

Opportunities and Challenges in Developing Military AI Applications

By Yixiang Xu



Yixiang Xu, New Research Initiative Fellow at AICGS working on the Institute's China-Germany-U.S. triangular relationship initiative

Incorporating artificial Intelligence (AI) for national defense is a current priority for countries around the world following its rapid development and multitude of applications in the commercial sector. Increased research and development funding from military research agencies are on course to push the global military AI and cybernetics market to a projected \$13.11 billion in 2024 at a compound annual growth rate of 18.66 percent.¹

Currently, militaries around the world are considering a wide range of AI defense applications. These include intelligence, surveillance and reconnaissance, logistics, cyberspace operations, information operations, command and control, semiautonomous and autonomous vehicles, and lethal autonomous weapon systems (LAWS).²

The main benefits of integrating AI into military systems include labor substitution, efficiency, cost reduction,

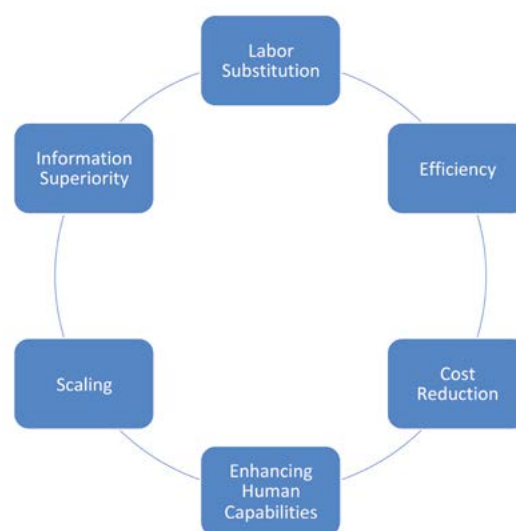
enhancing human capabilities, scaling, and information superiority. AI tools can handle larger volumes of data more efficiently, providing additional analytical capacity for early stage information processing, freeing up human analysts to concentrate on decision-making. AI-enabled tools are especially important in cyberspace operations as they can be trained to perform preemptive and real-time detection, evaluation, and response to network activities on a large scale, thus presenting a more comprehensive and dynamic barrier to attack.³ AI analysis tools could also help to streamline operations and generate greater cost savings.

In the United States, the Department of Defense launched the Algorithmic Warfare Cross-Functional Team (Project Maven) in 2017 to rapidly incorporate AI into existing DOD systems and is committed to spending \$1.75 billion over six years through the Joint Artificial Intelligence Center (JAIC) and \$2 billion to invest in dozens of programs through the Defense

1 "Global Military AI and Cybernetics Market to Reach \$13.11 Billion by 2024." CISION PR Newswire. November 7, 2019. <https://www.prnewswire.com/news-releases/global-military-ai-and-cybernetics-market-to-reach-13-11-billion-by-2024--300953679.html>

2 "Artificial Intelligence and National Security, Updated November 2019." Congressional Research Services

3 Scott Rosenberg, "Firewalls Don't Stop Hackers, AI Might," *Wired*, August 27, 2017. <https://www.wired.com/story/firewalls-dont-stop-hackers-ai-might/>



Advanced Research Projects Agency (DARPA).⁴ China released a national AI strategy in 2017 that heavily relies on military-civil fusion to facilitate AI technology transfer, which has already yielded results in large-scale visual recognition systems. Russia employs a similar centralized AI development approach and has achieved some early success in developing unmanned ground vehicles. Countries including France, Israel, and South Korea are also expanding efforts to deploy and integrate AI tools in their militaries.

These investments hint at a looming global AI arms race. Unlike the nuclear arms race of the twentieth century, AI-enabled machines will not only perform tasks, but also make decisions. Yet so little of their process and performance impact is understood by those who finance their development or are tasked with their operation. AI algorithms can produce unpredictable results, become subject to bias based on training data, and could experience simultaneous failures. The most sophisticated and highest-performing AI algorithms are often unable to explain their processes. In areas of human-machine interaction, the lack of explanation cautions humans to determine appropriate levels of trust in AI systems.

These concerns about AI become more profound with increasing levels of system autonomy. In the case of LAWS, weapon systems that independently identify and destroy targets without manual human control,

serious ethical and legal questions need to be raised regarding their deployment. The United States has so far refused to participate in negotiating legal or political instruments to regulate autonomous AI weapons at the United Nations. Other countries, while voicing concerns, are unwilling to restrict their own autonomous weapons development. Nevertheless, avoiding the possibility of unpredictable, large-scale, and potentially unaccountable destruction brought by LAWS means we must continue to push for an international, legally binding instrument that ensures meaningful human control over weapons systems.

Some efforts are being made to address potential ethical hazards, although more needs to be done to ensure secure, ethical use of military AI. In the United States, the DOD-commissioned Defense Innovation Board released recommendations on the ethical use of AI by the DOD that are consistent with the Law of War and domestic law, establishing a set of high-level ethics goals.⁵ As the development of AI for defense applications moves further along, specific principles should be developed. Amid the increasing public-private partnership in military AI development, governments need to set higher digital infrastructure and cybersecurity standards in the commercial sector, as well as safeguard against exploitation and proliferation with policies including investment screening and export control.

