Cognitive Computing and Government Social Programs

Bridging the gap between data quantity and data insights

IBM

Contents

People create 2.5 quintillion bytes of data every day.[1] According to IBM®, 90 percent of the data in the world today was created in the last two years alone. This data comes from sensors used to gather climate information, posts to social media, digital pictures and videos, purchase transaction records and cell phone GPS signals to name a few. According to some estimates, 70 percent to 80 percent of data might be unstructured in the form of audio, video, photographs, notes, reports, and other narrative formats.[2] This is information that does not typically reside in databases that are easily accessed and interpreted. So the question is, how can social programs access and use data—both structured and unstructured—to deliver better outcomes for the people they serve?

Enter cognitive computing

Cognitive computing refers to systems that learn at scale, reason with purpose and interact with humans naturally. These systems are not programmed—they are trained to sense, predict, infer and in some ways, think, using artificial intelligence and machine learning algorithms that are exposed to massive data sets. Cognitive systems improve over time as they build knowledge and acquire depth in specialty areas like child welfare, employment, disability management, substance abuse, elder services or any number of other social programs.

In contrast to current computing systems, which require that rules be hard-coded into a system by a human expert, cognitive computers program themselves.[3] They process natural language, make sense of unstructured data (such as case notes), and learn by experience much in the same way humans do. These systems not only bring massive parallel processing capabilities to churn through enormous volumes of often fluid data, but also use image and speech recognition as their eyes and ears. The dynamic learning inherent in these systems provides a feedback loop for machines and humans to refine insights and teach one another.

Benefits of cognitive computing

Like other technological advances, cognitive computing can enable new business models for social programs and can change the way caseworkers and other professionals work. Government leaders can take on projects of previously insoluble size and complexity. Massive data sets from multiple programs and organizations can be combined with sophisticated analytics, natural language processing and machine learning to help human experts synthesize findings and improve decision-making. Benefits can include:

- Combining data from education, substance abuse systems, healthcare and child welfare to identify the best programmatic and services options for individual children or families in a manner that would otherwise be impossible.
- Reviewing case notes, potentially written over many years in multiple departments, to provide a caseworker with a summary that includes key trends, themes and other summary information.
- Leveraging health, physical therapy, behavioral health and economic data to find the best care options for an elderly or disabled person who wants to live independently.
- Assessing the optimal training and education services to help get an unemployed person back to work as quickly as possible while also analyzing economic and industry trends to determine which industries might be expected to provide employment opportunities for that individual over the long term.

Cognitive computing systems can combine thousands of pages of service plans, case notes, medical records, images, educational records, and economic data or court documents to help recommend personalized service options to caseworkers.

Challenges of cognitive computing

Cognitive computing requires collaboration and different types of partnerships that extend across the public and private sector and into academic and research organizations. The capabilities enabled by cognitive computing might require government leaders to rethink their operating models. While some processes can be refined, others might need to be reinvented, and still others built from scratch.

New skills and training will be required, such as developing the ability to design and frame appropriate challenges for cognitive systems. New ways of thinking, working and collaborating will invariably lead to cultural and organizational change. Some of this can be challenging, particularly for managers accustomed to relying on their own judgment and experience to form decisions rather than working in a data-driven partnership. But these issues, like any transformation, can be resolved through an effective change management program.

In this context, social program organizations will need to consider which data sets—both structured and unstructured—are the most valuable for their organization to access. They should be considering the long-term challenges that their organization could address by combining and analyzing those data sets. They need to identify the skills they will need in order to take full advantage of cognitive capabilities. And they need to consider who they can partner with on a business and technological front to pilot initiatives and optimize investments.

Cognitive computing and the digital age

It has been estimated that the amount of data that governments are dealing with is expected to grow by 94 percent between 2015 and 2017.[4] As the world becomes more densely populated, as families become more complex, and individual needs become more multi-dimensional, the work of government social programs at all levels becomes more challenging.

The digital age has given governments a massive amount of data that has the potential to provide important insights. But organizations still struggle to unlock the full value of this data. Cognitive computing can help to unlock this value and bridge the gap between data quantity and data insights.

About IBM Watson Health

IBM Watson Health™ is working to enhance, scale and accelerate human expertise across the domains of health, human services, workforce services and social security, to help people live healthier, more productive lives. It is pioneering the use of cognitive technologies that understand, reason and learn to help social program organizations unlock the potential of data and analytics to improve service delivery. To IBM, health is not just healthcare, it is individual health, community health, employer health and economic health for better outcomes at lower cost.

For more information

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ibm.com/smarterplanet/us/en/ibmwatson/health/

1 IBM, http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html Accessed 18 April 2016.

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4 Rich Varos, "How cognitive computing can improve government services" Forbes.com. 23 November 2015 http://www.forbes.com/sites/ibm/2015/11/23/how-cognitive-computing-can-improve-governmental-services/#7f6dbd674b99

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