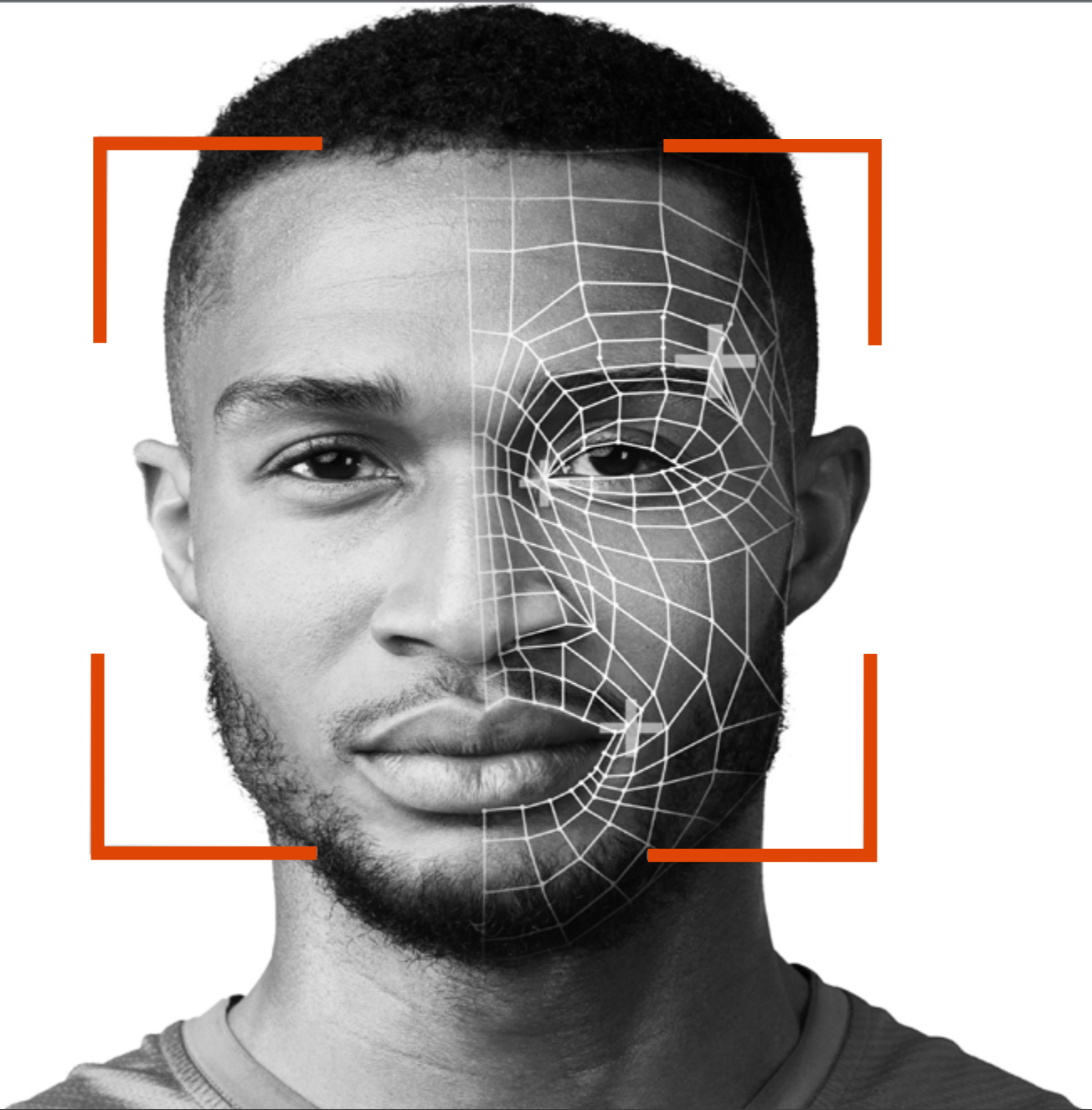


THE FUTURE OF FACIAL RECOGNITION AND ITS IMPACT ON MINORITIES:

