

# UW CENTER FOR PATTERN ANALYSIS AND MACHINE INTELLIGENCE

## GRADUATE SEMINAR SERIES

### Distributed Random Finite Set Theoretic Soft/Hard Data Fusion: Target Tracking Application

**Speaker:** Bahador Khaleghi

**Date:** July 27, 2011

**Time:** 4 pm- 5 pm

**Place:** E5 (5128) Refreshments will be served

#### **Abstract :**

The development of data fusion systems capable of incorporating soft human-generated data into the fusion process is an emerging trend in the fusion community, motivated mainly by asymmetric warfare situations where the observational opportunities for traditional hard sensors are restricted. This paper describes an extension of our prototype soft/hard data fusion system, based on RFS theory, from centralized into a fully distributed computational framework. A fully distributed data fusion algorithm relies only on information exchange between local sensor nodes and hence promises enhanced scalability, reliability, and robustness in contrast to the conventional centralized fusion approach. We propose a novel approach for distributed estimation of average soft data using the consensus propagation algorithm. The distributed estimation of aggregated hard data is accomplished through an average consensus filter. Based on the proposed approach, we describe a single-target tracking system capable of processing soft and hard data. The preliminary experiments demonstrate the efficiency of the consensus propagation based approach for distributed aggregation of soft data, as well as the advantages of incorporating soft data into the distributed data fusion process.

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