Institut für Industrielle Informationstechnik
Hertzstraße 16, Geb. 06.35
76187 Karlsruhe
www.iiit.kit.edu

Masterarbeit

Consideration of correlations during data fusion

Motivation

The current research project Circular Factory aims to realize the vision of the perpetual product by transferring used products into new product generations.
In this broad-based project, various sensors are used to measure the used products. The measurements will then be used to decide whether the object is still functional and can be reused in a new product or not.
This heterogeneous data is merged with each other to make the decision.

Task Definition

The data contains uncertainties and are represented as probilistic distributions.

Gaussian mixtures are a very common tool for describing arbitrarily structured uncertainties in various applications.
In the Circular Factory, the data of an object instance are fused together.
Fusion is a process that is usually performed by multiplying these densities.
The product of Gaussian mixtures can be calculated exactly, but the number of mixture components in the resulting mixture increases exponentially.
Therefore, it is important to approximate the resulting mixture with fewer components to keep it manageable for further processing steps.
There are already various algorithms that make it possible to reduce the components of the resulting distribution.
However, the algorithms do not yet allow covariances to be taken into account.

The task of this work is to carry out a fusion in which the correlation is taken into account.

Preknowledge

- Programming knowledge e.g. Python, Matlab
- Interest in collaboration with ongoing research project
- Interest in measurement technology

Forschungsgebiet

- Measurement technology
- Data processing
- Datafusion

Studiengang

- [x] Elektro- und Informationstechnik
- [x] Informatik
- [x] Mechatronik

Ausrichtung

- [x] Methodenentwicklung
- [ ] Messung
- [x] Entwicklung
- [x] Implementierung
- [ ] Signalanalyse
- [x] Recherche

Start

Ab sofort

Links

Forschungsprojekt
Mitarbeiter

Ansprechpartner

Luisa Hoffmann
Westhochschule, Hertzstr. 16
Geb. 06.35, Zimmer 114
luisa.hoffmann@kit.edu
Tel.:(0721) 608 - 44517