have the ability to automate discrimination at a scale never seen before in human history, raising concerns that that AI will accelerate social problems of sexism, racism, and other injustices. Sexism and racism refer to forms of systematic discrimination that harm women and people of color—especially Black and Indigenous people of color. Multiple systems of discrimination can affect someone's life at the same time—for example, sexism and racism compound harmful effects in the lives of women and girls of color.¹

In her book, *Algorithms of Oppression*, Safiya Noble, who is interviewed in the film, describes the role popular search engine algorithms play in promoting sexism and racism towards women and girls of color.² For example, up until a few years ago a Google search for the phrase 'Black girls,' 'Latina girls' or 'Asian girls' produced pornographic results. In another example, a 2013 study by Harvard researcher Latanya Sweeney found that Black names searched on Google brought up ads for criminal record search sites, associating Black people with criminality.³ In 2016, Microsoft's chatter bot Tay had to be taken down for posting racist and sexist comments after only sixteen hours of machine learning from the Internet.

Misrepresentations online can contribute to real-life harms by fueling violence against women and girls and over-policing in communities of color; they also inform commercial algorithms that profile consumers online. Companies use consumer profiling AI to make predictions about who might buy their products or who can be trusted with a loan, for example. Based on online data about us and people like us, an algorithm could decide to offer a higher insurance rate or a credit card with a lower limit, which was the case for the Apple Credit Card mentioned in the film. In her book, Noble calls this practice 'technological redlining,' which refers to the practice of using online data to categorize entire groups of people as unworthy of investment.²

The Great Recession demonstrated the widespread harm that commercial algorithms can enable. In her book, *Weapons of Math Destruction*, Cathy O'Neill, who is interviewed in the film, explains how unregulated algorithms played a role in almost every step that led to the subprime mortgage scandal in 2008.⁴ Banks used them to determine the credit scores of people targeted for subprime loans, to calculate the high mortgage rates that borrowers eventually couldn't afford to pay, and to bundle the mortgages into investment portfolios that ended up collapsing the stock market. Black people and their communities experienced some of the worst harms from the Great Recession. During the

crisis, home foreclosures amounted to the largest loss of Black wealth in U.S. history.⁵

“The machine is simply replicating the world as it exists and they are not making decisions that are ethical. They are making decisions that are mathematical. If we use machine learning models to replicate the world as it is today, we are not going to actually make social progress.”

Meredith Broussard

Sources:

1 “Kimberlé Crenshaw on Intersectionality, More than Two Decades Later.” Columbia Law School. June 8, 2017.

2 “In ‘Algorithms of Oppression,’ Safiya Noble finds old stereotypes persist in new media” by USC Annenberg. February 16, 2018.

3 “Racism is Poisoning Online Ad Delivery, Says Harvard Professor” MIT Technology Review, February 4, 2013.

4 “This Mathematician Says Big Data Is Causing a ‘Silent Financial Crisis’” by Rana Foroohar. TIME, August 29, 2016.

5 “Impact on the US Housing Crisis on the Racial Wealth Gap Across Generations” by Sarah Burd-Sharps and Rebecca Rasch. Social Science Research Council for the ACLU. June 2015.

■ LAWS AND OVERSIGHT

What are data rights?

So far, the European Union (EU) has taken the strongest stance on data rights, which refer to

the human right to privacy, confidentiality, and ethical use of personal information collected by governments or corporations through technology.

In 2016, the EU passed the General Data Protection Regulation (GDPR) creating the first human rights framework for technology companies to follow. It protects a user’s right to know who is collecting their data and for what purpose and the right to correct or erase data collected on them. If a user chooses not to opt-in to data collection, the law protects their decision from being used to discriminate against them or deny them access to services. The GDPR also prohibits the sale of data to third party data brokers. The GDPR took effect in 2018 and applies to any company doing business online with European customers no matter where the company is located. Companies that violate the GDPR face steep fines.¹

In 2018, California became the first and so far only U.S. state to pass a broad data rights law.² The California law allows the sale of user data, however, unlike the GDPR. Illinois, New Hampshire, and Texas grant residents the right to sue over data privacy. Under Illinois’ law, Facebook users filed a class action lawsuit against the company for its use of unauthorized facial recognition technology in its photo tagging feature. In 2020, Facebook settled for \$650 million in the largest payout regarding online privacy violations to date.³

Sources:

1 “Data Protection” European Commission. Accessed September 8, 2020.

