

Persistent visual surveillance

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Major laboratories working on visual surveillance

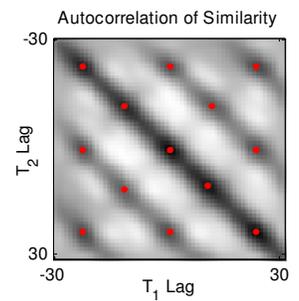
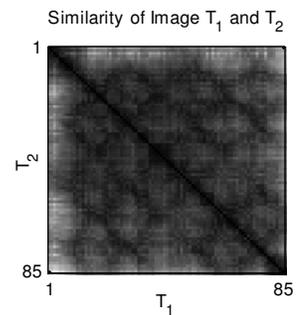
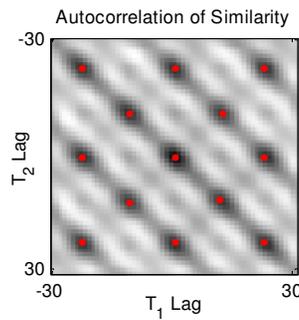
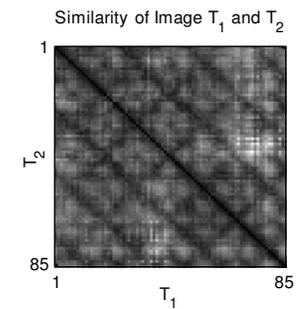
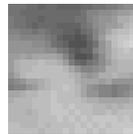
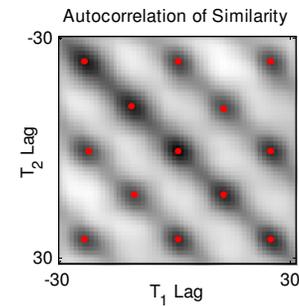
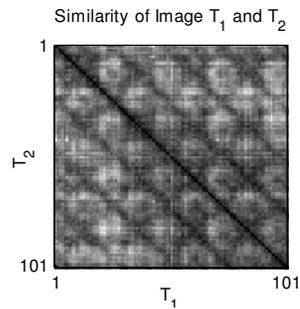
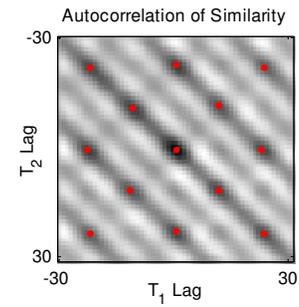
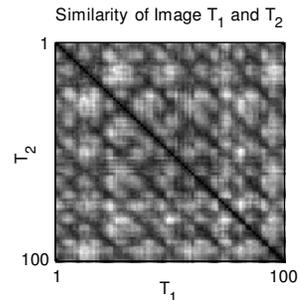
- Academic
 - University of Maryland
 - Carnegie Mellon University
 - M.I.T.
 - University of Southern California
- Industrial Research
 - Siemens
 - Sarnoff
 - Mitsubishi
 - SAIC
 - Alphatek ...

Single camera surveillance

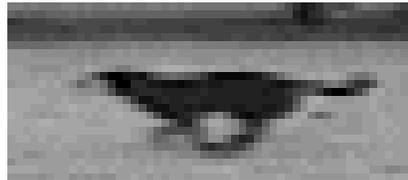
- Detection
 - Background comparison
 - Day/night
 - Illumination changes
 - Statistical background motion
 - Shadows, reflections



