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Facing Truths: Facial Recognition Software in Digital Archives

Rebecca Bakker

Kelley Flannery Rowan

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3RD ANNUAL PRRC SYMPOSIUM



Facing Truths: *Facial Recognition Software in Digital Archives*

Rebecca Bakker

Kelley Rowan

Digital Collections Center

Inspiration

Civil War Photo Sleuth
www.civilwarphotosleuth.com

Using technology and community to rediscover lost identities in American Civil War-era photographs

[Sign Up for Free](#)

Recently Added Photos



Unidentified

Added an hour ago
by Henry Pomerantz



Unidentified

Added an hour ago
by Henry Pomerantz



Unidentified

Added 2 hours ago
by Henry Pomerantz



Unidentified

Added 2 hours ago
by Henry Pomerantz



Unidentified

Added 2 hours ago
by Henry Pomerantz

Trying to solve the metadata problem



1004	January 24, 1984 B&W photo Special Viewing Sy Eisenberg
1004	File location: #1004
1004	November 1, 1983 B&W photo Election Night Sy Eisenberg and 18 head shots.
1004	File location: #1004
1004	1980's
1004	Seven photographs B&W of different events and presentations with the commissioners.
1004	File location: #1004

How it Started



Elizabeth Taylor 1



Gloria Estefan 1



Edward James Olmos 1



Don Johnson 1



Princess Caroline 1



Stanley Tucci 1

How it Started



Elizabeth Taylor 1



Gloria Estefan 1



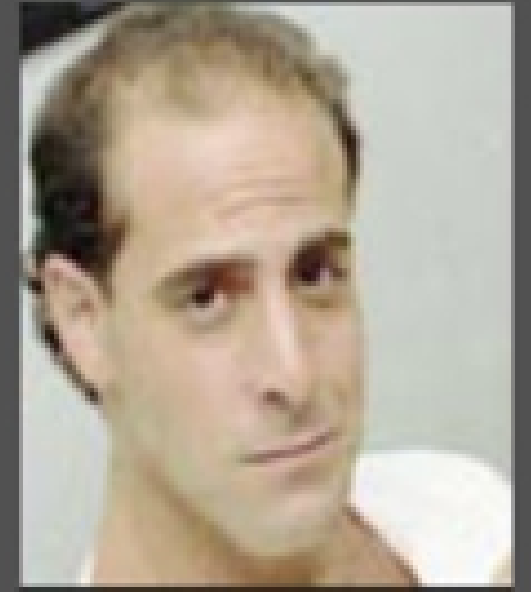
Edward James Olmos 1



Don Johnson 1



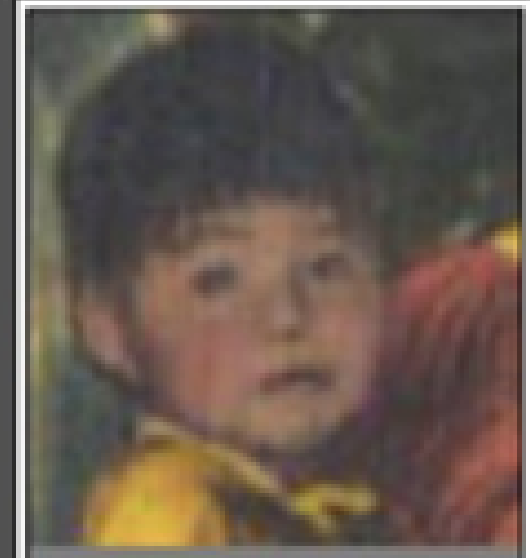
Princess Caroline 1



Stanley Tucci 1



Elizabeth Taylor?



Gloria Estefan?



Edward James Olmos?



Don Johnson?

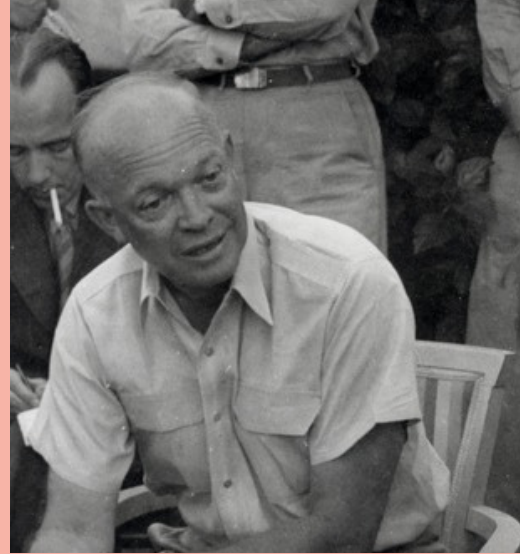


Princess Caroline?

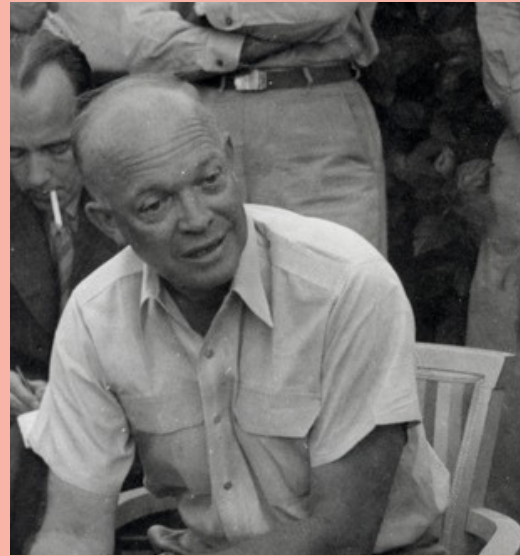


Stanley Tucci?

