Abstract:
Estimating surrounding objects and obstacles by processing sensor data is essential for safe autonomous driving. Grid-based approaches discretize the environment into grid cells, which implicitly solves the data association between measurement data and the filtered state on this grid representation. Recent approaches estimate, in addition to occupancy probabilities, cell velocity distributions using a low-level particle filter. Measured occupancy can thus be classified as static or dynamic, whereby a subsequent tracking of moving objects can be limited to dynamic cells. However, the data association between those cells and multiple predicted objects that are close to each other remains a challenge. In this work, we propose a new association approach in that context. Our main idea is that particles of the underlying low-level particle filter are linked to those high-level objects, i.e., an object label is attached to each particle. Cells are thus associated to objects by evaluating the particle label distribution of that cell. In addition, a subsequent clustering is performed, in which multiple clusters of an object are extracted and finally
checked for plausibility to further increase the robustness. Our approach is evaluated with real sensor data in challenging scenarios with occlusions and dense traffic.

Stichworte:

object detection; object tracking; particle filtering (numerical methods); target tracking; traffic engineering computing; data association; grid-based object tracking; particle labeling; surrounding objects; sensor data; safe autonomous driving; grid cells; measurement data; filtered state; grid representation; cell velocity distributions; measured occupancy; subsequent tracking; moving objects; dynamic cells; multiple predicted objects; high-level objects; object label; particle label distribution; low-level particle filter; Atmospheric measurements; Particle measurements; Object tracking; Sociology; Statistics; Particle tracking; Estimation

Kongress- / Buchtitel:

2018 21st International Conference on Intelligent Transportation Systems (ITSC)

Ausrichter der Konferenz:

IEEE

Datum der Konferenz:

November 4-7, 2018

Jahr:

2018

Monat:

Nov

Seiten:

3036-3043

Volltext / DOI:

http://doi.org/10.1109/ITSC.2018.8569511

Semester (für SAP-Datenerfassung):

WS 18-19

Occurences:

· Hochschulbibliographie > 2018 > Fakultäten > Elektrotechnik und Informationstechnik > Steuerungs- und Regelungstechnik (Prof. Buss)
· Einrichtungen > Fakultäten > Fakultät für Elektrotechnik und Informationstechnik > Lehrstühle und Professuren > Steuerungs- und Regelungstechnik (Prof. Buss) > 2018

entries: