Gaussian Particle Flow Bernoulli Filter for Single Target Tracking

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Abstract : The Bernoulli filter is a precise Bayesian filter for single target tracking based on the random finite set theory. The standard Bernoulli filter often underestimates the number of targets. This study proposes a Gaussian particle flow (GPF) Bernoulli filter employing particle flow to migrate particles from prior to posterior positions to improve the performance of the standard Bernoulli filter. By employing the particle flow filter, the computational speed of the Bernoulli filters is significantly improved. In addition, the GPF Bernoulli filter provides a more accurate estimation compared with that of the standard Bernoulli filter. Simulation results confirm the improved tracking performance and computational speed in two- and three-dimensional scenarios compared with other algorithms.

Keywords : Bernoulli filter, particle filter, particle flow filter, random finite sets, target tracking