

SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

MULTIPLE-TARGET TRACKING IN THE PRESENCE OF ASSOCIATION AMBIGUITIES

DISSERTATION DEFENSE

by

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Abstract: Multiple-target tracking becomes challenging when the measurements at the receivers contain both measurements due to moving targets and due to clutter, which are generally considered false alarms. Sometimes, due to the low target detection probability, some targets do not produce a measurement during a scan. As a result, before the state estimation, one needs to identify which measurements are target-originated and which measurements are clutter-originated. This problem of assigning a measurement to each target is called data association.

In this presentation, a new particle filtering algorithm to track multiple maneuvering targets in the presence of association ambiguity is presented. The proposed method considers data association and state estimation as separate subproblems. Data association is addressed first by formulating it as a game, considering each tracker as a player and the set of measurements as strategies. Then a regret-based learning algorithm is used to find the correlated equilibrium of this game in a decentralized manner. The set of correlated equilibria is a generalization of Nash equilibria and considers the ability of agents to coordinate their actions. Once the associations are known, the state of each target is estimated independently by representing the state using a set of particles and associated weights. The weight update equation using the principle of importance sampling is derived. Numerical simulations demonstrate the advantage of the proposed method for tracking problems of varying complexities.

DATE: Friday, September 20, 2013
TIME: 11:10 a.m.
PLACE: Green Hall, Room 0120

Dissertation advisor:
Dr. Arye Nehorai

This seminar is in partial fulfillment
of the Doctor of Philosophy degree