2 “California Rings in the New Year with a New Data Privacy Law” by Rachel Myrow. NPR, December 30, 2019.

3 Judge: Facebook’s \$550 Million Settlement In Facial Recognition Case Is Not Enough by Bobby Allyn. NPR, July 17, 2020.

Does my police department use facial recognition technology?

In 2019, San Francisco became the first city to pass a ban on the use of facial recognition technology by any city official or police officer. Oakland and Berkeley followed. California also passed a three-year ban on police use of facial recognition, which started in January 2020, joining New Hampshire and Oregon in imposing limits on the technology.¹ More than half of all states have considered some form of regulation on police use of facial recognition; see if your state is included in this map from Electronic Privacy Information Center: <https://epic.org/state-policy/facialrecognition/>.

In Massachusetts, where Joy Buolamwini conducted her work out of the MIT Media Lab, the cities of Boston, Springfield, Somerville, Brookline, Northampton, and Cambridge have all passed ordinances banning police use of facial recognition. Portland, Oregon also joined the list in 2020, and New York City passed the Public Oversight of Surveillance Technology (POST) Act requiring public disclosure before the NYPD can acquire surveillance technology. The State of New York placed a two year ban on facial recognition in public schools.²

During the mass Black Lives Matter protests in 2020, IBM and Microsoft agreed to stop selling facial recognition technology to law enforcement. And in June 2020, Amazon put a one-year moratorium on police use of Rekognition, buying time for Congress to establish oversight for its use by government entities.³ Immediately after the announcement, a group of lawmakers introduced the Facial Recognition and Biometric Technology Moratorium Act in Congress, which would ban use of the technology by federal law enforcement and local police forces that receive federal funding.

A handful of other bills have been introduced in Congress since 2018, including proposed

restrictions on commercial use of data and police use of facial recognition. One bill on the use of biometric technology in public housing was introduced by the representative of the Brooklyn tenants featured in the film. As of the writing of this guide, none of the bills have made it to the floor for a vote.

“For algorithms that have the potential to ruin people’s lives, or sharply reduce their options with regard to their liberty, their livelihood, their finances, we need an ‘FDA for algorithms’ that says, ‘show me evidence that it’s going to work, not just to make you money, but for society.’”

Cathy O’Neil

Sources:

1 “Portland City Council Votes to Ban Facial Recognition Technologies in Public Places” by Kyle Wiggers. *Venture Beat*, September 9, 2020.

2 “California lawmakers ban facial recognition from body cams” by Rachel Metz. *CNN*, September 13, 2019.

3 “Amazon pauses police use of its facial recognition software.” *Al Jazeera*, June 11, 2020.

4 “Facial recognition bill would ban use by federal law enforcement.” By Olivia Solon. *NBC News*, June 25, 2020.

■ TECH ETHICS AND ALGORITHMIC JUSTICE

In the absence of regulations, companies have adopted tech ethics in an effort to decrease harms caused by their products. Tech ethics are a set of principles that guide product development in the technology industry. The Algorithmic Justice League points out, however, that even when developed with the best of intentions, AI can still cause unintended harms when it is deployed in the real world. They call for a more robust process of algorithmic justice.

What is algorithmic justice?

Algorithmic justice exposes bias in algorithms in order to develop equitable and accountable design and implementation of coded systems. The Algorithmic Justice League outlines the following framework for promoting equitable and accountable AI:¹

That people have agency and control over how they interact with an AI system, which requires knowing how systems are used and what their potential harms might be.

That AI secure affirmative consent from people, such as with an opt-in request, on how or whether they interact with an AI system. No one should be penalized for opting out.

To respect human life, dignity, and rights, AI requires centering justice by prohibiting certain corporate and government uses.

Meaningful transparency. For an AI system to demonstrate meaningful transparency it must provide an explanation of how the system works, how it was designed, and for what specific purpose—as well as its known limitations.

Because it is constantly evolving, AI requires continuous oversight by independent third parties and laws that require companies and government agencies deploying AI to meet minimum reporting requirements.

That AI provides people who have been harmed with access to remedy, meaning that there is a working pathway for people to contest and correct a harmful decision made by artificial intelligence.

