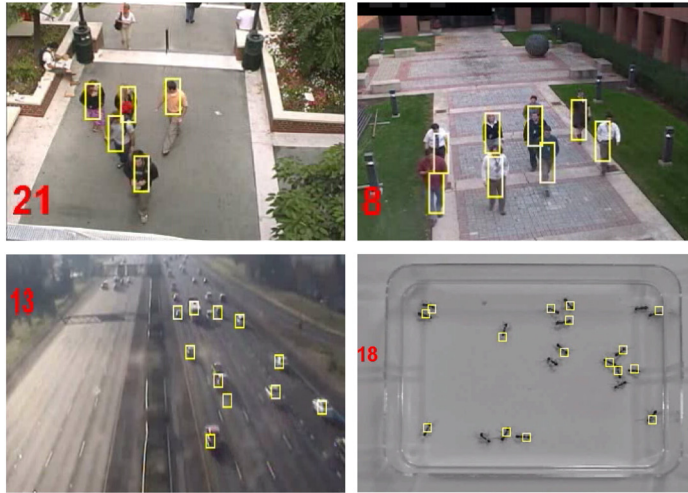# Detecting and Analyzing Multiple Moving Objects in a Crowd

Sample multi-object detection results from the algorithm: The red number indicates the aggregate count of independently moving objects detected.

Advantages

- Can automatically locate and count objects in high-density crowds with accuracy
- Overcomes some of the difficulties in detecting individual objects that move in unison
- Requires no complex shape or appearance models to select objects

Potential Applications

- Detecting and counting any type of moving object
- Estimating crowd size for event management and planning
- Support for analyses requiring counts of moving objects, such as in medical analysis
- Security and surveillance

Technology Summary

While human eyes can unconsciously perceive independent objects in coherent motion patterns such as crowds, automated systems have difficulty detecting and counting independently moving objects. A robust algorithm that works with a video recording apparatus to detect, count, and analyze regions of activity in crowds was developed by computer scientists at ORNL. The algorithm selects regions of coherent motion in both time and space, and then identifies sets of tracks that may contain objects of interest.

The technology includes an apparatus for identifying a moving object within a series of video images, an image recording device that stores images in a time series, and an image analysis feature configured to execute a program of instructions to identify the object. The program's steps include identifying several feature point tracks in which all feature points belonging to the same track are located within a polygon of predefined size. It then calculates a trajectory similarity factor where each similarity is a measure of a maximum distance between two tracks.

Patent

Anil M. Cheriyadat. *Detecting Multiple Moving Objects in Crowded Environments with Coherent Motion Regions*, U.S. Patent Application 12/489,589, filed June 23, 2009.

Inventor Point of Contact

Anil M. Cheriyadat
Computational Sciences and
  Engineering Division
Oak Ridge National Laboratory

Licensing Contact

David L. Sims
Technology Commercialization Manager,
  Building, Computational, and
  Transportation Sciences
UT-Battelle, LLC
Oak Ridge National Laboratory
Office Phone: 865. 241.3808
E-mail: simsdl@ornl.gov

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