China's Big Brother: how the country is taking the lead in artificial intelligence

Facial recognition glasses: from science fiction to reality

"*The future is already here – and there is no going back*"[1]. This is how an article published in February by the *South China Morning Post* begins. Just like Keanu Reeves in the *Matrix* series, the railway police in Zhengzhou, a central Chinese city, have started wearing futuristic sunglasses. But unlike in the former case, the latter one is no science fiction. Such police officers are the very first ones in the country to use facial-recognition eyewear to screen passengers during the Lunar New Year travel rush[2]. Also known as 'Spring Festival', it is China's most important holiday: wherever they are, people are expected to go back home and celebrate the festival together with their families[3]. This means that hundreds of millions of Chinese make their way back to their hometowns, accounting for an "*estimated 3 billion trips in total, by all modes of transport imaginable*" to be undertaken "*within a six-week period through mid-March, making it the biggest annual human migration event*"[4].

These smart glasses, linked to a tablet device and connected to the national database of people with criminal records, have supported police officers to nab seven fugitives related to major criminal cases and 26 people traveling with fake IDs[5] in February. When a person is marked out, the glasses show the police officers a warning sign, calling for their intervention[6]. Facial recognition systems are biometric computer applications generating a "faceprint" — a unique code applicable to one individual — identifying people by creating a digital image achieved by measuring "nodal points" – the major elements of their faces – such as the distance between the eyes, the width of a person's

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[1] Meng Jing, *From travel and retail to banking, China's facial-recognition systems are becoming part of daily life*, February 8, 2018,
http://www.scmp.com/tech/social-gadgets/article/2132465/travel-and-retail-banking-chinas-facial-recognition-systems-are.

[2] Zheping Huang, *Chinese police are wearing sunglasses that can recognize faces*, February 8, 2018,
https://qz.com/1202075/chinese-police-are-using-facial-recognition-glasses-for-survelliance/.

[3] *Chinese New Year 2018 — Holiday Guide, Traditions, Activities*,
https://www.chinahighlights.com/travelguide/special-report/chinese-new-year/.

[4] Celia Chen, Meng Jing and Sarah Dai, *Facial recognition to ticketing apps: how tech is helping ease the Lunar New Year travel crush*, January 27, 2018,
http://www.scmp.com/tech/china-tech/article/2130725/facial-recognition-ticketing-apps-how-tech-helping-ease-lunar-new.

[5] Zheping Huang, *Chinese police are wearing sunglasses that can recognize faces, Op. Cit.*

[6] Luke Dormehl, *Chinese police are using facial-recognition tech to catch criminals*, March 13, 2018,
https://www.digitaltrends.com/cool-tech/beijing-facial-recognition-police/.

nose and the curve of the cheekbones[7]. These are combined mathematically to build the faceprint, used to search through an identity database[8].

Chinese police are expanding the smart sunglasses program, as officers have started adopting them for the annual meeting of China's parliament in central Beijing, held in the second week of March. They have been used at a highway checkpoint on the outskirts of the city in order to pick up facial features and car registration plates and match them in real-time with a database of suspects. Anyone entering places such as the Chinese People's Political Consultative Conference, the Great Hall of the People and the National People's Congress had to go through facial scanners too. Wu Fei, chief executive of LLVision – the company producing such glasses – said people should not be concerned about privacy, as China's authorities are using them for "*noble causes*" like catching suspects and fugitives from the law[9].

In 2015, the Ministry of Public Security launched a project – won by *Isvision*, a security company based in Shanghai[10] – to build an "*omnipresent, completely connected, always on and fully controllable*" network using facial recognition systems[11], making it the world's most powerful facial recognition database. The aim is to identify any one of China's more than 1.3 billion citizens within three seconds and match someone's face to their ID photo with about 90 per cent accuracy[12].

There has been a major push by China's leaders to leverage technology to boost security in the country. Zhu Long, cofounder and chief executive of *Yitu Technologies*, says: "*China has a lot of people, and people are data. This is encouraging governments and companies to make machines intelligent, so they can analyse the huge amounts of data they get and provide solutions. The idiosyncrasies of China make research in these fields more meaningful and practical than in other countries*". He continues affirming that "*AI now analyses huge amounts of data produced by all kinds of devices, making sense of an ocean of numbers*"[13].

