

Master's Thesis (m/f/d) in the AI-DISCO Project

Formal Change Impact Analysis for Security Risk Reassessment in Edge-Cloud Systems

The DFKI Intelligent Networks research department studies a modular edge-cloud architecture in the AI-DISCO project. Changes to deployments or applications can invalidate assumptions about physical protection, network access or trust boundaries.

The research question

When does reassessing only the elements that depend directly or indirectly on a change produce the same assumption statuses, risk levels and required controls as a full reassessment?

Your tasks

- Model architectural elements, deployment attributes and security assumptions as a typed graph. Assess assumptions as valid, invalid or unknown.
- Develop an incremental method that tracks changes through previous and updated dependencies, and implement a prototype.
- Formally establish output equivalence to a full reassessment under complete rule dependencies, deterministic rules and an acyclic assessment graph.
- Evaluate the approach for industrial monitoring and safety-critical control. Measure output agreement, missed affected outputs, rule evaluations and runtime over sequences of changes.

Your qualifications

- Master's student in computer science, cybersecurity or a related field
- Interest in IT security, formal methods and graph algorithms, together with programming experience
- Ability to conduct independent scientific work and a good command of English

What we offer

Individual technical guidance at DFKI and insights into current research on secure AI platforms. You will study a defined architecture example and develop a formal model, a correctness proof and a prototype with reproducible experiments.

Interested in this thesis?

Send your CV, current transcript of records and earliest possible start date to jan.novacek@dfki.de.

For questions about the topic, contact Dr. Jan Novacek at [+49 631 2057 57092](tel:+49631205757092).

The German Research Center for Artificial Intelligence (DFKI) combines scientific research with application-oriented development in artificial intelligence.

We welcome applications from people of all genders and backgrounds.

German Research Center for Artificial Intelligence (DFKI)

Intelligent Networks
Dr. rer. nat. Jan Novacek

Trippstadter Str. 122
67663 Kaiserslautern, Germany
www.dfki.de

[+49 631 2057 57092](tel:+49631205757092)
jan.novacek@dfki.de

Thesis arrangements

Planned duration: six months
Start date by agreement

University supervision and formal examination requirements must be agreed before registration.
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