

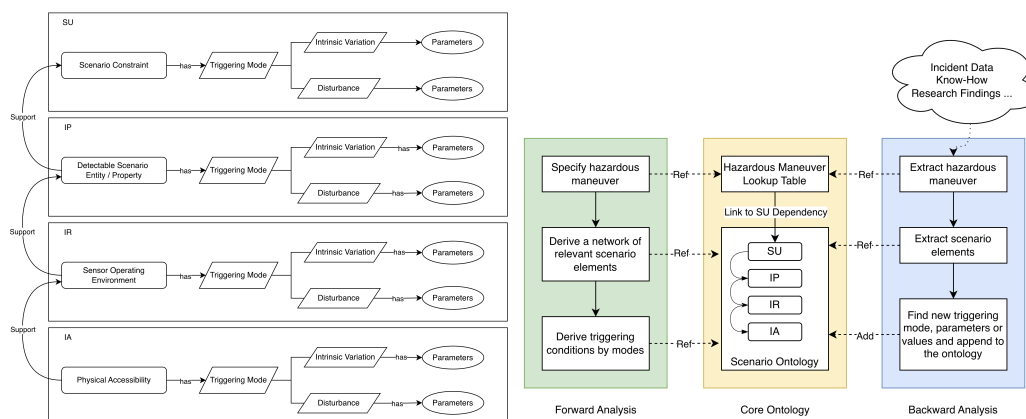
MSc thesis

# Developing a Tool-Assisted Approach for Triggering Condition Analysis with ISO 21448 Compliance

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## Background

This thesis focuses on the topic of triggering condition analysis, which represents a key analytical step required by ISO 21448 to ensure the Safety of the Intended Functionality (SOTIF). Currently, no mature methodology exists to systematically identify triggering conditions. To address this gap, this research proposes a systematic framework for triggering condition analysis, leveraging ontologies to represent scenarios, functional insufficiencies, hazardous maneuvers, and their interdependencies. Furthermore, the developed ontology was implemented as a tool to enable the automated generation of triggering conditions. This research contributes to the advancement of ontology-based triggering condition methodologies and supports the broader objective of automated triggering condition generation for SOTIF analysis.



*The left figure illustrates the developed ontology for organizing triggering condition analyses, and the right figure illustrates how such an ontology can be utilized and maintained for triggering condition analyses.*

## Methodology

This research utilizes existing ontologies for representing driving scenarios and autonomous driving systems and re-constructs these ontologies in a way that facilitate systematic and comprehensive triggering condition analyses. The tool development then follows the designed ontology to structure the analytical data and automate the steps in triggering condition identification and generation.

## Conclusion

The proposed ontology-based framework and tool implementation provide a systematic, theoretically grounded approach for analyzing triggering conditions in complex systems. The research has the potential to significantly advance automated triggering condition analysis and enable more robust and comprehensive SOTIF evaluations in compliance with ISO 21448 standards.