The Algorithmic Justice League has also called for a new federal office to oversee the development and deployment of AI. The proposal is modeled on the Food and Drug Administration (FDA), which regulates medicine and medical devices in the United States. Similar to how the FDA operates, a federal office for AI would create standards and datasets to make sure AI development serves the public interest and review algorithms before they are used on people. According to the Algorithmic Justice League proposal, it would also monitor the AI throughout its use to make sure it is being used as originally intended.²

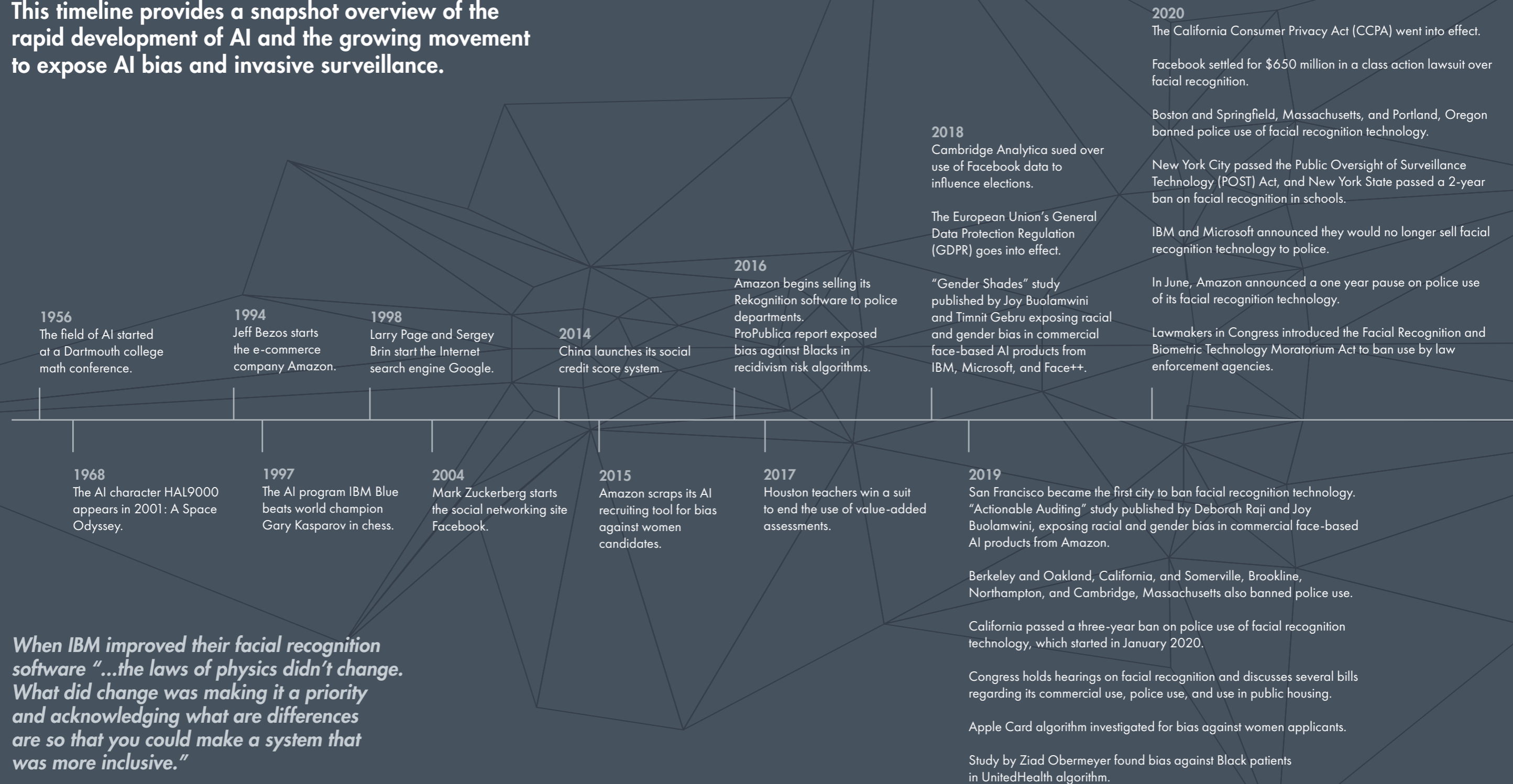
Source:

1 Learn More by Algorithmic Justice League. Accessed September 6, 2020.

2 “Facial Recognition Technologies in the Wild: A Call for a Federal Office” by Erik Learned-Miller, Joy Buolamwini, Vicente Ordóñez, and Jamie Morgenstern. *AJL*, May 29, 2020

TIMELINE

This timeline provides a snapshot overview of the rapid development of AI and the growing movement to expose AI bias and invasive surveillance.



