Technology Trend Topic: Natural Language Processing (NLP)

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Current ITC Vehicles 54151S IT Professional Services (formerly SIN 132-51), 561422 Automated Contact Center Solutions (ACCS) (formerly SIN 132-20) and Alliant 2 and VETS 2 solutions
Vehicles to Watch 8(a) STARS III

Overview

> **"We've all called a customer service line at some point in our lives. Nowadays our options for getting to what we need are rapidly growing. Chatbots, voice recognition, and AI systems provide faster and more accurate responses to our increasingly complex questions. Thousands of people call various government agencies every day with requests and concerns. At GSA, it's our job to help agencies get the solutions they need to make their contact centers as effective and efficient as possible. In fact, the President's Management Agenda calls for agencies to provide a modern, streamlined, and responsive customer experience."**
> - Bill Zielinski

What is Natural Language Processing (NLP)?
NLP is **a form of Artificial Intelligence** that extracts meaning from human language to make decisions**. - Forbes**

NLP draws from many disciplines, including computer science, computational linguistics and deep learning, **making it possible for computers to read text, hear speech, interpret it, measure sentiment and determine which parts are important. -SAS.com**

Quick, mathematical analysis of unstructured data - web comments, emails, narrative text - **has the potential to revolutionize government** decision-making, policymaking and service delivery. **-GCN.com**

The **deluge of unstructured data pouring into government** agencies presents significant challenges for agency operations, rulemaking, policy analysis, and customer service. NLP provides the tools needed to identify patterns and glean insights from all of this data, allowing government agencies to improve operations, identify potential risks, and improve public services. **-Medium**

Market Trends

ITC's 561422 Automated Contact Center Solutions (ACCS) (formerly SIN 132-20) includes a wide range of automated and attended managed solutions: **Callback, Chatbots, Email Delivery, Hosted Online Ordering, Hosted FAQ Service, Web Callback, Text-to-Speech and Voice/Speech Recognition.**

- 2023: Speech recognition market will be worth $18 billion **- Emerji**
- 2021: $16.07 billion NLP market with 22.5% annual growth **- Accenture**
- 2020: NLP insights will result in $430B productivity gains for organizations that can harness them **- Deloitte**
- Costs can be reduced by 30% with higher customer satisfaction through expanded use of more intelligent virtual assistants **- Accenture**
- 2017 DoD: NLP budget totalled $83 million, jumping nearly 17% from 2012 **- Deloitte**

Major cloud vendors and third party providers offer NLP services, with APIs to make offerings interoperable with existing systems. Once an agency is ready to make the leap, there should be infrastructure support to enable NLP applications. - **Accenture**

Use Cases/Applications

Citizens deserve an AI-empowered government, one that can process requests in a timely way and cut down on backlog **- Accenture**

Low-hanging fruit: agency help desk, answering FAQs **- Accenture**

- GSA uses NLP to make sure agencies **comply with Section 508** through its Solicitation Review Tool (SRT). Predictions are 95% accurate - **Marina Fox DotGov Domain Services, OGP**
- U.S. Citizenship and Immigration Services (USCIS) introduced **Emma, a voice-powered personal assistant** that understands and speaks both Spanish and English (similar to the Apple iPhone's Siri).
- ITC has used NLP to help determine if a project is considered **IT Modernization** based on text descriptions
- After the **2008 financial crisis**, the SEC used NLP to identify potential problems in disclosure reports of companies charged with financial misconduct
- **Grade.DC.gov** developed a sentiment analysis program for social media comments to make sure it's serving citizens
- Bots used NLP to artificially amplify the call to repeal net neutrality protections; FCC used NLP to cluster the 22 million comments and identify fakes
- **OPM plans to use NLP** to gain insights into statutory and regulatory text to support policy analysis
- HHS uses NLP to **process public comments on new regulations**; their tool demonstrated millions in cost savings

> **Future plans for the SRT include a scope expansion to predict whether solicitations contain other federal regulatory requirements such as cybersecurity or sustainability.** - Keith Nakasone

Risks/Challenges/Myths

> **"Accuracy, cost, transparency, maintenance costs, and other requirements impact the decision to use NLP compared to alternatives. It may be cost effective or realistic to use tools like mechanical turk or a team of people to make sure required data items are up-to-date."** - Steve Keller

Some expect NLP will become adept not just at reading government documents, but writing them **- Accenture**

NLP could free workers from tedious and repetitive jobs. **-Accenture**

Reducing NLP to a structure that works well in most instances is difficult; human language is extremely complex and nuanced. **- Nature**

NLP does not eliminate the need for structured content. A little extra work at the beginning makes things much easier in the end **- Digital.gov**

NLP may propagate and even amplify gender bias found in unstructured text used to train the algorithms **- Cornell University**

When it comes to cloud migration/acquisition, bundled services are highly appealing to agencies because they are easier to manage than integrative services and are cost-effective. But risk vendor-solution lock-in, which make it difficult to move from one provider to another.- **Gov't CIO Media**

What You Should Read NOW

1. Modernizing Contact Centers - Bill Zielinski's Aug '19 Blog Post
2. Cloud Empowerment at USAID Bill Zielinski Oct '19 Blog Post
3. GSA Insite Emerging Technology: AI & ML Projects
4. President's Management Agenda (2019)
5. Digital Services AI Playbook (launched Aug 2014)

Upcoming Technology Trends Topics

Cloud Computing
Zero Trust Architecture

Published Technology Trends Topics

Artificial Intelligence (AI) - Published 9/30/19
5G/Internet of Things - Published 11/22/19