Sensor, Signal & Information Processing (SenSIP) Center
Ira A. Fulton School of Engineering, Arizona State University
SenSIP Center
GWC 411 | PO Box 875706
Arizona State University
Tempe, AZ 85287-5706
480 965 5311 (Phone)
480 965 8325 (Fax)
sensip@asu.edu

SenSIP Graduate Student Seminar Series

Localization in Wireless Sensor Networks

Presenter: Xue Zhang, PhD Candidate
February 26 (Friday), 2016, 1:00 PM / Room: ERC 490

Abstract

In recent years, localization in Wireless Sensor Networks (WSNs) has been studied by many researchers. In this presentation, both location estimation and location detection will be discussed. We consider both problems in the presence of fading channels using time of arrival (TOA) measurements with narrowband communication signals. In location estimation problems, the Cramer-Rao lower bound (CRLB) for localization error is derived under different assumptions on fading coefficients. We show analytically that the loss in performance due to Rayleigh fading with known phase is about 5dB compared to the case with no fading. Unknown phase causes an additional 1dB loss. Meanwhile, the maximum likelihood estimator (MLE) for these assumptions are also derived. In the distributed detection formulation, each anchor receives a noisy signal from a node with known location if the node is active. Each anchor makes a decision as to whether the node is active or not and transmits a bit to a fusion center once a decision is made. The fusion center combines all the decisions and uses a design parameter K to make the final decision. We derive optimal thresholds and calculate the total probability of false alarm and detection under different assumptions on knowledge of fading coefficients.

Biography:
Xue Zhang is currently a PhD candidate under Prof. Andreas Spanias and Prof. Cihan Tepedelenlioglu in Arizona State University. Her research interests are in the areas of detection and estimation theory, localization in WSNs, and optimization. She has served as a reviewer for IEEE journals and conferences.

Refreshments

Upcoming Student Seminars:

Rushil Anirudh, *Modeling Human Actions as Riemannian Trajectories*, 03/04
Lorenzo Ferrari, *Sequential Utility Maximization for Dynamic Spectrum Access*, 04/01
Hoi To Wai, *Stochastic Frank-Wolfe Algorithms for High-dimensional Optimization: with applications to online learning and distributed optimization*, 04/08
Henry Braun, *TBA*, 04/15
Weina Wang, *TBA*, 04/29

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