



The China AI and Autonomy Report

A biweekly newsletter on AI and autonomy developments in China

Happy New Year and welcome to the China AI and Autonomy Report, a biweekly newsletter published by CNA. [Read in browser](#). While many of us took time off for the holidays, PRC AI and autonomy-related news did not. As a result, this newsletter is longer than previous ones. In this issue, we cover the release of two new PRC five-year plans on robotics and intelligent manufacturing. The Cyberspace Administration of China (CAC) has issued new regulations on algorithms used to influence consumer behavior. The *Washington Post* reports on US investment in PRC technology companies. SenseTime conducted its delayed IPO after US sanctions. Chinese military media outlets have continued their regular series of articles on the future of warfare featuring AI and unmanned systems. Researchers at the Chinese Academy of Sciences have developed an AI prosecutor that can file its own charges.

We wish all of our readers a safe, healthy, and happy 2022.

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MILITARY AND NATIONAL SECURITY

The *Washington Post* carried an extensive article on US government concerns over the possibility that foreign investors are inadvertently helping the People’s Liberation Army (PLA) improve its capabilities by investing in PRC-based dual use technology companies—including AI capabilities. According to the [article](#), a number of PRC technology firms benefit from significant levels of foreign investment—including in technologies that could improve the PLA’s warfighting capabilities—without publicly disclosing their links to the PLA. The article argues that “American capital may be flowing to a variety of [PRC] companies developing artificial intelligence, semiconductors and other advanced technologies that experts fear could have military or surveillance applications as well as civilian uses—a type of technology known as ‘dual use.’” The article notes that PRC dual-use technologies often do not face the same investment and export restrictions from other countries as do more overtly military technologies and discusses examples of foreign investment in PRC firms focusing on AI, data mining, and cybersecurity. According to the [article](#), “the White House has held senior- and Cabinet-level meetings on the issue but has not developed a specific proposal.”¹

The *Washington Post* also reports that its analysis of more than 100 Huawei PowerPoint presentations suggests that “the company has had a broader role in tracking China’s populace than it has acknowledged.” According to the [article](#), Huawei, a PRC information and communications technology giant and a world leader in smart phone technologies, has marketed its products as being able to “help [PRC] government authorities identify individuals by voice, monitor political individuals of interest, manage ideological reeducation and labor schedules for prisoners, and help retailers track shoppers using facial recognition.”

The *Post* found that Huawei has worked with DeepGlint, a company that has been sanctioned by the US Commerce Department for alleged human rights abuses in Xinjiang, to develop the “One Person One File” facial recognition system advertised as helping police in Xinjiang capture criminal suspects. It also found that Huawei codeveloped the “iFlytek Voiceprint Management Platform” with iFlytek, a PRC AI company that has also been sanctioned by the Commerce Department for alleged human rights abuses. The platform is advertised in the PowerPoint slides as being able to identify individual voices using a large database of voiceprints.²

PRC internet and AI giant Baidu has signed a cooperation agreement to become a “lunar exploration and aerospace engineering artificial intelligence global strategic partner” with the China National Space Administration (CNSA). According to [Pei Zhaoyu](#), deputy director of CNSA’s Lunar Exploration and Space Engineering Center, “AI can realize autonomous operation of spacecraft and provide basic capabilities for future space systems, especially deep space exploration.” Pei also expressed hope that CNSA could leverage Baidu’s expertise in driverless cars to develop lunar rovers.³

Ethiopian government forces have been successful in turning back a Tigrayan rebel advance on the capital of Addis Ababa with the use of PRC-manufactured unmanned aerial vehicles (UAVs). The *New York Times* [reports](#) that the Ethiopian government’s victory was aided by UAVs it has received from the United Arab Emirates (UAE), Turkey, and Iran—and notes that the UAE-supplied drones were manufactured in the PRC.⁴ The Dutch non-governmental organization PAX, a self-described peace organization, [identifies](#) the aircraft as Wing Loong UAVs based on commercial satellite imagery of an Ethiopian airbase.⁵ According to the *New York Times*, Ethiopia’s success in using drones “adds the country to a growing list of conventional conflicts, like those in Libya and Nagorno-Karabakh, where combat drones have become a significant factor in the fight, or even the dominant one.”

