

Surveillance tech from Carnegie Mellon can watch and predict

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Credit: Wikipedia

(Phys.org)—Yet another flavor of surveillance technology belongs to devices that can not only eyeball but perform "activity forecasting." At Carnegie Mellon, the Mind's Eye program is creating intelligent software that will recognize human activities in video and predict what might happen next. Earlier this week, new research from Carnegie Mellon presented a security camera system that can watch and predict what a person will do next with specially programmed software. The system would eventually sound an alarm if it recognized that an action was not permitted, detecting anomalous behaviors. One example of such a scenario would be the cameras at an airport or bus station, flagging a bag

abandoned for more than a few minutes.

The Carnegie Mellon pair disclosed details about their Army-funded research in a paper earlier this week, at the Semantic Technology for Intelligence, Defense, and Security conference at George Mason University. Their paper, "Using Ontologies in a Cognitive-Grounded System: Automatic Action Recognition in Video Surveillance," presents the knowledge infrastructure of a high-level artificial visual [intelligent system](#). Their research focused on a cognitive engine for [artificial intelligence](#) to automatically detect and interpret a person's actions through a surveillance feed.

Their automated approach could one day tempt security decision makers to reconsider using humans to monitor cameras, as human operators are not only expensive to maintain but present risks if distracted or drowsy. Scientists in the past have discussed the fact that technology has progressed to a point where mounting cameras to capture video imagery is economical; the cost factor comes in the form of hiring humans to watch the imagery. Also, cameras that do nothing but watch can only provide information after a crime has occurred. Investigators may get to see how a car was stolen or a store clerk robbed but after the fact, whereas the researchers' approach is designed to help prevent crimes or dangerous events from happening.

The researchers said that to approximate human visual intelligence In order to achieve the desired level of complexity, computer vision algorithms need to be complemented with higher-level tools of analysis involving knowledge representation and reasoning, often under conditions of uncertainty.

Alessandro Oltramari, a postdoctoral researcher and Christian Lebiere, both from the Department of Psychology at Carnegie Mellon, suggest that this automated [video surveillance](#) approach could find applications

both in military and civil environments.

Their technology leverages the advances that have been made so far, over the years, in recognizing objects and their properties. Their cognitive engine also incorporates research on activity forecasting conducted by a team led by postdoctoral fellow Kris Kitani. That team has tried to understand what humans will do by calculating which physical trajectories are most likely. "We address the task of inferring the future actions of people from noisy visual input. We denote this task [activity](#) forecasting," said Kitani and his colleagues in a research paper on the subject.

More information: stids.c4i.gmu.edu/papers/STIDS...veGroundedSystem.pdf

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