



MINISTÈRE DES ARMÉES



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AI and war: Battle algorithm

The Economist, September 7, 2019

Artificial intelligence is transforming every aspect of warfare

AS THE NAVY plane swooped low over the jungle, it dropped a bundle of devices into the canopy below. Some were microphones, listening for guerrilla footsteps or truck ignitions. Others were seismic detectors, attuned to minute vibrations in the ground. Strangest of all were the olfactory sensors, sniffing out ammonia in human urine. Tens of thousands of these electronic organs beamed their data to drones and on to computers. In minutes, warplanes would be on their way to carpet-bomb the algorithmically-ordained grid square. Operation Igloo White was the future of war--in 1970.

America's effort to cut the Ho Chi Minh trail running from Laos into Vietnam was not a success. It cost around \$1bn a year (about \$7.3bn in today's dollars)--\$100,000 (\$730,000 today) for every truck destroyed--and did not stop infiltration. But the allure of semi-automated war never faded. The idea of collecting data from sensors, processing them with algorithms fuelled by ever-more processing power and acting on the output more quickly than the enemy lies at the heart of military thinking across the world's biggest powers. And today that is being supercharged by new developments in artificial intelligence (AI).

AI is "poised to change the character of the future battlefield", declared America's Department of Defence in its first AI strategy document, in February. A Joint Artificial Intelligence Centre (JAIC) was launched in the Pentagon in summer 2018, and a National Security Commission on Artificial Intelligence met for the first time in March. The Pentagon's budget for 2020 has lavished almost \$1bn on AI and over four times as much on unmanned and autonomous capabilities that rely on it.

Rise of the machines

A similar flurry of activity is under way in China, which wants to lead the world in AI by 2030 (by what measure is unclear), and in Russia, where President Vladimir Putin famously predicted that "whoever becomes the leader in this sphere will become the ruler of the world". But the paradox is that AI might at once penetrate and thicken the fog of war, allowing it to be waged with a speed and complexity that renders it essentially opaque to humans.

AI is a broad and blurry term, covering a range of techniques from rule-following systems, pioneered in the 1950s, to modern probability-based machine learning, in which computers teach themselves to carry out tasks. Deep learning--a particularly fashionable and potent approach to machine learning, involving many layers of brain-inspired neural networks--has proved highly adept at tasks as diverse as translation, object recognition and game playing (see chart on next page). Michael Horowitz of the University of Pennsylvania compares AI to the internal combustion engine or electricity--an enabling technology with myriad applications. He divides its military applications into three sorts. One is to allow machines to act without human supervision. Another is to process and interpret large volumes of data. A third is aiding, or even conducting, the command and control of war.