PRC Foreign Ministry calls for P5 talks on the use of AI. Fu Cong, director-general of the PRC Foreign Ministry's Department of Arms Control, stated that the five permanent members of the United Nations Security Council (P5) should talk "more directly" about global security (see article [here](#)). According to Fu, "strategic stability goes beyond nuclear. Our idea is to expand the subject of the P5 process so we could discuss not only the nuclear issues, but also other issues related to strategic stability, including outer space, missile defense, even AI and other emerging technologies." Fu delivered the remarks during a briefing to reporters following a joint statement signed by the P5 pledging to avoid a nuclear war.⁶

UNMANNED SYSTEMS

A China Military Online article discussed the use of several unmanned systems by the PLA Shenyang Joint Logistics Support Center. The [article](#) discusses several systems, including wheeled unmanned ground systems that can haul 600 kg of supplies and conduct reconnaissance, tracked unmanned ground systems for explosive ordnance disposal and decontamination of contaminated areas, and UAVs that can spray disinfectant over contaminated areas.⁷

A Xinhua article discussed three methods for coordinating the actions of manned and unmanned aircraft. According to the [article](#), true interoperability between manned and unmanned aircraft is not yet achievable. However, it offers three methods for coordinating UAVs with manned aircraft operations; all involve the use of a "rear area control system," which is presumably ground based.

- In the first method of coordination, the actions of the UAV(s) are controlled completely by the rear area control system. The UAV(s) feed sensor images and other data to the manned aircraft and can participate in counterair and ground/maritime attack with manned aircraft.
- In the second method of coordination, the flight of the UAV(s) is controlled by the rear area control system, but the sensors and weapons systems can be operated by the manned aircraft.
- In the third method of coordination, the manned aircraft takes full control of the UAV(s) after they are launched by the rear area control system. During the mission, the rear area control system monitors the performance of the UAV(s) and can take over control, when necessary.⁸

The PLA Air Force Airborne Corps has used drones to supply troops in exercise. The state-owned *Global Times* [reports](#) that during an exercise in Yunnan Province, a medium lift rotary wing UAV supplied troops with 50 kilograms of ammunition. During the same exercise, a heavy lift UAV was used to transport a "wounded" soldier to medical treatment.⁹

FUTURE WARFARE

A China Military Online article discussed command and control (C2) issues in future wars using AI. The article, titled "[Planning, Designing, and Organizing the Implementation of Future Wars Requires an Analysis of the Changes in the Operational Command Link.](#)" argues that AI will accelerate the evolution of command linkages, but that humans will retain a decisive role in decision-making. Counterintuitively, the article argues that the more that AI is integrated into command decision-making, the more important the role of humans will become. According to the article, "regarding some major issues related to the overall situation, such as who to fight, where to fight, and what goals to fight, the decision-making power must always be firmly controlled by humans, and machines must not be allowed to make decisions. Otherwise, a war may continue to escalate or even break away." In this context, the article argues that the role of AI will be limited to situation analysis and analysis of major problems.

The article also argues that command links will increase and become more important (and vulnerable) in future wars. Future warfare will require linking multiple services across multiple domains to achieve true interoperability and linking military commands with government command organizations to achieve a whole-of-nation effort. The proliferation of command links, however, will expose militaries to increased attempts to disrupt their C2 process. This situation will require not only better efforts to defend military networks but also improved efforts to protect technology supply chains from disruption and compromise so that foreign adversaries cannot deny the PRC critical technologies. The increased vulnerability of command links will also require command decision-making systems to become more adaptive and resilient.

Finally, the article argues that operational command links must be tested and improved through simulation and wargames.¹⁰

China Military Online continued its series on “The Winning Mechanism of War” with an article on achieving operational advantage through the continual evolution of AI systems. The article, titled [“Discussing the ‘Winning Mechanism’ from the Standpoint of Improving Operational Systems,”](#) argues that in future war, the advantage will go to the side whose organizational system can best learn from and adapt to new situations. The evolution of operational systems involves not only the upgrading of weapons and equipment but also the adaptation of organizational systems to new situations. According to the article, the longer a war lasts, the more important evolution becomes. The side that evolves the fastest will achieve progressively greater advantages resulting in a situation in which “the strong get stronger and the weak get weaker.” Evolution of operational systems can occur in the following four ways:

