BOSTON UNIVERSITY

Boston University Statistics and Probability Seminar Series

Statistical Problems in Wireless Sensor Networks

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February 5, 4-5pm
Mathematics and Computer Science (MCS) Building, Room 149
111 Cummington Street, Boston
Tea and Cookies at 3:30pm in MCS 153

Abstract: Wireless Sensor Networks (WSN) are a new technology with many applications, including environmental monitoring, habitat monitoring, surveillance, and health care. In many applications, each sensor records a signal (temperature, vibration, etc) emitted from a target, makes a decision about the target's presence, and then transmits either the signal or the decision to a central node. Transmission of decisions instead of signals offers significant savings in communication costs, but binary decisions are unreliable in noisy environments. We develop a new algorithm to improve reliability of binary decisions, the Local Vote Decision Fusion (LVDF). Using LVDF, we develop new data fusion algorithms for target detection (making a network-level decision about the presence of a target), target localization (estimating the target's position), and target tracking (estimating trajectories of multiple moving targets over time). We apply our framework based on binary corrected decisions to two case studies – an experiment involving tracking people and a project of tracking zebras. Our tracking approach based on corrected decisions exhibits a competitive performance even compared to maximum likelihood estimation based on the signals themselves. Motivated by the success of the LVDF algorithm in WSNs, we are currently developing a general classification framework for based on data fusion from correlated classifiers

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For directions and maps, please see *http://math.bu.edu/research/statistics/statseminar.html.*