What Policy Makers and Stakeholders Should Consider



A Financial Services Innovation Coalition (FSIC)
Technology Inclusion Initiative Essay

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FOREWORD

By Dr. Neil Sahota United Nations Artificial Intelligence Advisor

In 1994, Bally's launched the use of facial recognition in Las Vegas casinos. While humans could use cameras to track a person through the facility, the advent of facial recognition technology [allowed computers](#) to track hundreds of people simultaneously, in real time. What started as a solution to combat cheating and fraud evolved into a marketing tool as the casinos soon learned customers' preferences in games and drinks. Fast forward to 2007 when Australia launched SmartGate, which works with biometric passports to validate a person through facial recognition and their passport photo. Today, facial recognition technology (FRT) has made a quantum leap forward and no longer requires comparison to a tagged image or a database of passport photos. Now, artificial intelligence (AI) technology can determine who a person is just from an unconnected image, video, or audio file by scouring the internet. Or can it?

In 2015, Google said that its face analysis technology did well in recognizing the gender of white men but not so much women and ethnic minorities. Worse, the technology thought African Americans were "gorillas." Even though these were not intentionally epithets or errors by Google, they raise the question of how could this have happened. That's the challenge we face. In developing these technologies, we need diverse teams to train the AI systems. We could show a million photos of different faces of all types to train an AI system; however, if none of the photos shows a person wearing glasses, then the AI will not realize people can wear glasses. It seems trivial, but think of all the variations we have for facial recognition. *Missing a variation means that we're missing a segment of the population.*

Acknowledgement

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INTRODUCTION

With so many potential benefits, why is there so much opposition to artificial intelligence and facial recognition technology?

Artificial intelligence (AI) and the emerging technology revolution have brought many incredible advances. From natural language processing to facial recognition technology (FRT) to semantic analytics, there are many things to admire and appreciate. Because modern FRT cannot exist without AI, much of the discussion in this area revolves around the accuracy of the AI component.

But, as with all things, there are cautionary issues to be taken into account. One of the most pressing issues is that of racial equity and diversity. Over the last few years, the United States has become ever more aware of its problems with systemic racism and economic disparity. This awareness has spilled over into discussions about the regulations of the technology industry.

Consequently, it is impossible to ignore the move to more reliance on AI, especially as it relates to FRT and its potential for adverse effects on communities of color. It has become so prevalent that even the IRS had offered the option for taxpayers to use facial recognition as an account access security feature. Note: [at one point](#), the IRS required facial recognition security to access accounts. To date, some 70 million Americans have signed up for the program.

From financial services to health care, technological advances have not benefited all people equally and, in many cases, have been used to the detriment of minority communities.

Definition and How Facial Recognition Works

First, some basic definitions:

1. AI applies algorithms to vast amounts of data to accelerate information processing and decision making.
2. AI-based facial recognition technology is software that can quickly search large databases of

faces and compare them to a face or faces that have been detected in a photo or video.

A widely accepted definition of facial recognition as introduced to the U.S. Congress:

FACIAL RECOGNITION TECHNOLOGY: The term “facial recognition technology” means the automated or semiautomated process that assists in identifying or verifying an individual based on the characteristics of an individual’s face.

It must be noted that people often conflate “facial recognition technology” with other types of software. For instance, the National Human Genome Research Institute uses “face analysis technology” to detect a rare genetic disease. This application would not be considered FRT because no identification component is used during the facial analysis process. There are other examples, but the above definition will be applied for this publication.

