COVER STORY

Banned, But Not Broken

What happened when SenseTime, one of the world's hottest AI companies, was put on the U.S. Entity List? Not as much as you'd think.

BY AMY HAWKINS — MAY 31, 2020

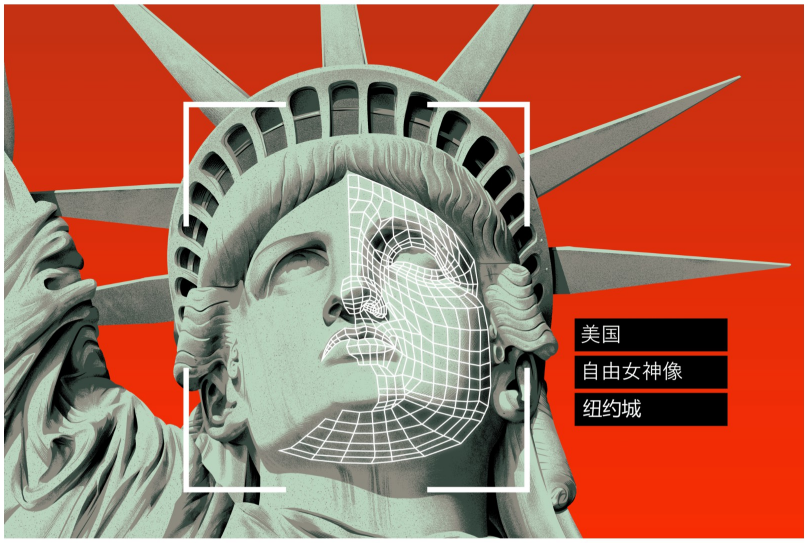


Illustration by Chris Koehler

You won't find SenseTime's name on the building that houses its Beijing headquarters, but its technology guards the entrance. All workers must clear a security check by SenseTime's facial-recognition software, and company employees pass a second face scan to enter their offices.

In its entrance hall, SenseTime, a privately-held company now valued at more than $7 billion, shows off some of the products that made it one of the world's hottest startups in artificial intelligence, and helped the company beat out Facebook's facial recognition algorithm to become the most accurate in the world. By teaching computers to think like humans, AI technologies can replicate functions like speech, hearing and — SenseTime's specialty — vision.

A digital billboard in the lobby, for example, shows how SenseTime-enabled cameras placed in stores capture images of shoppers and then sort them by age and gender, creating valuable demographic data bought by retailers. On another screen, a digital image of a Van Gogh self-portrait — tricked out by SenseTime's motion-detection technology — lets viewers alter the painting with their own facial expressions: stick out your tongue and watch the tortured artist stick his out, too.

SenseTime surveillance software identifies customers' movement patterns at a department store in 2017.
Credit: Reuters/Thomas Peter

SenseTime's technology can even alter your own image. It works with Meitu, a company that sells video editing apps, to offer instant image beautification using your own phone's camera. When I took a photo of myself, the app rendered a version of my face that was thinner and more feminine. Lest that sound like a confidence crusher, visitors to the SenseTime lobby can also pass time in front of a SenseTime-enabled screen that generates an "attractiveness rating" designed to flatter. Everyone gets a high mark.

But there is a far less amusing side of SenseTime's capabilities, one that has placed the company at the center of the deepening political and economic struggles between China and the United States. According to the U.S government and experts in surveillance technology, SenseTime technology has been deployed in Beijing's brutal religious suppression, surveillance and internment of Uighur Muslims, an ethnic minority of 11 million people concentrated in China's northwest province of Xinjiang. Natives to the region have facial features more akin to central Asians than China's majority Han people.

The United States last year placed SenseTime and seven smaller Chinese artificial intelligence companies on an export-control blacklist, saying they were implicated in human rights abuses in Xinjiang. Companies on the list are restricted from buying goods from the U.S., including semiconductor chips that are critical components.

