Multimodal Interfaces

Module title: Multimodal Interfaces
Abbreviation: 10-HCI-MMI-152-m01

Module coordinator: holder of the Chair of Computer Science IX
Module offered by: Institute of Computer Science

ECTS: 5
Method of grading: numerical grade
Duration: 1 semester
Module level: graduate
Other prerequisites: --

Contents
The multimodal interaction paradigm simultaneously uses various modalities like speech, gesture, touch or gaze, to communicate with computers and machines. Basically, multimodal interaction includes the analysis as well as the synthesis of multimodal utterances. This course concentrates on the analysis, i.e. the input processing. Input processing has the goal to derive meaning from signal to provide a computerised description and understanding of the input and to execute the desired interaction. In multimodal systems, this process is interleaved between various modalities and multiple interdependencies exist between simultaneous utterances necessary to take into account for a successful machine interpretation.

In this course, students will learn about the necessary steps involved in processing unimodal as well as multimodal input. The course will highlight typical stages in multimodal processing. Using speech processing as a primary example, they learn about:
1. A/D conversion
2. Segmentation
3. Syntactical analysis
4. Semantic analysis
5. Pragmatic analysis
6. Discourse analysis

A specific emphasis will be on stages like morphology and semantic analysis. Typical aspects of multimodal interdependencies, i.e. temporal and semantic interrelations are highlighted and consequences for an algorithmic processing are derived. Prominent multimodal integration (aka multimodal fusion) approaches are described, including transducers, state machines and unification.

Intended learning outcomes
At the end of the course, the students will be able to build their own multimodal interfaces. They will have a broad understanding of all the necessary steps involved and will know prominent algorithmic solutions for each of them. Student will have learned about available tools for reoccurring tasks as well as their pros and cons.

Courses (type, number of weekly contact hours, language — if other than German)
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Module taught in: German and/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written examination (approx. 90 minutes) or presentation of project results (approx. 30 minutes)
Language of assessment: German and/or English
creditable for bonus

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Master’s degree (1 major) Human-Computer-Interaction (2015)
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<th>Master's degree (1 major) Human-Computer-Interaction (2018)</th>
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<tr>
<td>Master’s degree (1 major) eXtended Artificial Intelligence (xtAI) (2020)</td>
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