[7] Sijia Jiang, *Backing Big Brother: Chinese facial recognition firms appeal to funds*, November 13, 2017, https://www.reuters.com/article/us-china-facialrecognition-analysis/backing-big-brother-chinese-facial-recognition-firms-appeal-to-funds-idUSKBN1DD00A.

[8] Kinling Lo, *In China, these facial-recognition glasses are helping police to catch criminals*, February 7, 2018, http://www.scmp.com/news/china/society/article/2132395/chinese-police-scan-suspects-using-facial-recognition-glasses.

[9] Pei Li and Cate Cadell, *China eyes 'black tech' to boost security as parliament meets*, March 10, 2018, https://www.reuters.com/article/us-china-parliament-surveillance/china-eyes-black-tech-to-boost-security-as-parliament-meets-idUSKBN1GM06M.

[10] Stephen Chen, *China to build giant facial recognition database to identify any citizen within seconds*, October 12, 2017, http://www.scmp.com/news/china/society/article/2115094/china-build-giant-facial-recognition-database-identify-any.

[11] Deena Zaidi, *Inside China's growing use of facial recognition technology*, February 15, 2018, https://venturebeat.com/2018/02/15/inside-chinas-growing-use-of-facial-recognition-technology/.

[12] Meng Jing, *From travel and retail to banking, China's facial-recognition systems are becoming part of daily life, Op. Cit.*

[13] Zigor Aldama, *China's big brother: how artificial intelligence is catching criminals and advancing health care*, December 10, 2017, http://www.scmp.com/magazines/post-magazine/long-reads/article/2123415/doctor-border-guard-policeman-artificial.

Surveillance firm *CloudWalk* has as client the local police, and by using it, the latter "*may soon be able to predict crime by looking at the way people walk*". Zhang Li, Assistant to President of *CloudWalk* says: "*If people of interest to the police frequently appear on our cameras at important locations, our system can analyze their behavior to see if they look suspicious*". People cannot hide by changing their walk or covering their face, as "g*ait recognition technology and voice identification are also available*"[14].

Given the importance of such features, the fact that both Chinese private firms and startups are playing an active role with the government to monitor fraudulent and criminal behavior, comes at no surprise[15].

Artificial intelligence used in everyday life boosts real business

Facial recognition is transforming not only Chinese way of fighting crime, but also its way of doing business. Such method of identification "*is popping up everywhere in everyday life in China. The sector is booming. Over 15% growth per year. Between now and 2020, sales could pass 6 billion euros*"[16]. Today's 170 million cameras across the country could rise by further 450 million units by 2020[17]. China relies heavily on card-less identification. The "Smile to Pay" feature "*launched by Alibaba's Ant Financial affiliate, lets users take selfie to authenticate a digital payment. Facial recognition in China allows students to enter university halls, travelers to board planes*", and employees to enter their office without the

need of ID cards[18]. In addition, such technology is adopted by China Merchants Bank's automated teller machines, while the *Baidu* search provider is planning to roll it out at Beijing's main airport for the "face as boarding pass" capability[19].

Several firms are employing such technology in their system. Among these, "*Dahua's facial recognition system is currently the deepest network among facial recognition systems*", while "*Hikvision Digital Technology claims to be the world's largest maker of surveillance technology*", as "*users apply this solution to blacklist criminals and prevent admission of known offenders to venues like sports stadiums, parks, and casinos*". SenseTime "*has a growing business relationship with the government and large data sets of a vast population*". Face++ has been "*ranked 11 out of 50 on MIT's list of the world's smartest companies*". Its technology already "*powers popular*

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[14] Reuters*, Big brother close ups boost China's tech sector*, Published on November 13, 2017, https://www.reuters.com/video/2017/11/13/big-brother-close-ups-boost-chinas-tech?videoId=372965479.

[15] Deena Zaidi, *Inside China's growing use of facial recognition technology, Op. Cit.*

[16] *Smile to enter: China embraces facial recognition technology*, Published on September 7, 2017, from minute 1:46 to minute 2:10, https://www.youtube.com/watch?v=0R2ve-5a4Ag.