When IBM improved their facial recognition software "...the laws of physics didn't change. What did change was making it a priority and acknowledging what are differences are so that you could make a system that was more inclusive."

Joy Buolamwini

■ INCLUSION IN THE TECH INDUSTRY

Throughout AI's history, women and people of color have been systematically excluded from the academic halls and executive suites where decisions about technology were made. And recent reports show technology companies and STEM education programs still do not include equal representation of women and people of color. Complaints about sexual harassment and cultural incompetency plague the industry. And yet research shows that companies with diverse teams attract better talent and are more profitable—making inclusion both fair and just and good for business.¹

So how inclusive is big tech?

In 2019, Facebook, Google, Apple, and Microsoft on average employed slightly more than 20 percent women in technical positions, such as coders, engineers, and data scientists. When it came to race/ethnicity, Apple posted the highest diversity in technical positions at six percent Black and eight percent Latinx, with the rest of the companies achieving a fraction of that.²

In the reports, companies mainly classify their staff as either women or people of color—but not both—making it difficult to assess how many women of color are represented in the industry numbers. Meanwhile, Amazon does

not separate its demographic information by job title, so while its numbers report 42 percent women and roughly the same for Black and Latinx workers, many may be working in distribution centers rather than developing AI.²

A 2018 study by the Oakland-based Kapor Center and Center for Gender Equity in Science and Technology at Arizona State helps to fill in the gaps left by tech company reports. It found that among all women employed in computer and information science occupations, 12 percent are Black or Latinx women. In Silicon Valley tech companies, however, the numbers are far worse—less than two percent of all workers are Black, Latinx, or Native American/Alaskan Native women. When it comes to leadership positions in Silicon Valley, the report found that less than one percent are held by Latinx women, and less than a half a percentage point are held by Black women.³

As for start-ups, about four percent of women-led companies are founded by Black women and less than two percent by Latinx women. In comparison, Black and Latinx women entrepreneurs represent the largest and fastest growing groups of new women-owned small businesses in America.⁴

Sources:

1 "Why Diversity Matters" by Vivian Hunt, Dennis Layton, and Sara Prince. McKinsey Company, January 1, 2015.

2 "Five Years of Tech Diversity Reports—and Little Progress" by Sarah Harrison. WIRED, October 1, 2019.

3 Women and Girls of Color in Computing by Kapor Center, Center for Gender Equity in Science and Technology at Arizona State, and Pivotal Ventures. 2018.

4 Project Diane and Project Diane Latinx by Digital Undivided. Accessed September 7, 2020.

What about STEM education?

Studies show that women and people of color, especially Black professors, are chronically underrepresented and underpaid across Science, Technology, Engineering, Mathematics (STEM) disciplines, signaling a lack of role models and culturally competent mentors for students of color in the field.¹

In 2018, young women comprised about 20 percent of advanced computer science courses in high school. Among female students that took AP computer science college qualifying exams, two percent identified as Black and four percent as Latinx. Less than one percent were Native American/Alaskan Native girls.²

Once young women make it to college, the trend of under representation continues. Women of all races/ethnicities earn 18 percent of Bachelor's degrees in computer science degrees. Of that, women of color combined make up less than 10 percent of degree earners—with 3 percent identifying as Black, 2 percent Latinx, and 2 percent Asian.²

Girl coding groups, such as the San Francisco-based Black Girls Code, aim to mentor more girls into computer science fields. And tech companies, like Google and Apple, have made some modest investments in programs at historically Black colleges and other STEM education programs, like Girls Who Code.³

Sources:

1 "The Missing Black Professors" by Colleen Flaherty. *Inside Higher Ed*, August 22, 2017.

2 Women and Girls of Color in Computing by Kapor Center, Center for Gender Equity in Science and Technology at Arizona State, and Pivotal Ventures. 2018.

3 "Google, Expanding on HBCU Pilot, Launches 'Tech Exchange' to Boost Diversity in Industry" by Emily Tate. *EdSurge*, September 19, 2018.

