

Facial Recognition

John Rudy 11/9/2022

What's a Face?

- A physical face seen by a person or a camera
 - When a person sees it, it is somewhat remembered.
 - When a computer sees it, it goes to a file for future retrieval and or modification.
- Modifications can be done by the person filmed
- Modifications can be done by agencies (CIA, KGB...) or by antagonists (bullies)
 - Social media and internet in general a good source of faces.
- Zoom can improve your face “Touch Up My Appearance option” Stop Video button, video settings

Lots of available applications

- FREE 10 Best Face Swap Apps for iPhone and Android Devices [2022]
<https://filmora.wondershare.com/video-editor/best-face-swap-apps.html>

- Cupace 4.8



5. Face App 4.2

Price: Free, offers in-app purchases

Compatibility: iOS, Android



Image from the Internet

Modify Imagery for Crime or Politics

Michael Crichton: *Rising Sun (1992)*. Digital editing finally unraveled by a video specialist.

Create Fake News <https://www.flexclip.com/create/fake-news-video.html>

Awesome Fake News Video Templates for Free



Cool News Youtube Outro

Let's edit a stunning outro to promote your news YouTube channel!



News Youtube Outro

Make an attractive video to promote your news YouTube channel!



Youtube Intro News

Let's make an attractive YouTube intro about news. It's easy and interesting.

FR Capability available for well over a decade

- Might it have helped with the April 15, 2013 at 2:49 PM Boston bombing?
- CBS Evening News 2016 says maybe.
<https://www.cbsnews.com/news/law-enforcement-increasing-use-of-facial-recognition-technology/>

But that was 9 years ago

- Biometric-based digital IDs started in **2001** when U.S. legislation mandated biometrics for U.S. entry and exit.
 - (OAG is the world's leading provider of digital flight information, intelligence and analytics for airports, airlines and travel tech companies)
 - <https://www.oag.com/blog/biometrics-airport-travelspheres-future-digital>

How does it work?

- **You need metrics that are not easily changed by make-up, hair styling, beards, contact lenses, plastic surgery or cover-up.**
 - Advantage of iris scans
 - Potential advantage of fingerprints – can be altered, or they age
 - Voice recognition (my bank and credit card use it)
 - Facial geometry
- **How many faces have been captured?**
 - The average human can recognize 5000 faces (10/2018) BUT cannot pair them with names <https://www.science.org/content/article/average-person-can-recognize-5000-faces#:~:text=To%20qualify%20as%20%22knowing%22%20a,of%20the%20Royal%20Society%20B%20>.
 - Clearview.ai has 3 BILLION images. See Washington Post <https://www.washingtonpost.com/technology/2022/02/16/clearview-expansion-facial-recognition/>
 - All without permission

Facial Recognition for “Beginners”

<https://towardsdatascience.com/face-recognition-for-beginners-a7a9bd5eb5c2>

- The geometric feature-based methods analyze local facial features and their geometric relationship with other features.
- Despite title, the math in this article is beyond me



Faces can be “scraped” from facebook, camera sites, etc

Clearview. AI has become dominant

- <https://www.washingtonpost.com/technology/2022/02/16/clearview-expansion-facial-recognition/> on track to have 100 billion facial photos in its database within a year
- Initially for arrests and criminal investigations by thousands of law enforcement and government agencies around the world
- Its data collection system now ingests 1.5 billion images a month.
- \$50 million from investors (privately held)
- Billionaire John Catsimatidis used it to identify someone his daughter dated and piloted it at one of his Gristedes grocery stores in NYC to identify shoplifters
- Used in Ukraine to identify Russians
- In May 2022, under the terms of an ACLU settlement, Clearview agreed to a permanent ban from selling its facial recognition database to private companies
- Many lawsuits and injunctions pending.
 - UK watchdog fines Clearview £7.5m over image collection

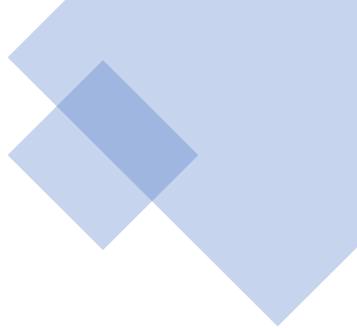
Clearview Backup -- Just heard

WIRED article 11/7/22

- “Clearview Stole my Face and the EU Can’t do Anything About It”
- Clearview scraped his photo ~5/2020 and is marketing it without his knowledge or permission
- Lawsuit in Germany
- French data protection authority 3rd EU regulator to sue (10/22) and fined 20M €
- Also Italy and Spain
- Clearview “cannot” delete a face because scraping continues



