Introduction to Distributed Sensor Data Fusion

Summer

(in German: Introduction to Distributed Sensor Data Fusion)

Module-ID: FIN-INF-120497

Abbreviation	Credit Points	Semester	Term	Duration	Language	Level
SDF	6	Summer	starting at 1.	1 Semester	english	Master

Link:	LSF
Limited accessability:	
Responsibility:	Prof. Dr.-Ing. Benjamin Noack
Lecturer:	Prof. Dr.-Ing. Benjamin Noack
Classes:	• Lecture *Introduction to Distributed Sensor Data Fusion* • Exercise *Introduction to Distributed Sensor Data Fusion*

Applicability in curriculum:	- M.Sc. INF: Informatik - M.Sc. INF: Informatik Wahlpflicht (SPO 2027) - M.Sc. INGINF: Informatik - M.Sc. INGINF: Ingenieurinformatik - M.Sc. WIF: Informatik - M.Sc. WIF: Informatik Wahlpflicht (SPO 2027) - M.Sc. DKE: Applied Data Science - M.Sc. DE: Methoden des Digital Engineering - M.Sc. DE: Methoden der Informatik - M.Sc. DE: Fachliche Spezialisierung - M.Sc. VC: Computer Science - M.Sc. VC: Computer Science (SPO 2027)

Intended learning outcomes:
Students who complete the course ...

- have an overview of basic problems and methods in designing distributed sensor systems and their applications.
- understand how to process data in a network of sensors, what requirements the infrastructure must meet, and how to model and describe errors like measurement noise.
- are familiar with the mathematical tools and can apply them.
- can analyze, compare, and evaluate different approaches to information processing of sensor data.

Content:
This lecture introduces basic principles, requirements, and methods of sensor data processing. Since data are more often gathered by networked sensor systems, this lecture places particular emphasis on distributed sensor data fusion methods. We will start by discussing the technical specifications of a sensor system and the basics of digital sensor data processing. Our study includes sampling theorems, compressive sensing, and signal matching. We will consider the required infrastructure to processing sensor data in networked systems, i.e., sensor networks. Based on this infrastructure, we can apply methods for multisensor data fusion to spatially distributed sensors and can monitor spatio-temporal processes.

Workload:
56 h contact time 124 h independent study

Pre-examination requirements:	Type of examination:	Teaching method / lecture hours per week (SWS):
	Oral exam (30 min)	• Lecture (2 SWS) • Exercise (2 SWS)

Prerequisites according to examination regulations:	Recommended prerequisites:

none	

Media:	Literature:
	Literature will be announced in the lecture.

Comments:

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