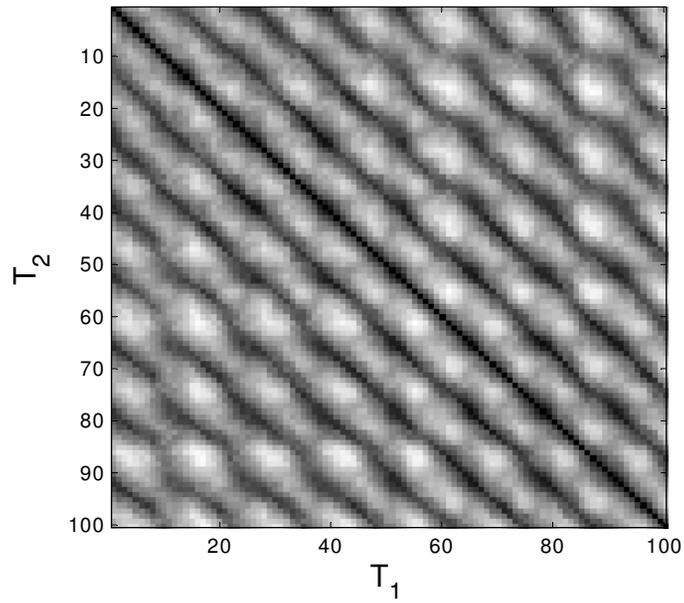
Man, machine, or...?



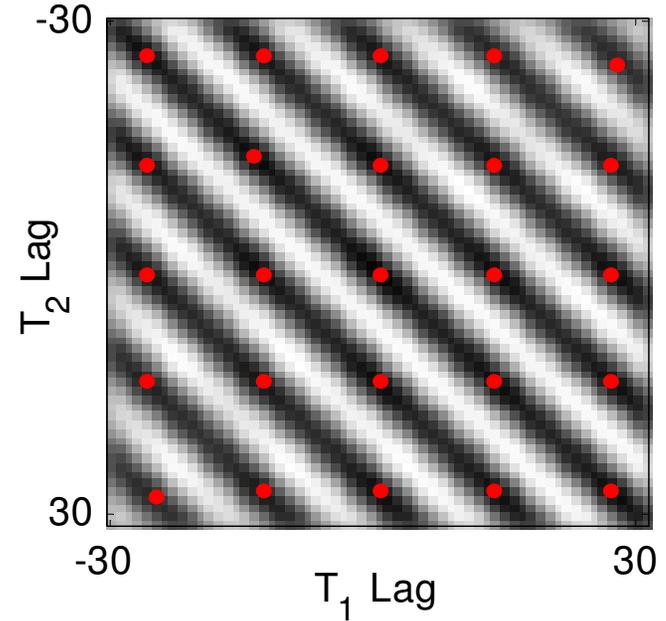
Beast



Similarity of Image T_1 and T_2



Autocorrelation of Similarity



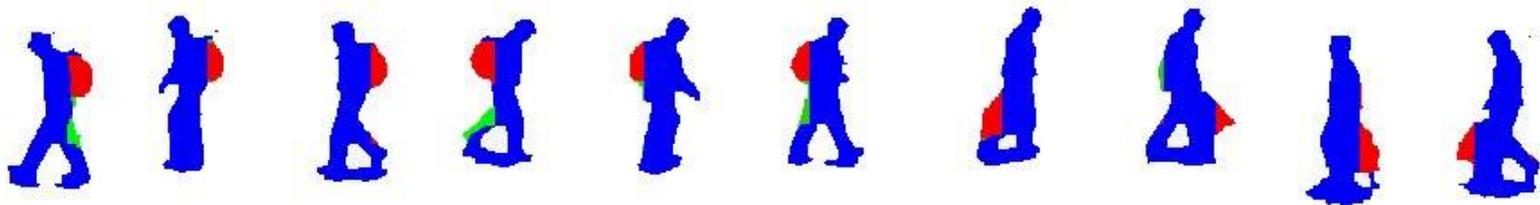
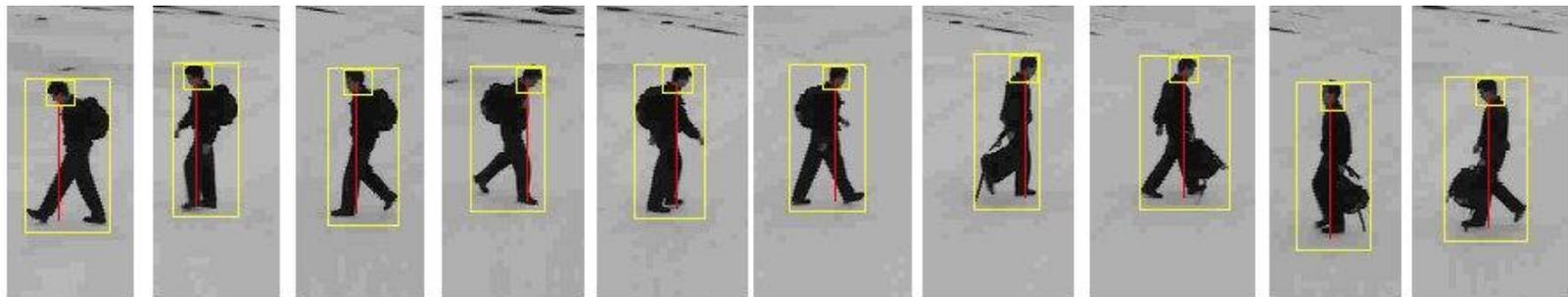
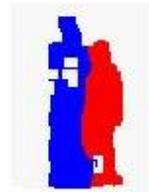
Biometrics