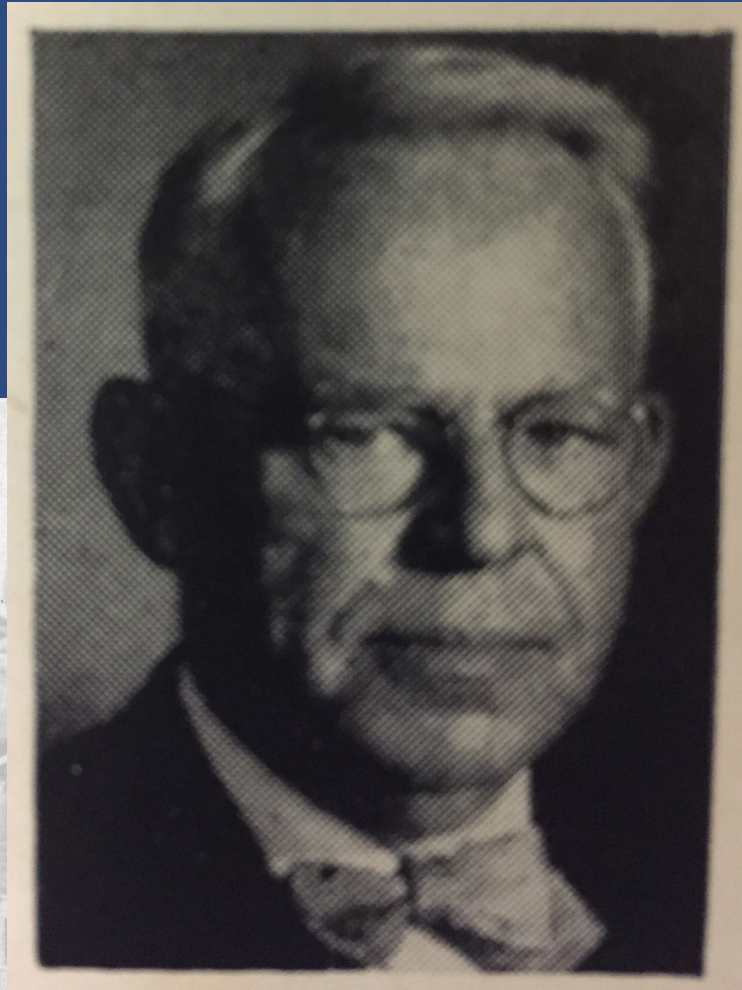
How it Started



How it Started

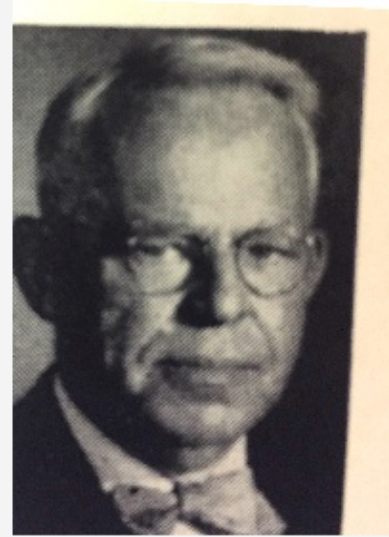


Seeing the Potential

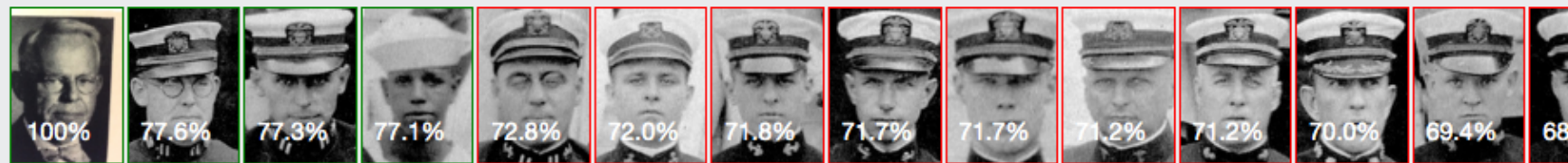


Seeing the Potential

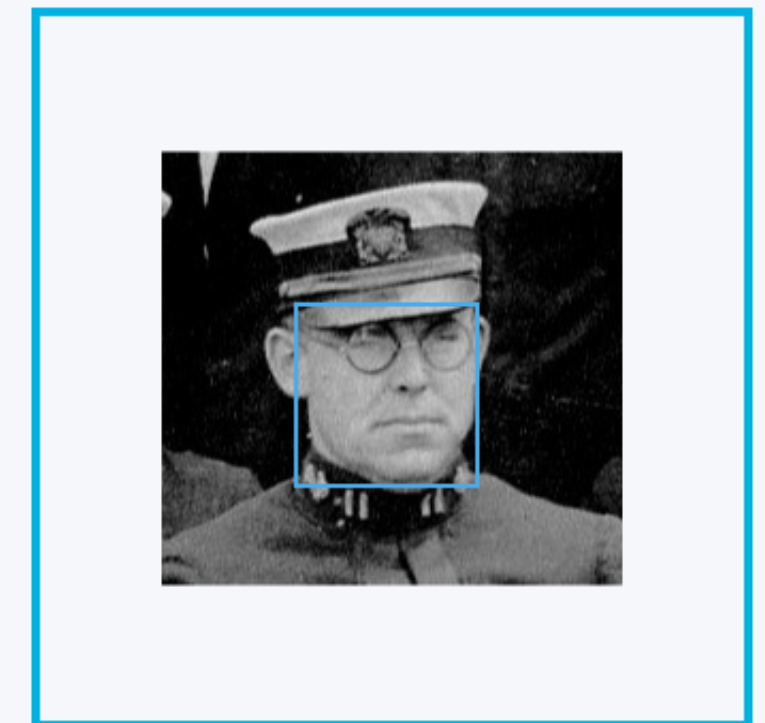
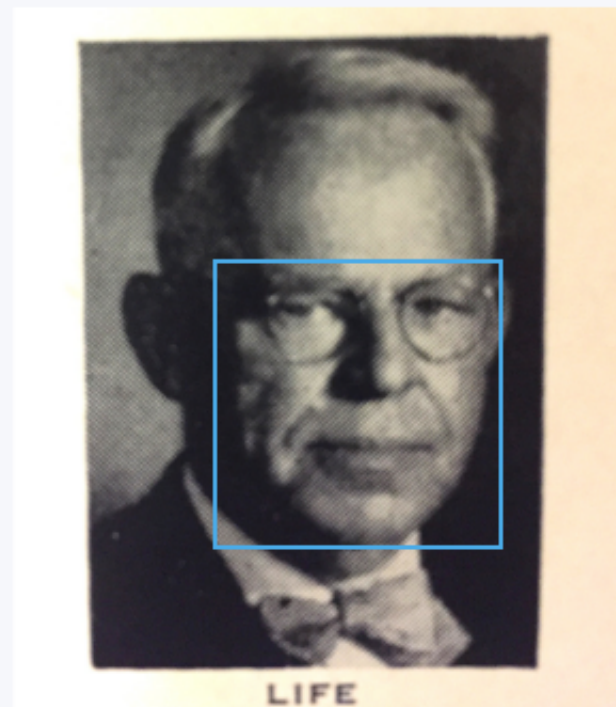
Betaface



