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Analytics and the Final Frontier

The Soviet Union's launch of Sputnik in 1957 ushered in an era of space exploration that saw both the USSR and the United States double down on their efforts to explore what Gene Roddenberry's character, Captain Kirk, describes as "the Final Frontier". President John F. Kennedy accelerated the national focus on space in the 1960's, calling for the United States to put a person on the moon by the end of the decade.

From that first moonshot to NASA's successful landing of the Perseverance on Mars in 2021, space has remained a priority for the United States. What has changed is the new technological capabilities other countries and private organizations have acquired for launching spacecraft and satellites into orbit for scientific exploration, communications, intelligence gathering, and even recreational space travel. But what do these advancements mean for us here on Earth?

A New Approach to Data Analytics

According to a recent article in **Space News**, we are in the midst of another space race. Organizations like the National Geospatial Intelligence Agency (NGA) maintain a lead in the "geoint" race. But with China investing in advanced Low Earth Orbit (LEOs) satellites that can revisit any point on the globe within 30 minutes, agencies like NGA "need new approaches for handling big data and for delivering information to customers faster."

As the article points out, the key to managing this ever-growing data flow is automation and achieving maximum interoperability between systems. Efficiently managing the extreme influx of data is just the starting point for intelligence organizations like NGA as agencies undertake digital transformation efforts. Agencies are evolving from viewing data analyzed by human analysts, to applying advanced analytics that improve situational awareness and accurately predict events. Big data challenges — similarly facing DOD, I.C.-related, and civilian agencies — require solutions that deliver data

agility, unified analytics, and the ability to easily deploy predictive analytics in near real-time.

Near real-time delivery of information is not possible without high-speed analytics and high-volume throughputs across systems. Deploying a higher level of **Analytic Process Automation** (APA) with predictive modeling capabilities democratizes the ability to harness and leverage vast data from numerous sources, including geospatial and satellite imagery.

Recently, Alteryx partner, **Reveal Global Consulting**, shared a use case where the U.S. Census Bureau is turning to the use of analytic automation and satellite imagery to speed up the creation of insights that feed key economic indicators.

Economic insights require quality data

“As we advance into the 21st Century, we are experiencing increased demand for our data, struggling with challenges to traditional data collection methods, and exploring rich new data sources and tools that can revolutionize what we do and how we do it. Our success critically depends on our ability to seize the opportunities in front of us to deliver statistical products that address increasingly complex and diverse needs of our users.”

—Ron Jarmin, Deputy Director, U.S. Census Bureau

Most Americans are familiar with the U.S. Census Bureau given its role in surveying every person for the "Decennial Census of Population and Housing." People may not know that the Census Bureau, part of the U.S. Department of Commerce, is the nation’s leading provider of quality data about the economy.

Mandated by law, Census collects, analyzes, and reports actionable data about people, places, and the health of the economy to Congress; the White House Office of Management and Budget; federal, state, and local government agencies; news organizations; businesses; and the public. For example, Census data, research findings, and key indicators are used to:

- Assess the health of the U.S. economy
- Allocate funding for new roads and schools

Define voting districts

Provide services for the elderly

Locate job training centers

Qualify people for social security

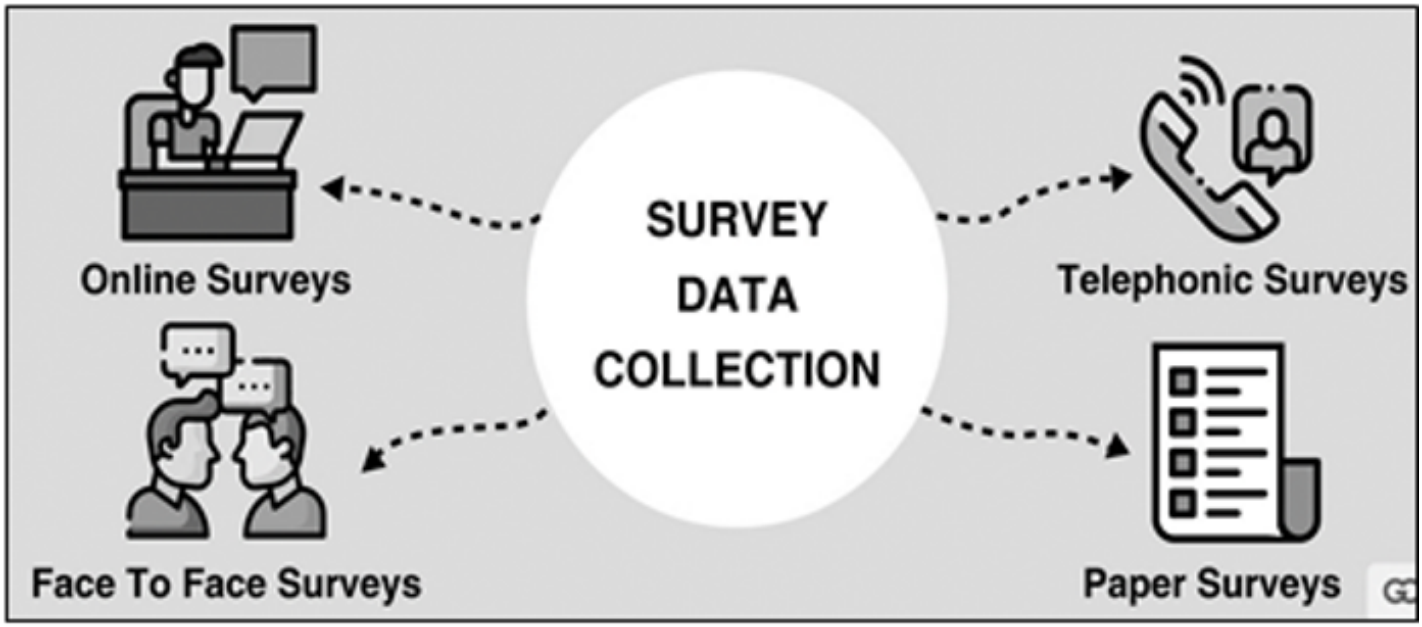
Assess construction spending and activity

Audit disaster recovery spending

Data as a Strategic, High-Value Asset

Census data is one of our most valuable national assets. It must be accurate, timely, protected, and used wisely to effectively allocate over $675 billion in federal funding to states, local communities, and businesses.