- Face recognition
 - Good commercial systems available
 - Many open problems
 - Face in a crowd
 - Aging
 - Partial obscuration (hats, scarves, etc.)
 - Pose
- Iris
 - Distance limitations, but current research addressing this

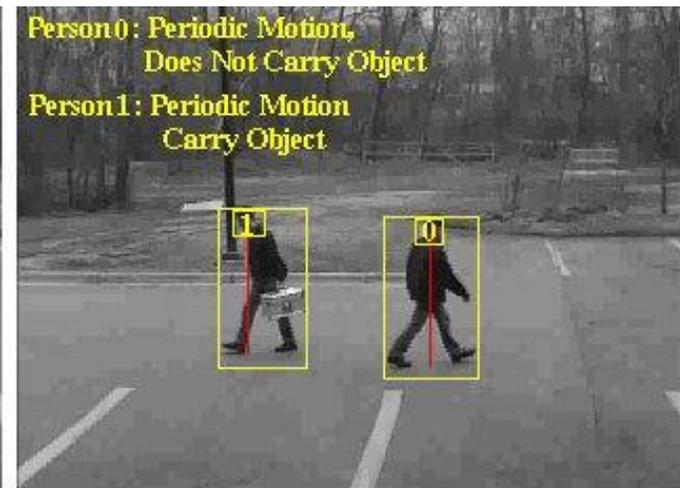
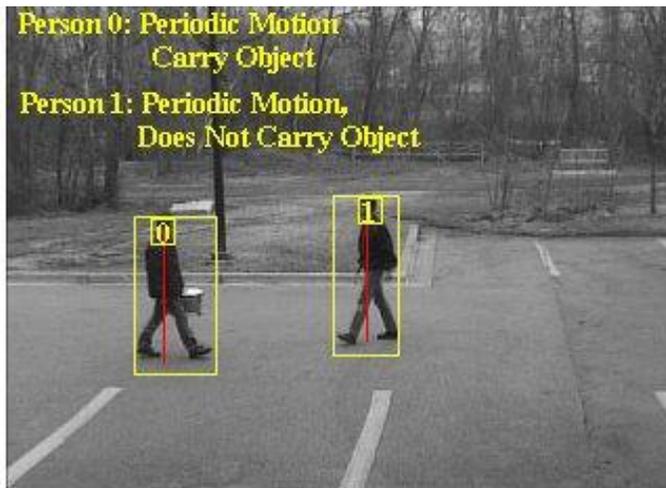
Biometrics

- Gait
 - Recently completely DARPA HID program
- Integration of biometrics
 - Not systematically investigated

Event recognition



Event recognition



Wide area surveillance

- What about systems with hundreds or thousands of cameras
 - Little, if any, advanced vision analysis
 - Basically, sophisticated DVM systems
 - Only DARPA and HSARPA addressing research problems associated wide area surveillance
 - Combat Zones that See
 - HSARPA BAA 04-05