改进的粒子滤波算法在 RFID 室内目标跟踪中的应用

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摘　要：针对复杂室内环境下，现有的 RFID 目标跟踪方法容易受到多径效应和非视距等因素影响，采用典型的粒子滤波算法估计精度低的问题，提出了一种改进的粒子滤波算法.该算法利用了无迹卡尔曼滤波来构造粒子滤波的重要性分布函数，使得重要性分布函数融入最新的观测信息.根据运动模型建立了动态目标的状态方程，将阅读器接收到的信号强度作为观测值建立了观测方程.通过该算法与其他滤波算法相比较，仿真结果表明，该算法有效提高了目标跟踪的精度，增强了目标跟踪系统的稳定性.

关键词：RFID；目标跟踪；粒子滤波；无迹卡尔曼滤波；重要性函数

Application of improved particle filter algorithm in RFID indoor target tracking

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Abstract：For the complex indoor environment, the existing RFID target tracking method is easily affected by multipath effect and non-line of sight，The typical particle filter algorithm is used to estimate the low precision， An improved particle filter algorithm is proposed. The algorithm utilizes the unscented Kalman filter to construct the importance distribution function of the particle filter, so that the importance distribution function is integrated into the latest observation information. The state equation of the dynamic target is established according to the motion model, and the observation equation is established by taking the signal strength received by the reader as the observation value. Compared with other filtering algorithms, the simulation results show that the algorithm effectively improves the accuracy of target tracking and enhances the stability of the target tracking system.

Key words：RFID; target tracking; Particle Filtering; Unscented Kalman Filter; importance function

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