4 "DARPA Announces \$2 Billion Campaign to Develop Next Wave of AI Technologies." DARPA, September 7, 2018. <https://www.darpa.mil/news-events/2018-09-07>

5 "AI Principles: Recommendations on the Ethical Use of Artificial Intelligence by the Department of Defense." Defense Innovation Board, October 31, 2019. https://media.defense.gov/2019/Oct/31/2002204458/-1/-1/0/DIB_AI_PRINCIPLES_PRIMARY_DOCUMENT.PDF

The U.S. Decoupling Attempt Is Too Costly for the World

By Zhexin Zhang



*Dr. Zhexin Zhang,
Assistant Research Fellow
at the Center for Asia
Pacific Studies and
Assistant Director of the
Institute of Taiwan, Hong
Kong, and Macao Studies
at the Shanghai Institute
for International Studies*

Comprehensive and inspiring as it was, the 2019 International Security Forum in Bonn witnessed another step toward the United States decoupling from China, which it accused of “predatory industrial policies,” “violating international law and rules,” and “threatening values of the free world.” This attempt, grounded in accusations that appear unfair, impractical, and harmful to world peace and prosperity, can hardly gain much support from the international community.

It is true that China enjoys significant advantage in global technological, industrial, and commercial competition through its state-led approach (e.g., “Made in China 2025” and the Belt and Road Initiative), and there is much room for China to improve its intellectual property rights protection and ensure an open and fair domestic business environment. Yet, compared with two decades ago, the Chinese market has undeniably become much more open and international rules-based. For instance, China’s average tariff rate has dropped from 45 percent to 6.7 percent; the negative list for foreign investment in specific fields has shortened from 190 in 2011 to 40 in 2019, and Presi-

dent Xi Jinping’s announcement of five new measures to promote China’s opening-up on the second China International Import Expo (CIIE) has further strengthened the confidence of the global business community. Meanwhile, China is making increasing contributions to global governance ranging from tackling climate change and sustainable development to UN peace-keeping and upholding the international system.¹ Considering this progress and the new opportunities China presents to the world, it is senseless to overstate China’s imperfectness and feel victimized by China’s “growing pains.”

Yet, the Trump administration appears keen on decoupling from China by restricting bilateral ties in political, economic, cultural, and other fields. Despite Vice President Mike Pence’s statement on 24 October that the United States does not seek to decouple from China, much damage has been done to U.S.-China relations and the U.S. economy as well, including the ongoing trade war that is projected to cost the U.S. economy billions of dollars and 300,000 jobs²; technological sanctions against Chinese companies that have much

¹ White Paper on “China and the World in the New Era,” September 27, 2019.

² CBS, September 12, 2019

disrupted global industrial chains; increasing limitations to people-to-people exchange that have reduced Chinese visitors to the United States by 20 percent; growing regional tension over Taiwan, Hong Kong, and the South China Sea due to U.S. intervention; and, as this Bonn Forum showcases, a global public opinion campaign to alienate China from all “like-minded countries.” As a result, the Trump administration has begun to encounter a backlash both at home (e.g., some members of Congress have proposed legislation to curb presidential tariff power) and, ironically, from the 192 American enterprises that attended the second CIIE, an 18 percent increase from last year, in spite of the administration’s decoupling advocacy. Opposition has also emerged from abroad (e.g., the UK and Germany seem to hold an open stance to China’s Huawei participating in their 5G network construction); as close partners of the Indo-Pacific Strategy, both India and Japan have openly rejected the scenario of building a geopolitical bloc against China, but rather seek to bring relations with China to “new heights” instead. With the presidential election approaching, the United States’ decoupling goals will be even more difficult to achieve.

That said, if the Trump and later U.S. administrations are determined to further decouple from China, the world will certainly face a gloomy future: the IMF

predicts that the lasting trade war will cost the global economy \$700 billion by 2020, slowing global economic growth to lower than 3 percent and triggering more protectionist and unilateral policies in many countries; as more trade and technological barriers emerge, global investors will have less incentive to invest, further exacerbating unemployment and radical populism in developing and developed countries alike. China’s close economic partners, including EU countries, will be compelled to take sides between China and the United States. Worst of all, a new Cold War may take shape where an isolated and cornered China becomes more politically and economically closed and seeks to expand its sphere of security and economic influence worldwide, which, like the Cold War decades ago, truly reflects the much-hyped notion of today – “one world, two systems.”

Fortunately, this is not a reality yet. As Mao Zedong (and similarly, Carl Schmitt) famously put it, politics is an art to “foster as many comrades (friends) and as few enemies as possible.” Indeed, after three decades of globalization, the interdependent world cannot afford deliberate schisms and manufactured enemies, but rather needs more common understanding and consultation on the shared interests and coordinated approaches among countries, which I hope can become the dominant theme for this Forum next year.



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Contact

Center for Advanced Security, Strategic and Integration Studies
University of Bonn
Römerstraße 164
53117 Bonn, Germany

Prof. Dr. Wolfram Hilz
Acting Director
Phone: +49 (0) 228 73-3553
Email: sekretariat.hilz@uni-bonn.de

Dr. Enrico Fels
Managing Director
Phone: +49 (0) 228/73 62995
Mail: fels@uni-bonn.de

Philip Ackermann
Project Manager
"International Security Forum Bonn"
Phone: +49 (0) 228/73 62972
Mail: philip.ackermann@uni-bonn.de

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Center for Advanced Security,
Strategic and Integration Studies (CASSIS)
University of Bonn
Römerstraße 164
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cassis.uni-bonn.de