Beijing sees Uighurs as a threat to national unity and considers many suspected terrorists. The U.S. estimates China has rounded up 800,000 to 2 million Uighurs, Kazakhs and other minorities and detained them in extrajudicial "re-education" camps. The Chinese Communist Party calls the camps vocational and educational training centers. Amnesty International calls them "places of brainwashing, torture and punishment," and part of a "government campaign of mass internment, intrusive surveillance, political indoctrination and forced cultural assimilation."

Uighur groups and human rights advocates welcomed adding SenseTime and other Chinese companies to the Entity List. Ziba Murat, a Uighur-American who has been in the U.S since 2005, said the measure was "overdue," and that "American companies should not be complicit in any way with the violation of human rights and the human dignity of any people."

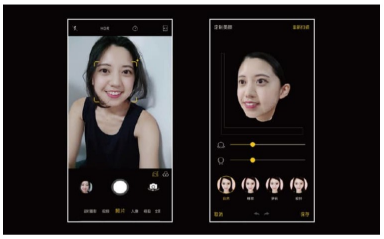
Murat, who lives in Tampa, Fla. has not heard from her mother in Xinjiang since 2018, and suspects she was taken to a camp as retribution for a family member's activism. But the timing of the sanctions in the middle of a trade war created suspicions that the U.S. has an ulterior motive: stopping China from reaching its goal of global primacy in artificial

intelligence. The view in China was that the blacklisting "was an attempt to undercut leading Chinese firms with a gesture to human rights," said Matt Sheehan, author of *The Transpacific Experiment*.

There's little doubt, analysts say, that the U.S. is concerned about China's military development. "Understanding the relevance of AI and machine learning [to military use] is still in the early stages," says Tai Ming Cheung, director at the Institute on Global Conflict and Cooperation at UC San Diego. "But the U.S. is keen to try to limit [China's AI development] because whoever invests and gets ahead will have a first mover advantage."

For its part, SenseTime has strongly denied the accusations made by the U.S. government. In a statement to *The Wire*, the company said: "SenseTime's technology has never been applied for any unethical practices. We strongly deny and contest those claims about SenseTime's involvement in the so-called repression in Xinjiang."

Since SenseTime was named last October, eight more Chinese technology companies have been added to the Entity List. Analysts say it's an unprecedented use of a list that was designed to protect national security, not human rights. And, perhaps more important, if the desired result is to punish SenseTime and others like it — for human rights abuses or for strategic advantage — some question whether sanctions even work.



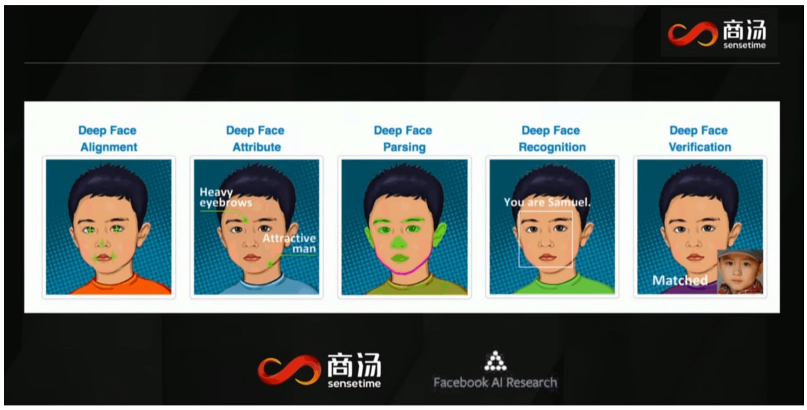
SenseTime's instant beautification technology
Credit: SenseTime

The company's financial backers include some of America's biggest investment and technology firms, such as Fidelity and Qualcomm, the American chip giant. And while American firms have restrictions on selling equipment to SenseTime, the laws do not forbid Americans from investing in the company or buying its products.

A TECHNOLOGY DYNASTY?

In February of 2018, SenseTime's co-founder, Tang Xiao'ou, was in Massachusetts to help announce his company's partnership with MIT in the school's "Quest for Intelligence" initiative, a $1 billion plan to reshape its curriculum and research around artificial intelligence.

