

'Forget the Facebook leak'

Brain-reading technology: China is mining data directly from workers' brains on an industrial scale

Saturday 5 May 2018, by [CHEN Stephen](#) (Date first published: 29 April 2018).

Government-backed surveillance projects are deploying brain-reading technology to detect changes in emotional states in employees on the production line, the military and at the helm of high-speed trains.

On the surface, the production lines at Hangzhou Zhongheng Electric look like any other.

Workers outfitted in uniforms staff lines producing sophisticated equipment for telecommunication and other industrial sectors.

But there's one big difference - the workers wear caps to monitor their brainwaves, data that management then uses to adjust the pace of production and redesign workflows, according to the company.

The company said it could increase the overall efficiency of the workers by manipulating the frequency and length of break times to reduce mental stress.

Hangzhou Zhongheng Electric is just one example of the large-scale application of brain surveillance devices to monitor people's emotions and other mental activities in the workplace, according to scientists and companies involved in the government-backed projects.

Concealed in regular safety helmets or uniform hats, these lightweight, wireless sensors constantly monitor the wearer's brainwaves and stream the data to computers that use artificial intelligence algorithms to detect emotional spikes such as depression, anxiety or rage.

The technology is in widespread use around the world but China has applied it on an unprecedented scale in factories, public transport, state-owned companies and the military to increase the competitiveness of its manufacturing industry and to maintain social stability.

It has also raised concerns about the need for regulation to prevent abuses in the workplace.

The technology is also in use at in Hangzhou at State Grid Zhejiang Electric Power, where it has boosted company profits by about 2 billion yuan (US\$315 million) since it was rolled out in 2014, according to Cheng Jingzhou, an official overseeing the company's emotional surveillance programme.

"There is no doubt about its effect," Cheng said.

The company and its roughly 40,000 employees manage the power supply and distribution network to homes and businesses across the province, a task that Cheng said they were able to do to higher standards thanks to the surveillance technology.

But he refused to offer more details about the programme.

Zhao Binjian, a manager of Ningbo Shenyang Logistics, said the company was using the devices mainly to train new employees. The brain sensors were integrated in virtual reality headsets to simulate different scenarios in the work environment.

“It has significantly reduced the number of mistakes made by our workers,” Zhao said, because of “improved understanding” between the employees and company.

But he did not say why the technology was limited to trainees.

Shenzhen police can now identify drivers using facial recognition surveillance cameras

The company estimated the technology had helped it increase revenue by 140 million yuan in the past two years.

One of the main centres of the research in China is Neuro Cap, a central government-funded brain surveillance project at Ningbo University.

The programme has been implemented in more than a dozen factories and businesses.

Jin Jia, associate professor of brain science and cognitive psychology at Ningbo University’s business school, said a highly emotional employee in a key post could affect an entire production line, jeopardising his or her own safety as well as that of others.

“When the system issues a warning, the manager asks the worker to take a day off or move to a less critical post. Some jobs require high concentration. There is no room for a mistake,” she said.

Jin said workers initially reacted with fear and suspicion to the devices.

“They thought we could read their mind. This caused some discomfort and resistance in the beginning,” she said.

“After a while they got used to the device. It looked and felt just like a safety helmet. They wore it all day at work.”

Jin said that at present China’s brain-reading technology was on a par with that in the West but China was the only country where there had been reports of massive use of the technology in the workplace. In the United States, for example, applications have been limited to archers trying to improve their performance in competition.

The unprecedented amount of data from users could help the system improve and enable China to surpass competitors over the next few years.

With improved speed and sensitivity, the device could even become a “mental keyboard” allowing the user to control a computer or mobile phone with their mind.

The research team confirmed the device and technology had been used in China’s military operations but declined to provide more information.

The technology is also being used in medicine.

Ma Huajuan, a doctor at the Changhai Hospital in Shanghai, said the facility was working with Fudan University to develop a more sophisticated version of the technology to monitor a patient's emotions and prevent violent incidents.

In addition to the cap, a special camera captures a patient's facial expression and body temperature. There is also an array of pressure sensors planted under the bed to monitor shifts in body movement.

"Together this different information can give a more precise estimate of the patient's mental status," she said.

Ma said the hospital welcomed the technology and hoped it could warn medical staff of a potential violent outburst from a patient.

She said the patients had been informed that their brain activities would be under surveillance, and the hospital would not activate the devices without a patient's consent.

Deayea, a technology company in Shanghai, said its brain monitoring devices were worn regularly by train drivers working on the Beijing-Shanghai high-speed rail line, one of the busiest of its kind in the world.

The sensors, built in the brim of the driver's hat, could measure various types of brain activities, including fatigue and attention loss with an accuracy of more than 90 per cent, according to the company's website.

If the driver dozed off, for instance, the cap would trigger an alarm in the cabin to wake him up.

Zheng Xingwu, a professor of management at the Civil Aviation University of China, said China could be the first country in the world to introduce the brain surveillance device into cockpits.

Most airline accidents were caused by human factors and a pilot in a disturbed emotional state could put an entire plane at risk, he said.

Putting the cap on before take-off would give airlines more information to determine whether a pilot was fit to fly, Zheng said.

"The influence of the government on airlines and pilots in China is probably larger than in many other countries. If the authorities make up their mind to bring the device into the cockpit, I don't think they can be stopped," he said.

"That means the pilots may need to sacrifice some of their privacy for the sake of public safety."

Qiao Zhian, professor of management psychology at Beijing Normal University, said that while the devices could make businesses more competitive the technology could also be abused by companies to control minds and infringe privacy, raising the spectre of "thought police".

Thought police were the secret police in George Orwell's novel *Nineteen Eighty-Four*, who investigated and punished people for personal and political thoughts not approved of by the authorities.

"There is no law or regulation to limit the use of this kind of equipment in China. The employer may

have a strong incentive to use the technology for higher profit, and the employees are usually in too weak a position to say no," he said.

"The selling of Facebook data is bad enough. Brain surveillance can take privacy abuse to a whole new level."

Lawmakers should act now to limit the use of emotion surveillance and give workers more bargaining power to protect their interests, Qiao said.

"The human mind should not be exploited for profit," he said.

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P.S.

* South China Morning Post. PUBLISHED : Sunday, 29 April, 2018, 9:02pm. UPDATED : Wednesday, 02 May, 2018, 3:08pm:

<http://www.scmp.com/news/china/society/article/2143899/forget-facebook-leak-china-mining-data-directly-workers-brains>

This article appeared in the South China Morning Post print edition as: hi-tech hat mines data from minds of workers.