- *Active evolution* refers to human-directed changes to operational systems.
- *Global evolution* refers to the evolution of humans, weapons, and the combination of humans and weapons. In this type of evolution, virtual reality and augmented reality can improve the ability of personnel to respond to new situations, improvements in AI algorithms can enhance the performance of weapons and equipment, and distributed operations and integrated command systems can bring about changes in organizational structure.
- *Stepless evolution* refers to the ability to upgrade existing weapon systems. In the past, weapons systems were upgraded by replacing platforms with more advanced versions. In future warfare, upgrades to weapon systems will occur with “intergenerational evolution,” which involves replacing existing software with new software, and “intragenerational evolution,” which involves iterative improvement of existing algorithms.
- *Continuous evolution* refers to the evolution that occurs during peacetime and into war. During peacetime, evolution can occur as a result of lessons learned from simulations and training and from real-world peacetime activities such as reconnaissance/counter reconnaissance and “gray zone” operations. During wartime, evolution can occur during repeated iterations of the “stimulation-observation-strike” cycle that can result in rapid adaptations of the operational system.

The article also notes that AI-enabled systems can self-evolve. Operations using AI can be simulated in cyberspace and iteratively evolved without human involvement.¹¹

INDUSTRY

SenseTime launches IPO after US sanctions (see article [here](#)). SenseTime, which specializes in facial recognition and is China's largest AI company, was [sanctioned](#) on December 10 by the US Treasury Department, which accused the company of enabling human rights abuses against Muslim Uyghurs in Xinjiang. The sanctions banned US investment in the company, forcing it to postpone its IPO to December 20. The company raised \$740 million in the IPO, lower than the \$750 million to \$767 million it had hoped to raise before the US sanctions were announced. Nine investors, all PRC institutions, bought about 67 percent of the stock on offer in the IPO. The company increased in value 23 percent from its IPO price on its first day of trading on December 30.¹²

RESEARCH AND DEVELOPMENT

PRC scientists have developed an AI “prosecutor” that can file its own charges. [According to the South China Morning Post](#), the AI prosecutor can file a charge with more than 97 percent accuracy based on a verbal description of the case. The tool was built and tested by the Shanghai Pudong People's Procuratorate, the largest and busiest district prosecution office in China, and holds the potential to reduce prosecutor workloads. The AI prosecutor trained on 17,000 cases conducted from 2015 to 2020 and is able to identify and press charges for Shanghai's eight most common crimes (credit card fraud, running a gambling operation, dangerous driving, intentional injury, obstructing official duties, theft, fraud, and “picking quarrels and provoking trouble”).

According to the project's lead scientist, Professor Shi Yong of the Chinese Academy of Sciences, the machine makes an important contribution because, unlike existing AI tools used in legal settings, it participates in the decision-making process. The article also highlights that the AI prosecutor developed by Shi's team can work on desktop computers, which is important because prosecutors usually do not have access to large computers often required by natural language processing tools.¹³

Developers at China Three Gorges University's Intelligent Manufacturing Innovation Technology Centre have reportedly developed a robot that can read minds. [The South China Morning Post reports](#) that the robot, designed to be used on factory assembly lines, can recognize the intention of its human coworker by monitoring the coworker's brain waves and signals from the coworker's arms. It is not apparent if the robot has been tested in a real-world environment. According to the article, the use of industrial robots in China is increasing at an annual rate of 15 percent.¹⁴

POLICY AND GOVERNANCE

The PRC has published a five-year plan for its robotics industry, aiming to become an innovation hub for global robotics by 2025 (for full text in Chinese, see PRC government website [here](#); for summary article in English from *China Daily*, see [here](#)).¹⁵ The plan aims for the PRC robotics industry to make breakthroughs in core robot components such as speed reducers, servomotors, and control panels, which, [according to an official from China's Ministry of Industry and Information Technology](#), are the three basic building blocks of sophisticated automated machines.¹⁶ The plan also includes a section for strengthening financial support and favorable tax policies for the development of the robotics industry.

