

**Abstract:** Particle filters have been widely used in estimating the states of dynamical systems by using Bayesian interference and stochastic sampling techniques. In order to improve the performance of the sequential particle filters, the parallel computing techniques were introduced to handle a large number of particles with multiple processing units (PUs). However, the particle transfers between PUs in resampling stages produce extra communication, which lower the speedup factors. Different particle routing policies were proposed in resampling processes to improve the performance and estimation accuracy. Besides the centralized resampling and decentralized resampling techniques, the hybrid resampling algorithms were introduced to improve the performance of parallel/distributed particle filters by reducing the communication costs without loss of estimation accuracy. The hybrid resampling algorithm is able to skip some centralized sampling steps, which decreases the communication cost. In this survey, we study the parallel/distributed particles filters with different routing policies and hybrid resampling algorithms, which provides us the motivation and intuition for further improving the performance of parallel/distributed particles filters in future.

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