RECOGNIZING TECH TALENT

Coded Bias celebrates women leading the ethical revolution in technology. The women interviewed in the film join a long tradition of pioneering women who have used data and technology to advance justice and increase opportunity for other women and girls in the tech industry. The film's broadcast and community events are a chance to share the names and accomplishments of women in tech. Here are just a few suggestions.

IDA B. WELLS was a data journalist and an anti-lynching advocate. In 1895, Wells published *The Red Record: Tabulated Statistics and Alleged Causes of Lynching in the United States, 1892-1894*. Her data analysis provided proof of the underlying racism of lynch mobs.

GRACE MURRAY HOPPER was a computer scientist and rear admiral in the U.S. Navy during World War II, where she served as one of the first programmers of the Harvard Mark I computer.

KATHERINE G. JOHNSON calculated the flight path for the first NASA mission to space. When NASA opened the position to women mathematicians in 1953, she was one of the first hired. One of her jobs was to verify accuracy for computer results.

EVELYN BOYD GRANVILLE was the second Black woman to earn a Ph.D. in mathematics from Yale University in 1949. She worked as a computer scientist for IBM and the U.S. Space Technologies Laboratories.

ANITA BORG co-founded the online network *Systers* in 1987 and the Institute for Women and Technology (IWT) in 1997 to support and increase the inclusion of women in the tech industry.

KIMBERLY BRYANT is an electrical engineer and in 2011, founded *Black Girls Code* to teach basic programming concepts to Black girls who are underrepresented in technology careers.

STEPHANIE CASTILLO is the Executive Director of *Latina Girls Code*. In addition to teaching girls how to code, she is also an immigration advisor to assist undocumented students in her organization.

KATHRYN A. FINNEY is the founder and CEO of *digitalundivided*, a social enterprise that leads high potential Black and Latinx women founders through the startup pipeline from idea to exit.

LAURA I. GOMEZ founded *Atipica*, a recruiting software start-up that uses AI to help companies make bias-free hiring decisions. She previously worked at Google and YouTube, and led Twitter en Español.

KATE CRAWFORD AND MEREDITH WHITTAKER co-founded the AI Now Institute at New York University, a leader in tech ethics and algorithmic justice research run by a team of mostly women. Among her achievements, Whittaker was an organizer of the 2018 Google Walk-outs, in which a large group of staff staged a strike to demand five specific policies to support company diversity.

CLARE GARVIE, who testified alongside Joy Buolamwini to Congress in 2018, is the lead author of the *Perpetual Line-Up* and other ground-breaking facial recognition research from the Center for Privacy & Technology at Georgetown Law.

RUHA BENJAMIN is a sociologist and professor at Princeton University. She founded the *Ida B. Wells Just Data Lab* and authored the book *Abolitionist Tools for the New Jim Code*.

LATANYA ARVETTE SWEENEY is a Professor of the Practice of Government and Technology at Harvard and the Director of the Data Privacy Lab in the Institute of Quantitative Social Science.

SASHA COSTANZA-CHOCK is an Associate Professor of Civic Media at MIT, author of *Design Justice: Community-Led Practices to Build the Worlds We Need*, and member of the *Algorithmic Justice League*.

COMPUTER SCIENTIST RACHEL THOMAS founded the Center for Applied Data Ethics at the University of San Francisco.

FOUNDER MAYA WILEY AND CO-DIRECTOR GRETA BYRUM are leading the Digital Equity Laboratory at The New School.

KIMBERLY SCOTT, a STEM education specialist, and Jessica Solyom, a specialist in Indigenous education, lead the Center for Gender Equity in Science and Technology at Arizona State University.

REDIET ABEBE is a computer scientist and co-founder of Black in AI. She was the first female computer scientist admitted into the Harvard Society of Fellows.

YESHIMABEIT MILNER is co-founder and executive director of Data for Black Lives, which uses data for social change, and worked at the racial justice organization Color of Change.

ADJI BOUSSO DIENG became the first Black woman faculty in Princeton's School of Engineering and the first Black faculty in Princeton Computer Science in 2020.

09

DISCUSSING THE FILM

■ FRAMING THE CONVERSATION

The film *Coded Bias* covers a range of topics about AI, surveillance, and data rights that affect every American. However, women and people of color tend to disproportionately bear the harms of racist and sexist technology. Your events are an opportunity to amplify the voices of women and people of color who have largely been excluded from the tech industry. For event hosts planning screenings of the film, strive to invite a majority of women of color speakers for your post-screening panel discussions.

