Government Business Council

Booz | Allen | Hamilton

Human-Machine Teaming: Top 5 Takeaways

Major points made at the Genius Machines: The Next Decade of Artificial Intelligence Summit

Since their emergence in popular culture, robots have always cultivated a certain sense of hesitation — the very first appearance of the word "robot" in popular fiction, a 1920 science fiction play by Czech writer Karel Čapek, ends with a complete labor displacement and eventually a robot revolt. The idea that one day, robots will gain consciousness and take over is inherently ingrained in the concept of artificial intelligence (AI).

There is a reason, though, that these stories are found in the fiction section of the bookstore. In reality, leaders in the public and private sectors are using AI to save costs, increase efficiencies and drive innovation. This relationship between AI and government and military organizations was the topic of discussion in "Human-Machine Teaming: Understanding How Humans & Machines Will Work Together," the opening session in the Defense One and Nextgov event exploring the current and future implementations of AI.

Government Business Council (GBC) attended the session in order to better understand the views of senior Department of Defense (DoD) leaders and experts as they relate to AI and its relationship with human operatives. The following are GBC's top five takeaways.

AI is not coming to replace human capital jobs

Fundamentally, AI programs are built on the data and processes compiled and managed by people. To maintain consistency, AI algorithms use this data to find connections, parallels and similarities, and use that info to provide analysts with a recommendation. The level of an AI's effectiveness is only as high as the data it is working with. "A lot of our AI discussion is really agent-driven," said Dr. John Paschkewitz, Acting Deputy Director, Defense Sciences Office, DARPA, "there is great opportunity to lift the productivity of collective work."

> "A lot of our AI discussion is really agent-driven."
>
> Dr. John Paschkewitz, Acting Deputy Director, Defense Sciences Office, DARPA

Most of the time, organizations that employ AI strategies are not trying to replace analysts; rather, they are attempting to augment their analysts' abilities — either by taking over the more time-consuming or monotonous aspects of the data process, increasing the speed at which analysis can be done or by enhancing analysts' training. Big decisions will always

be made by humans, because ultimately it is humans that will have to manage consequences. “We are not replacing sailors and marines when we do this,” said Brigadier General Frank Kelley, Deputy Assistant Secretary of the Navy (Unmanned Systems), Office of the Assistant Secretary of the Navy.

Effective human-machine teaming needs to consider people first

As humans and machines work alongside each other more and more, sharing data and analysis, building the machines with humans in mind is more important than ever before. “Paradoxically, you almost have to take a humanistic approach to the implementation of AI,” said said Eric Druker, Director, Data Science and Machine Intelligence, Booz Allen Hamilton. He added that designing these systems in collaboration with the individuals that will use them is critical to earning their support and adoption.

> “Paradoxically, you almost have to take a human approach to the implementation of AI.”
>
> Eric Druker, Director, Data Science and Machine Learning, Booz Allen Hamilton

Humans and machines are good at very different things. Leaders should consider what people and machines bring to the table, and design technology and strategies that will make each as effective as possible. Humans are held up as the standard, but humans are not perfect. Organizations need to think about the natural faults within their analysts. Organizations will need to ensure that they are not introducing or reinforcing any analyst biases in new AI processes.

Naturally, organizations are going to have to decide which aspects of their processes they are comfortable giving to a machine, and how doing so will improve the analysts’ ability to make decisions. “There is an underlying question of autonomy,” said Dr. Paschkewitz, adding that organizations will have to “Choose where their risk resides.”

Leadership will need to be aligned to make progress

“You’re not going to get anywhere unless leadership is aligned with you,” said General Frank Kelley. He credits the Department of the Navy’s success in AI development to leaderships’ complete alignment on the potential of unmanned systems. “Sailor and Marines within the Department of the Navy are ready to embrace and form the future of where we are going to go.”

It all comes down to trust. How can we get users to trust machines enough to use them to their full potential? Leaders and analysts need to be able to interpret the data machines produce, and also understand how the machine came to the decision it did. All of this requires strong user interfaces and user experiences, as well as transparent, specific and sound reasoning behind how the machine reaches a certain decision.