[17] *Smile to enter: China embraces facial recognition technology*, from minute 2:32 to minute 2:40, *Op. Cit.*

[18] Deena Zaidi, *Inside China's growing use of facial recognition technology, Op. Cit.*

[19] Meng Jing, *From travel and retail to banking, China's facial-recognition systems are becoming part of daily life, Op. Cit.*

applications like Alipay and Didi Chuxing"[20]. This start-up, valued $1 billion, is a leader in the Chinese market[21]. Xie Yinan, the company's cofounder, affirms that his company's technology has already helped the police catch more than 3,000 fugitives: "*It's just like in the films. The police no longer needs to manually look for someone from thousands in the camera. The video network automatically detects and alerts them*"[22]. He also affirms that "*other countries, especially the U.S. have similarly advanced technology, but China is the first to really implement this*"[23].

Yitu Technology, leading pioneer in artificial intelligence, has a system of cameras in its Shanghai headquarters recording anyone entering the building and tracking them inside. An AI algorithm recognizes faces and plots the movement of their owners on maps of each floor. There is also a large screen identifying anyone who stares at it and then playing videos of their recent movements[24].

Such technology is making its way through the fast-moving consumer goods industry too. The fast-food chain KFC uses the "Smile to Pay" application. A video promoting the company's 30th anniversary in the Chinese market says that "*powered by facial recognition technology and massive*

databases, the AI screen is able to read customer's facial features and automatically recognize his/her age, gender, mood index, ecc. And welcomes costumers with a personalized pep talk and customized meal package. The screen remembers faces and keeps tracks of orders. On the second visit, a customer can reorder his/her favorite food with just one click"[25].

These are all the latest example of how Beijing is moving ahead of the rest of the world to lead the AI field.

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[20] Deena Zaidi, *Inside China's growing use of facial recognition technology, Op. Cit.*

[21] *Smile to enter: China embraces facial recognition technology*, from minute 1:46 to minute 2:10, *Op. Cit.*

[22] Sijia Jiang, *Backing Big Brother: Chinese facial recognition firms appeal to funds, Op. Cit.*

[23] *Smile to enter: China embraces facial recognition technology*, from minute 2:51 to minute 2:58, *Op. Cit.*

[24] Zigor Aldama, *China's big brother: how artificial intelligence is catching criminals and advancing health care, Op. Cit.*

[25] *Baidu + KFC Facial Recognition Technology*, published on December 14, 2017, from minute 0:57 to minute 1:34, https://www.youtube.com/watch?v=ZfqXC5g_UyI.

Given its growing number of public and commercial applications for facial recognition, China is making this technology a part of people's everyday life[26].

Xinjiang, the Muslim region, is pioneering the Big Brother tech power

Technology used to control huge amounts of people is not something new in China. Facial recognition is a big part of Beijing's two-year-old domestic surveillance upgrade campaign called *Xue Liang*. In fact, Xinjiang, a region bordering Pakistan and Afghanistan home to about 10 million Uyghurs – a Muslim Turkish-speaking ethnic minority – has become a laboratory for technologies that tracks large groups simultaneously. Some villages are the testing ground for facial recognition systems that "*alert authorities when targeted people venture more than 300 meters beyond designated "safe areas" – such as – individuals' homes and workplaces*"[27]. In order to create this high-tech digital surveillance regime, "*authorities have lined streets with cameras equipped with facial recognition software, created a DNA database intended to include all residents, labeled each resident as "safe" or "unsafe," and installed ID readers at bus stops, train stations, and shopping malls; those deemed unsafe are not permitted to enter*"[28].
Beijing has intensified its efforts to upgrade security technology after Uyghurs were blamed for deadly attacks in China. The Xinjiang alert system is focused on a region playing a key role in the Belt and Road Initiative[29]. The Chinese government has extended this campaign to Uyghurs studying or working abroad: they have been issued an order to return home threatening to detain relatives of those who don't comply[30].

