Distributed Smart Cameras

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We have developed over the years several distributed smart camera systems [Lin06, Vel08]. We believe that distributed algorithms are required to scale problems stemming from multiple cameras up to the number of cameras required to understand interesting scenes. We believe that distributed algorithms, real-time operation, and low power must be considered as first-class design goals, not tossed over the fence as an implementation detail.

Several research problems must be addressed to build useful distributed smart camera systems:

- Message-passing algorithms for problems like tracking that have known behavior in terms of message complexity, convergence, etc.
- An understanding of the relationship between low power operation and distributed algorithms.
- Load balancing in real-time distributed systems.
- Multi-band and multi-modal sensor fusion.

[Vel08] Senem Veliapasalar, Jason Schlessman, Cheng-Yao Chen, Wayne H. Wolf, and Jaswinder P. Singh, "A sdcalable clustered camera system for multiple object tracking," *EURASIP Journal on Image and Video Processing*, v. 2008, article ID 542808, 2008.

[Lin06] C. H. Lin, W. Wolf, A. Dixon, X. Koutsoukos, and J. Sztipanovits, "Design and implementation of ubiquitous smart cameras," in *Proceedings, SUTC 2006*, IEEE, 2006.