University of Stuttgart
Collaborative
Artificial Intelligence

Institute for Visualisation and Interactive Systems
Collaborative Artificial Intelligence
Prof. Dr. Andreas Bulling

Fachpraktikum Collaborative Artificial Intelligence (SS 2025)
"Computational Human Behaviour Modelling"

Introduction

Understanding human behaviour is at the heart of designing intelligent and interactive systems. As technology becomes more integrated into daily life, the need to model and predict human actions accurately has grown significantly. This course provides a unique opportunity to leverage state-of-the-art computational methods in machine learning, computer vision, and human-computer interaction for multimodal human behaviour modeling, e.g. pose or, and gaze estimation or behaviour forecasting, through hands-on research projects.

Learning outcomes

The goal of this Fachpraktikum is to familiarize students with cutting-edge research topics at the intersection of machine learning, computer vision, and human-computer interaction, with a focus on computational human behaviour modeling. After having completed the Fachpraktikum, students will have acquired theoretical knowledge about the most important problems in machine understanding of human behaviour. The core competency acquired through this course is the ability to implement latest machine learning methods (e.g. deep convolutional neural networks, multimodal transformer architectures, diffusion models) that address the processing and interpretation of human input in computing systems and evaluate them on state-of-the-art datasets.

Implementation

Students will work in groups of two on projects with different modalities like gaze, body pose or physiological signal. Students will learn how to implement and train models using machine learning Python libraries and how to validate and evaluate these models on benchmark datasets. In their projects, students will go through the whole development cycle: • Exploration of different use cases • Data processing to train machine learning models • Implementation of a neural network architecture • Model training using the processed data • Validation and analysis of the trained model • Presentation of methods, experiments, and results • Write a short paper summarizing the project. Attendance in the weekly meetings is mandatory. **Available space: max 12 students. Language: English.**

Requirements

This Fachpraktikum is intended for **Master students** in Computer Science, Computational Linguistics, Visual Computing, Simulation Technology, and INFOTECH. Students need to have a **solid understanding of machine learning, and/or computer vision**. **Prior attendance of lectures in these areas is required**. **Prior experience with Python and PyTorch is highly recommended.**

Time and place

Tuesday 9.45 - 11.15, Room 00.009, Pfaffenwaldring 5a

Contact

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