**Hauptseminar “Intelligent User Interfaces”**

**Introduction**
The research area of intelligent user interfaces is where the Human-Computer Interaction (HCI) community meets the Artificial Intelligence (AI) community, with contributions from related fields such as psychology, behavioral science, cognitive science, computer graphics, design, the arts, and more. The overall goal of intelligent user interfaces is to improve the interaction between humans and machines, by leveraging both HCI approaches and state-of-the-art AI techniques from computer vision, machine learning, social signal processing and affective computing, natural language processing, data mining, and reasoning.

The seminar provides an in-depth introduction to the core concepts of intelligent user interfaces. The seminar primarily deals with machine analysis of human non-verbal behavior and its applications to human-computer, human-robot, and computer-mediated human-human interaction. Methods involve computer vision, machine learning, deep learning, and model-based optimization.

**Learning goals**
The goal of the seminar is to familiarize students with exciting new research topics in the area of intelligent user interfaces. Moreover, the seminar teaches basic scientific writing and oral presentation skills. After completing the seminar, students will have acquired theoretical knowledge about the most important problems in machine understanding of human behavior and how to leverage such understanding in the design of intelligent user-facing technologies.

The core competency acquired through this course is a solid foundation in computer vision and machine learning (particularly deep-learning) algorithms to process and interpret human input into computing systems. In particular, students should be able to understand systems that deal with the problem of recognizing people in images, detecting and describing body parts, inferring their spatial configuration, estimating their visual attention, performing action/gesture recognition from still images or image sequences, also considering multi-modal data, among others. Furthermore, students will understand how to use models of human behavior in optimization based (algorithmic) design of user interfaces.

**Implementation**
The seminar will have a different structure from regular seminars to encourage more discussion and a deeper learning experience: We will use a case-study format where all students read the same paper each week but fulfill different roles and hence prepare with different viewpoints in mind:

- **Historian**: Find out how this paper sits in the context of the related work. Use bibliography tools to find the most influential papers cited by this
work and at least one paper influenced by the work (and summarize the two papers briefly).

- **Presenter:** Give a short talk about the paper that you read in depth.
- **PhD student:** Propose a follow-up project for your own research based on this paper - importantly the project should be directly inspired by the paper or even use/extend the method proposed.
- **Journalist:** After the presentation, write an article about the paper that can be understood by the general public; include points from the general discussion during the seminar, the historian, or the PhD student.

- **All students** (every week): Come up with an alternative title; did the paper miss anything? What are its key limitations?

**Requirements**

This research seminar is intended for **Master students** in Computer Science, Visual Computing, Media Informatics, and Computational Linguistics. Students should have a **good understanding of computer vision, machine learning, and/or human-computer interaction. Prior attendance of lectures in these areas is required.** Attendance in the weekly meetings is mandatory. The final grade will be composed of individual grades for the respective task each week as well as active participation in the discussions.

**Date & Time**
t.b.a Available space: 6–14 students

**Term**
WS 2021/22

**Language**
English

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