

# Master/Bachelor Thesis: Synthesis of test case specifications for automated vehicles using temporal logic



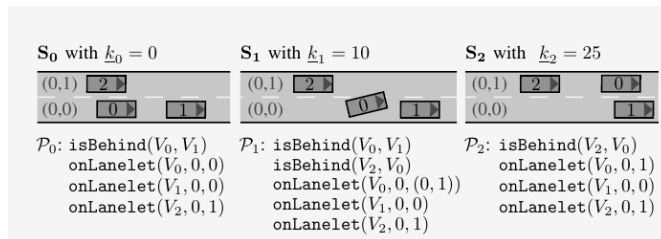
Technische Universität München



Fakultät für Informatik  
Lehrstuhl für Echtzeitsysteme  
und Robotik

## Motivation

Proving the safety of automated vehicles is still a major challenge due to the variety of situations that can be possibly encountered in the real world. To cope with this variety, virtual testing is essential in the development phase. In this work, you will contribute to a project that aims at automatically generating critical test scenarios.



## Description

In our previous work, we develop a method to create traffic scenarios based on an abstract description, i.e. scenario template, see figure above. To simplify the creation of the scenario templates, you will develop a method to automate the formulation of these templates. The templates should meet user defined specifications like desired maneuvers or traffic rules encoded in temporal logic. Based on automata theory, the tool should return all scenario templates that satisfy these specifications.

For a master thesis the topic can, e.g., be extended to incorporate maps for automated driving using graph theory.

## Requirements

You should meet some of the following requirements:

- interest or even experience in (temporal) logic
- adequate coding skills
- motivation and able to work independently

If you want to know more about the topic, just write me an email with your transcript of records. The topic can also be adapted to your interests.

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**Advisor:**  
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**Research project:**  
Generation of Critical Test  
Scenarios for Automated  
Vehicles

**Type:**  
Bachelor or Master Thesis

**Research area:**  
Automated vehicles, temporal  
logic, automata theory, graph  
theory

**Programming language:**  
Python

**Required skills:**  
Python

**Language:**  
english

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