■ DISCUSSION QUESTIONS

The following discussion questions are written with event hosts and viewers in mind. Event hosts can use these conversation prompts to facilitate post-screening discussions online. Viewers can also use these to generate dialogue with others who have seen the film. Join the conversation online at [#CodedBiasPBS](https://twitter.com/CodedBiasPBS).

1. *Coded Bias* interviews a dynamic group of scholars and advocates—mostly women of color—on the subject of artificial intelligence. What information or interviews stood out to you while watching the film? Why do you think they resonated?
2. What are some popular culture depictions of artificial intelligence you have seen in film or television? How do you think popular culture has influenced American perceptions of AI?
3. Have you ever talked about algorithms with friends, family, or co-workers? How would you describe an algorithm to someone who is unfamiliar with the technology?
4. What examples of AI did you hear discussed in the film? Have you ever encountered an algorithm described in *Coded Bias*? If so, which one?
5. How do algorithms influence what news we see online or the perspectives we see on social media? How does AI shape the way we all think?
6. Early AI developers measured the intelligence of the technology by its ability to play games, such as chess. Why might this definition of intelligence be limiting? What other forms of intelligence are important measures for technology?
7. Joy Buolamwini's research challenged the idea that technology is a neutral decision maker and immune to human bias. What is bias? How did Buolamwini's work help to expose AI bias?

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- 8.** What civil rights are at stake when it comes to automated decision making? What protections do we need to safeguard as AI develops in the future?
- 9.** Who is harmed by AI bias? How does power factor into who is harmed and who benefits from AI products?
- 10.** Have you ever had the experience of being surveilled? If so, how did it make you feel?
- 11.** Amy Webb in the film says: “I would prefer to see our Western democratic ideals baked into our AI systems of the future.” What ideals or values, if any, would you like to see incorporated into AI development?
- 12.** Do you think police or immigration enforcers should be allowed to search databases that store your driver’s license photo or passport photo? Why or why not?
- 13.** Joy Buolamwini says in the film “Because of the power of these tools, left unregulated there’s really no kind of recourse if they’re abused. We need laws.” Do you agree that AI should be regulated? Why or why not?
- 14.** Joy Buolamwini describes Amazon’s response to her research on bias in its products as “a continuation of the experiences I’ve had as a woman of color in tech. Expect to be discredited. Expect your research to be dismissed.” Is this an experience you can relate to in your work? Why or why not?
- 15.** Studies found racial bias in algorithms used in the courts for sentencing and in hospitals to recommend health care—even though the AI did not factor in race data. How does this happen? What is causing biased results?
- 16.** How is AI being used during the COVID-19 pandemic? What human rights concerns related to pandemic data and surveillance should health officials be considering?
- 17.** During the COVID-19 pandemic, big tech industries have seen record profits while many American workers have suffered from the economic slow down. What role, if any, do you think they should play in the economic recovery from the pandemic?
- 18.** How is the tech industry doing when it comes to promoting inclusion in the workforce? What more needs to be done to ensure that everyone has a fair opportunity to work in tech?
- 19.** What effect do you think a more inclusive workforce would have on the tech industry? Do you think tech products would be less biased? Why or why not?
- 20.** What promising practices have you seen in teaching tech ethics and/or increasing student inclusion in computer science programs?
- 21.** What is your vision for AI development in the future? How would you like to see the technology evolve?

POTENTIAL PARTNERS

For event organizers hosting Indie Lens Pop-Up screenings, the potential partners below can help connect you to subject matter experts to discuss the film with your audience.

Civil rights and civil liberties groups.

For example, the ACLU has a widespread effort to increase community oversight of surveillance technology and policing. Groups participating in the Black Lives Matter and immigrant rights movement may also be working on issues of surveillance and systemic racism against Black and immigrant communities.

Join the Algorithmic Justice League:

<https://www.ajl.org/>

See if there is an ACLU affiliate near you:

<https://www.aclu.org/about/affiliates>.

Find a Black Lives Matter chapter near you:

<https://blacklivesmatter.com/chapters/>

Find a chapter of Black Youth Project 100:

<https://www.byp100.org/chapters>

Connect with Data for Black Lives:

<https://d4bl.org/about.html>

Professional tech groups can speak to their experiences in the industry and efforts to support tech talent who identify as women, Black, or Latinx.

