



The University of Chicago
Departments of Computer Science,
Mathematics, and Statistics

Scientific and Statistical Computing Seminar

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Center for Applied Mathematical Science

Adaptive Spatiotemporal Image Processing Techniques and Applications to Remote Sensing

FRIDAY, September 30, 2011, at 3:30 PM

133 Eckhart Hall, 5734 S. University Avenue (unless announced otherwise).

ABSTRACT

In space-based infrared sensor systems, cluttered backgrounds are typically much more intense than the equivalent sensor noise or the targets being detected and tracked. Therefore, the development of efficient clutter suppression techniques is of critical importance. We propose adaptive spatiotemporal image processing techniques that can be effectively used for background estimation and clutter filtering jointly with image alignment (jitter compensation and scene stabilization). We will also discuss efficient nonlinear filtering-based target tracking techniques for tracking dim targets in stressing cluttered environments. The results of simulations for space-based IR staring sensor systems (for various geometries, resolutions, illuminations and meteorological conditions) and processing of real data will be presented. These results show that the developed algorithms substantially outperform state-of-the-art approaches and allow for reliable tracking of low-observable objects.

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