Soccer Stadiums Being Monitored

- >15,000 cameras in 8 stadiums for 2022 World Cup
 - Track ~1,000,000 fans
 - Not the first to do so
 - In 2017 mistakenly identified ~2000 as possible criminals
 - Some EU countries pursuing legl options
- 

AI Restrictions are increasing

<https://www.forbes.com/sites/timbajarin/2020/06/18/why-it-matters-that-ibm-has-abandoned-its-facial-recognition-technology/?sh=43dfd44cafaf>

IBM Has Abandoned Its Facial Recognition Technology: IBM has been thinking about this since 2014

Poor accuracy and its tendency towards the bias of people of color.

Face recognition technology was a very small part of IBM's business

[Principles for Trust and Transparency](#) frames IBM's approach to AI

Microsoft *“will not sell facial recognition technology to police departments in the United States until we have a national law in place, grounded in human rights, that will govern this technology”*

Amazon also said they would place a [moratorium on selling their Facial Rekognition Technology](#) to police agencies.

Lawsuits

Casinos are good customers

eConnect connected to more than 300,000 cameras in casinos, resorts, nightclubs, restaurants, stadiums, and airports.



Identity Management— Know Your Customer (KYC)

You don't know a customer's worth until their gaming history is in the system. Face-matching technology in the identity management system helps you recognize and track customers to learn about how often they visit your venue and even their gaming value.

Can you do it yourself?

What software is available to me?

<https://towardsdatascience.com/what-is-the-best-facial-recognition-software-to-use-in-2021-10f0fac51409>

- Provides brief analysis on the “top” free and for charge systems.
- Doesn't explain how to use them.

A Recent Study on Face Recognition Biases

https://www.researchgate.net/publication/354512875_A_Comprehensive_Study_on_Face_Recognition_Biases_Beyond_Demographics

Four German authors September 2021

Attribute	Negative	Positive	Attribute	Negative	Positive	Attribute	Negative	Positive
Male	1,349,127	1,958,913	Brown Hair	1,196,846	817,910	Bushy Eyebrows	2,119,007	1,071,154
Young	989,321	1,250,114	Gray Hair	2,839,278	316,839	Arched Eyebrows	1,814,707	762,116
Middle Aged	2,395,142	354,968	No Beard	466,498	2,108,546	Mouth Closed	485,079	139,989
Senior	3,013,551	260,687	Mustache	2,629,842	16,629	Smiling	1,034,713	625,844
Asian	3,048,755	115,021	5 o Clock Shadow	1,834,468	434,288	Big Lips	1,532,764	939,155
White	642,933	2,136,057	Goatee	2,655,062	9,229	Big Nose	1,202,627	503,066
Black	2,973,783	157,109	Oval Face	793,888	466,869	Pointy Nose	1,044,887	1,816,441
Rosy Cheeks	2,321,058	33,990	Square Face	1,585,311	1,709,811	Heavy Makeup	2,314,175	982,666
Shiny Skin	1,110,002	581,133	Round Face	2,287,232	5,905	Wearing Hat	2,946,013	256,130
Bald	3,004,817	207,554	Double Chin	2,326,091	605,454	Wearing Earrings	1,961,832	992,962
Wavy Hair	2,193,351	856,616	High Cheekbones	1,328,748	857,224	Wearing Necktie	2,162,852	350,886
Receding Hairline	1,948,374	513,859	Chubby	2,410,459	406,896	Wearing Lipstick	2,138,389	1,126,676
Bangs	2,701,346	355,048	Obstructed Forehead	2,316,315	195,722	No Eyewear	199,386	2,597,310
Sideburns	2,198,368	1,097,130	Fully Visible Forehead	845,847	1,668,763	Eyeglasses	2,854,252	339,032
Black Hair	2,067,750	514,619	Brown Eyes	401,359	1,303,174	Attractive	2,301,934	884,429
Blond Hair	2,574,286	347,723	Bags Under Eyes	1,367,622	917,779	Total	87,929,447	35,969,435

Partial data

“Scandals” with Facial Recognition

11/21 Facebook is shutting down its long-criticized facial recognition system and deleting scan data on a billion people

- Policy change shuts down a feature that automatically identified people who appeared in Facebook users' digital photos
- "There are many concerns about the place of facial recognition technology in society, and regulators are still in the process of providing a clear set of rules governing its use"
- Facebook agreed in 2020 to a **\$650 million** payout after failing to win dismissal of a case alleging it illegally collected biometric information for "face tagging" in violation of a 2008 Illinois privacy law.