Contact the Black in AI group to find talent near you:

<https://blackinai.github.io>

Connect to members in the Latinx in AI group:

<https://lxai.app/public-directory>

Women in Machine Learning directors and post directly to the group's mailing list (find a link at the bottom of the page):

<https://wimlworkshop.org/senior-advisory-council/>

See the map from Anita Borg communities:

<https://community.anitab.org/groups/>

Search the directory for Women Tech Founders:

https://womentechfounders.com/directory/?wpbdp_view=search

See if there is a local meeting of the Tech Workers Coalition:

<https://techworkerscoalition.org>

STEM students and tech ethics educators from local clubs or higher education institutions.

They could share their experiences in the field as part of panel discussion or potentially lead audience members in a short educational activity.

See if there is a Girls Who Code location near you:

<https://girlswhocode.com/locations>

See if there is a Google Tech Exchange program near you:

<https://www.blog.google/outreach-initiatives/diversity/tech-exchange-brings-black-and-latinx-students-google/>

Browse the winners from the Responsible Computer Science Challenge hosted by the Mozilla Foundation:

<https://foundation.mozilla.org/en/initiatives/responsible-cs/winners/>

Review this database of tech ethics courses to see if there is one nearby:

<https://link.medium.com/3iTniC91T7>

Local elected leaders, such as city council members or school board members, who make decisions about the use of surveillance technology. Reach out to local elected officials to see what work they have done to address concerns about government use of surveillance technology. You could also consider framing the event as a public listening session or town hall to discuss surveillance issues relevant to your community.

See this map from Fight for the Future for an overview of facial recognition technology:

<https://www.banfacialrecognition.com/map/>

See where surveillance technology is being used in the map on Electronic Frontier Foundation's Atlas of Surveillance:

<https://atlasofsurveillance.org>

ENGAGEMENT ACTIVITY IDEAS

There are other ways to engage with the film beyond a discussion. These activities invite people to get involved with the issues in creative ways.

Incorporate spoken word poetry and other forms of art into your event. You could invite spoken word poets, visual artists, or other artists to share artistic work related to technology. Reach out to your local youth art programs and high school writing classes to offer the opportunity for a poet to write and record a spoken word piece on video to play after your screening of the film. For inspiration, see Buolamwini's spoken word video "AI, Ain't I A Woman?" <https://youtu.be/QxuyfWoVV98>. Or the Algorithmic Justice League's "Voicing Erasure" piece. <https://www.ajl.org/voicing-erasure> And for more information about spoken word, check out area organizations like the San Francisco-based YouthSpeaks: <https://youthspeaks.org/>.

You can host a Drag VS AI virtual workshop, participants learn about the basic workings of facial recognition technologies. Then, with the assistance of drag performers, you'll learn how to use make-up, accessories, and other props to drag the machines and confront the 'Coded Gaze' – the algorithms that claim to read our age, gender, mood, and identity. Once you've assembled your look, you'll have a chance to do your thing on the runway! Finally, you'll learn about how to move from individual acts of resistance to shared oversight of facial recognition technologies and AI systems <https://www.ajl.org/drag-vs-ai>

You can organize a hackathon, where coders, mathematicians, and data scientists come together to develop tech solutions that address problems identified by the community. For example, you could ask participants to analyze crime data from your local police department to identify patterns of bias in local policing. These events can be done in-person or virtually with livestream video. It may be helpful to partner with a local organization or degree program that has experience hosting hackathon type events. For more inspiration, see how Black Girls Code hosts a hackathon: <https://www.blackgirlscode.com/bgchackathons.html>

Host an innovator fair and ask local designers, inventors, and start-ups to share work that contributes to the social good. For example, a student science group could present a prototype for an application of AI designed to serve the community members in need. This activity can be adapted for virtual events by recording short video interviews with local innovators. Reach out to your local universities to see if they honor any award winners. For more inspiration, check out the Anita Borg Abie award winners: <https://anitab.org/awards-grants/abie-awards/>

Invite your audience members to try an accuracy test of facial recognition technology. For those that would like to participate, they can submit their photo in advance and you could reveal the results at your event. If you are doing the activity on behalf of an organization, it is a good idea to check with your legal team to create a permission form for participants explaining exactly how their data will be used as part of the activity. Alternatively, you could perform a test on a group of local elected officials, whose images are publicly available on the Internet. To learn more about how to run an accuracy test, see this guide from the ACLU: <https://www.aclu.org/blog/privacy-technology/surveillance-technologies/amazons-face-recognition-falsely-matched-28>