The five-year plan anticipates that the operating income of China's robotics industry will grow at an average annual rate of 20 percent from 2021 to 2025. It highlights different categories of robotics innovation for a variety of industries and purposes, from high-end industrial robots for the auto,

aerospace, and railway industries to specialized robots for underwater exploration and deep sea mining.

The PRC also released a five-year plan on intelligent manufacturing, aiming for the majority of large-scale manufacturers to achieve digitization by 2025 (for full text of the plan in Chinese, see Chinese government website [here](#)).¹⁷ By 2025, the PRC plans to have completed the digitization of 70 percent of large-scale manufacturers and the construction of 500 intelligent manufacturing facilities. The plan seeks to cultivate 150 providers of intelligent manufacturing solutions and create a stronger foundation for intelligent manufacturing by establishing industrial internet platforms and revising industry standards.¹⁸

The plan further endeavors to strengthen research on AI, 5G, big data, and edge computing.¹⁹ These goals are contextualized explicitly in the plan by a perception of an increasingly competitive international environment for intelligent manufacturing, citing strategies from the US (Strategy for American Leadership in Advanced Manufacturing), Germany (National Industry Strategy 2030), and Japan (Society 5.0).²⁰ [In an interview with the *Global Times*](#), Zhang Xiaorong, director of the Beijing-based Cutting-Edge Technology Research Institute, offered additional context for understanding the plan, stating that China still needs to catch up in software and industrial infrastructure compared with other leading countries, highlighting that “the industrial software, operating systems and equipment used in China are mainly from foreign brands.”²¹

The PRC’s top internet regulator, CAC, has published a new regulation on algorithms, reining in how companies use them to influence consumer behavior (see full text of regulations from the PRC government website [here](#) and a translation of the regulations [here](#)).²² The new regulation prohibits “algorithmic discrimination,” a practice that has led to differentiated pricing of products and services for different consumers based on their spending habits.²³ Under the new regulation, providers using algorithmic recommendation services must inform users of these services in a “conspicuous manner” and “publicize the basic principles, intentions and main operating mechanisms” of algorithm recommendation services.²⁴

The regulation also stipulates that algorithm recommendation services engaged in news services must apply for a news service license, cannot generate or disseminate fake news, and are prohibited from disseminating information from sources not on the [government’s list of approved news sources](#).²⁵ In addition, new rules also prohibit the use of algorithms to promote monopolistic behavior and to facilitate unfair competition.²⁶ [According to a PRC-based lawyer interviewed by the *South China Morning Post*](#), “tightening regulation [on algorithms] means the disappearance of grey areas and the increase of operating costs [for platform operators],” meaning that “some small and medium-sized internet companies may face difficulties in terms of development, a factor that affects their survival [in the industry].”²⁷ The new regulation will enter into force on March 1, 2022.²⁸

CAC has published final regulations requiring companies with more than 1 million users to submit to an extensive cybersecurity review before listing on foreign stock exchanges.

Bloomberg [reports](#) that the finalized regulations appear to allow PRC companies to list in Hong Kong without a security review (see full text of regulations from the CAC website [here](#) and a translation of the regulations [here](#)).²⁹ In July 2021, CAC launched a [cybersecurity review](#) of the ride-hailing app Didi two days after its IPO on the New York Stock Exchange.³⁰

INTERNATIONAL COOPERATION

During the 2022 Consumer Electronic Show (CES), Baidu and JiDU Automotive announced that Nvidia semiconductors will power its first autonomous electric vehicle model slated for mass production. The vehicle, which is being developed by Baidu and PRC carmaker Geely's joint venture, JiDU Automotive, will use the US-based Nvidia's DRIVE Orin SoC (system-on-a-chip) and will be a level 4 autonomous vehicle, a high level of driving automation that does not require human intervention in most circumstances.³¹ [According to the South China Morning Post](#), Baidu is the first Chinese company to show an intention to launch a mass-production car with level 4 automation, noting that most autonomous driving models on the market are at levels 2 and 2+.³² The level 4 model is scheduled to be fully unveiled at the Beijing Auto Show in April 2022 and to begin mass production and delivery in 2023. At CES 2022, Nvidia presented its latest technologies for autonomous driving, noting that it works with the vast majority of leading New Energy Vehicle companies in China.³³

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