Technology Can Be a Two-Edged Sword

As history has demonstrated, technology can be a two-edged sword for minorities, and this is especially true when it comes to FRT. For example:

1. As the accuracy of FRT systems continues to improve, the potential for errors in high-risk uses to affect disadvantaged communities must be reduced.
2. The lack of workforce diversity and inclusivity has resulted in many advances in technology being used to harm or disadvantage minorities, especially Black Americans. There are multiple layers of racial equity dilemmas regarding technology, but two of the areas that need the most significant overhaul include:
 - The general workplace inclusion
 - The fair use of the technology in the field

The use of facial recognition technology is growing exponentially, and it has provided many benefits. But unless technology industry leaders and stakeholders find a way to eliminate bias and increase diversity at all levels, the benefits of facial recognition will be stifled and calls to ban the technology will continue.

BENEFITS OF FACIAL RECOGNITION

The facial recognition market is substantial, estimated to be \$5.01 billion in 2021, and [researchers expect](#) it to grow to \$12.67 billion by 2028. It is used in many ways, such as allowing you to:

- Go through security at the airport
- Unlock your phone
- Purchase products at stores

Facial recognition has many benefits, especially regarding security and law enforcement. These benefits are crucial for Black, Hispanic and indigenous communities where the number of missing children and unsolved murders is tragically high. The uses of FRT in many cases and the resulting benefits are lawful, ethical and nondiscriminatory, such as:

- Detecting identity fraud
- Preventing potential terrorist attacks
- Helping find and rescue human sex trafficking victims

Law enforcement agencies use the technology to uncover criminals or find missing children or seniors. In New York, police apprehended an accused rapist using facial recognition technology within 24 hours of an incident where he threatened a woman with rape at

knifepoint. Additionally, proper use of the technology can reduce the interpersonal interaction of minorities with police and law enforcement, reducing the chances for adverse consequences.

Airports are increasingly adding facial recognition technology to security checkpoints; the U.S. Department of Homeland Security [predicts](#) that 97% of travelers will use FRT to authenticate their travel documents by 2023. Also, in cities with soaring crime rates, business owners have [installed facial recognition systems](#) to alert staff when individuals known to be involved in organized retail crime enter their places of business.

And further, there are many real-world examples of how it has been beneficial:

- Taylor Swift, the entertainer, used the technology to [identify her stalkers](#) as they came through the gate at her Rose Bowl concert in May 2018
- New York City Police used FRT to [identify a potential terrorist suspect](#) who left a pair of rice cookers in a subway station
- A nonprofit group used FRT to [help rescue](#) 15,000 children and identify 17,000 sex traffickers



THE DANGER OF INACCURACIES AND HUMAN ERROR

One of the most significant public concerns about facial recognition is the possibility of a false positive. A false positive is when the software incorrectly identifies an individual as someone else. In applications where law enforcement is leveraging this technology to create a list of possible matches to a suspect, a false positive means that someone could be wrongly identified, leading to a wrongful arrest. When you factor in that arrests do show up in some background checks, even though they are mistakes, they could still lead to future job loss and economic opportunities. Beyond that and any immediate loss of income from being unable to work when they are held in jail, there is the expense of bail they may be unable to pay.

While accuracy for these models has improved significantly enough to lower the error rate to 0.03%, this is possible when using highly accurate models under very good conditions. However, the 0.03% error rate only occurs with higher-quality images. With lower-quality images, the error rate can increase, [for example](#), to 9.3% for one algorithm tested in 2020.

There is a definite need for robust training because of the bias of individuals using FRT and the impact of their errors. [According to Neurosciencenews.com](#), “even experienced face identification staff can get as many as one in two wrong when it comes to comparing photos with unfamiliar faces.” At the same time, National Institute of Standards and Technology (NIST) research [has shown](#) that the combination of FRT and trained personnel result in the most accurate identification processes, compared to either component alone. Training should be comprehensive for users, especially law enforcement, but certainly for all people who use FRT for high-risk uses. Training requirements should assess:

- The capabilities and limitations of such technology when deployed under high-risk use cases
- Procedures for interpreting and acting on match results
- Human review requirements

Usage of Facial Recognition Technology and Other Advanced Technologies From the U.S. Perspective and Its Implication for Minorities

Within the U.S., some federal, state and local law enforcement agencies employ FRT. [As of 2021](#), at least 42 federal agencies leveraged facial recognition for law enforcement. Some are [concerned](#) that the lack of inclusion, diversity and equity within the U.S. organizations creating advanced technology tools combined with a history of racism and bias in some law enforcement agencies might further automate the disparities in the U.S. justice system.

