

Modulbeschreibung

Module no./code	IMA_5.3.2
Module title	Car Entertainment and Advanced Driver Assistance Systems
Courses in the module, if applicable	
Content	<ul style="list-style-type: none"> • Advanced Driver Assistance Systems <ul style="list-style-type: none"> - Introduction and Overview: Categorization and Examples, Architecture of ADAS - Sensors: Vision Systems, Radar, Lidar, Ultra Sonic; Fusion of Sensor-Data - Introduction to Computer Vision: basic principles of image pre-processing and feature extraction - Classification using machine learning systems: basic principles of machine learning, k-Nearest Neighbours algorithm • Connected Car <ul style="list-style-type: none"> - Mobile Communication systems for voice and data - Communication between driver and car, car to car, car to surrounding (radar) - Positioning Systems - Software standards and technologies for Car2X integration (i.e. GENIVI, Android Auto) - Fundamentals of mobile apps in the automotive domain - Implementation of car-related mobile applications • Car Entertainment <ul style="list-style-type: none"> - Digital Broadcasting - Digital Television - Travel Management
Learning outcomes	<p>Topic-based objectives:</p> <ul style="list-style-type: none"> • To give students an overview of modern Advanced Driver Assistance System (ADAS), their classification and basic structure of signal processing • To enable students to understand basic principles of signal detection, pre-processing, feature extraction and classification for ADAS <p>At the end of the course students will be able to:</p> <ul style="list-style-type: none"> • Understand how ADAS based of computer vision work and which steps of signal detection and processing are necessary. Based on this knowledge, students are able to increase themselves their knowledge of development of ADAS or take part on further courses for development of ADAS e.g. in corresponding master programs • Know the different possibilities, their abilities and limits of communication systems between a driver, the car and the surrounding systems and can solve problems given out of this scenario

	<ul style="list-style-type: none"> • Understand and analyse the role and integration of mobile apps for the car and their integration with other information systems • Being able to develop a simple car-related mobile app including car integration
Semester (or trimester)	5th Semester
Duration	1 Semester
Frequency	Each Semester
ECTS credits	5 ECTS Credits
Workload	<ul style="list-style-type: none"> • Total: 150h • Participation in courses: 45h • Self-study: 90h • Exercises: 15h
Type of module (compulsory, optional, etc.)	Elective Module, depends on students' selection
Applicability of the module	Computer science in economics (Wirtschaftsinformatik)
Prerequisites for participation	Recommended courses: <ul style="list-style-type: none"> • Course: Car IT (IMA_3.4)
Person responsible for module	Prof. Dr.-Ing. Dany Meyer
Name of teacher	Prof. Dr. Philipp Brune Prof. Dr. Christian Bachmeir Prof. Dr.-Ing. Dany Meyer
Language of instruction	English / German
Type of examination / requirement for receiving credits	Written exam, 90 min
Weighting in overall examination grade	2,4%
Teaching and learning methods	<ul style="list-style-type: none"> • Lecture / presentation and case studies • Exercises with Matlab/Simulink (Computer Vision Toolbox) • Exercises and App Development Project using the Android platform • Specific lecture notes via data projector / Power Point • Interactively developed content via whiteboard/visualizer • Case studies and readings provided on the university's e-learning platform
Special features (online component, visits to companies, guest lectures, etc.)	
Reading list	Mandatory: <ul style="list-style-type: none"> • No mandatory literature

(required reading / additional recommended reading)

Recommended:

- Eskandarian, Azim (2012): Handbook of intelligent vehicles. London, New York: Springer
- Handbuch Fahrerassistenzsysteme. Grundlagen, Komponenten und Systeme für aktive Sicherheit und Komfort; 2, korr. Aufl. Wiesbaden: Vieweg + Teubner, 2012
- Reif, Konrad: Fahrstabilisierungssysteme und Fahrerassistenzsysteme. Wiesbaden: Vieweg+Teubner Verlag / GWV Fachverlage, Wiesbaden, 2010
- Jörg Roth: Mobile Computing. Dpunkt, 2005
- Thomas Fuchß: Mobile Computing. Hanser, 2009
- Joseph Anuzzi, Lauren Darcey, Shane Conder: Introduction to Android Application Development (Developer's Library) Addison-Wesley, 2013