


Data:	UI. Ma. / Examination number: 11506	Version: 04.02.2022 	Start Year: SoSe 2022
Module Name: (English):	<b>Interactive Ubiquitous Systems and Intelligent User Interfaces</b>		
Responsible:	<a href="#">Pfleging, Bastian</a>		
Lecturer(s):	<a href="#">Pfleging, Bastian</a>		
Institute(s):	<a href="#">Institute of Computer Science</a>		
Duration:	1 Semester(s)		
Competencies:	<p>Students leave this module with a variety of learning outcomes - knowledge, skills/competencies, and attitudes.</p> <p><b>LO1: Knowledge</b></p> <ul style="list-style-type: none"> <li>• Students will have a well-founded knowledge of the foundations of ubiquitous computing and aspects related to advanced topics of human-computer interaction and intelligent systems.</li> <li>• Students will get familiar with methods for user-centered design and HCI-related research methods.</li> </ul> <p><b>LO2: Skills/Competencies</b></p> <ul style="list-style-type: none"> <li>• Students will be able to apply the obtained knowledge to conduct project work and implement their own interactive ubiquitous system in different contexts.</li> </ul> <p><b>LO3 Attitudes:</b></p> <ul style="list-style-type: none"> <li>• Students will develop the understanding related to implications arising from the application of intelligent user interfaces.</li> <li>• Students will be able execute methods of user-centered design following common norms and procedures and understand the importance of developing sensitively and respectfully.</li> </ul>		
Contents:	<p>This module looks at current topics at the intersection of ubiquitous computing, (advanced) human computer interaction, and machine learning.</p> <p>The lecture focuses on the foundations of ubiquitous computing (UbiComp) and combines this with an in-depth look at advanced topics of human-computer interaction (HCI). This includes current design/development and research methods. Additionally, we will look at techniques originating from machine learning and artificial intelligence for practical applications within the research area of human computer interaction and ubiquitous systems. Besides the fundamental topics of UbiComp and advanced HCI, the lecture will cover a selection of trending research topics in these fields such as:</p> <ul style="list-style-type: none"> <li>• Foundations of ubiquitous computing</li> <li>• (Multimodal) human-computer interaction; research methods &amp; prototyping</li> <li>• Mobile interaction</li> <li>• Wearable Computing</li> <li>• Physiological sensing &amp; interaction (e.g., EMG, EEG, EMS)</li> <li>• Gestures &amp; hand tracking</li> <li>• Text processing</li> <li>• Tangible interaction</li> <li>• Voice user interfaces &amp; natural language processing</li> </ul>		

	<ul style="list-style-type: none"> <li>• Recommender systems</li> <li>• Usable security</li> <li>• Automated driving and automotive user interfaces</li> <li>• Context-aware computing / interaction</li> <li>• Explainability of intelligent systems</li> <li>• Ethical aspects of intelligent and ubiquitous systems</li> </ul> <p>As part of the practical course, students are expected to create and evaluate their own intelligent system (individually or in groups) over the course of the semester and present intermediate milestones throughout the tutorials. This include short concept presentations: e.g., to explain how a new aspect as presented in the lecture integrates into the (improved) system; and milestone presentations a week later that showcase the implementation or assessment. Tutorials will also be used to introduce lecture topics in the form of hands-on exercises. The progress of the project will be documented in a project report and there will be a final project presentation.</p>
Literature:	<p>Typical references include scientific publications related to the topics presented in each lecture and will be provided with the course material.</p> <p>Additional material:</p> <ul style="list-style-type: none"> <li>• John Krumm: Ubiquitous Computing Fundamentals, CRC Press, 2010, ISBN 9781420093605</li> <li>• Jonathan Lazar, Jinjuan Heidi Feng, Harry Hochheiser: Research Methods in Human Computer Interaction (Second Edition), Morgan Kaufmann, 2017, ISBN 9780128053904</li> <li>• Andy Field, Graham Hole: How to Design and Report Experiments, Sage Publishing, 2003, ISBN: 9780761973836</li> </ul>
Types of Teaching:	<p>S1 (SS): Lecture / Lectures (2 SWS)  S1 (SS): Project / Lectures (2 SWS)</p>
Pre-requisites:	<p><b>Recommendations:</b>  <a href="#">Eingebettete Systeme, 2019-04-17</a>  <a href="#">Grundlagen der Informatik, 2015-05-19</a>  <a href="#">Mensch-Maschine-Kommunikation, 2021-01-12</a></p>
Frequency:	yearly in the summer semester
Requirements for Credit Points:	<p>For the award of credit points it is necessary to pass the module exam. The module exam contains:  MP/KA* (KA if 8 students or more) [MP minimum 30 min / KA 90 min]  AP*: Project presentation and project report</p> <p>* In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.</p>
Credit Points:	6
Grade:	<p>The Grade is generated from the examination result(s) with the following weights (w):  MP/KA* [w: 1]  AP*: Project presentation and project report [w: 1]</p> <p>* In modules requiring more than one exam, this exam has to be passed or completed with at least "ausreichend" (4,0), respectively.</p>
Workload:	The workload is 180h. This consists of 42h presence time and 138h self-study. The latter comprises individual/group work on the project, preparation & post-processing of lecture content, and exam preparation.