

LmunA 2022

Research report

Forum: General Assembly 6
Issue: Investigating the utilization of facial recognition
as means of regulating human behavior
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Introduction

The theme for this year's edition of LmunA is:

‘Emerging technologies in shaping modern society’

Technology is expanding and improving at an uncontrollable rate, and law enforcement is struggling to keep up with the never-ending developments, as is the case for facial recognition technology (FRT). Facial recognition uses technology to recognize and confirm a person's identity using just key features of their face. This technology commenced just 50 years ago, when three scientists tried to use computers to recognise a human face. While their attempts were not successful, they did kickstart the facial recognition technology we now have today.

Facial recognition has been depicted in the media very often, but rarely is it depicted correctly. There are many different ways in which facial recognition systems operate, but there are three basic types¹:

- Detection: The process of finding a face within an image, think of how your phone camera detects a face and puts a square around it. It's only focused on looking for things that resemble faces, not identities.
- Analysis: This maps faces, by measuring the distances between your eyes, nose, mouth etc. This is similar to how filters work within apps such as Snapchat and Instagram. This method, however, is prone to mistakes and glitches.
- Recognition: This method does involve the confirmation of identity. It is used to verify a person, on a newer smartphone for example. It can recognise faces with disturbing accuracy.

¹ <https://www.nytimes.com/wirecutter/blog/how-facial-recognition-works/>

Definitions of key terms

Artificial Intelligence

The simulation of human intelligence by machines and computer systems.

Facial recognition technology (FRT)

The process of identifying an individual using their face.

Biometric technology

The use of technology to identify a person based on a human bodily feature, such as their fingerprints.

Marker

A biological indicator.

Eigenface

A method used to recognize and detect faces within an image containing multiple faces layered on top of each other.

Behavioral engineering

The use of technology to control or modify one's behavior.

Moratorium

The agreement to stop an activity or a legal obligation for a set period of time.

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General overview

Facial recognition technology was first developed in 1964, when Charles Bisson, Woodsy Bledsoe and Helen Chan Wolf started researching how to use computers to recognize human faces. Very little of their work was published, because the funding for the research was administered by an unnamed agency.²

Their work was later picked up by Goldstein, Harmon and Lesk. This trio made further improvements to the FRT by introducing 21 specific markers that were used to identify human faces with detail. These markers included the color of the individual's hair and the thickness of their lips. While this method was more accurate, it was still very labor intensive.

In 1988, Kirby and Sirovich applied a standard linear algebra technique to the face recognition problem. This was a huge milestone, because it showed that less than a hundred values were needed to construct a normal face image. They created the concept of 'Eigenface'.

Turk and Pentland started using this 'Eigenface' technique in 1991. The duo discovered how to detect faces within an image using this technique, which created further interest in developing facial recognition technologies.

FRT's rely on a concept called 'biometric technology', which relies on the identification of measurements of human bodily features.

Following these developments, The Defense Advanced Research Projects Agency (DARPA) and the National Institute of Standards and Technology (NIST) rolled out the Face Recognition Technology (FERET) programme in the early 1990s in order to encourage the commercial facial recognition market. The project involved creating a database of facial images.

The utilization of FRT first came to public attention when it was used on the audience at the 2001 Super Bowl. Surveillance footage was compared to a database of mugshots to detect potential criminals and terrorists. Using this technique, they were able to identify 19 people with a criminal record.³

From this point on, using FRT has become more common in our society and our everyday lives. The most widely known example of this is the FaceID feature that Apple introduced with the launch of the iPhone X, to replace the fingerprint ID.

Law enforcement is now seeking to implement this technology into more aspects of our every day life, with the purpose of keeping track of our behavior. In particular, FRT's are now starting to get implemented at schools and universities. In Australia, the US and UK, multiple institutions are using these technologies for automated roll-calls and observing the attention and emotions of the students by scanning and analyzing their facial expressions.

