
Fachpraktikum Collaborative Artificial Intelligence (SS 2026)

Introduction

This practical course explores cutting-edge research at the intersection of machine learning, computational cognitive modelling, computer vision, and human-machine interaction to advance collaborative artificial intelligence (CAI). Realising CAI requires systems that can perceive, model, and reason about human behaviour, including subtle non-verbal cues, and use this understanding to make informed, context-sensitive decisions during interaction. CAI research builds on and contributes to multiple areas of AI, including multimodal machine learning, human behaviour modelling, and social reasoning. In the course, students will gain a deeper understanding of how computational models of humans can be used to enable better human-AI collaboration as well as hands-on experience in implementing and evaluating these methods.

Learning outcomes

The goal of this practical course is to familiarise students with exciting current research topics at the intersection of machine learning, computational cognitive modelling, computer vision, and human-computer interaction. After having completed the practical course, students will have acquired theoretical knowledge about the most important problems in machine understanding of human behaviour and cognition and how to leverage such understanding in the design of collaborative user interfaces. The core competency acquired through this course is the ability to implement latest machine learning methods (e.g., deep neural networks, diffusion models, multi-agent reinforcement learning, transformers etc.) 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 that explore different aspects of collaborative AI. 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 • Writing of a short paper summarising the project outcomes.
Available space: max 20 students. Language: English.

Requirements

This practical course is intended for **Master students in Computer Science, Computational Linguistics, Visual Computing, and Simulation Technology**. Students must have a solid understanding of machine learning, and/or computer vision. **Successful completion of the Master course “Machine Perception and Learning” is strictly required.** Prior experience with Python and PyTorch is essential.

Contact

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