The Future Has Begun: Using Artificial Intelligence to Transform Government

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In our first discussion, we highlight two case studies. The first is how the Bureau of Labor Statistics (BLS), used AI to make tedious tasks a thing of the past. The second case focuses on how the U.S. Department of the Air Force is applying AI to conquer the complexities of federal purchasing. These cases describe works in progress, not end results. Still, other agencies can learn and likely benefit from these organizations' early experiences, particularly if these first stages end up being a springboard to significant shifts in agency practices. We also present insights, based on these stories, which can be guideposts for other government agencies interested in using AI. These are just two of four case studies found in *The Future Has Begun: Using Artificial Intelligence to Transform Government,* which is excerpted in this contribution.

Using AI to Relieve Employees of Tedious, Repetitive Tasks

The Bureau of Labor Statistics at the U.S. Department of Labor looks to use artificial intelligence to relieve employees of tedious, repetitive tasks and save hundreds of work hours. Bureau staff have to read and study hundreds of thousands of survey responses about workplace injuries and illnesses each year to understand and help prevent them. AI technology evaluates responses faster than a person can and enables bureau staff to work on more important tasks, including follow-up on the survey results.

BLS collects data on workplace injuries from a sample of around 200,000 businesses through its annual Survey of Occupational Injuries and Illnesses. It then must assign codes that correlate to particular survey responses. In 2015, there were 2.9 million reported private sector injuries and illnesses in the workplace and 752,600 reported by the public sector, according to the survey. Understanding why and how these injuries and illnesses happen can help the bureau tell companies and governments how to prevent them. But reading hundreds of thousands of survey responses to pick out the important details to code is a repetitive,

time-consuming process, and one that does not require critical thinking.

Employees of the bureau's Occupational Safety and Health Statistics program choose codes to assign to pieces of information, whether it is a code designating that a respondent is a nurse or one that indicates, say, an arm injury. They then read through the survey responses and assign the codes. Once they had the codes and the rules down, program team members had to go through about 300,000 incident narratives each year. It took about 25,000 work hours to read and code, and then more time to double-check the coding and correct mistakes—until the bureau found a way to automate the coding process and improve the quality and efficiency of the coding tasks.

In 2014, the bureau started using AI to code responses. It started small. The first survey year, computers assigned five percent of all codes, and they coded only the occupations in

which the injury or illness occurred, as these are the easiest codes to assign. By 2016, the most recent survey year, computers assigned nearly 50 percent of all codes, and these codes related not just to occupations, but to the nature of the injury or body parts affected. Even better, the bureau found from the start that the computer coded more accurately, on average, than a trained human coder. To allay employees' apprehension about technology, in the form of machine learning, taking over some of their job responsibilities, the bureau's leaders played an active role in communicating the change and the benefits of using AI.

The technology can provide more comprehensive, ongoing, and timely surveillance to inform future injury prevention policy and practice. It also could benefit bureau employees themselves. They could now focus on more complicated cases that require human judgment, shifting from mind-numbing to more interesting tasks, and increasing the quality of their work. Staff also could do more follow-up work, such as calling respondents to get clarifications on their survey responses. At the same time, the bureau held training sessions for coding staff on what machine learning is and what it does, to help them get a better understanding of its value to the bureau.

Conquering the Complexities of Federal Purchasing

A second illustration of the use of AI explains how the Air Force looks at using the technology to make sense of complex acquisition regulations so it can speed the process of buying goods and services. The department will upload thousands of regulations, contract cases, acquisition training material, and Defense Department policy. AI technology then will be able to answer queries from federal contract officials and contractors about acquisition rules and regulations, such as, how to proceed with a contract, what procedures to follow, or what contract a small business could bid on.

Every federal agency and branch has dealt with the complicated acquisition process for obtaining goods and services. For the Air Force, a huge government purchaser, the challenge is exponentially larger than for many other agencies. In fiscal 2017 alone, the department spent around $53 billion on products and services, or 11 cents of every dollar the federal government spent on acquisitions that year. AI could help the Air Force smooth the acquisition process by helping officials figure out rules and regulations and make good contract decisions more quickly and efficiently.

