



Industry partnership expands applications for MIT-LL's video surveillance analytics technology

MIT Lincoln Laboratory

Technology from MIT Lincoln Laboratory that makes it significantly easier and faster for investigators to review surveillance video—originally developed for public transportation security—will soon be available for commercial use, after being licensed by software start-up Doradus Labs.

As part of the laboratory's work with the Department of Homeland Security, MIT-LL researchers developed the Forensic Video Exploitation and Analysis (FOVEA) tool to speed up the process of reviewing and analyzing security footage from subways and rail systems in the aftermath of an attack or during an event of interest.

Doradus Labs, which licensed the FOVEA technology in 2019 and 2021, is a software development and technical support company focused on machine learning, including machine learning for video surveillance.

The first envisioned commercial application of the FOVEA technology is for monitoring casino activity, as part of efforts to prevent future events like the 2017 mass shooting in Las Vegas that killed 60 people. In that case, the perpetrator managed to stockpile five suitcases of automatic-type firearms in his casino hotel room without being detected.

Inefficiency is a major challenge when forensic analysts are trying to confirm a security threat based on surveillance video from most large-scale, closed-circuit systems. Commercially available video analytics can require extensive work by video surveillance operators, especially when confirming an apparent threat requires searching through large amounts of archived video.

Unlike existing commercial solutions, FOVEA's capabilities can be integrated into existing surveillance systems, so video data do not need to be exported or otherwise curated before being analyzed. FOVEA also can be processed on any desktop or laptop computer, with no need to purchase proprietary server equipment or transmit data to a cloud service. This feature is important for adhering to government or corporate privacy policies.

The system's new analytic capabilities, made possible with machine learning, include:

- Video Summarization, which creates a very short



Above: FOVEA's benefits were confirmed after it was deployed in two mass transit facilities.

visual summary of a long stretch of video for quicker review

- Jump Back, which automatically rewinds to the point in a video when an object of interest first appeared
- Multi-Camera Navigation and Path Reconstruction, which tracks a person or vehicle across multiple camera views and allows users to assemble a composite video.

These features result in shorter investigation times, improved ability to react to in-progress events, and a more robust security presence. Investigations that usually take days can be performed in hours, and review tasks that usually take hours can be performed in minutes.

The MIT-LL team confirmed these benefits after deploying a FOVEA prototype in two mass transit facilities and integrating the software into their video management systems. Then the team began to focus on commercialization.

MIT-LL identified Doradus as a potential licensee through the National Science Foundation's Innovation Corps (I-Corps) program. An initial nondisclosure agreement was followed by a trial license, which allowed the company's engineers to familiarize themselves with the software and the underlying source code. The trial phase led to a commercial license agreement, which was amended after MIT-LL updated FOVEA with additional functionality.🌀