

Modular Multi-Object Tracking System for Video



CACI's modular, multi-object tracking system uses artificial intelligence to identify and track objects – including vehicles and humans. The integrated deep learning-based neural network system is capable of real-time (30 Hz) detection, even in complex and noisy overhead imagery situations. It enables tracking and reidentification of all objects of interest even through periods of significant long-term occlusion.

Initially designed to speed full-motion video (FMV) analysis for national security customers, this system can also track objects and perform semantic analysis on live and recorded video from close proximity systems, such as closed-circuit television networks and traffic cameras.

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Benefits

- Fast, accurate, and reliable object detection and feature extraction
- Wide range of look angles enables numerous applications
- Minimizes track ID switches
- Modular format integrates easily into existing systems
- Labeling tools speed process by 33 percent in most cases
- Enables tracking and reidentification of objects even through periods of significant occlusion
- Single-query image allows user to identify all video frames in which an object occurs
- Works with unlabeled data

Use Cases

- Aerial surveillance from drones or high altitude platforms
- Closed-Circuit TV camera monitoring
- Traffic camera monitoring
- Semantic analysis of any live or recorded video feed

State-of-the-Art Video Tracking Powered by AI

CACI's state-of-the-art, robust video tracking system uses both supervised and unsupervised learning techniques to track and identify objects of interest. The system consists of an object detection network, a feature extraction network for object reidentification, various sub-classifiers for fine-grained (FG) attribute prediction (e.g., a person's gender, or a vehicle make and model), and the tracking engine, which contains the track association, reidentification, and propagation logic.

This tracking system was developed using ground-based and overhead imagery at a wide range of look angles to enable numerous applications from overhead FMV to closed-circuit television and even traffic cameras. It is designed to be fast and modular, allowing detection and attribute prediction of new object types as needed. It is capable of processing both archival footage and live video streams frame-by-frame. It has undergone numerous rounds of optimization and testing to ensure operation at an optimal point on the speed-accuracy curve.

Both supervised and unsupervised neural networks are supported, meaning it may be possible for your application to work with less labeled data. A state-of-the-art reidentification neural network and track association strategy minimizes track ID switches. The system also integrates with CACI's labeling tools, which can reduce labeling effort by up to 33 percent. Its neural network retraining code is easy to use: simply supply data in the right format, and the neural network immediately retrains itself to identify and track the new objects of interest.

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. (8/11/2020)



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