² <https://www.historyofinformation.com/detail.php?entryid=2495>

³ <https://abcnews.go.com/Technology/story?id=98871&page=1>

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During the 2015 protests in Baltimore, after the death of Freddie Gray, FRT was used by the Baltimore police force to monitor the protestors. The purpose of this was to catch and arrest protestors that had outstanding warrants right then and there. Geofeedia, the company behind this technology, used the outcome of these arrests to advertise their technology to other police departments.

The rise of the usage of FRT's has, quite obviously, sparked a lot of controversy and outrage. A technology that is able to identify just about anyone by only analyzing their face and matching it to a database is a huge intrusion of privacy.

Widespread use of FRT's in China helps the government keep track of almost every move the Chinese citizens make. By using these technologies, the Chinese government can influence the behavior of inhabitants, by giving them personal warnings or even fines for committing a minor offense. This gives them the impression that they are always being watched, causing them to behave a certain way. This concept is called 'behavioral engineering'.⁴

While FRT's can aid with keeping us safe, by tracking down criminals and potential terrorists, they can also become a danger to us and our privacy, by constantly keeping our actions in line. Facial recognition technologies will keep progressing and improving in their accuracy almost daily. It is only a matter of time until law enforcement will make widespread use of these technologies to track and identify individuals for their own use.

⁴ <https://www.cnet.com/news/politics/in-china-facial-recognition-public-shaming-and-control-go-hand-in-hand/>

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Major parties involved

Top ten countries making the most use of FRT's⁵:

1. China

China makes widespread use of FRT's all over their country with use of surveillance cameras to control their inhabitants' actions by penalizing them for 'uncivilized' behavior.

2. Russia

Russian authorities make use of FRT's to, for one, track and detain protestors and other criminals.

3. The United Arab Emirates

UAE uses FRT's to, amongst other things, eliminate fraud and register attendance at schools. Furthermore, the patrol cars in Abu Dhabi now include FRT to help them identify suspicious people

4. Japan

The National Public Safety Commission (NPC) stores a large database of facial images of around 10 million Japanese citizens. This database has been provided to the police of Japan to use it with FRT's to track down criminals.

5. Chile

By 2022, the greater part of the citizens will have an electronic ID card that utilizes facial recognition.

6. Australia

Australian police forces were caught using FRT from the app 'Clearview', which used images from social media to create a database of people all over the world. They have since then stopped using this app.

7. Brazil

The use of FRT's by the police and the government is not as widespread as in other countries, but it is definitely on the rise. It is already being implemented in public transport and in schools.

⁵ <https://www.comparitech.com/blog/vpn-privacy/facial-recognition-statistics/>

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8. Argentina

People have been wrongfully detained in Argentina due to incorrect identification through FRT's. Furthermore, FRT's are used in schools and in public transport.

9. France

France has widespread use of FRT, which is only growing, in the government, police, banking, and public transport. In 2020, the French High Court ruled that FRT's are not to be used in schools.

10. The United Kingdom

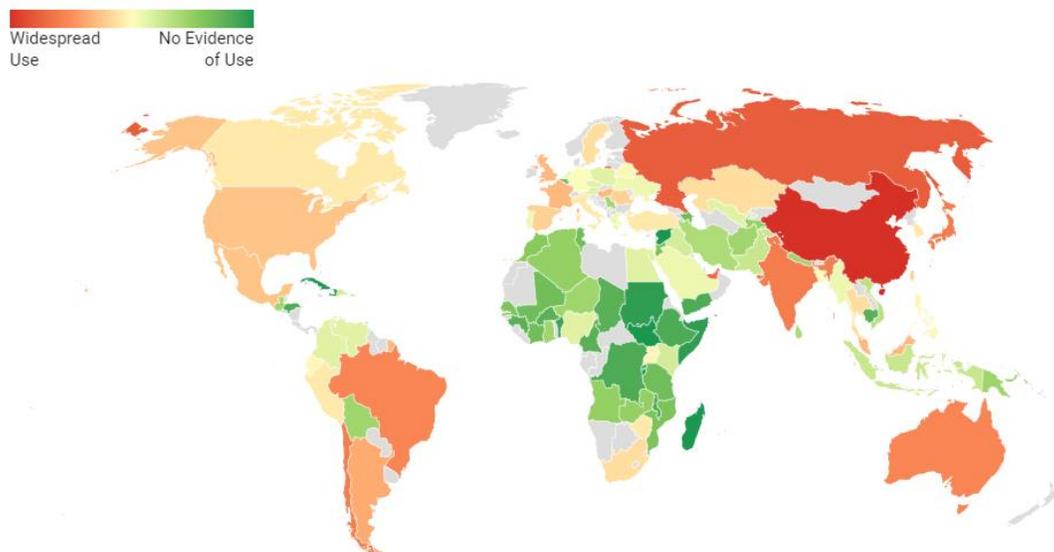
The same as France, the UK has widespread use of FRT.

