Assistenzrobotik

Summer

(engl. Assistance robotics)

Modulnummer: FIN-INF-120443

Kürzel	CP	Semester	Fachsem.	Dauer	Sprache	Niveau
AROB	6	Summer	starting at 1.	1 Semester	deutsch	Master

Link zum LSF:	LSF
Zugang beschränkt:	
Verantwortung:	Norbert Elkmann (Fraunhofer IFF)
Dozent:in:	Norbert Elkmann (Fraunhofer IFF)
Lehrveranstaltungen:	• Vorlesung *Assistenzrobotik* • Übung *Assistenzrobotik*
Verwendbarkeit:	- M.Sc. INF: Informatik - M.Sc. INF: Informatik Wahlpflicht (SPO 2027) - M.Sc. INGINF: Informatik - 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. DE: Informatik Wahlpflicht (SPO 2027) - M.Sc. DE: Digital Engineering (SPO 2027) - M.Sc. DE: Engineering Specialization (SPO 2027)

Angestrebte Lernergebnisse:
Graduates of this module ...

- know mathematical transformations for the geometric and differential description of robot kinematics
- know the equation of motion of robot manipulators and can apply it to questions of collaborative safety
- know the different types of interpolation for describing a robot path and can independently generate C^2 trajectories

- can model the kinematics of mobile robots and determine their position taking into account uncertainties in space
- are familiar with various machine learning methods (unsupervised and supervised learning as well as deep learning) and can classify their possible applications for image processing in the context of robotics
- understand the basic principles of reinforcement learning and know how it can be used to generate optimal handling strategies for robots
- know the basics of machine safety (risk assessment and CE marking)
- know the safety operating modes for collaborative robot systems and can apply them

Inhalt:

- Introduction to assistance robotics
- Fundamentals of assistance robotics (modeling of robot kinematics, path planning, motion and force control, sensors, mobile systems)
- Human-robot collaboration and safety: technologies, machine safety, standards, legal situation
- AI processes in robotics

Arbeitsaufwand:
42h attendance time + 138h independent work

Prüfungsvorleistungen:	Studien-/Prüfungsleistungen:	Lehrform / SWS:
	Oral examination	• 2 SWS Lecture • 2 SWS Exercise

Voraussetzungen nach Prüfungsordnung:	Empfohlene Voraussetzungen:
none	• Programming skills • Linear algebra

Medienformen:	Literatur:

Hinweise:

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