Dressed in a sharp grey suit and billed as one of MIT's "featured innovators," Tang's speech opened by adeptly catering to his audience. A picture of his young son flashed on the giant screen behind him as he asked the MIT faculty to remember the face when college admissions time rolled around. Then, admitting that the boy's math scores weren't very good, Tang confided, "I don't think he will make it to MIT. We will settle for Harvard."



Tang Xiao'ou, founder of SenseTime, used his son's face to demonstrate face recognition technology at MIT's Quest for Intelligence.
Credit: Massachusetts Institute of Technology on YouTube

The joke was well received, and Tang seemed at ease being "back home" at MIT, where he himself earned his Ph.D. in 1996. In his introduction of Tang, MIT professor Eric Grimson hailed SenseTime as a "great example of how robust scientific developmental methods can have an impact on real world settings," as well as Tang's "longstanding and close ties to MIT."

MIT's alliance with SenseTime funded 27 research projects at the university involving about 50 faculty. MIT hasn't announced how much SenseTime pledged to support the research. But an MIT spokesperson says SenseTime made three donations to MIT in 2018 via an entity called the MIT Hong Kong Foundation, plus an additional donation in 2019, and that the four gifts added up to more than half of SenseTime's pledge to the school. Tang also made a donation to MIT in 2019, the spokesperson said.

MIT disclosures to the government show three donations from the MIT Hong Kong Foundation totaling $8.5 million in 2018. A person familiar with the matter said the company's 2019 donation to the school was in the range of $1 million to $4 million.

A native of China, Tang later moved to Hong Kong to teach computer science at the City University of Hong Kong (CUHK). In 2001, he established the CUHK Multimedia Laboratory, which is devoted to computer vision.

In 2014, the lab unveiled its DeepID facial recognition software, which won an international competition with an identification accuracy rate of 98.5 percent — better than human eyes. That same year, thanks to an initial $10 million investment from the American venture capital firm IDG (now Chinese owned), Tang founded SenseTime alongside Xu Li, a young computer scientist with a CUHK doctorate who now serves as chief executive officer. Tang remains "very active at the company," a SenseTime spokesperson says.

Xu is upfront about SenseTime's grand vision of leveraging artificial intelligence into a new era of Chinese greatness. As Xu describes it, SenseTime's name in Mandarin — *shang tang* — invokes a storied emperor from the 16th century B.C. and a dynasty that lasted over five centuries and was known for its early scientific discovery.

"The Shang Dynasty is the first regime with written records in China, and its first king was Cheng Tang," Xu explained in an interview with a Chinese media site. "So the name SenseTime — Shang Tang — tells the people that we hope to echo past glories and [put] Chinese technologies in the leading leagues."

SenseTime CEO Xu Li discusses AI with a Chinese media site.
Credit: EqualOcean

But the company has, from its inception, tried to distance itself from sensitive political issues when dealing with foreign partners and focusing instead on its academic credentials. Xu says that the company is behind only Microsoft and the Carnegie Mellon School of Computer Science in papers published in the computer vision field — Xu himself has published over 50 — and in 2016, the company became the first Asian representative on Nvidia's list of leading AI laboratories.

But while Tang speaks about U.S. college rivalries and the company espouses the importance of academic partnerships, Tang's MIT slideshow also underscored one of SenseTime's competitive advantage: its ability to operate unhindered by privacy laws. In order to train computers and break accuracy records, SenseTime has had to collect, share, and digitize a multitude of faces. Tracing that progress, year by year, Tang's presentation showed that the number of faces under study grew from 300,000 in 2015 to 200 million by 2017.

"China's mass surveillance ambition is national," says Maya Wang, senior researcher at Human Rights Watch in Hong Kong. "Xinjiang is only the more intrusive and visible end of

[the] spectrum"

The Chinese aren't altogether comfortable with the spread of facial recognition technology — one recent poll showed that 74 percent of them favored traditional forms of identification — but opponents aren't in a position to do much about it, least of all the minorities in Xinjiang.

According to Nicole Morgret, a project manager at the Uyghur Human Rights Project, a Washington, D.C.-based NGO, Uighurs in Xinjiang who are not detained live a life of near total surveillance.