You can ask your audience to help create a community-generated map identifying where surveillance cameras exist in your community. Ask audience members to submit locations of where they see security cameras in your community. Consider doing this before a screening of Coded Bias so you can reveal results to your viewers at the event. You can create a digital map using a free tool such as Google Maps: <https://www.google.com/maps/about/mymaps/>. For an example, see the map of Project Green Light cameras: <https://www.freep.com/story/news/local/michigan/detroit/2019/06/27/detroit-project-green-light-cameras/1561014001/>

Submit a Freedom of Information Act (FOIA) request to your local government regarding the use of surveillance. Anyone has the right to make a FOIA request to a government entity as a way to ensure transparency. For example, Mijente offers some suggestions about how to file an FOIA request: https://mijente.net/wp-content/uploads/2019/07/Tech-Policy-Report_v4LNX.pdf. The government entity should reply within about a two-week time period. The results of the FOIA could be revealed at an event or you could create content regarding your findings as promotion for your event.

Host a book club reading of one of the authors featured in the film. You could also ask your library to create a display featuring women in tech authors. Book club events can also be hosted virtually using video conferencing. Books relevant to the film include:

The Big Nine: How The Tech Titans and Their Thinking Machines Could Warp Humanity by Amy Webb. *Public Affairs Books, 2019.*

Algorithms of Oppression: How Search Engines Reinforce Racism by Safiya Umoja Noble. *NYU Press, 2018.*

Artificial Unintelligence: How Computers Misunderstand the World by Meredith Broussard. *MIT Press, 2018.*

Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor by Virginia Eubanks. *St. Martin's Press, 2018.*

Twitter and Teargas: The Power and Fragility of Networked Protest by Zeynep Tufekci. *Yale University Press, 2017.*

Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy by Cathy O'Neil. *Crown Books, 2016.*

1984 by George Orwell. *Secker & Warburg, 1949.*

Start a STEM club for youth underrepresented in the field to provide more opportunities to explore computer science. You can reach out to schools, libraries, and youth centers to see if something already exists in your area. If not, partner with community groups to recruit girls of all backgrounds to join. You can also consider raising money for scholarship so youth from all income backgrounds can participate. See how to start a Girls Who Code club: <https://girlswhocode.com/get-involved/start-a-club>

ADDITIONAL RESOURCES

<http://pbs.org/codedbias> - the web page for the Independent Lens broadcast premiere of Coded Bias on PBS.

<https://www.codedbias.com/> - the website for Coded Bias created by filmmaker Shalini Kantayya.

<https://www.ajl.org> - Algorithmic Justice League (AJL) founded by Buolamwini combines art and research to illuminate the social implications of AI.

<https://www.aclu.org/issues/privacy-technology> - American Civil Liberties Union (ACLU) works on the issue of privacy and technology to ensure that civil liberties are enhanced rather than compromised by technological innovation.

<https://ainowinstitute.org> - AI Now Institute at New York University is a research center dedicated to understanding the social implications of AI.

<https://www.fightforthefuture.org> - Fight for the Future is a group of artists, activists, engineers, and technologists advocating for the use of technology as a liberating force.

<https://bigbrotherwatch.org.uk> - Big Brother Watch UK is an independent civil liberties group fighting to reclaim privacy and defend freedoms during a time of technological change.

<http://colorofchange.org> - Color of Change is an online racial justice organization that helps people respond effectively to injustice in the world, including hate speech online.

<http://d4bl.org> - Data for Black Lives is a movement of activists and mathematicians using data science to create change in the lives of Black people.

<https://datasociety.net> - Data & Society is a nonprofit research group that looks at the impact of AI and automation on labor, health, and online disinformation.

<https://www.eff.org/pages/face-recognition> - the Electronic Frontier Foundation (EFF) is a nonprofit organization defending civil liberties in the digital world.

<https://mijente.net> - Mijente is a Latinx and Chicax fighting for racial, economic, gender, and climate justice—and against high-tech immigration enforcement.

<https://www.technologyreview.com/podcast/in-machines-we-trust/> - MIT's In Machines We Trust podcast covers everything automation.

EDUCATIONAL
DISCUSSION GUIDE

C O D E D B I A S