Catching Criminals on Video: Video Be on the Lookout (vBOLO)

Video surveillance systems are used by law enforcement and transportation authorities as an important safety measure. It can be challenging to link a subject who was recorded committing a crime in one surveillance camera to their re-entry into the surveillance system hours or days later. The Center for Visualization at Data Analytics (CVADA) at Purdue University and ALERT is developing the Video Be on the Lookout (vBOLO) system that can help re-identify subjects of interest as they re-appear in a surveillance system.

Collaborators:
- Northeastern University
- Purdue University
- Rensselaer Polytechnic Institute
- University of Notre Dame

Additional information on vBOLO

The first phase of the project demonstrated the potential effectiveness of computer-vision-based re-identification, but also indicated areas where more research or better physical infrastructure was required. The current vBOLO system can currently find the correct person in a lineup of 10 automatically-detected candidates 90% of the time for one camera.

CVADA-Purdue and ALERT expect to improve performance of vBOLO to find the correct person in a lineup of five candidates 95% of the time. This would involve the addition of high resolution video, facial analysis, motion features, improved body features, and subject attributes.

Background on how vBOLO works

The subjects that law enforcement wants to identify as they re-appear are manually delineated by the users. The method uses computer vision and image processing techniques to create features of the subject. Humans are continuously detected and monitored to determine when the subject reappears in the video. This is done by extracting features from each candidate and matching it to the subject. Features include color, texture, face and motion information. We also are investigating the use of “attributes.” Attributes indicate whether a subject is carrying an object or wearing a specific type of clothing. The result of the matching process is a constantly-updated list of likely matches to the subjects that is somewhat similar to a “line up”.

Real Users, Real Results

- CVADA-Purdue and Alert is developing vBOLO for the Greater Cleveland Regional Transit Authority (GCRTA) to augment their current systems.
- vBOLO could be used for a wide variety of security and public safety operations.

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