



Modernizing intelligence analysis

Automation technology can help agencies derive insights from data sources too vast for human review

GOVERNMENT AGENCIES **HAVE** access to more sensors and more data sources than ever before, but they need appropriate automation technology to make timely decisions. Artificial intelligence and the subfield of machine learning provide mechanisms for decision-makers to get more value out of their information by enabling faster analysis of more data.

Most federal agencies have too much data to analyze manually. Take the U.S. Geological Survey, for example. USGS works with NASA to distribute data from Landsat satellites and provide remote sensing photographs of the Earth. Millions of photos have been collected since 1972 – far too many for any organization to manually analyze every photo for information about how the world is changing.

However, with the help of new computer vision techniques that use neural networks, it is now possible to automatically detect changes in satellite images over time. Even more impressive, new machine learning

algorithms can detect specific objects (e.g., cars, buildings, airplanes) in satellite images.

The bottom line is that machine learning can help agencies examine data that otherwise might never be analyzed by a human.

Frameworks that simplify AI adoption

Other AI techniques of particular interest to government agencies include natural language processing capabilities that can summarize lengthy text documents and pattern analysis algorithms that can detect anomalies in cybersecurity data.

Three major communities provide low-cost access to machine learning capabilities, and each is based on a specific framework. In 2015, Google released TensorFlow, a free framework that simplifies the creation and sharing of deep learning algorithms. Similarly, Facebook released its open-source machine learning framework, PyTorch, in 2016. In addition, Python scikit-learn has received major enhancements from more



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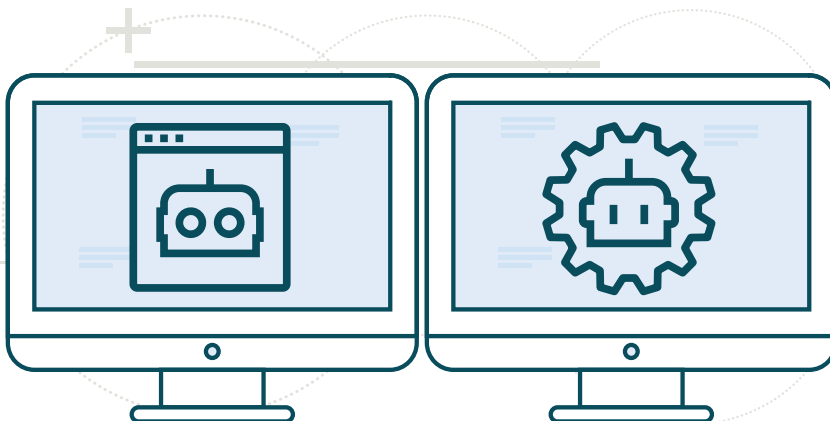
than 1,500 contributors worldwide.

In the same way that standardization enhanced innovation and lowered costs in automobile manufacturing, the standardization of machine learning around these three frameworks has greatly simplified the process for organizations to adopt the technology. TensorFlow, PyTorch and scikit-learn are all programmable with the popular Python language, have excellent online documentation and have seen massive adoption in the United States.

3 factors for AI success

We launched our company Black Cape because, based on our extensive experience in defense and national security, we had a new vision for how AI and machine learning could revolutionize national security. We are building a team of seasoned, mission-focused software developers and subject-matter experts to help modernize the way federal agencies conduct intelligence analysis and apply AI to mission outcomes.

We have found that the outputs of





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intelligence analysis are driven by three main factors:

- **People.** First and most importantly, agencies need to assign clear leaders for AI efforts and provide them with resources and authority. AI prototyping and deployment also require a multidisciplinary team of domain experts, computer scientists and AI specialists. Optimally, the AI team should be physically colocated.

- **Process.** Solving a specific agency challenge must drive the process of testing and deploying AI capabilities. Agencies should have a concrete challenge (e.g., to speed up annotation of objects in photos), use a specific dataset (the archived photos from August 2019) and identify a desired end state (populating a database with a list of all the objects detected in the photos).

- **Technology.** To reduce risk and

increase speed to deployment, we recommend starting with proven frameworks – such as TensorFlow, PyTorch or scikit-learn – and focusing on common use cases. Once you have some initial success, then you can take on a harder problem. ■

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