"Uighurs are forced to go through checkpoints," she says, "and facial recognition is used to ensure they match their ID card. It is part of the system of controlling the movement of Uighurs."

The year SenseTime was founded, 2014, was also the year that China's president Xi Jinping launched his "strike hard" campaign in Xinjiang. Terrorist attacks by Uighur militants had taken dozens of civilian lives in Xinjiang and other parts of China, and decades of government efforts to establish control and populate the region with more ethnic-Han Chinese had failed to quash separatist elements among Uighur and other Muslim minorities, the government contends.

Xi moved security forces into the region to attack suspected terrorist enclaves. Uighurs were rounded up, a precursor of larger detentions to come, and authorities began to systematically identify and track Uighurs nationwide.

A perimeter fence around a "vocational skills education center" in Xinjiang in 2018. Police detained two Reuters journalists for more than four hours after the photo was taken.
Credit: Reuters/Thomas Peter

SenseTime's sales grew as the state started allocating funds for artificial-intelligence development and security and surveillance systems, including smart-cameras and visual recognition systems. It had other government patrons as well. The state-owned Bank of China and C.I.C.C., a state investment bank whose former chairman, Wang Qishan, is now China's vice president, were early SenseTime investors. Alibaba, China's mammoth e-commerce purveyor founded by Jack Ma, lead a $600 million funding round in 2018.

Shortly after that milestone, the Ministry of Science and Technology named SenseTime to China's "National Team" of artificial-intelligence innovators, joining much bigger companies like Alibaba, Baidu and Tencent.

SenseTime's breakout came as the Chinese Communist Party was setting its sights on global technology dominance. At his speech at the 2017 National Congress of the Chinese

Communist Party, President Xi told a room of 2,000 delegates that artificial intelligence was a top priority. The government called for a world-leading AI industry by 2030, generating about $150 billion and related-industry revenues 10 times that.

Local governments in China stepped in too, offering subsidies to AI startups, including SenseTime, to build research centers in their regions, according to analysts. SenseTime also announced deals beyond China's borders, partnerships with the governments of Malaysia and Abu Dhabi.

Back in China, even though the authorities kept a tight lid on access to Xinjiang, reports began leaking out about the camps and international condemnation focused on China's use of AI and its burgeoning surveillance system. A dark shadow fell over SenseTime's particular expertise, facial recognition software, and SenseTime moved to curb its profile in security work.

A few months after the MIT launch, the company sold its 49 percent stake in SenseNets, a joint venture it had formed with NetPosa, a video processing company. The decision was made "out of business considerations," said Kang Ho, a SenseTime spokesperson.

Victor Gevers, a Dutch hacker who hunts for privacy breaches, later discovered that SenseNets had left personal information unsecured for months on the Internet, including location-tracking data on over 2.6 million people in Xinjiang. The people were tagged with ethnic identifications, and 28 percent were Uighurs.

"It was clearly meant as a database for security purposes," says Gevers.

In September 2018, before the disclosures, SenseTime had raised $1 billion, its largest financing round ever, from Softbank and the Chinese venture capital fund Huaxing. But it continued to distance itself from businesses that might arouse criticism, including exiting its joint venture with Tangli Technology, which provided data analysis and surveillance for police in Xinjiang.