Limitations and concerns of facial recognition technology

China's growing arsenal of security technology has fueled the growth of a domestic industry: in 2015 – the last time these figures were released – its budget accounted for US$145.8 billion, more than the military one in the same year[31]. This technology has some limitations, as such a heavy reliance on facial recognition could lead to data hacks complying leak loads of sensitive information. Even the slightest inaccuracy in face detection could lead to a wrongful arrest[32]. Facial recognition error

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[26] Meng Jing, *From travel and retail to banking, China's facial-recognition systems are becoming part of daily life, Op. Cit.*

[27] South China Morning Post, *China said to be testing facial recognition system to monitor Muslim-dominated Xinjiang region*, January 18, 2018,
http://www.scmp.com/news/china/society/article/2129473/china-testing-facial-recognition-system-monitor-muslim-dominated.

[28] Bethany Allen-Ebrahimian, *Chinese Police Are Demanding Personal Information From Uighurs in France*, March 2, 2018,
http://foreignpolicy.com/2018/03/02/chinese-police-are-secretly-demanding-personal-information-from-french-citizens-uighurs-xinjiang/.

[29] *China said to be testing facial recognition system to monitor Muslim-dominated Xinjiang region, Op. Cit.*

[30] Bethany Allen-Ebrahimian, *Chinese Police Are Demanding Personal Information From Uighurs in France, Op. Cit.*

[31] *China said to be testing facial recognition system to monitor Muslim-dominated Xinjiang region, Op. Cit.*

[32] Deena Zaidi, *Inside China's growing use of facial recognition technology, Op. Cit.*

rates can be as low as 0.8 per cent, but in practice that would mean eight in 1000 scans could misidentify a murder suspect[33]. Beijing's focus on population control has raised concerns about intrusion on individual privacy. There is the issue of human rights violations, for example when iris scans and fingerprints are made compulsory.

However, there is also concern on potential abuses, as one of the main issues is that "*blacklists could include a wide range of people stretching from lawyers and artists to political dissidents, charity workers, journalists and human rights activists*"[34].

Artificial intelligence as international issue

Fabrice Epelboine, professor at Science Po in Paris and cofounder of Yogosha, providing computer security service, affirms that facial recognition is going to be used more and more: "*the surveillance State is a global phenomenon, it's transforming governance all over the world, whether it's the American governance or the French or European way to see democracy or China, they are all going the same way*". According to the professor, every country able to use such technology will do it[35]. The list of companies using facial recognition is not limited to China: such technology is already available to unlock the Iphone X; British Airways has first installed it at Los Angeles International airport in November and, proving effective at reducing queuing times, the company is now bringing it to Orlando, Miami and New York JFK[36].

Zhu Long, says: "*Technology is just a tool that can be used for right or for wrong. And it's not only about governments*"[37]. Professor Epelboine closes with a warning: "*Nobody really realizes the side effects it is going to have on our political regimes*" as they are all "*going to change deeply because of those technologies and this is a question nobody really asks the people who governs us*"[38]. Zhu Long says that it's not just about governments: given the fact that Internet giants like Google and Facebook are forefront of AI, they should be involved in such concerns too[39].

Xie Yinan, Face++'s marketing and public relations director affirms: "*We are only technology providers, we are neutral*". "*If you go back to the time before there is mobile, before there is the Internet, then of course you had better privacy. But times have to advance with technology*"[40].

Given the fact that the flow of time and technological development are unstoppable, and that, "*the future is already* here", where are we heading to?

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[33] Kinling Lo, *In China, these facial-recognition glasses are helping police to catch criminals, Op. Cit.*

[34] Pei Li and Cate Cadell, *China eyes 'black tech' to boost security as parliament meets, Op. Cit.*

[35] *Smile to enter: China embraces facial recognition technology*, from minute 5:12 to minute 9:20, *Op. Cit.*

[36] Jenny Southan, *British Airways Installs Big Brother-Style Facial Recognition Gates At More US Airports*, March 9, 2018, https://www.forbes.com/sites/jennysouthan/2018/03/09/british-airways-installs-big-brother-style-facial-recognition-gates-at-more-us-airports/#18eadc857456.

