# Bachelor's / Master's Thesis (m/w/d)
Safe and reliable Teleoperation for Dexterous Manipulation

Problem formulation

In teleoperation systems for dexterous manipulation, ensuring safety and reliability is paramount, particularly in high-stakes environments. Traditional teleoperation methods often lack robust mechanisms for detecting anomalies and predicting potential failures, leading to risks of unintended actions and system breakdowns. Developing a system that integrates real-time anomaly detection with proactive failure prediction could significantly enhance the safety and reliability of teleoperation for complex manipulation tasks.

Task definition

This thesis will focus on developing a safe and reliable teleoperation framework for dexterous manipulation, incorporating advanced anomaly detection and proactive failure prediction mechanisms. The research will involve designing algorithms that monitor system performance in real-time, detect anomalies, and predict potential failures before they occur, thereby enabling preemptive corrective actions. The system's effectiveness will be tested through a series of teleoperation tasks, evaluating its ability to maintain safety, minimize errors, and enhance overall reliability in complex and dynamic manipulation scenarios.
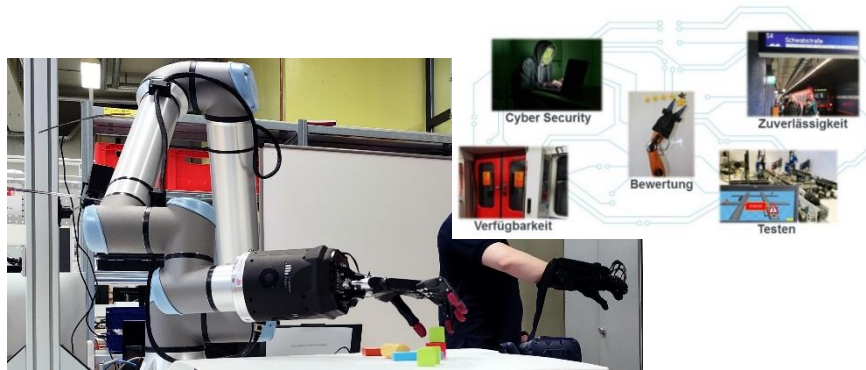
You shall offer

- Solid knowledge base and experience in deep learning, and robotics.
- Coding skills in Python and C++.
- Experience with ROS and communication technology

We will offer
- The most state-of-the-art technologies in deep learning and computer vision.
- Working in a lab with a Germany-wide unique Shadow Teleoperation System
- Tight support from supervisors, including a workshop on scientific writing.

Research area:
AI & Robotics

Focus:
☒ Experimental
☒ Theoretical
☒ Practical
☐ Simulation
☐ Construction (CAD)

Study program:
☒ Maschinenbau
☒ Mechatronik
☒ Elektrotechnik
☒ Informatik
☐ Informationswirtschaft
☐ Wirtschaftsingenieurwesen

Begin: From now on

If you are interested, please send us an e-mail with your **curriculum vitae** and a current **transcript of records**.

Contact person:
Edgar Welte
Geb. 50.38; Raum 1.15
Phone: +49 721 608 48645
edgar.welte@kit.edu

Please note that your data will be treated in accordance with the applicable data protection regulations as part of the application process.

This thesis is offered in cooperation with the IAS Institute of the University of Stuttgart.

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