

## Master Thesis

# Machine Learning for Hazard Identification in Automation Systems

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**Motivation:** Industrial automation systems must undergo a risk assessment process to achieve CE-conformity and to be allowed on European markets. A major part of the risk assessment process is the identification of possible hazards in the system. Currently, this is done with intuition, expert knowledge and simple tools like checklists. However, with new trends, such as Industry 4.0 and Human-Robot-Cooperation, the complexity of automation systems increases. Therefore, more sophisticated tools are required to support the identification of hazards.

**Goal:** The goal of this thesis is to develop a novel method for hazard identification that learns to find hazards in complex automation systems without using pre-defined rules or checklists. A human-robot-cooperation system will serve as an exemplary use case for the development of the method.

### Tasks:

- Modeling and simulation of automation systems
- Research on (ML-)algorithms to identify hazards in the simulation model.
- Deployment and validation of the algorithms in simulation

This thesis is aimed towards students in the fields of **informatics**, **electrical engineering** as well as **mechatronics** and **mechanical engineering**. It requires basic knowledge of machine learning and programming in python. Knowledge about robotics and automation technology is also helpful.

This thesis will give you the chance to use machine learning techniques on a challenging problem which is relevant for the whole automation industry.

**Are you interested?** Write to Tom Huck ([tom.huck@kit.edu](mailto:tom.huck@kit.edu)) or call 0721 608 47113!