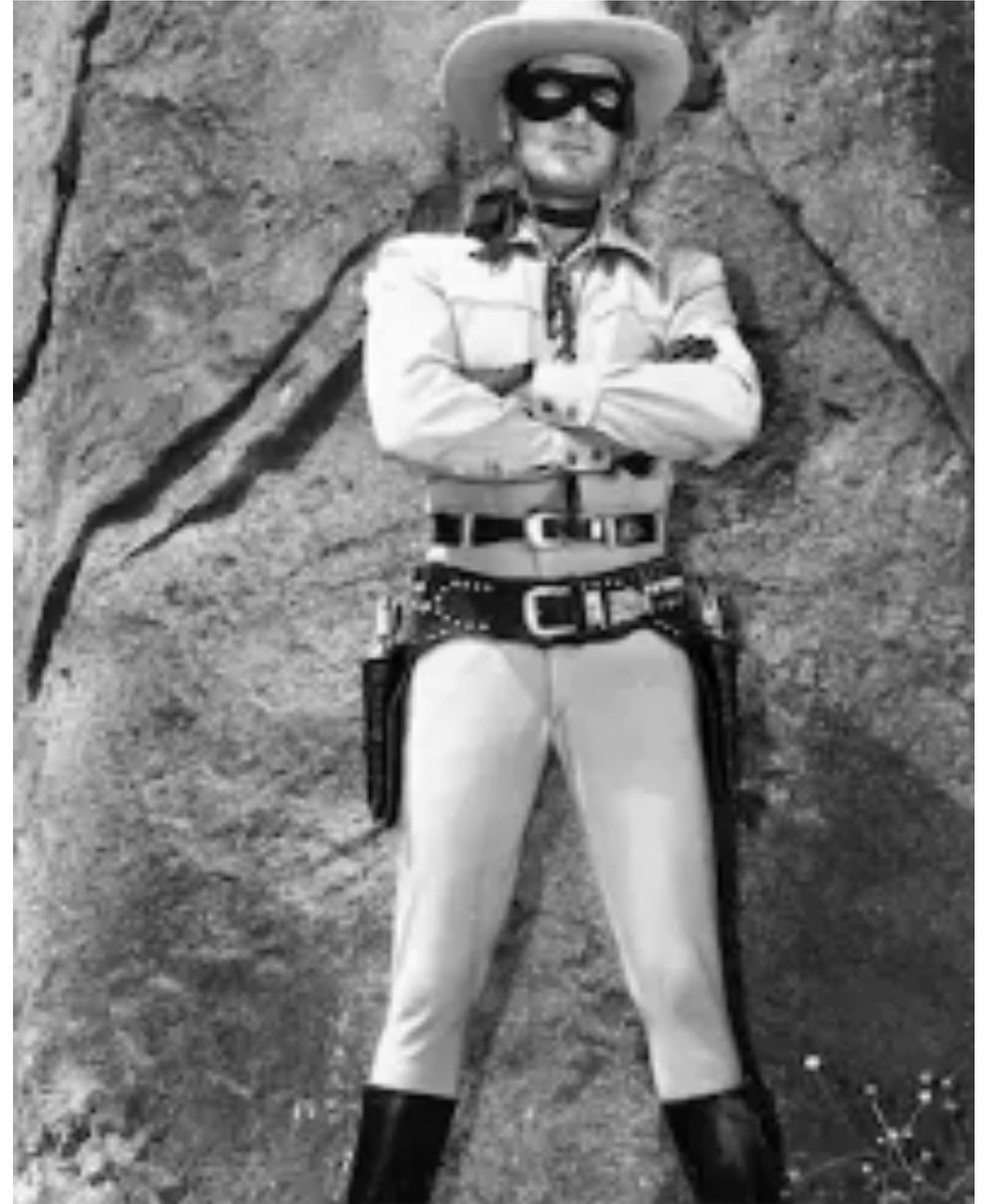
<https://www.technologyreview.com/2021/04/14/1022676/robert-williams-facial-recognition-lawsuit-aclu-detroit-police/>

- Large groups of incorrect black mis-recognition leading to ACLU lawsuits

Privacy

- Is it a problem?
- How much is too much?
- Can it be dangerous?
- Should it be restricted? Must it require consent?





A Final Thought

Would facemasks alter facial recognition?