Lehrstuhl Steuerung, Regelung und Systemdynamik

Master thesis

Theory, systematic literature review, analysis

Human-AI interaction and teaming in safety-critical systems: a systematic literature review

Keywords: Human-AI interaction, Human-AI teaming, safety and reliability

Conditions

Duration:	6 Months (of full working weeks), must be finalized latest April 2026
Requirements:	Experience of literature research, scientific writing
Language:	English/Deutsch
Target groups:	Master students

Content:

The rapid development of artificial intelligence technologies has opened up new opportunities for human–AI collaboration in safety-critical domains such as mobility, robotics, and transportation. While automation can enhance efficiency and reliability, the interaction between humans and AI remains a decisive factor for safety and trust.

This master's thesis provides the opportunity to systematically review and analyze the **last five years (2020–2025)** of research on **Human-AI interaction and Human-AI teaming**. The focus lies on concepts, methods, and empirical evidence that address **team performance, safety, and reliability** in joint human–AI systems.

Key aspects include **in/on-the-loop workflows**, **adaptive task allocation**, **explainable AI approaches**, **trust calibration**, **shared autonomy**, and the use of **metrics for team reliability and safety assurance**. The goal is to identify current best practices, evaluate methodological approaches, and highlight research gaps in the emerging field of Human-AI teaming for safety-critical applications.

The steps in detail are:

- Investigation of the current state of the art: Systematic review of studies on Human-AI interaction and teaming in safety-critical contexts (1.5 months).
- Evaluation of the sources: Definition of criteria for the inclusion or exclusion of studies. Evaluation of the quality and relevance of the sources (e.g. impact factors, publication data) (1 month).
- Literature analysis: Review of the development of the research topic. Synthesize existing knowledge on workflows, task allocation strategies, and evaluation metrics; compare methods, results, and assumptions (1.5 months).
- Critical evaluation: Identify methodological limitations, potential biases, and domain-specific challenges for safety-critical applications (1.5 months).
- Research gaps and future directions: Propose relevant research questions for future studies. Summarize key findings (0.5 months).
- Documentation and presentation of the results.

Supervisor: Olena Shyshova, M.Sc.
Office: MB 345
E-Mail: olena.shyshova@uni-due.de