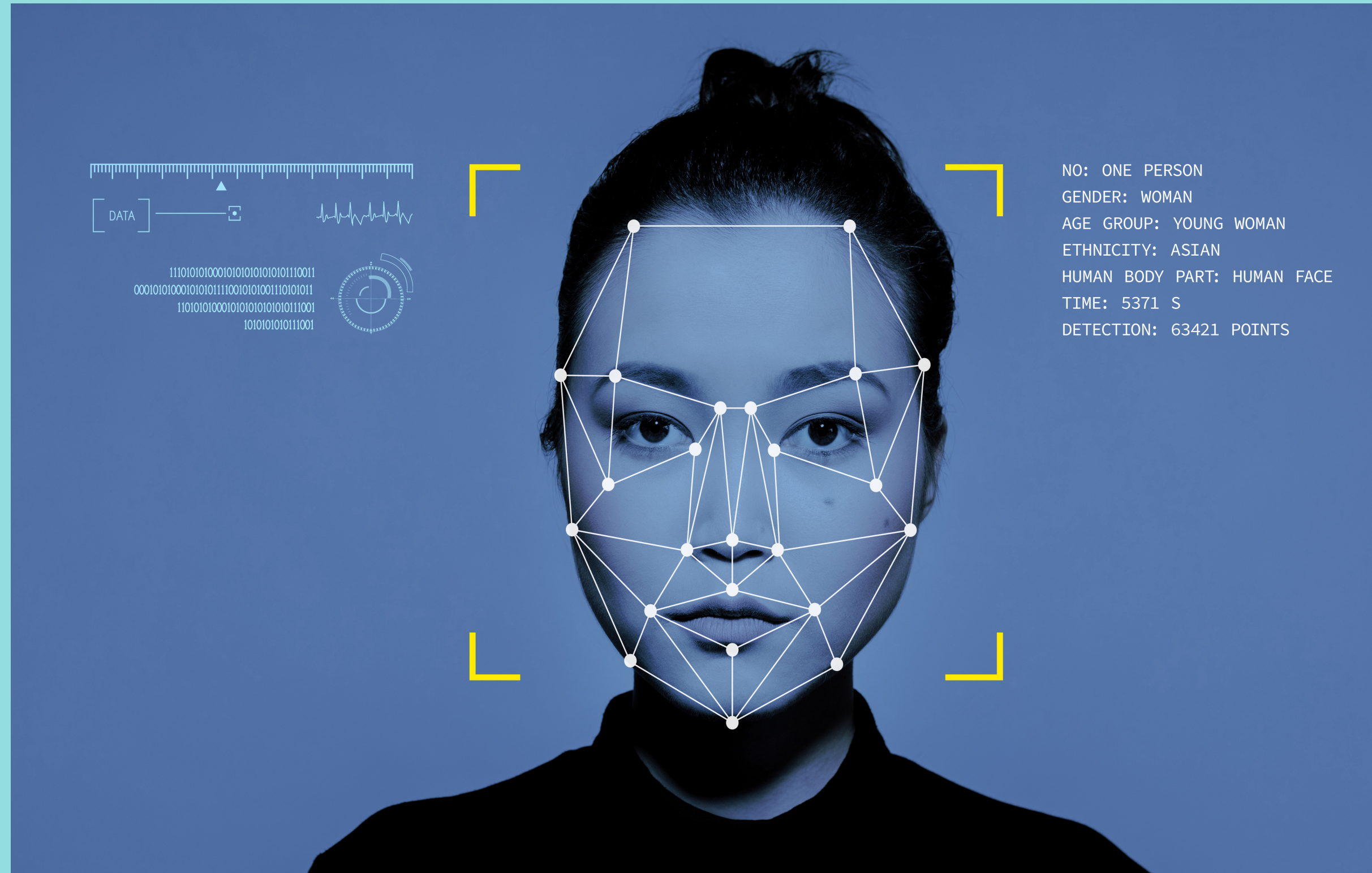
Original Face



Face+



How Facial Recognition Software Works



Challenges of Archived Photographs



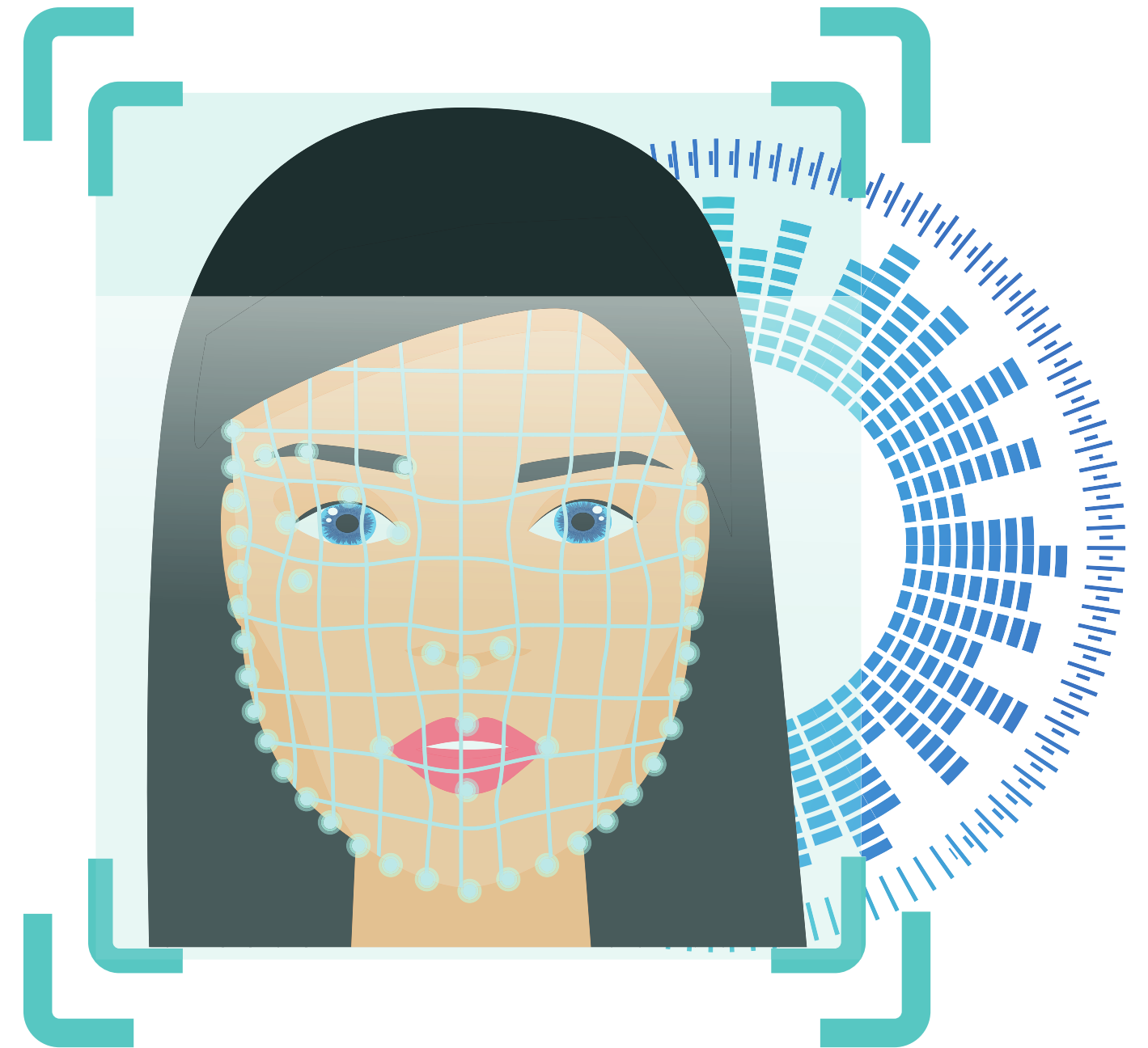
4 Months Baby Row

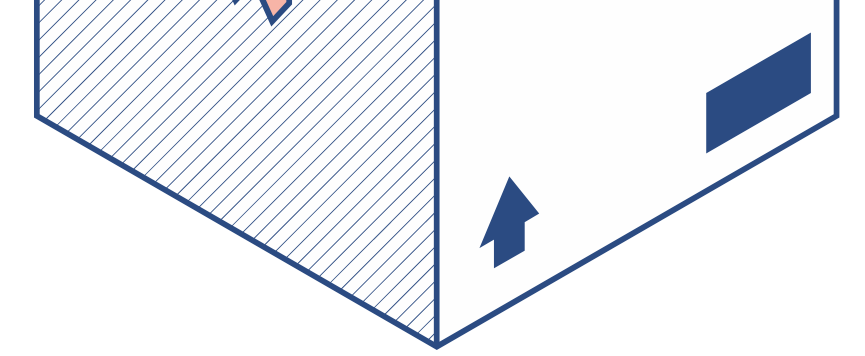
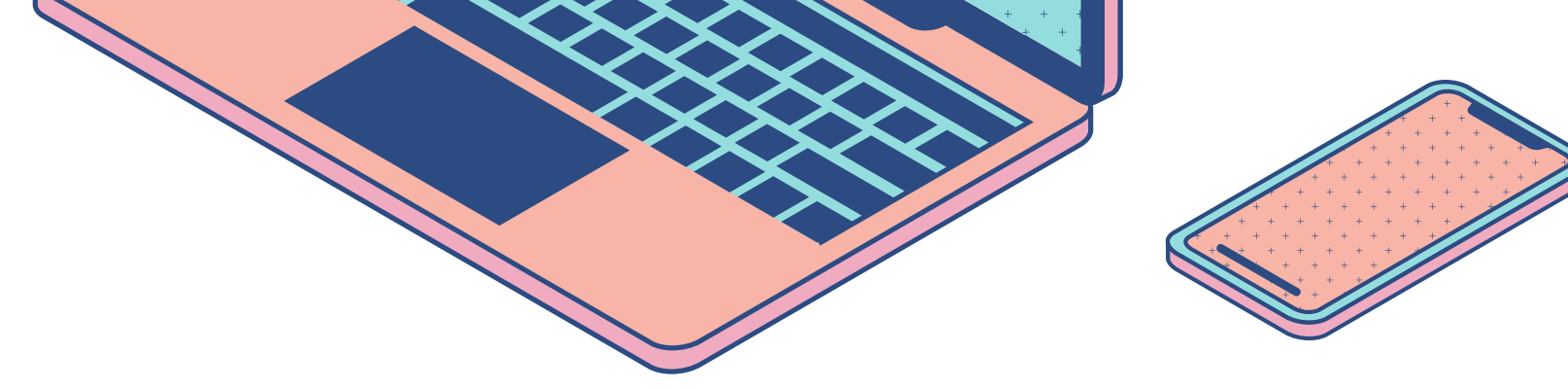
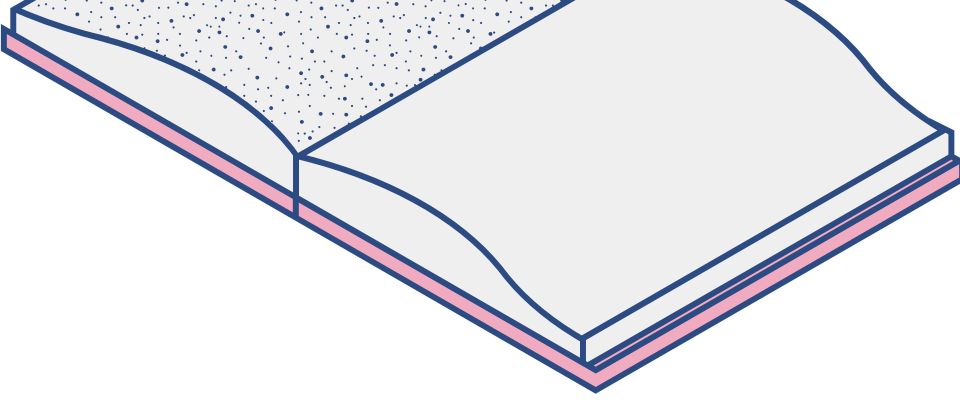


LYRASIS Catalyst Fund

AI for Archives: Using Facial Recognition to Enhance Metadata

Awarded \$25,000 in 2019 to determine the most effective facial recognition applications that could be implemented into digital archive image collections.





Rebecca Bakker



Dr. Liting Hu



Kelley Rowan



Keven Guan

Computer Science Students: Pinchao Liu, Zhongzhou Li & Ruizhe He
Digital Collections Center Student: Christine Monge