Druker added that rather than racing to use the latest technology, organizations could stand to gain from taking a step back and using less-sophisticated approaches that are more familiar to analysts, in order to better show them that the machine does not invent information; rather, the system is trained on the analysts’ knowledge base.

Public-private partnerships will be critical

“In the commercial sector, about 70 percent of large organizations are using robotic process automation to begin automating lower-level tasks at the enterprise level,” said Druker, “in a research poll recently conducted that looked at technology’s use in the federal government, only 50 percent of federal employees [surveyed] who were in a position to utilize that technology were aware it existed.”[1]

That is not to say it will be easy to simply port over technology and processes from the private sector and reskin them for military purposes. “The battlefield environment is highly unstructured, it is highly dynamic, it is adversarial in nature and it might be resource-constrained in ways that civilian applications are not,” said Dr. Danielle C. Tarraf, Information Scientist, RAND Corporation. This creates a new set of

challenges that private sector companies do not typically have to deal with.

The sections of the private sector that use automated systems heavily usually have someone on staff that was connected to building the system, who is able to monitor it, tweak it periodically, and take it offline when necessary. Said Dr. Tarraf, "there is a very valid question of what do you need to have in place in order to play that role?" Optimal strategies will take the technology that works in the private sector and marry it with the specific goals, challenges and expertise of government and military organizations.

"Typically, we kind of think in our lanes... I think this idea of autonomy and umanned systems, we need to rethink the lanes and the boundaries for that."

Brigadier General Frank Kelley, Deputy Assistant, Secretary of the Navy (Unmanned Systems), Office of the Secretary of the Navy

The AI Future is inevitable

Unmanned systems are already featured heavily in our military branches, each of which has experimented with finding places both where they can utilize AI-driven, autonomous processes and where they would be better served in a human-machine team. "Typically, we kind of think in our lanes… I think this idea of autonomy and unmanned systems, we need to rethink the lanes and boundaries for that," said General Kelley, "You think something has to be a completely autonomous aircraft, but maybe not so, maybe you can have one pilot in a helicopter where we've normally had two, or a full crew of four… we can take the burden off of that pilot and think more in terms of mission."

Many of the advances in AI are made using open source technology — tools easily available to adversaries. This ubiquity makes it even more important to create a long-term plan for AI priorities and capabilities, as well as to continually innovate in the space, along with protecting and defending against outside threats. "There's a need to have a national strategy for AI that starts to consider some of these issues, because the barrier to entry for so many of these technologies is getting lower and lower," said Druker.

The continued advent of AI also represents big opportunities for government and military organizations, particularly in attracting and developing a new generation of talent. Today's young workers have grown up around similar technology, using computer games and smart phones since their childhoods. "There is no barrier for them to be immersed in (AI technology), if it's done well," said Dr. Paschkewitz. It would be foolish to not take advantage of these skills to develop and utilize new technologies that could help organizations achieve their goals.

"Getting humans to want to use and trust AI bots requires a holistic approach," said Druker, "the art is how do you balance building something that is recognizable to what they do today, versus not getting stuck in the same way they're doing things today, because artificial intelligence provides a way to redefine our processes and to do things in a fundamentally different way."

Sources

[1] http://www.govexec.com/insights/reports/flash-poll-automation-government/145473

About GBC

As Government Executive Media Group's research division, Government Business Council (GBC) is dedicated to advancing the business of government through analysis, insight, and analytical independence. An extension of Government Executive's 40 years of exemplary editorial standards and commitment to the highest ethical values, GBC studies influential decision makers from across government to produce intelligence-based research and analysis.

About Booz Allen Hamilton

For more than 100 years, business, government, and military leaders have turned to Booz Allen Hamilton to solve their most complex problems. They trust us to bring together the right minds: those who devote themselves to the challenge at hand, who speak with relentless candor, and who act with courage and character. They expect original solutions where there are no roadmaps. They rely on us because they know that—together—we will find the answers and change the world. To learn more, visit BoozAllen.com.