

A STRATEGIC FRAMEWORK FOR MILITARY APPLICATIONS OF ARTIFICIAL INTELLIGENCE

The military advantage in AI will go to the nation with the most strategically focused investments and the most comprehensive enabling environment.

When the concepts for the DOD's current Third Offset were being developed, strategists identified its greatest risk of failure: that the US military would enthusiastically but haphazardly adopt enabling technologies—especially artificial intelligence—in a “peanut butter spread,” instead of focusing investment on high priority areas.

Recognizing this very real risk, the Center for Autonomy and AI at CNA developed a framework for strategic investment by the Navy in artificial intelligence. A new publication by the center recommends that the Navy develop a strategy and implementation plan for AI applications. At the same time, the success of these AI investments depends upon the Navy creating a comprehensive enabling environment.

MAKING THE RIGHT INVESTMENTS IN AI

The publication, *Combat Identification: An Opportunity for Using AI in Warfighting*, gives a framework for deciding on investments in AI around the following key questions:

- Can I?
 - o Is current, narrow AI technology capable of the intended task?
 - o Are sufficient and unbiased data available to inform the intended AI function?
- Should I?
 - o Does it address the most urgent operational plans in the National Defense Strategy?
 - o Does it fill a gap or expected weakness in operational capabilities?
 - o Do peer competitor advances in AI require it?
 - o Could it lower costs and free up scarce resources?

To assist in answering these questions, the Navy should develop an AI strategy to complement the DOD strategy for AI and should support further analysis of peer competitor developments in AI.

The AI investment framework recognizes several limitations on the successful development of military applications of AI. One such limitation is that the Department of Defense operates with limited resources. The Second Offset of the late 1970s and 1980s provides a model of smart and disciplined use of limited resources, with a focus on just a few applications of technology for key capabilities, such as precision-guided munitions and networked information exchange for targeting. These capabilities gave the US a decisive military edge, as demonstrated in Desert Storm. Consistent with this lesson, the AI strategic framework should focus on applications meeting key operational requirements and/or lowering costs and freeing up scarce resources.

A second limitation is the technology of AI itself. For all of the impressive advances of the past few years, the technology is at best many decades away from the human-like, general AI represented by the HAL-9000 in *2001: A Space Odyssey*. Rather, existing narrow AI is successful only with very specific and structured problems, limiting the kinds of applications the Navy should seek. Given that applying AI inherently includes risk of failure—AI is a black-box approach, and success is not guaranteed—early AI efforts should include experimentation with a number of pilot “sprints” to manage risk and maximize learning.

BUILDING A COMPREHENSIVE ENABLING ENVIRONMENT FOR AI SUCCESS

But CNA also recognizes that even the best decisions regarding application of AI will not yield the desired results unless a comprehensive enabling environment is in place. To create that environment, we recommend the following actions:

- Create policy and resourcing for data collection, storage, sharing, and use in AI applications.
- Update intelligence and intelligence requirements for data needed in planned AI applications.
- Address ethical and legal issues such as bias mitigation in the collection of data for AI training.
- Develop test-and-evaluation processes appropriate for non-deterministic and adaptive systems.
- Combine iterative development, experimentation, and assessment to accelerate learning and improvements.
- Consider “AI ready” characteristics in systems and standards that allow periodic AI updates.
- Develop robust training and education to cultivate appropriate trust of AI-enabled systems.
- Analyze human-machine teaming to best divide labor between warfighters and AI systems.
- Become an effective fast follower of critical developments in the tech industry.
- Develop policy for operational AI applications, including use-of-force decisions, to improve AI safety.
- Develop export policy for AI systems, encouraging interoperability with allies while protecting critical technologies.

SUMMARY

The technology of artificial intelligence will revolutionize national security, as it will every area of life. This is an opportunity for the US military, but only if it learns lessons from the past and prioritizes use of technology based on a larger strategy. History also shows that a technological advantage means little unless warfighters complement the technology with a comprehensive enabling environment. For example, the British first invented the tank and led the development of the technology. But the Germans developed the training, doctrine, concept of operations, and organizational structure to use tanks effectively in combat. As a result, German tank battalions regularly outmaneuvered Allied forces in the early years of World War II. As AI transforms military warfare, the advantage will go to the nation with the most strategically focused investments *and* the most comprehensive enabling environment.

CNA CENTER FOR AUTONOMY AND AI

CNA's Center for Autonomy and AI supports the U.S. goal of effectively incorporating autonomy, AI, and related technologies in military capabilities. Throughout history, the ability to adapt technological advances to warfighting has led to fundamental changes in how war is conducted and the tools used in its conduct. Autonomy and AI represent revolutionary technologies in warfare which offer opportunities to the U.S. for countering and deterring emerging threats, addressing security challenges and advancing U.S. national interests. But this opportunity is by no means certain, since autonomy also offers potential asymmetric advantages to near-peer competitors, some of which have been pursuing these capabilities aggressively. Likewise, rapid innovation in the private sector and a commercial research and development sector dwarfing that of the U.S. military create new challenges for the U.S., which will need to quickly identify and integrate cutting edge technological developments in this rapidly changing environment.

Because of the foundational impact autonomy and artificial intelligence will have on the character of warfare, CNA created the Center for Autonomy and Artificial Intelligence to focus on these emerging technologies and their contribution to national security. The Center capitalizes on the ability to leverage the scientists and analysts of CNA's staff of 600, with their experience base in military operations, test and evaluation, security and intelligence analyses, technology assessment, and autonomy and AI.

ABOUT CNA CORPORATION

CNA is a not-for-profit research and analysis organization with 75 years of experience providing government agencies with data-driven insights and real-world, actionable solutions grounded in our direct experience with the operational environments where these solutions are applied. CNA developed the foundational techniques for operational analysis to address complex challenges facing government programs. We have applied these techniques successfully in areas ranging from defense to aviation, education, justice, and homeland security.

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