Testing Facial Recognition Software



Facial Recognition Software Tested

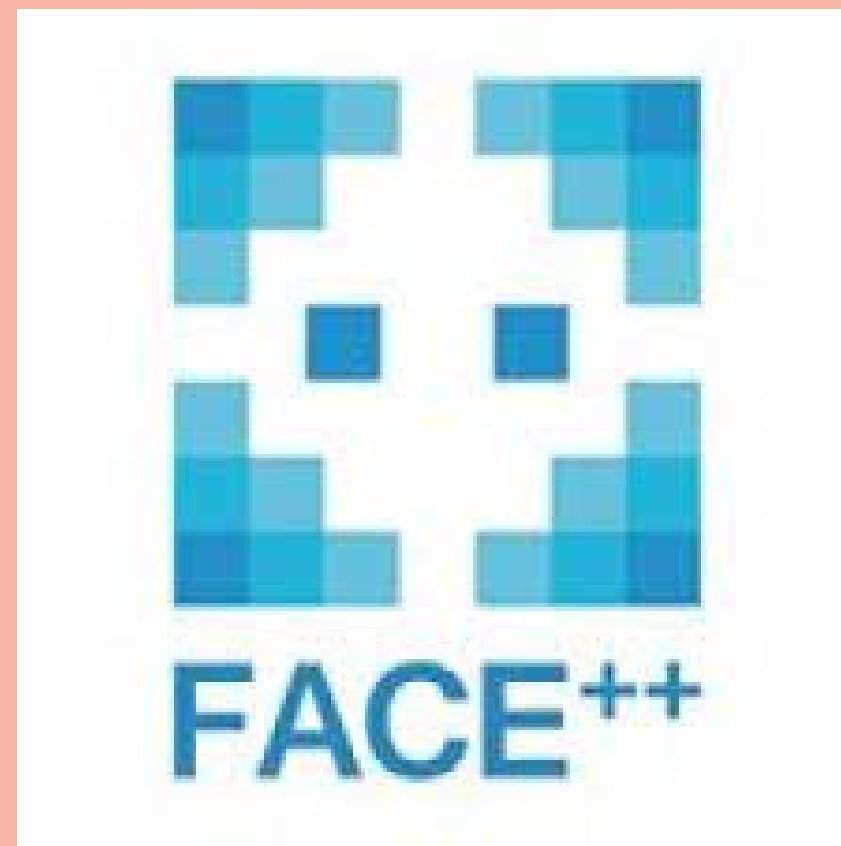
1



2



3

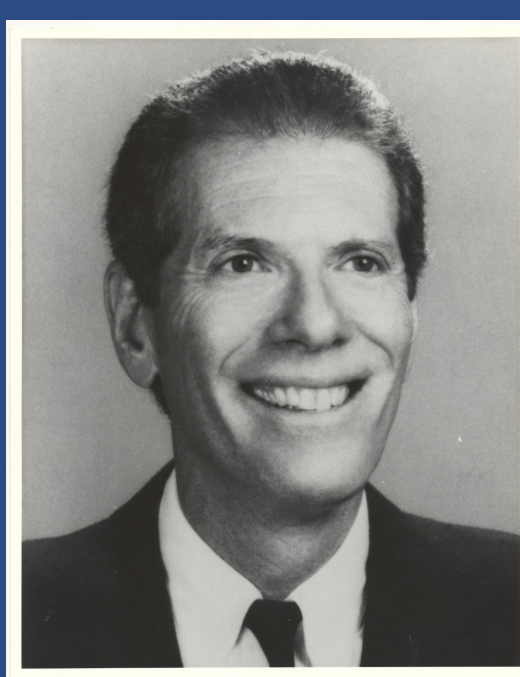
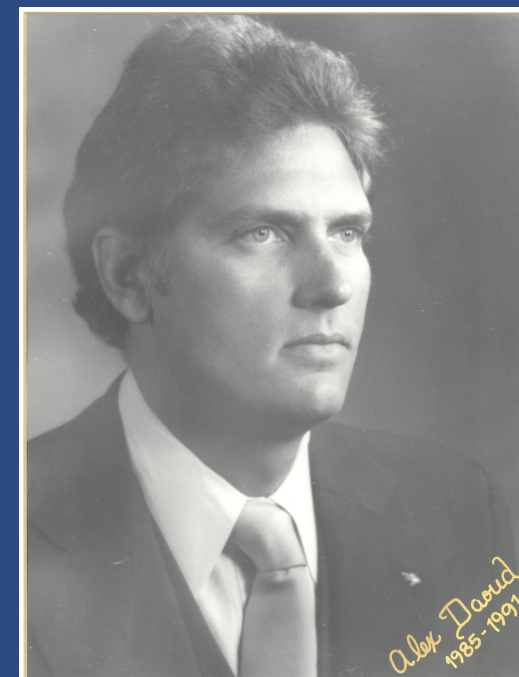
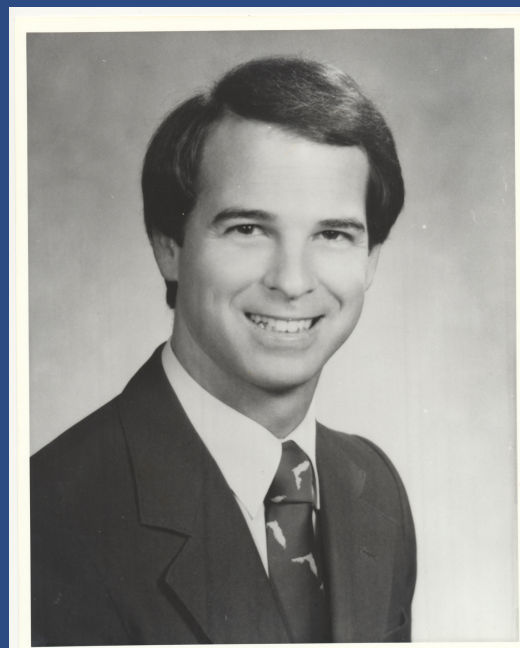
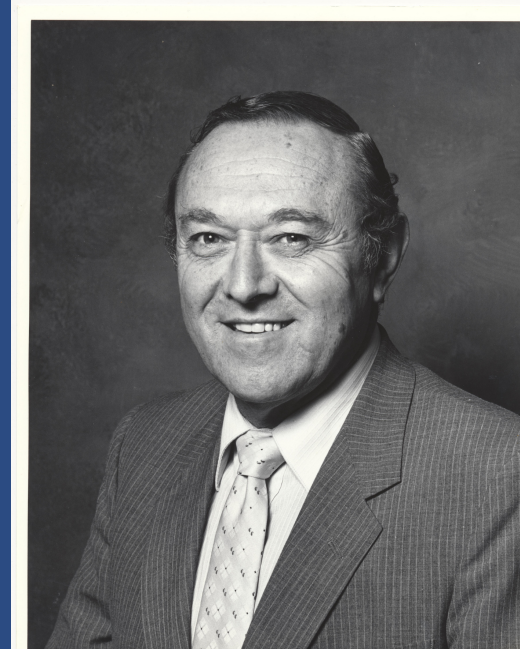
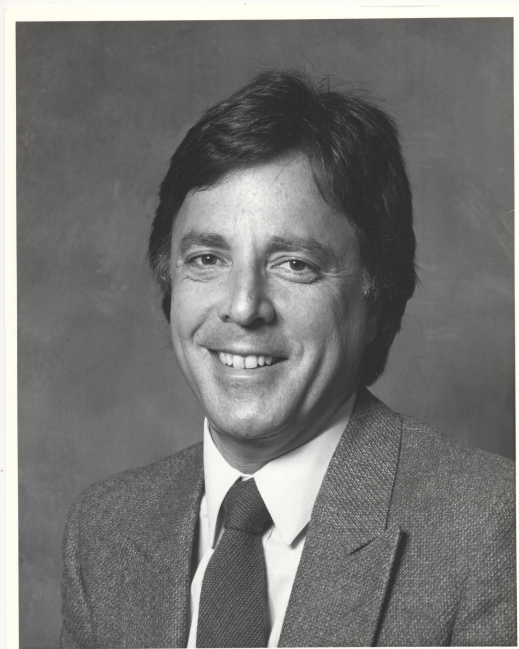


Choosing Photographs



- "Typical" archived photographs
- Copyright Free
- Public Figures
 - Working in official duty
 - Identities already known
- Individuals appear in multiple photographs

Choosing Photographs

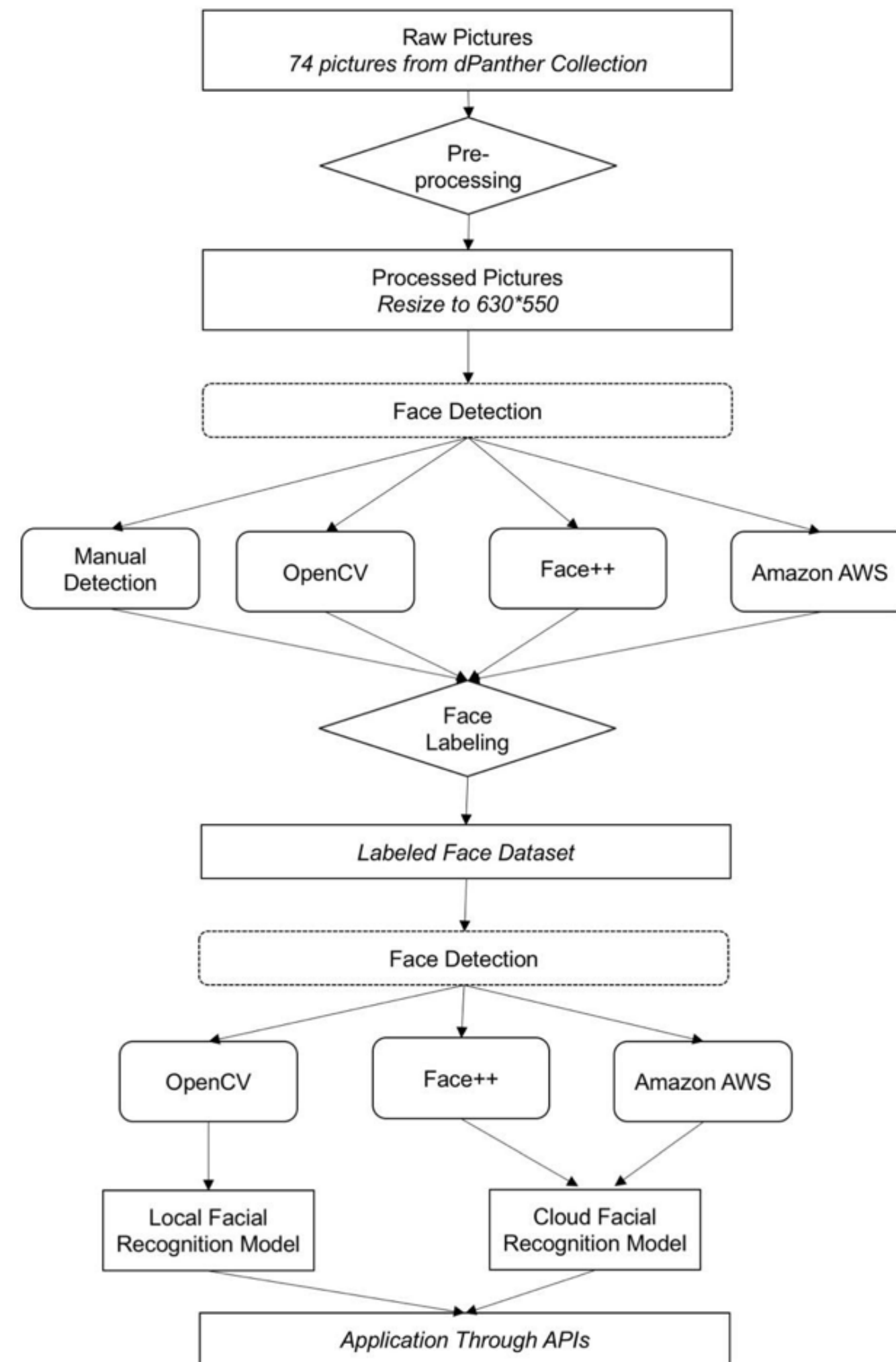


Creating Training Sets

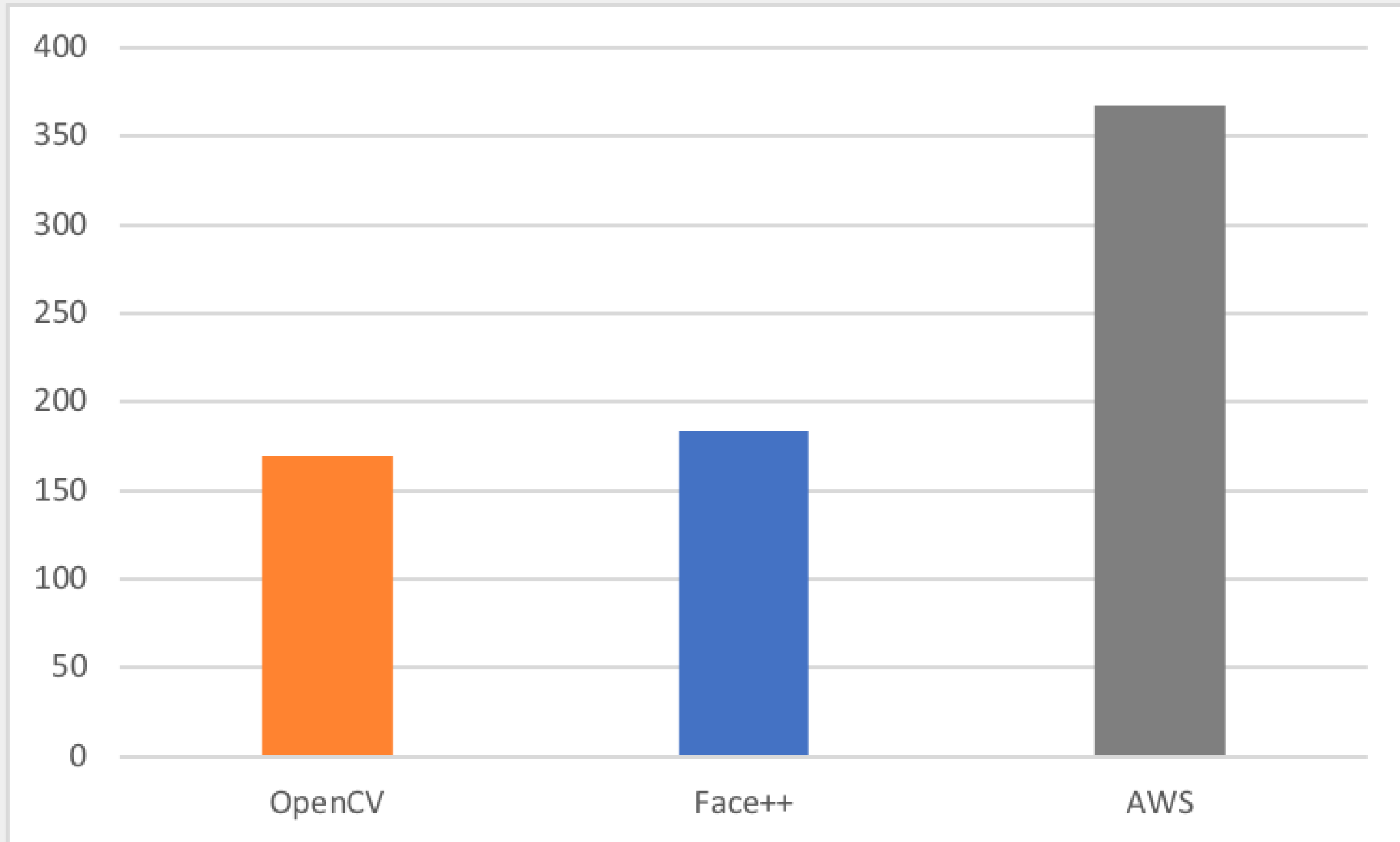
- Identifying photos for use
- Manually cropping faces
- Labeling individuals



