Distributed Fusion with Multi-Bernoulli Filter based on Generalized Covariance Intersection

Abstract:

In this paper, we propose a distributed multi-object tracking algorithm through the use of multi-Bernoulli (MB) filter based on generalized Covariance Intersection (G-CI). Our analyses show that the G-CI fusion with two MB posterior distributions does not admit an accurate closed-form expression. To solve this problem, we firstly approximate the fused posterior as the unlabeled version of _-generalized labeled multi-Bernoulli (_-GLMB) distribution, referred to as generalized multi-Bernoulli (GMB) distribution. Then, to allow the subsequent fusion with another multi-Bernoulli posterior distribution, e.g., fusion with a third sensor node in the sensor network, or fusion in the feedback working mode, we further approximate the fused GMB posterior distribution as an MB distribution which matches its first-order statistical moment. The proposed fusion algorithm is implemented using sequential Monte Carlo technique and its performance is highlighted by numerical results.