

FeatureTrace™

AI-Automated GEOINT Feature Extraction



Geospatial-intelligence (GEOINT) analysis requires hours of painstaking work by analysts to process, exploit, and disseminate imagery. Many of these tasks have, until now, required human analysts to manually examine imagery to identify and extract key elements such as "foundational features."

CACI's FeatureTrace™ technology and expertise revolutionizes GEOINT analysis. Using deep learning and artificial intelligence (AI) tools and algorithms, FeatureTrace saves hours of valuable manpower by automatically collecting key satellite and overhead imagery road features (and will soon be able to collect other features, like buildings, and bodies of water).

Instead of manually identifying these features, a GEOINT analyst now only has to quality check the processed imagery. With FeatureTrace, once complex and time consuming tasks, like manually identifying road transport networks, can now be done in a fraction of the time.

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Features

- FeatureTrace™ extracts roads from imagery using the power of neural networks, which examine and interpret images similarly to humans
- FeatureTrace can extract roads from 3-channel RGB satellite imagery in one-minute-by-one-minute tiles in under two minutes, a process that could take an analyst up to 10 hours to conduct manually
- Networks trained using analyst-identified imagery and data, enabling the neural network to label all pixels in an image with high accuracy and precision
- FeatureTrace converts the output from the neural network into geospatial vector data usable on multiple geographic information system platforms

Benefits

- FeatureTrace generates rapid feature extraction and vector-to-vector change detection, facilitating effective, continual data enrichment that will lead to steady-state Map of the World (MoW) maintenance
- FeatureTrace introduces automation into an analysts workflow early on, allowing them to focus on producing more efficient, effective, and accurate GEOINT
- Powerful AI and deep learning tools save hours of time and personnel expenditures by performing feature extraction in minutes

How FeatureTrace™ Improves GEOINT

FeatureTrace automates the foundational feature extraction process using powerful new software tools that break down satellite and overhead images into smaller pieces. CACI's specialized neural network processes these image pieces, identifying features with 97 percent accuracy.

Afterward, a GEOINT analyst examines the resulting image for quality control. By allowing analysts to focus on the quality control portion of the process, and not time-consuming manual extraction that often takes hours, imagery processing becomes exponentially faster and more effective.

Road Map for FeatureTrace Enhancement

CACI's AI and deep learning experts will continue to improve and refine FeatureTrace's unique analysis capabilities. Beyond collecting road features, CACI is working on adding FeatureTrace extraction capabilities that specifically identify buildings, waterways, and powerlines in imagery. Attribution will also be a key focus. Future improvements and enhancements planned for FeatureTrace include:

- Perfecting FeatureTrace's road detection capabilities
- Multiple feature class detection (such as points of interest, bodies of water, and land cover)
- Subclass feature identification (distinguishing roads versus cart tracks, for example, and highways versus local roads)
- Vector-to-vector change detection
- A steady state of continuing maintenance driven by automation and AI
- Regional FeatureTrace GEOINT expertise - FeatureTrace will continually train for region-specific nuances

This material consists of CACI International Inc general capabilities information that does not contain controlled technical data as defined within the International Traffic in Arms (ITAR) Part 120.10 or Export Administration Regulations (EAR) Part 734.7-10. (08/06/2020)



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