Project Workflow and Development



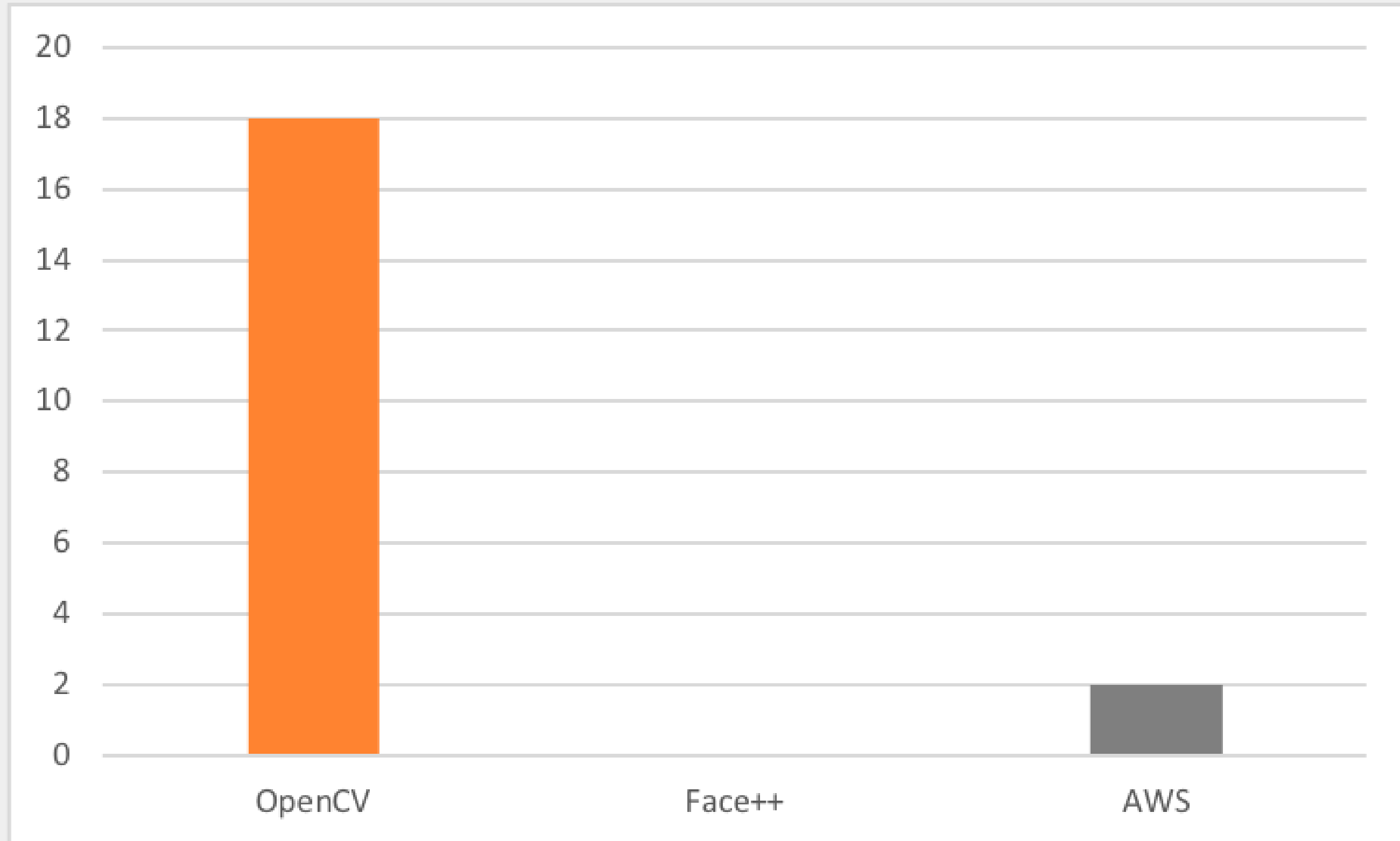
Faces Detected



Faces Detected



False Detection

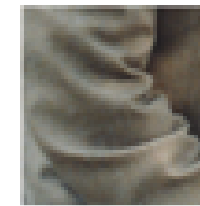


False Detection



[Read feature documentation to learn more](#)
Issues or questions? Use feedback button on bottom-left.

▼ Results



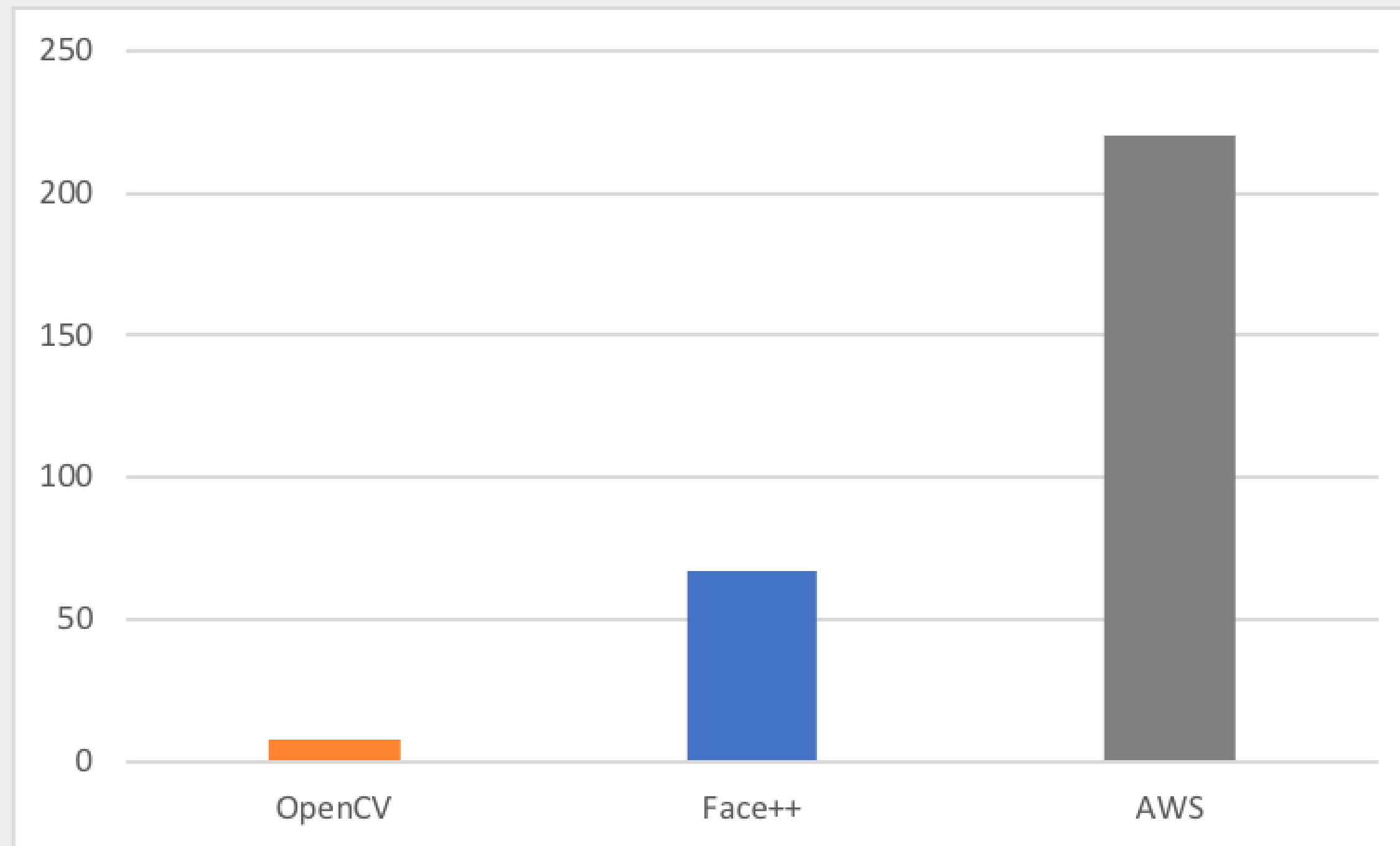
looks like a face	97.8 %
appears to be male	50.8 %
age range	2 - 8 years old
not smiling	98.2 %
not wearing glasses	92.1 %
not wearing sunglasses	95.5 %

[Show more](#)