At the time of drafting *The Future Has Begun,* the department began running a pilot project, working with two contractors, with hopes to unveil the AI system both online and as a phone application starting later in 2018. Department employees and contractors are uploading a massive amount of data—information from Federal Acquisition Regulations and the Defense Federal Acquisition Regulation Supplement, as well as other laws and rules. The data identifies the capabilities the Defense Department needs and how those capabilities will be evaluated.

This effort requires major effort before the system can be helpful. "It's not magic," said Frank Konieczny, the Air Force's chief technology officer. Once the Air Force completes this task, the system should be able to answer requests from department employees and contractors. The goal is to enable a contract officer to query how a specific contract should be structured or if a particular contract type can be used for buying a particular product or service—whether that is an incentive contract, a fixed-price contract, or some other contract type. Contracting officers could quickly find answers to difficult questions so that they can focus on creating agreements and use the flexibility available in the procurement regulations. Any business interested in contracting with the Air Force, from a large multinational corporation to a small startup, would be able to query the software about bidding on a contract. A company also could request a list of all the contracts it is eligible to bid on—options that could simplify the process for those bidders.

At the same time, AI technology can be taught to analyze text to get at the regulation's meaning. Human experts can help the system learn to discern the intent of regulations by correlating words, acronyms, or phrases to an explanation. Acquisition professionals tend to use the contract type they are used to, rather than the most appropriate one—even if it is not the best or most efficient contract for their purchase—because they know how to follow the regulations for that specific contract. AI could help ensure that Air Force professionals use contracts expeditiously and comply with all regulations, even when they use a new and unfamiliar contract type. An acquisition process using AI software could also help company employees understand what they need to know for a contract application and what acquisition regulations apply when submitting a proposal, without the assistance of lawyers. It could also help businesses identify what regulations they must follow based on their type of work.

Additionally, making contracting easier could lead to new and innovative services and technologies for our country as more first-time contractors, small businesses, and others become willing to bid for defense contracts. Expanding the number of potential bidders could help the department supply better products and services to the warfighter faster, and at lower cost. A successful pilot can help give other agencies an AI approach to emulate—one that would simplify and speed up what is now a mystifying government necessity. The acquisition workforce no longer will have to spend hours trying to find and make sense of regulations, and employees would have more time to focus on other mission-critical work.

Recommendations for Getting Started

The people interviewed in the drafting of *The Future Has Begun* report shared several insights for government leaders seeking to use AI. Most of their ideas focused on the transformation their organizations went through when starting to use AI.

- **Not every task should be augmented by artificial intelligence.** Agencies and project teams should first discuss what role artificial intelligence could play in their work, what tasks AI could make easier, and what outcomes they expect AI to help them achieve. AI is not a silver bullet, and it is not appropriate for every challenge.

- **Do not underestimate the upfront investment needed.** Once agencies and project teams identify areas where AI can help them achieve their missions, they need to consider the resources they will need, including experts with knowledge of AI systems and how to use them, and

budgets to support implementation of the technology. Agencies should also consider how much staff time will be necessary to get an AI system up and running, especially in cases where employees must upload a trove of data and information.

- **Start small.** Artificial intelligence, like most new technologies, is best tested on a small scale before it is deployed fully. Using a pilot program enables people to get familiar and comfortable with the technology and catch errors and correct course. And it enables the system to improve.

- **It is always about the data.** AI is data hungry. One of the most common challenges with using AI is data access, availability, and quality. The more and better quality the data, the better its performance and accuracy. However, most government data and information is contained in separate agencies and, in many cases, the data is limited. All agencies should ensure quality data and information are available for training, testing, using, and refining AI systems.

- **Agency expertise in artificial intelligence could boost AI's potential.** Agencies will need a robust federal AI workforce to manage the growth and potential of these technology systems. These experts could serve as the repository of AI knowledge for agency program and could work directly on projects when teams lack AI expertise. However, agencies likely will encounter challenges with attracting AI experts, as they have with cybersecurity experts. Therefore, they should prepare for a probable shortage of AI talent in government and look for ways to work with AI experts in the private sector and academia.

- **Government could work with outside experts, particularly at colleges and universities.** Colleges and universities have a tremendous amount of artificial intelligence expertise and ongoing research and development programs and projects, and some have designated AI departments. Agencies could conceivably realize an added benefit if, while working with AI departments, public service piques the interest of college and university students and researchers who could take their skills to the public sector.