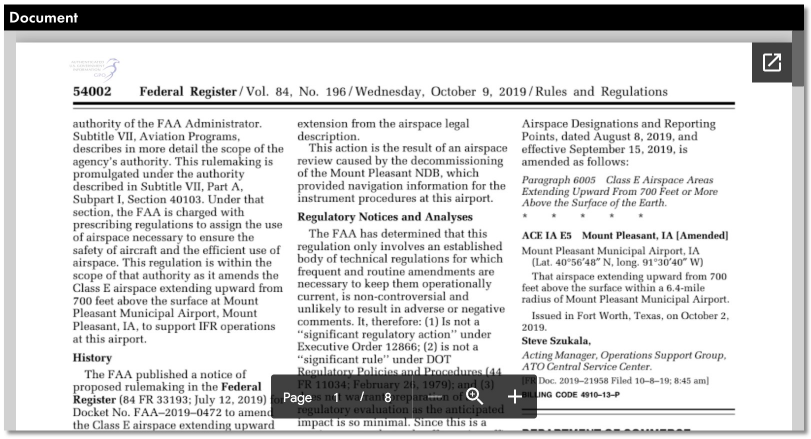
SenseTime, though, insists that its technology was not used in Xinjiang and also said it is committed to finding solutions to the ethical dilemmas now facing the market. In a statement to *The Wire,* the company said: "We welcome the global debate on the ethics and sustainability of AI technology development. This is an important debate which must involve the academic community, regulators and the technology industry, and should be made independent of political motive. Together with partners, SenseTime continues to work to promote fair, responsible and legally compliant applications of AI technology."

Indeed, the company says many of its customers are private companies in medical diagnosis, education and entertainment. It denies doing business with security forces in Xinjiang. But a month before SenseTime was blacklisted, Xu told *Bloomberg News* that the company's technology was used by police who bought through third parties. Some government contracts come from "state-owned companies with a focus on smart-city applications," says SenseTime's Kang.

The company also acknowledged, in a 2018 interview with Evan Osnos in *The New Yorker*, that it works with China's police, or public security bureaus.

HOLES IN THE BLACKLIST

To be added to the Entity List, which was established in 1997, the Commerce Department must determine that an entity (typically a business) is involved in "activities contrary to the national security or foreign policy interests of the United States."



SenseTime was added to the Entity List Oct. 9, 2019. The addition is shown here in the Federal Register.

Historically, that has included exports of technology that could be used to produce weapons. But when the Commerce Department named SenseTime and seven other Chinese AI companies to the list last autumn, in the midst of highly tense trade talks, it said the firms "have been implicated in human rights violations and abuses in China's campaign targeting Uighurs and other predominantly Muslim ethnic minorities" in Xinjiang. It was seemingly the first time the list was being used to punish companies for human rights abuse.

Washington's concern that U.S. products were supporting intrusive surveillance in China were not unfounded. A study by IPVM, a website that specializes in covering the surveillance and security industry, found requisitions by at least eight police projects in China that were aimed specifically at detecting Uighurs. These types of servers are similar to those used by SenseTime for facial recognition, and are powered by chips from U.S. companies such as Intel, Qualcomm or Nvidia.

Nvidia and Qualcomm declined to comment. William Moss, a spokesperson for Intel, said, "while we do not always know nor can we control what products our customers create or the applications end-users may develop, Intel does not support or tolerate our products being used to violate human rights." He added that the company wasn't aware of its business partners being involved in the police requisitions.

Nvidia, Intel and Qualcomm could lose billions in sales if the sanctions against SenseTime and other Chinese AI companies are strictly enforced. But many experts believe the U.S companies continue to supply SenseTime via loopholes and workarounds in the sanctions.

"In theory, [U.S. companies] can't ship U.S. chips or any technologies to SenseTime and that should seriously undermine SenseTime's ability to expand its business," says Mark Li, a semiconductor analyst at Bernstein Research. But "in practice these U.S. suppliers find ways to partially circumvent the ban."

Paul Triolo, an analyst at the Eurasia Group in New York, believes some companies on the list are simply buying the U.S. semiconductors from "unofficial resellers" — foreign middlemen — while others were stockpiling GPUs in anticipation of their entry on the list.

In a statement to *The Wire*, SenseTime board member Xu Bing said the company had "a sufficient level of hardware reserve," noting that they had been preparing for sanctions for some time, although the company declined to say how long the reserve would last.

Another circumvention of the blacklist relies on the details of the export restriction, which applies to completed products in which at least 25 percent of the value is of U.S.-origin. Nvidia and other U.S. chipmakers design and market their products, but often outsource the

manufacturing to contractors like Taiwan Semiconductor Manufacturing Company. U.S. companies could evade the export restriction by claiming an input value below 25 percent.