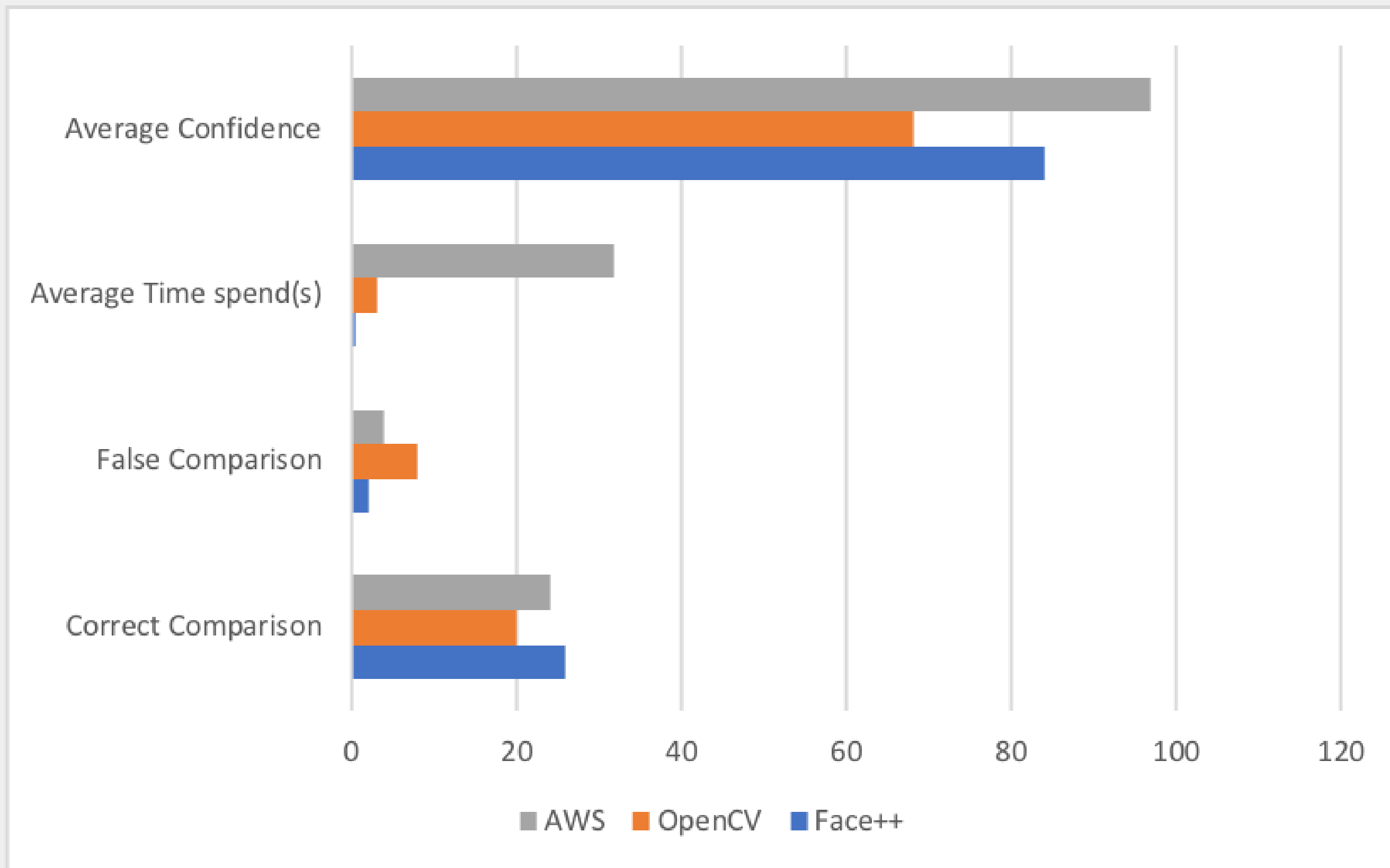
▶ Request

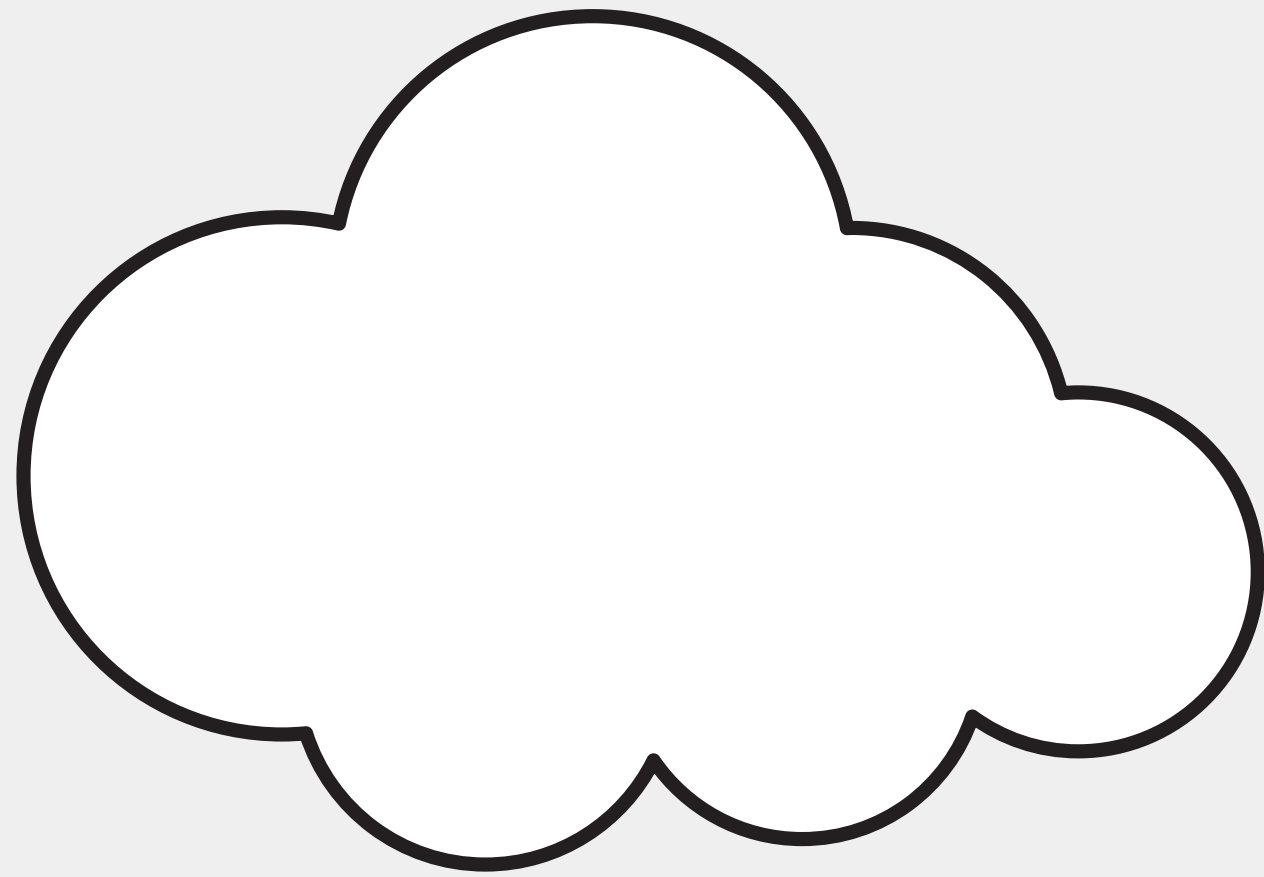
▶ Response

Time to detect per face (in seconds)



