

Seminar Talk

Dr. Qiang Le
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Department of Electrical & Computer Engineering
Hampton University

Tuesday, March 27, 2018
3:00 p.m. KH 224

Title: Detection, Estimation and Information Fusion for Target Localization

Abstract:

Wireless sensor networks have proven useful for detecting and tracking multiple targets. Recent work has demonstrated that even the low information provided by proximity sensors is sufficient to localize and track multiple targets when fusing such information from a network of sensors. Proximity sensors are low cost and power devices that report binary information: '1' for detection of one or many targets, and '0' for no detection of targets within proximity. Another low cost device is a microphone array that can provide bearing, i.e., direction of arrival, measurements that point to potential target locations. These cheaper sensor packages typically are used to cue more sophisticated sensors that require more power in order to classify and monitor the targets. In theory, the best localization performance is achieved when all types of sensor nodes share their raw sensor data. To this end, we investigate the feasibility of using the probability hypothesis density (PHD) filter to fuse binary and bearing measurements. Another question to answer is which type of sensor should be selected for actions at right time. To address this challenge, Renyi entropy is used as criteria to select the sensor type.

In addition, Dr. Le would like to talk about a framework that consists of raw image segmentation and multiple target trackers (multiple hypothesis tracker or Gaussian mixture probability hypothesis density tracker) on how to obtain the tracks of the electrokinetic particles in microscopic video.

Bio:

Qiang Le (Ph.D. in ECE from Georgia Tech in 2006) joined Hampton U in 2006 and currently is an Associate Professor in Department of ECE. Her research interest is in signal detection and estimation, multiple target tracking and localization, multi-modal sensor fusion, geospatial statistical data analysis for health disparity, and engineering education research. Her research in multiple target tracking using proximity sensors, and multi-modal information fusion for localization was awarded by Army Research Lab. Her work on geospatial statistical data analysis for health disparity was sponsored by Hampton University Minority Men's Health Initiatives (HU-MMHI). In addition, she is a dedicated teacher in engineering education.