

论文与技术报告

一种有轨迹标识的利用测量生成新目标密度的GM-PHD滤波器

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摘要:

在存在杂波、漏检、目标数目未知和变化的情况下, PHD滤波器是一种多目标跟踪新方法, GM-PHD滤波器是PHD滤波器的一种近似实现。然而,GM-PHD滤波器没有提供单个目标状态估计的身份, 而构建目标运动轨迹需要目标状态估计的身份, 同时, 现有的GM-PHD滤波器在新目标密度生成时对新目标出现位置进行了限制, 难以对观测空间任意位置随机出现的目标进行跟踪。为解决非线性观测系统GM-PHD滤波器中目标状态估计的身份标识和新目标密度生成问题, 设计了一种新的GM-PHD滤波器。该滤波器利用传感器的观测数据生成新目标密度, 通过给滤波器输出的高斯项增加专有身份标识并使用身份标识将源于同一目标不同时刻的目标状态估计关联起来。仿真实验验证了滤波算法的有效性。

关键词: 多目标跟踪 概率假设密度滤波器 新目标密度生成 身份标识

A Gaussian Mixture PHD Filter with Track Label and Target-Birth Density Generation Using Measurements

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Abstract:

The probability hypothesis density (PHD) filter is a novel approach to tracking an unknown and time-varying number of targets in presence of clutter, miss-detection. The Gaussian mixture PHD (GM-PHD) filter is an approximation implementation of the PHD filter. However the GM-PHD filter do not provide identities of individual target state estimates, which are needed to construct tracks of individual targets. Meanwhile, it is difficult for the GM-PHD filter to track the targets randomly appearing from uncertain position of the observation space because in order to generate target-birth density, the strict restricts on the appearing position of the birth targets exist in the GM-PHD filter. To solve the problems of the generation of the target-birth PHD and the track labeling in a nonlinear observation system, a new GM-PHD filter is proposed in which the measurements of sensors are used to generate the target-birth PHD, and the output state estimates of targets of the filter over time are associated with the additional identifying label in the output Gaussian components of the filter. The efficiency of the proposed algorithm is verified by simulations.

Keywords: multitarget tracking probability hypothesis density filter target-birth density generation identifying label

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2. 龙建乾, 杨威, 付耀文. 基于改进的PHD粒子滤波的多目标跟踪技术[J]. 信号处理, 2011,27(9): 1296-1300
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