11. Belgium

Belgium has banned the use of facial recognition technologies.

12. Luxembourg

Luxembourg has banned the use of facial recognition technologies.



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Timeline of Key Events

1964-1965	C. Bisson, W. Bledsoe and H. Chan Wolf pioneered FRT by using computers to recognise human faces.
1970s	A. Goldstein, L. Harmon and A. Lesk picked up where the other scientists left off and improved FRT by including 21 markers.
1988	L. Sirovich and M. Kirby started applying linear algebra to FRT, which made FRT a possible software to be used in businesses.
1991	M. Turk and A. Pentland used the system of 'Eigenface' to detect faces within an image.
1990s	The Defense Advanced Research Projects Agency and the National Institute of Standards and Technology released the Face Recognition Technology programme to encourage commercial use.
2001	FRT was used on the audience at the 2001 Super Bowl to detect criminals and potential terrorists.
2010	Facebook implemented a FRT that helped identify faces of people in pictures posted by social media users.
2015	Baltimore police make use of FRT to arrest people at the protests after Freddie Gray's death.
2017	Apple launched the iPhone X, which was the first iPhone that could be unlocked with FaceID, a facial recognition technology developed by Apple.

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Previous attempts to solve the issue

As stated on the website of the United Nations, all the Member states of the UN Educational, Scientific and Cultural Organization (UNESCO) adopted a historic agreement that defines the common values and principles needed to ensure the healthy development of AI, on the 25th of June 2021.⁶

The development of AI will certainly pose difficulties. As UNESCO explained in a statement: “We see increased gender and ethnic bias, significant threats to privacy, dignity and agency, dangers of mass surveillance, and increased use of unreliable Artificial Intelligence technologies in law enforcement, to name a few. Until now, there were no universal standards to provide an answer to these issues”.

However, on the 15th of September 2021, as stated on the website of the United Nations, UN High Commissioner for Human Rights Michelle Bachelet called for a moratorium on the sale and use of AI systems that pose a serious risk to human rights until safeguards are put in place.⁷

Bachelet has said: “Artificial intelligence can be a force for good, helping societies overcome some of the great challenges of our times. But AI technologies can have negative, even catastrophic, effects if they are used without sufficient regard to how they affect people’s human rights”.

While there haven’t been many efforts made into investigating the use of FRT’s to regulate human behavior, UNESCO has already looked at safe ways to develop AI for other purposes.

⁶ <https://news.un.org/en/story/2021/11/1106612>

⁷ <https://www.ohchr.org/en/2021/09/artificial-intelligence-risks-privacy-demand-urgent-action-bachelet>

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Possible solutions

The investigation of utilizing facial recognition to regulate human behavior can be quite tricky, as using FRT's poses a huge privacy issue. To regulate human behavior via facial recognition, law enforcement would need to have a huge database filled with detailed information on every single citizen in the country. Gathering this information can already be quite the challenge. Furthermore, inhabitants would feel like their every move is being watched and judged by others, giving them the feeling they have no true freedom to do as they please.

To start investigating this technology, it would be best to start on a small scale and to have thoroughly thought through regulations set in place. The technology would need to be tested over and over again until it is ready for widespread use. China is already regulating the behavior of its inhabitants and sending them warnings whenever they do something that is slightly unusual.

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