L3HARRIS™
FAST. FORWARD.

SYNTHETIC LABELED DATA

Training-data generation enables faster development of machine-learning algorithms

The U.S. intelligence community is drowning in available sensor data that may hold critical information to enhance missions. To overcome the time and cost of gathering training data for deep-learning applications, L3Harris is automating synthetic training data generation.

UNDERSTANDING MISSION NEEDS

Agencies are unable to process new imagery as even newer data comes in. Artificial intelligence (AI) technology may offer a solution, but requires robust machine learning algorithms and industry-specific training datasets.

Where most commercial applications can take advantage of plentiful training data that is gathered through crowd-sourcing means, the intelligence and defense communities' targets are often elusive. The means for gathering training data often require additional security considerations.

VALIDATED TRAINING DATA

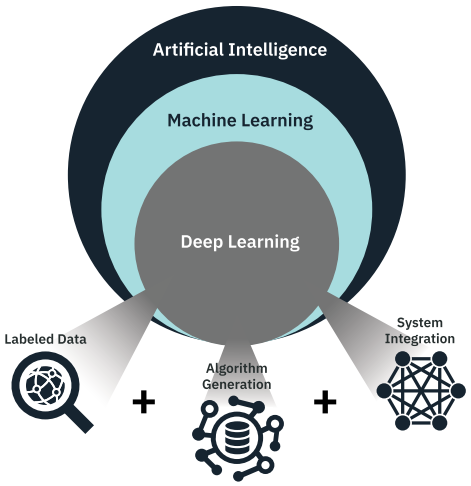
To support defense and intelligence machine-learning missions and reduce this training data burden, L3Harris is providing a trusted source of labeled synthetic training data to feed algorithms.

Our automated, defense-specific, synthesized, metadata-labeled datasets fill the training gap. This enables further development of deep-learning algorithms unhindered by lack of training data.

ENABLING ARTIFICIAL INTELLIGENCE

Technologies and knowledge gained from our 40-year legacy of delivering radiometrically correct, high-fidelity remote-sensing simulations yield proven synthetic training data for intelligence, surveillance and reconnaissance focused machine learning.

Today, using proprietary image sensor simulation and modeling techniques, L3Harris can automate simulated training data generation for defense-focused objects and systems of interest. L3Harris can provide training data production services or support the integration of custom synthetic data generation tools within customer workflows. These capabilities can support panchromatic, multispectral, thermal, hyperspectral and synthetic aperture radar (SAR) systems.



BENEFITS

- Requires zero or few real training images
- Deploys new algorithms more rapidly
- Faster identification of new objects of interest
- Increased performance by training with robust synthetic datasets

HIGHLIGHTS

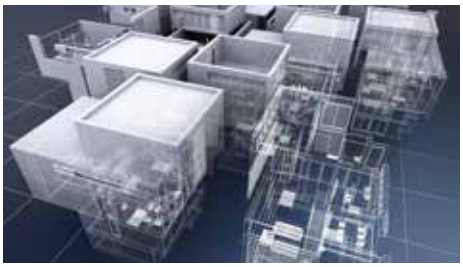
- Synthetic training data automation eliminates most of the time-intensive effort of collecting, managing and labeling data
- Radiometrically accurate training datasets closely match real data by simulating every step of the tasking, collection and processing chain
- Algorithms trained with synthetic training data have been validated as accurate compared to algorithms trained with real data

For more information, please contact intelmanagement@L3Harris.com

RADIOMETRIC RAY TRACING + SENSOR MODELING + DOMAIN ADAPTATION = PERFORMANCE

RADIOMETRIC RAY TRACING

There is a significant difference between synthetic data generated using a game engine and data generated by accurately modeling an imaging system end to end. While the gaming industry makes scenes look realistic to a human observer, they are not concerned with phenomenology the human eye cannot perceive (e.g. IR, HSI, SAR) or in simulating actual sensor characteristics under specific real-world collection conditions. L3Harris has led decades of corporate and government investment into the development of automated scene building capabilities that can support physics-based end-to-end modeling of remote sensing systems.

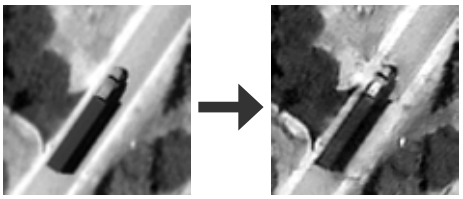


SENSOR MODELING

L3Harris has 50-plus years of experience applying image-science expertise to imaging systems. Our modeling capabilities have supported airborne and space systems and a variety of government and commercial customers. L3Harris' unique experience analyzing operational imagery for systems has fueled the development of models to accurately represent these systems within simulation environments. L3Harris has proven experience with all types of imaging systems, industry-leading image analysis, gold-standard modeling capabilities and operationally validated tools.

DOMAIN ADAPTATION

Concerns regarding bias and bridging the synthetic-real gap have been central to our investments in synthetic data. L3Harris has invested in the use of domain adaptation to map synthetic data into the space of real data. It is essential to know how to map the synthetic data to the domain of the real data when training deep-learning models. L3Harris is ideally positioned to do this work with significant expertise in both synthetic data generation and deep learning neural networks. By using state-of-the-art metrics to characterize the relationship between synthetic and real datasets, L3Harris can manipulate the synthetic generation process to close the domain gap and thereby improve performance.



Synthetic with no domain adaptation

Synthetic with domain adaption

Synthetic Labeled Data

Nonexport-controlled Information

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.

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