Consequently, diversity and inclusion will be hard to achieve without improvements in this space; therefore, caution as to which companies and products are used is paramount.

Authors Cathy O’Neil and Virginia Eubanks discuss in their books on [big data](#) and [automating inequality](#), respectively, how, as a society, we are increasingly automating decision making using machines. The danger of doing this is that humans could be too trusting of technology performance and, as a consequence, stop questioning the AI-driven decisions. There are often no proper systems in place to question the algorithm, have a decision reviewed with transparency and serve justice to those who were harmed.

One of the most famous examples is the [COMPAS recidivism algorithm](#), which unfairly predicted that Black defendants were more likely to recommit crimes than white defendants. ProPublica found that the algorithm was twice as likely to falsely classify a Black defendant as a high risk for violent recidivism than a white defendant. This algorithm has kept multiple people in prison longer than necessary, which often has a [disproportionate impact](#) on individuals, families and communities that are Black and of color. In addition, with the increase in law enforcement use of advanced technologies, bias towards viewing minorities as criminals could lead to increased police violence in communities of color.

THE DANGER OF INACCURACIES AND HUMAN ERROR

Example of an Error and Its Consequences

There are three U.S. examples where it is alleged that the use of FRT by law enforcement led to a mistaken arrest.

The most well-known is that of Roger Williams. Mr. Williams was misidentified and wrongly arrested by the Detroit Police Department following an investigation where facial recognition was used. It was [later confirmed](#) that human error was the cause of Williams' misidentification and wrongful arrest. We could cite the Robert Williams case as an example of transparent discussion about 1) The use of FRT in a law enforcement investigation and 2) Opportunities for contestation and redress within the broader process that led to an erroneous arrest.

This ties back into the theories of O'Neil and Eubanks that human beings can become too trusting of AI decision making.

The Williams case can help demystify FRT's (limited) role in criminal investigations and can illustrate that, most often, the FRT itself is not the primary factor in making an arrest decision. For instance, it could be pointed out that the investigating agency did not use the FRT or additional investigative procedures according to protocol. In a *60 Minutes* segment, the police chief said that the erroneous arrest resulted from "sloppy" police work. Also, it could be stated that other criminal defendants should be similarly entitled to receive information about the use of FRT in the process leading to their arrest and should have similar opportunities for redress.

As is true with most instruments, the problem usually rests not with the device but with those who wield it. It is clear that technology must be fielded in a way that addresses concerns that the criminal justice system and law enforcement personnel, prosecutors and judges have shown a willingness to abuse authority and unfairly overpolice communities of color.