American companies realized the 25 percent rule represents a "very large loophole in the way that the law is written for export controls," says Doug Fuller, an associate professor at City University of Hong Kong.

The aftermath of the Entity List naming also highlights how intertwined U.S. and China business interests have become. In addition to being suppliers, U.S. firms are among the biggest investors in SenseTime, including Qualcomm, which has a joint venture with SenseTime, the Tiger Global hedge fund, Silver Lake and Fidelity. These firms stand to see their stakes devalued if the U.S. sanctions damage the company.

While SenseTime's 2019 revenues — about $750 million, according to PitchBook — represent a slowdown from past rates, they were still a hefty increase from 2018. This tracks with Huawei's experience after being added to the Entity List: the company reported that 2019 revenues grew by 18 percent, despite being blacklisted in May.

Neither the blacklisting nor America's calling out of SenseTime on human rights appears to have prompted major American divestments. Silver Lake, Qualcomm, Tiger Global, and Fidelity are still listed by Pitchbook as investors.

Among them, only Fidelity commented. "We recognize the valid concerns being raised around the use of surveillance technology in Xinjiang province," its statement read. "We have continued to engage with [SenseTime] on this matter and have been assured of their strict compliance procedures. We will continue to monitor this issue closely and to assess whether we need to take further action."

For its part, MIT said it would review its relationship with SenseTime after the blacklisting. MIT also told *The Wire* it won't be returning the company's donations supporting the research.

"SenseTime provided a gift to MIT that allows unrestricted MIT research in human and machine intelligence," said Richard Lester, the associate provost at MIT. "These are MIT-generated ideas and research projects selected by MIT faculty. The results will be open and publishable," he added, and any intellectual property "belongs solely to MIT."

While policymakers in Washington may balk at the idea of American research being used in China, much of the AI research from universities, including MIT's, is generally published on open-source platforms. It is not only difficult in practice to stop code from crossing borders, it also goes against academic norms.

"We don't have clear mechanisms or tools for blocking the exchange of ideas," says Sheehan, and there is a "big debate about how much we want to get into the business of regulating it."

In the end, then, despite the expectations that the sanctions would strike at the heart of China's AI ambitions, the fallout has been muted. Some analysts even question whether blocking collaboration could backfire and undermine American interests.

“Despite the expectations that the sanctions would strike at the heart of China's AI ambitions, the fallout has been more muted.”

Decoupling AI is "always seen as a trade-off between innovation and security," says Samm Sacks, a cybersecurity fellow at New America, a Washington think tank. "But I think there is a risk in losing visibility into where China's capabilities are."

The export ban could, for instance, speed up China's efforts to develop its own top-notch semiconductors to reduce its heavy reliance on U.S. imports.

"I wouldn't bet against China's ability to develop good-enough replacements in the medium to long term," says Sheehan.

Although using the Entity List on behalf of the Uighurs has raised the profile of their plight, how much it has helped them is open to debate. While Morgret, at Uyghur Human Rights Project, calls the sanctions "a major step" and "the most concrete action that has been taken to respond to the Uighur crisis so far," other activists say it's not enough.

"For me, the sanctions on companies such as SenseTime [are] symbolic at best, because they are not the only ones providing such technologies to the Chinese government," says Otkur Arslan, a Uighur activist in the Netherlands. "Meanwhile, I haven't seen any signs of improvement" in Xinjiang.

Amy Hawkins is a journalist who has written extensively about China. For three years she lived in Beijing, where she reported on tech, society, business and culture for the likes of *Foreign Policy*, *The Guardian*, *The Sunday Times* and others. She now works in London for *The Economist*. @XLHawkins

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COVER STORY

Pole Position

BY EYCK FREYMANN

In public, Chinese diplomats and climate negotiators deny that they see any link between climate change and geopolitics. But there is a deeply cynical consensus within China's academic and policy communities that climate change creates geopolitical opportunities that China can exploit — and must exploit before its rivals do. Greenland was the proof of concept for this strategy. And it caught the U.S. flat-footed.

THE BIG PICTURE

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Q & A

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