Outputs per Program





Cloud based applications

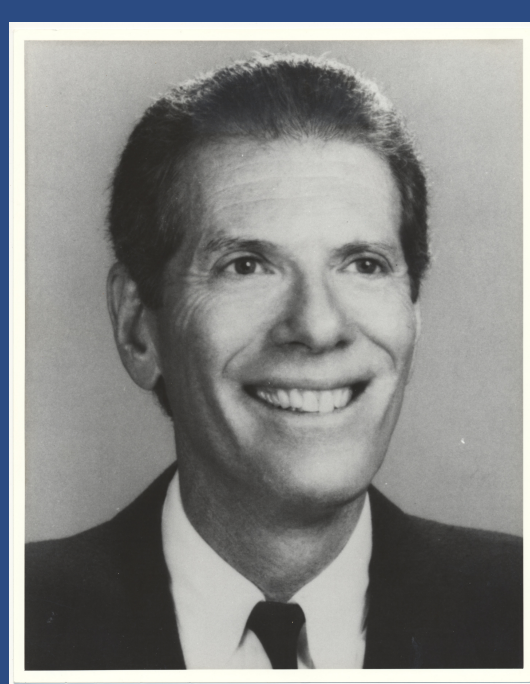
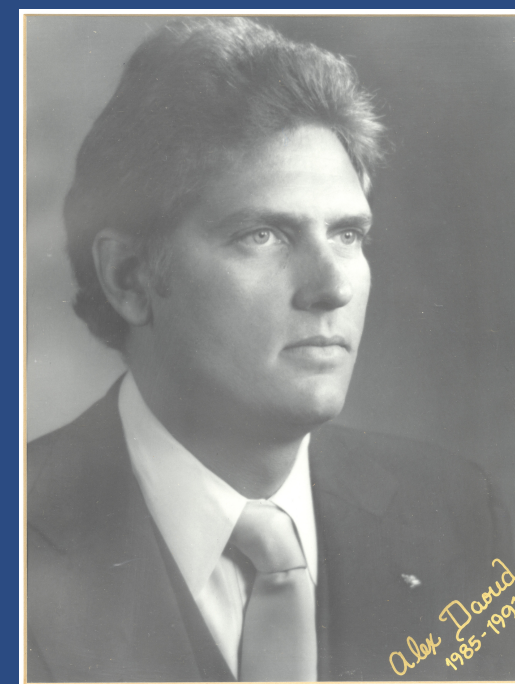
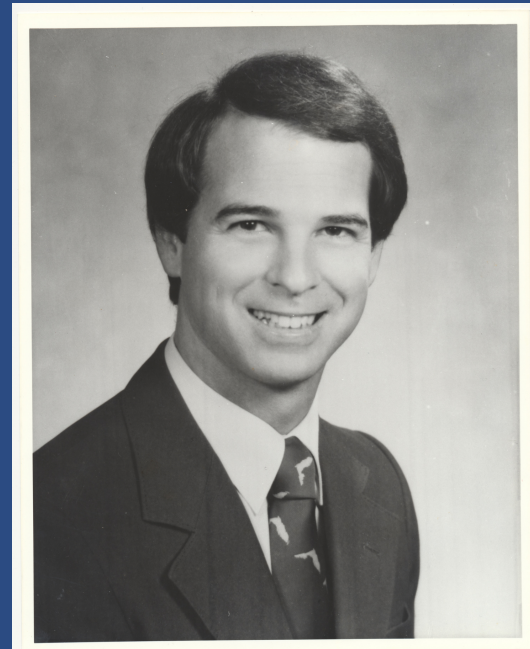
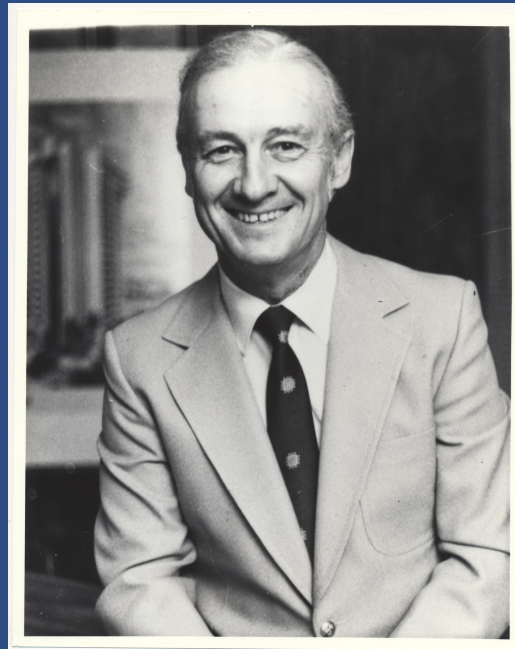
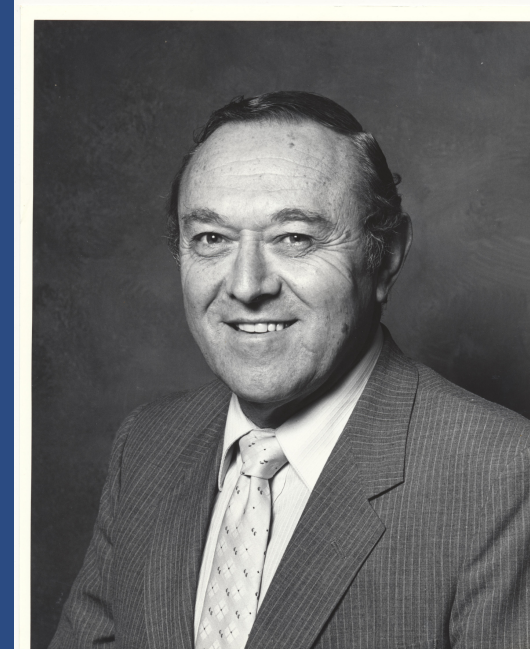
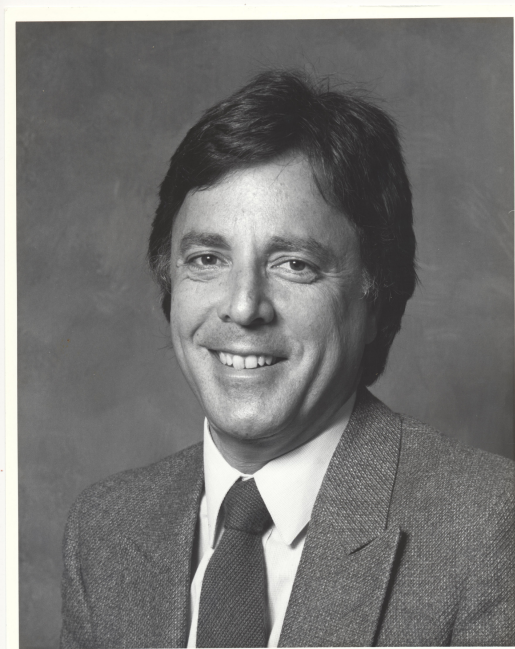
- more accurate
- slower
- easy to implement
- low cost to run
- privacy/ethical issues



In-House trained application

- less accurate
- faster
- open source but needed more computing resources and training data to set up
- scalable

What do these photos have in common?