EFFORTS TO BAN FRT

Reported errors and their fallout have fueled efforts to ban FRT

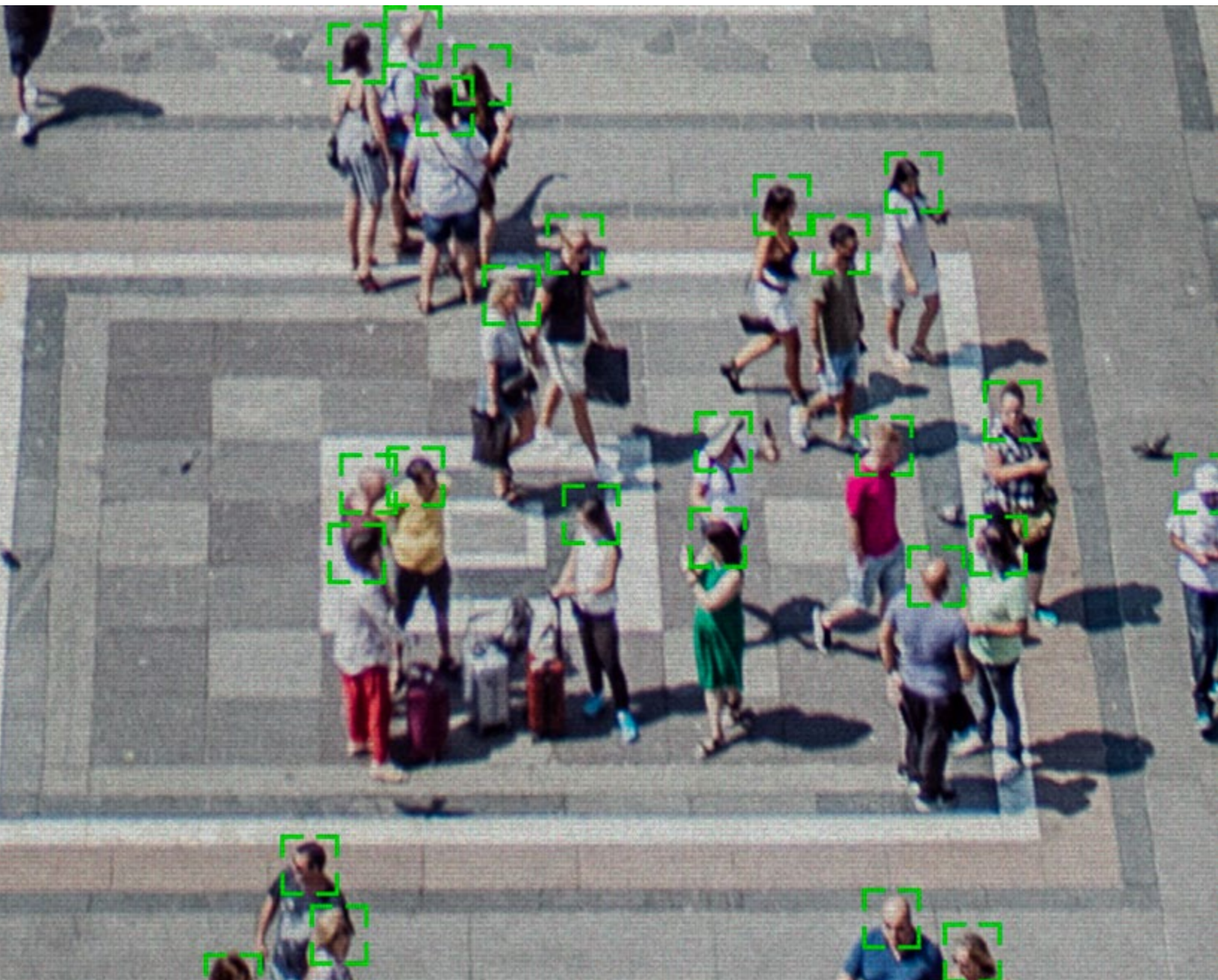
Organizations from *Amnesty International* to *Data 4 for Black Lives* have all called for outright bans on facial recognition and other biometric technology used in policing and law enforcement. While some of the concern is around reported bias in the technology's accuracy globally, there is also concern that removing the bias from the software doesn't remove the bias from those using the software.

In some parts of the world, these technologies help enable governments and organizations to violate

human rights and civil liberties. For this reason, they are asking for international organizations as well as governments to create enforceable policies for these technologies that:

1. Strictly regulate them
2. Create more transparency
3. Ensure the use of this technology is ethical
4. Compensate those who have been harmed

Without these policy improvements and a better understanding of how FRT should be applied, more organizations and municipalities will likely support efforts to ban it.



NEED FOR INCLUSION IN THE TECH WORKPLACE

Diversity can nurture understanding, better inclusion and less bias

Lack of Diversity Can Lead to Biased Technology

It is well established that the use of FRT and AI is considerable and growing by the day, and as a result, sensitivity to racial disparities must be high. Many experts believe this sensitivity begins in the tech workplace. Data has shown time and again that the tech industry is predominantly led and managed by Caucasian men. Though the numbers of white women are paltry in comparison, with 14% at the professional level, 18% at the manager level and 15% at the executive level, their numbers far outpace those of Hispanic and Black women, who are below 2% in all three categories.

