Measurement Clustering Criteria for Localization of Multiple Transmitters

ECE Departmental Seminar

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Wednesday April 1, 2009 at 2:00 PM

STII, Room 230A

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ABSTRACT

We consider the problem of localizing multiple cochannel transmitters belonging to a licensed or primary network using signal strength measurements taken by a group of unlicensed or secondary nodes. Traditional localization techniques can be applied to multiple transmitter localization, provided that: (1) the total number of cochannel transmitters in the system is known, and (2) an appropriate set of clustered measurements is available. We present two criteria to determine the total number of cochannel transmitters in the primary system. The first criterion is called the *net MMSE* criterion, which uses the Cramér-Rao lower bound on localization accuracy. The second criterion is the information-theoretic criterion, *minimum description length*. Both of these criteria lead to measurement clustering algorithms in a natural way. Although we consider only signal strength measurements, the approach can be generalized to include other types of observations (e.g., time and angle information) with independent measurements in additive noise. Our numerical results demonstrate the effectiveness of the proposed approach to measurement clustering.