Abstract

This paper presents a comparison of different fitters namely: Extended Kalman Filter (EKF), Particle Filter (PF) and a proposed Enhanced Particle / Kalman Filter (EPKF) used in robot localization. These filters are implemented in matlab environment and their performances are evaluated in terms of computational time and error from ground truth and the results are reported. The considered robot localizer uses radio beacons that provide the ability to measure range only. Since EKF and its variants are not capable to efficiently solve the global localization problem, we propose the Enhanced Particle / Kalman Filter (EPKF) which provide the required initial location to address this drawback of EKF. We propose using PF as Initialization phase to coarsely predict the initial location and numerous sets of data are experimented to get robust conclusion. The results showed that the proposed localization approach which adopts the particle filter as initialization step to EKF achieves higher accuracy localization while, the computational cost is kept almost as EKF alone.

References
Particle / Kalman Filter for Efficient Robot Localization

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Index Terms
Keywords

Particle Filter  Extended Kalman Filter  Robot Localization