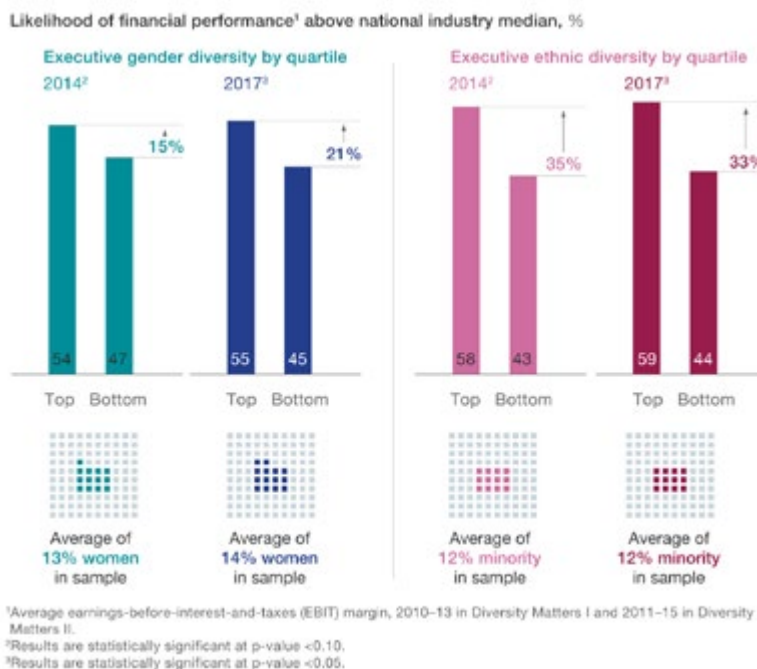
Some have expressed concern that this lack of diversity can result in AI with built-in bias, and that bias can result in errors that harm underserved individuals. This issue is of high interest to civil rights advocates. To quote the American Civil Liberties Union (ACLU), "One false match can lead to a wrongful arrest, a lengthy detention and even deadly police violence."

According to Dr. Neil Sahota, the AI advisor to the United Nations, "There is a necessity for diverse teams to bring different perspectives and thought to AI systems, especially those we are entrusting to make decisions involving human lives."

Diverse Leadership Teams Can Be More Innovative and Profitable

It is well documented that companies are more profitable when diversity is present in the workplace. According to a report from McKinsey & Company, "Gender and ethnic diversity are clearly correlated with profitability, but women and minorities remain under-represented." Another research report from McKinsey affirms the connection between company financial performance and diversity. Their original research, over time, showed an increase in the likelihood of outperformance from a gender and ethnic diverse executive team versus a homogenous group. Consider this exhibit:

This graph shows how having a diverse executive team has become more valuable over time.



McKinsey&Company

NEED FOR INCLUSION IN THE TECH WORKPLACE

Diverse Teams Create More Accountable and Responsive Products

According to studies by Harvard University, diverse teams, including leadership teams, can develop products that take into account their customer's changing needs. The study reported on 366 public companies. Those companies in the top quartile for diversity in management were 35% more likely to have financial returns above their industry mean.

Why the technology industry hasn't taken advantage of the value in diversity is a subject for another time; however, please see the picture below, which shows the members of the [Forbes Technology Council](#). While

these council members are trying to instruct others in the industry on building a "truly diverse and inclusive team," there is a noticeable lack of racial diversity on the council itself.

This example is not perfect but represents how the technology industry is handling the thorny issue of diversity and why it still falls short of being genuinely diverse after years of discussions. This council of influential decision makers probably considers itself diverse because half the members are women. *Most, if not all, minorities would not consider this group very diverse.* The council members are considered "experts," but their credentials seem to identify them as experts in the tech field, not experts of diversity, equity and inclusion policy or diverse team building.