Facial recognition software (FRS) works best on white men



FRS has the highest error rate with
black women 18-30 years old



Amazon Rekognition

FALSE MATCHES



28 current members of Congress



July 2018

28 members of congress were matched with mugshots

FACIAL RECOGNITION ERROR RATE (%) FOR WOC

Microsoft

20.8

Kairos

22.5

Amazon

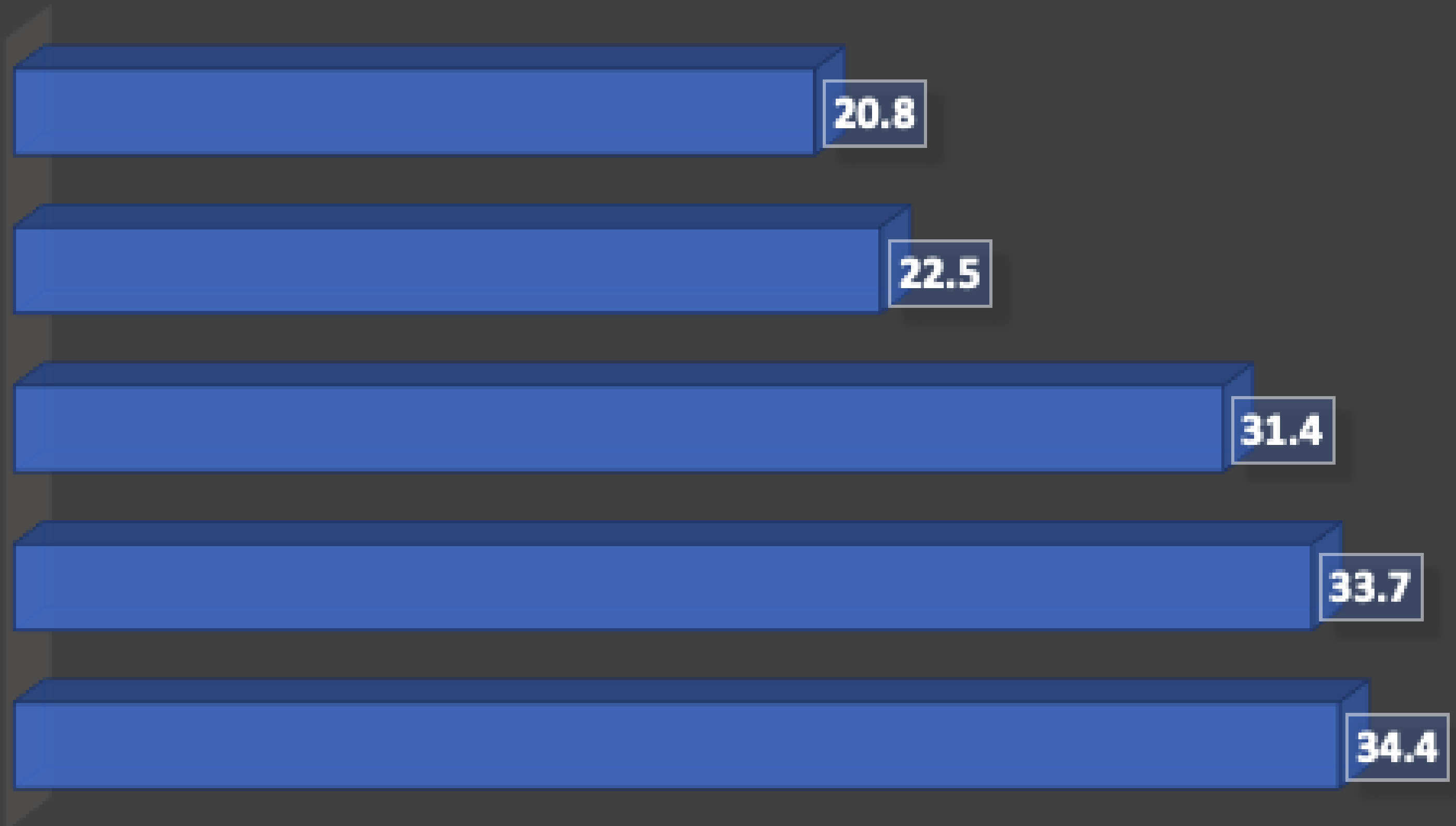
31.4

Face++

33.7

IBM

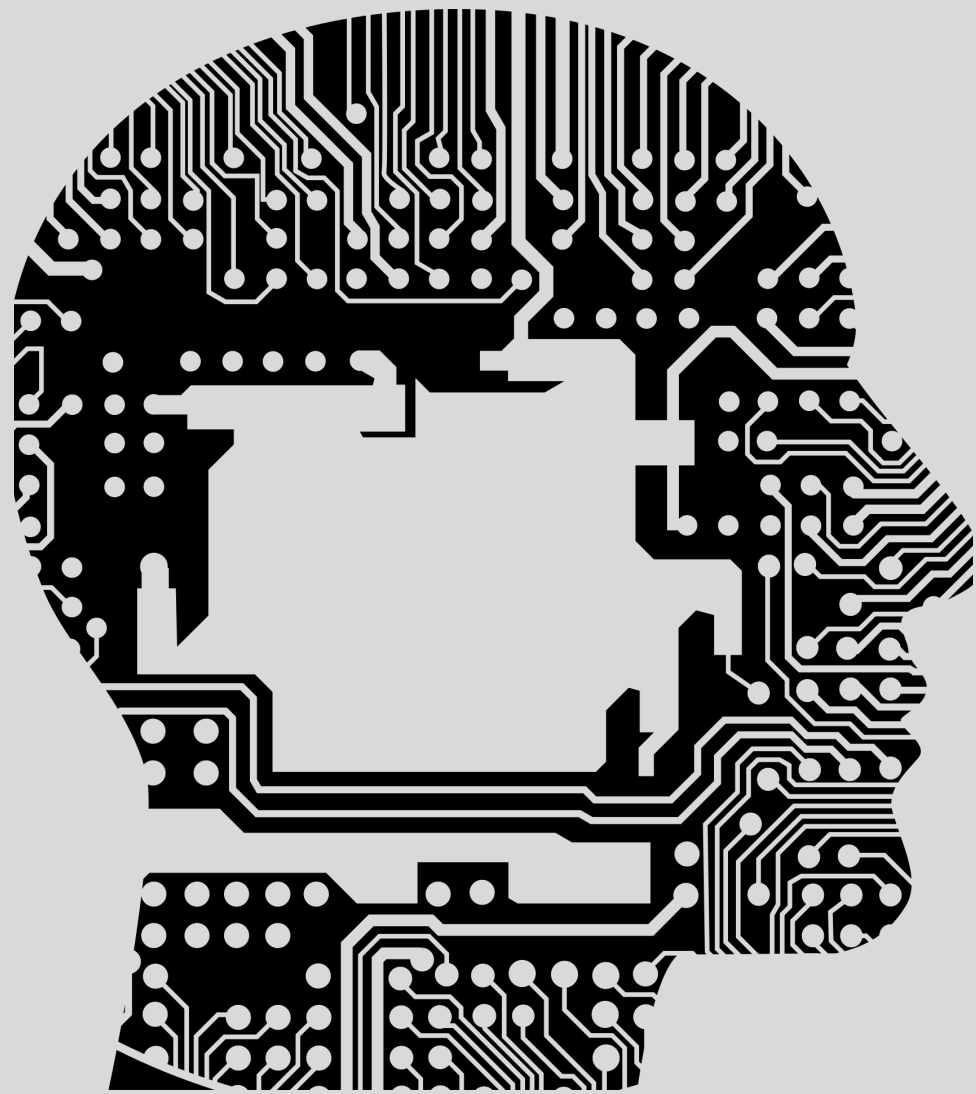
34.4





Camera settings are not optimized to capture darker skin tones

FRS Harms



- discriminatory
(employment, housing, etc.)
- surveillance state
- improper data storage
(cloud/local)
- violates privacy

What % of people in the U.S. are already in a FR database?

- 15%
- 35%
- 50%
- 70%
- 85%



Misuse of FRS in 2019

- 2019 - Research was published by US academics that had trained FRS to recognize and distinguish Chinese Uyghur faces from their Tibetan and Korean counterparts. Authorities in Xinjiang were using FRS to commit genocide of their Uyghur population.
- 2019 - Emails released later revealed the the NYPD was using FRS to surveil the BLM movement.

- **June 10, 2020 - Amazon bans police from using Rekognition**
- **Plan to review ban 1 year later**
- **Amazon advocated for government regulation of FRS**
- **May 18, 2021 - Amazon blocked police forces from using its FRS indefinitely**



2019 AI Now Report

- **Regulators should ban the use of affect recognition** in important decisions that impact people's lives and access to opportunities
- Government and business should **halt all use of facial recognition** in sensitive social and political contexts until the risks are fully studied and **adequate regulations are in place.**
- The AI industry needs to make significant structural changes to **address systemic racism, misogyny, and lack of diversity.**
- **AI bias research should move beyond technical fixes** to address the broader politics and consequences of AI's use.

- 2019 - San Francisco bans the use of FRS
- Senator Roy Blunt, Mo. drafts legislation that goes nowhere



States with biometric laws

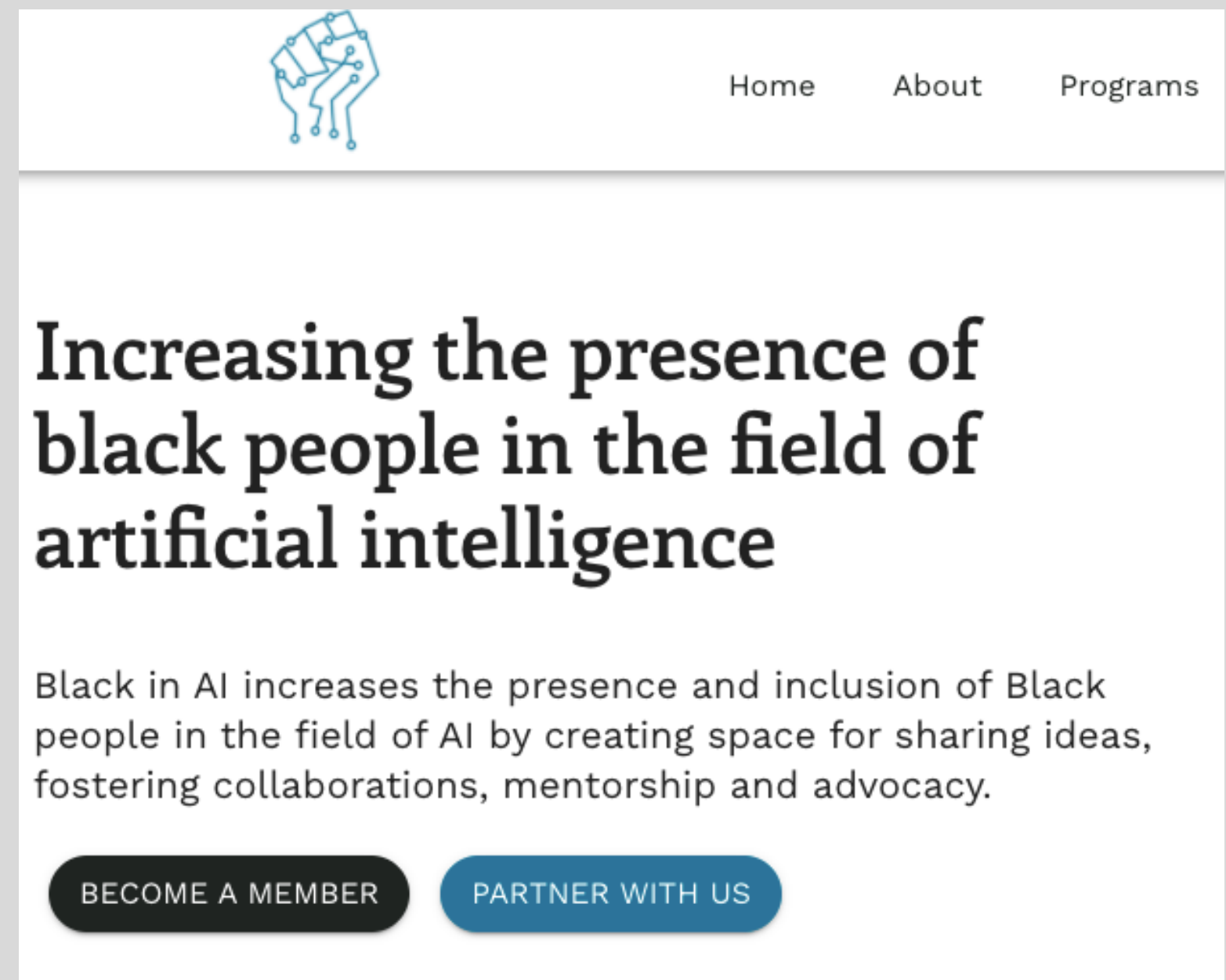
- 2008 - Illinois developed the Biometric Information Privacy Act
- 2009 - Texas
- 2017 - Washington
- 2020 - California (CA. Consumer Privacy Act (CCPA))
- 2020 - New York (SHIELD)
- 2021 - Arkansas



- Partnered with Joy Buolamwini at the MIT Media Lab to create FRS study
- Gebru founded Black in AI

FRS is too dangerous to be used by law enforcement at this time

Timnit Gebru



The screenshot shows the top portion of the Black in AI website. At the top left is a logo of a hand holding a circuit board. To the right are navigation links for 'Home', 'About', and 'Programs'. The main heading reads 'Increasing the presence of black people in the field of artificial intelligence'. Below this is a paragraph: 'Black in AI increases the presence and inclusion of Black people in the field of AI by creating space for sharing ideas, fostering collaborations, mentorship and advocacy.' At the bottom are two buttons: 'BECOME A MEMBER' and 'PARTNER WITH US'.

Home About Programs

Increasing the presence of black people in the field of artificial intelligence

Black in AI increases the presence and inclusion of Black people in the field of AI by creating space for sharing ideas, fostering collaborations, mentorship and advocacy.

BECOME A MEMBER PARTNER WITH US

Algorithmic Justice League

DONATE

RACIAL JUSTICE REQUIRES ALGORITHMIC JUSTICE.

**TECHNOLOGY SHOULD
SERVE ALL OF US. NOT JUST
THE PRIVILEGED FEW.**

Join the Algorithmic Justice League in the movement towards equitable and accountable AI.

report AI harms

Benefits of FRS

- Archives
- Finding missing children
- Medical uses
- Security clearance
- Purchase identification
- Device identification
- Advertising



Automation Bias

*TRUSTING THE
COMPUTER
MORE THAN
YOURSELF*



Ethical framework for use of FRS

- Informed collection
- **informed use**
- No sharing or selling of data without informed consent
- **Individuals maintain access and the right to change or delete their information**
- Ensure against misuse
- **Have security**
- No sharing with government without a warrant
- **Parental consent required for minors**
- Transparency

The logo for the American Civil Liberties Union (ACLU), featuring the letters "ACLU" in a bold, white, sans-serif font centered within a solid black rectangular background.

RESOURCES

ACLU

- [Amazon Rekognition Test Article](#)
- [Ethical Framework for FRS](#)

Organizations

- [Algorithmic Justice League](#)
- [Black in AI](#)

Reports, Policies, and Bills

- [AI Now Institute - Report](#)
- [Sen. Roy Blunt, Mo. Commercial Facial Recognition Privacy Act](#)
- [State of Illinois Biometric Information Privacy Act](#)

ARTICLES

- [How Ethical is Facial Recognition Technology? - Towards Data Science](#)
- [The Ethical Questions that Haunt Facial-Recognition Research - Nature](#)
- [Racial Discrimination in Face Recognition Technology - Harvard](#)
- [A Case for Banning Facial Recognition - NYT](#)
- [The Anatomy of Biometric Laws: What U.S. Companies Need to Know in 2020 - National Law Review](#)
- [Released NYPD Emails Show Extensive Surveillance of Black Lives Matter Protestors - CNN](#)
- [Amazon Bans Police From Using its Facial Recognition Technology for the Next Year - The Verge](#)

Do you have any questions?

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Kelley Rowan, krowan@fiu.edu

AI for Archives: Using Facial Recognition to Enhance Metadata" (2020). *Works of the FIU Libraries*. 93.

<https://digitalcommons.fiu.edu/glworks/93>