For the past several decades, Census has relied heavily on burdensome manual processes and outdated tools to collect, process, analyze, and report data on the population, housing, businesses, workforce, public finance, resources used, etc. The sheer volume, velocity, and veracity of Census' big data is hard to manage with legacy systems. Manual surveying and data processing are labor-intensive, tedious, and costly.



Analytic Automation Enables Insights on Construction Indicators

As part of its digital transformation efforts, U.S. Census Bureau Economic Indicators Division, Construction Programs, contracted Reveal Global Consulting to design, build, and deploy modernized and automated approaches for data collection, analysis, and dissemination that reduce operational costs while improving the accuracy and quality of Census economic indicators. Specifically, Census wanted an advanced analytics and process automation solution to compile and release U.S. economic indicator data worldwide that would meet specific requirements and achieve tangible goals:

- Eliminate redundant data entry
- Streamline the indicator release process
- Create a consistent look and feel for the indicators' website
- Prevent early release of indicators
- Maintain security of indicator information
- Re-use existing systems rather than create new ones
- Use enterprise systems for their primary purposes
- Use a loosely coupled architecture
- Use existing security infrastructure
- Minimize changes to established business processes
- Refactor code rather than rewrite it
- Improve the quality of Census data products
- Prioritize security over performance

A Unified Approach to Analytics

The U.S. Construction Indicator use case required an end-to-end solution with a robust Analytic Process Automation (APA) platform at its core. APA eliminates data analysis barriers by unifying multiple tools into one platform that provides end-to-end, self-service analytics across big data management prep, analytics and data science, and process automation to accelerate insights and actions.

Working directly with the client, Reveal built an advanced analytics and visualization solution for Census that enables the following:

Modernizes construction industry indicators (housing starts, residential and non-residential construction spending, and others)

Identifies alternative sources of data to reduce reliance on surveys

Leverages advanced analytics and automates processes to optimize performance

Provides advanced analytics and data visualization to provide Census users and external stakeholders with timely, relevant insights for optimal decision-making

Uses A.I. to analyze satellite image data showing construction activity over time

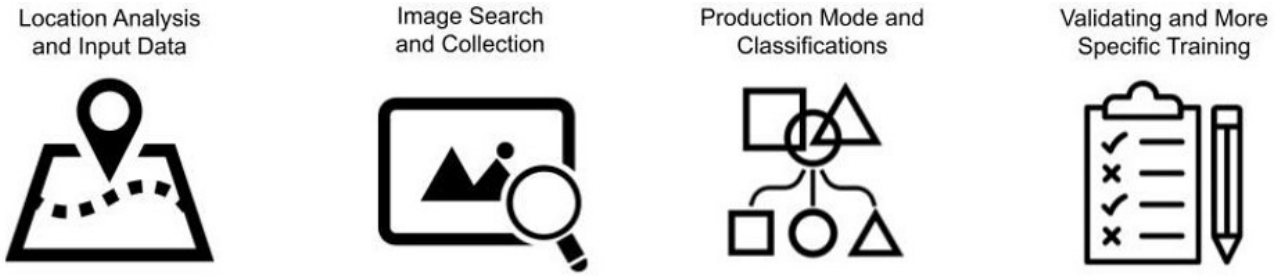
The solution collects, filters, formats, and aggregates unstructured data from numerous Census and third-party sources. The data is ingested into the Alteryx APA Platform which, in turn, enables the creation and scheduling of workflows that can collect satellite imagery and automate analysis using geospatial and AI/ML capabilities to validate, compile, and create more accurate and timely construction indicator insight. Data utilized includes:

Third-party U.S. permit data for residential single-family homes

Web-scraped jurisdiction websites and PDFs

Census shapefiles for every U.S. state

Satellite images of construction sites show pre-construction and post-construction



Once trained, the analytic solution automates critical functions, including the ability to:

Filter, format, and aggregate data from multiple sources

Map and perform geospatial analysis

Evaluate third-party data coverage and evaluate for accuracy

Schedule, prompt, and collect CNN Model Classifications

Evaluate and aggregate image classifications

Merge third-party construction data and image classifications

Create visualizations

Automate the updating of Construction Indicator insights

Starts

Completions

Analytics Automation: Accelerating the Quality of Insights

With analytics automation, agencies like the U.S. Census can create, acquire, leverage new data sources, and provide higher quality service offerings and products to end-users. By reducing the need for manual field data collection, aggregation, and other preprocessing efforts, the analytics automation capability enabled by Alteryx and Reveal is accelerating the quality and accuracy of insights on construction activity and is improving organizational flexibility and operational efficiency by allowing the Census resources to focus on high-value tasks.

Watch This Next.

Want to learn more about how Reveal Global Consulting and Alteryx partner to deliver a unified automated analytics capability that reduces manual processes around prepping, blending, and analyzing data, including the automatic creation of geospatial insights from satellite imagery?

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