SOLUTIONS TO AMELIORATE HIGH-RISK USES, INCREASE BENEFITS THROUGH DIVERSITY AND PREVENT MISUSE

While the misuse of facial recognition must be avoided, minorities cannot and should not be denied the benefits of technology because of biased technology and users

Policy Considerations

The Importance of Public Policy Debates

As a society, it is essential to debate the use of all technology in policing or public safety. FRT is a tool. Cities, states and the federal government should establish minimum standards for the performance of FRT and training for using the technology. One such standard is that FRT providers must submit their technology to NIST for performance and accuracy (including demographics) testing. If technology providers do not submit to these tests, public officials should think seriously about limiting or preventing the purchase of such untested technologies in policing. Everyone must understand what they are buying: Know your algorithm and its provider!

Private-sector companies developing and selling FRT are increasingly emphasizing the technology's ethical development, sale and use. Many companies now have AI ethics and principles. For example, Paravision will not sell to any country on the U.S. Department of Defense list of Countries of Special Concern. About 40 countries on that list are known for human rights violations. Other companies have adopted similar policies limiting where and to whom the technology can be provided. They would rather pass up the business than sell the tech to a government that may misuse it. For many companies, this also includes AI ethics boards or advisors on their team to help guide and inform decisions around building, selling and deploying such tech. Additionally, the Security Industry Association (SIA), a group of technology providers in the United States, has published a set of [Principles for the Responsible and Effective Use of Facial Recognition Technology](#).

Differentiating Use Cases

As has been stated, there are many uses of facial recognition such as law enforcement, national defense, intelligence, homeland security, border management or passports/visas and many more. In all cases, human oversight must be a significant component to utilize FRT. If a facial recognition system provides a high probability match of a face on a candidate list, that should never be the sole basis for arrest. Police officers must establish probable cause before arrest and use corroborating evidence to support the face match. A face match should be treated as a lead followed by good police work. As of today, FRT match results do not meet the Frye and Daubert standards for sole evidence admissibility in a U.S. court of law. The Virginia General Assembly recently [passed a bill](#), with significant support from members of the Virginia Legislative Black Caucus, that would replace that state's ban on law enforcement use of FRT with a set of rules to ensure these procedures are followed, while authorizing certain use cases and prohibiting others.

Differentiating Between Public Safety Cameras vs. Police Surveillance Cameras

There is or should be a distinct difference between traffic/public safety cameras at intersections or stop lights/signs and public safety security-related surveillance cameras that may or may not contain FRT. The biometrics industry has long persisted that certain U.S. surveillance-based use cases must be regulated. Specifically, state and local law enforcement use of unfettered, non-consent-based facial recognition on security cameras for surveillance purposes on U.S. citizens in the general public square should be strictly regulated or even prohibited or banned.

There are use cases where crimes are committed, and security camera footage contains faces of alleged criminal activity. But in those instances, police should only use that technology for post-event analysis based on probable cause (think Boston Marathon bombers and trying to identify the terrorists from footage). These types of use cases should be debated and delineated in policy debates, not banned outright.

SOLUTIONS TO AMELIORATE HIGH-RISK USES, INCREASE BENEFITS THROUGH DIVERSITY AND PREVENT MISUSE

Require Use of the Best Technology to Get Best Results

NIST List

NIST has specialized expertise in and equipment for measuring biological processes and systems and experience managing the large amounts of data these measurements produce. The U.S. government has charged NIST with reviewing and grading FRT for accuracy and inclusion. FRT vendors submit their technology to NIST to be reviewed and receive an accuracy score; however, there is no requirement that companies submit their technology for review, nor is there a requirement that companies or government agencies use technologies that have been reviewed.

International Considerations and Quality Control

One of the significant issues facing U.S. policymakers is that facial recognition technology is a global product. Many of the largest providers are firms situated outside the United States. These firms are typically Japanese or French. On the whole, many of these companies are heavily engaged at multiple levels with customers and lawmakers.