[37] Zigor Aldama, *China's big brother: how artificial intelligence is catching criminals and advancing health care, Op. Cit.*

[38] *Smile to enter: China embraces facial recognition technology*, from minute 5:12 to minute 9:20, *Op. Cit.*

[39] Zigor Aldama, *China's big brother: how artificial intelligence is catching criminals and advancing health care Op. Cit.*

[40] Sijia Jiang, *Backing Big Brother: Chinese facial recognition firms appeal to funds, Op. Cit.*

Reference List

Aldama Zigor, *China's big brother: how artificial intelligence is catching criminals and advancing health care*, December 10, 2017,
http://www.scmp.com/magazines/post-magazine/long-reads/article/2123415/doctor-border-guard-policeman-artificial

Allen-Ebrahimian Bethany, *Chinese Police Are Demanding Personal Information From Uighurs in France*, March 2, 2018,
http://foreignpolicy.com/2018/03/02/chinese-police-are-secretly-demanding-personal-information-from-french-citizens-uighurs-xinjiang/.

Baidu + KFC Facial Recognition Technology, published on December 14, 2017, from minute 0:57 to minute 1:34,
https://www.youtube.com/watch?v=ZfqXC5g_UyI

Chen Celia, Jing Meng and Dai Sarah, *Facial recognition to ticketing apps: how tech is helping ease the Lunar New Year travel crush*, January 27, 2018,
http://www.scmp.com/tech/china-tech/article/2130725/facial-recognition-ticketing-apps-how-tech-helping-ease-lunar-new

Chen Stephen, *China to build giant facial recognition database to identify any citizen within seconds*, October 12, 2017,
http://www.scmp.com/news/china/society/article/2115094/china-build-giant-facial-recognition-database-identify-any

Chinese New Year 2018 — Holiday Guide, Traditions, Activities,
https://www.chinahighlights.com/travelguide/special-report/chinese-new-year/

Dormehl Luke, *Chinese police are using facial-recognition tech to catch criminals*, March 13, 2018,
https://www.digitaltrends.com/cool-tech/beijing-facial-recognition-police/

Huang Zheping, *Chinese police are wearing sunglasses that can recognize faces*, February 8, 2018,
https://qz.com/1202075/chinese-police-are-using-facial-recognition-glasses-for-survelliance/

Jiang Sijia, *Backing Big Brother: Chinese facial recognition firms appeal to funds*, November 13, 2017,
https://www.reuters.com/article/us-china-facialrecognition-analysis/backing-big-brother-chinese-facial-recognition-firms-appeal-to-funds-idUSKBN1DD00A

Jing Meng, *From travel and retail to banking, China's facial-recognition systems are becoming part of daily life*, February 8, 2018,
http://www.scmp.com/tech/social-gadgets/article/2132465/travel-and-retail-banking-chinas-facial-recognition-systems-are

Li Pei and Cadell Cate, *China eyes 'black tech' to boost security as parliament meets*, March 10, 2018,
https://www.reuters.com/article/us-china-parliament-surveillance/china-eyes-black-tech-to-boost-security-as-parliament-meets-idUSKBN1GM06M

Lo Kinling, *In China, these facial-recognition glasses are helping police to catch criminals*, February 7, 2018,
http://www.scmp.com/news/china/society/article/2132395/chinese-police-scan-suspects-using-facial-recognition-glasses

Reuters*, Big brother close ups boost China's tech sector*, Published on November 13, 2017,
https://www.reuters.com/video/2017/11/13/big-brother-close-ups-boost-chinas-tech?videoId=372965479

Smile to enter: China embraces facial recognition technology, Published on September 7, 2017,
https://www.youtube.com/watch?v=0R2ve-5a4Ag

South China Morning Post, *China said to be testing facial recognition system to monitor Muslim-dominated Xinjiang region*, January 18, 2018,
http://www.scmp.com/news/china/society/article/2129473/china-testing-facial-recognition-system-monitor-muslim-dominated

Southan Jenny, *British Airways Installs Big Brother-Style Facial Recognition Gates At More US Airports*, March 9, 2018,
https://www.forbes.com/sites/jennysouthan/2018/03/09/british-airways-installs-big-brother-style-facial-recognition-gates-at-more-us-airports/#18eadc857456

Zaidi Deena, *Inside China's growing use of facial recognition technology*, February 15, 2018,
https://venturebeat.com/2018/02/15/inside-chinas-growing-use-of-facial-recognition-technology/

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