As a consequence, quality control issues are difficult for policymakers to manage because there are no set criteria for acceptable accuracy.

For this reason, stakeholders must reconcile the need for competitive marketplaces with strong social and governmental policies. When reviewing FRT products for use in the U.S., policymakers must ensure that purchasers use products that perform consistently across race, gender and other demographics.

According to NIST, there are facial recognition products that have significantly eliminated race and gender bias. Shouldn't these products be among those considered best technology? For this to happen, U.S. Congress and policymakers should craft legislation that requires agencies and law enforcement to disclose any use of facial recognition, enumerates accuracy requirements prior to procurement, creates robust training programs

that address bias and guarantees constitutional rights to ensure facial recognition does not inhibit protected speech and due process protections. Further, the industry should implement workforce development programs that engage historically Black colleges and universities, minority serving institutions and Hispanic serving institutions. Finally, there should be better community engagement between law enforcement and community leaders who represent marginalized neighborhoods.

Beyond Hiring – Solutions to Increase Diversity and Equity in the Technology Industry

While hiring more diverse candidates is sometimes seen as a solution to the problem, there are ways in which that strategy can fall short without the right systems and structures in place at an organization, one of the most important being: Do the diverse employees being hired have:

- A safe enough environment to speak candidly about their ideas and concerns?
- A path to grow within the organization in ways that fairly and equitably compensate them and show the organization values their contributions?
- The power and equity within the organization to make decisions, not just express opinions?
- Sponsorship, not just mentorship, within the organization to get into the positions that will allow them to make decisions?

And to support those things, an organization needs to hold decision makers, stakeholders, managers and other leaders accountable for all of the above and responsible for any bias or ethically adverse outcomes that come as a result of what their team builds. The full weight of fairness, diversity, inclusion and equity cannot sit solely on the shoulders of the diverse employees hired into the organization. That in itself cannot be the entire strategy.

Another part of the strategy needs to be around systems. Today, you will rarely walk into a company that doesn't have a plan for building software, but often, tech compa-

SOLUTIONS TO AMELIORATE HIGH-RISK USES, INCREASE BENEFITS THROUGH DIVERSITY AND PREVENT MISUSE

nies don't have a plan for ensuring that software is fair, equitable and as unbiased as possible. In her book *Building for Everyone: Expand Your Market With Design Practices From Google's Product Inclusion Team*, Annie Jean-Baptiste discusses that diverse people need to be represented throughout different teams, including those that are a part of the different parts of the software development life cycle. She also discusses modifying objectives and key results to accommodate product inclusion initiatives and integrating product inclusion at key touchpoints throughout the process from ideation to execution.

Creating Partnerships With Other Stakeholders

Given the logistical obstacles to making tech more inclusive (i.e., training, hiring and promoting diverse

individuals), alternative strategies must be employed to make the technology better and more precise. One strategy is partnerships between tech companies and various community-based grassroots organizations. Companies could create task forces that include individuals not part of their normal ecosystem, from programming to testing.

This is not a novel idea. Pharmaceutical companies also struggle with finding diverse participants in their workforce and their drug testing clinical trials. They are trying to find ways to diversify these ecosystems to meet the demands that health disparities be reduced. This strategy could well bridge the gap between FRT programmers and end users.



CONCLUSION

The use of facial recognition technology is growing exponentially, and it has provided many benefits, but unless technology industry leaders and stakeholders find a way to eliminate bias and increase diversity at all levels, the benefits of facial recognition will be stifled and calls to ban the technology will continue.

FRT is a fast-growing dynamic space with the capacity and potential to keep us safer and make us more produc-

tive than ever before, but this capacity and potential must be governed appropriately to ensure all are benefited equally. Concerns about systemic racism and other issues could impede FRT from living up to its potential. Therefore, policymakers and stakeholders must be vigilant and open to policies that reduce racial disparities in how the technology works and how it is used.



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