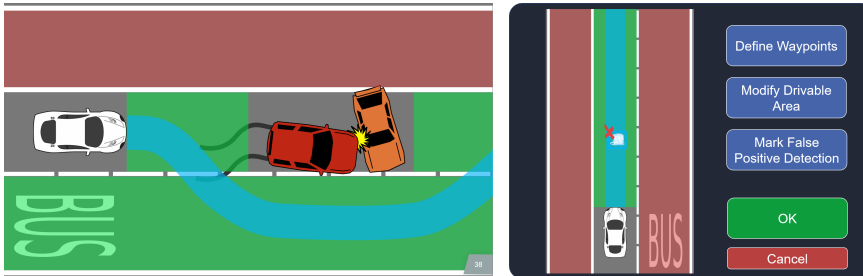


Bachelor Thesis / Master Thesis



Corner case scenario (left), user interface mock-up (right)

Human Interaction in Level 5 Autonomous Driving

In level 5 autonomous vehicles, the user may not have the ability to interact with the system through interfaces such as a steering wheel. However, there may be corner case scenarios in which the vehicle is not able to plan a trajectory but a human sees a way e.g. past an obstacle.

One idea to handle these scenarios would be to allow the user to influence the behavior and trajectory planning of the vehicle by e.g. adjusting boundary conditions in a way that the vehicle is able to find a solution.

At MRT we use arbitration graphs¹ for behavior planning. Arbitration graphs allow for transparent, comprehensible, and scalable decision-making on a behavior level.

This work should explore the possibility of integrating the ability for human interaction into the arbitration graph architecture.

The proposed thesis consists of the following parts:

- + Literature research about recent ideas and solutions for human interaction in level 5 autonomous vehicles
- + Developing and implementing interfaces for human interaction inside the behavior planning algorithm
- + Testing and validating the results in simulation

I am happy to answer any questions you might have. Feel free to ask for an appointment or directly ask at my office!

Institute of Measurement and Control Systems (MRT)
Prof. Dr.-Ing. Christoph Stiller

Advisor:
Nick Le Large, M.Sc.

Programming language(s)¹:
C++ proficient
Python beginner

System, Framework(s):
Linux, ROS

Required skills:

- Independent and structured work approach
- C++ skills

Language(s):
German, English

For more information please contact:

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Or directly send in your application including your current grades as well as our questionnaire!



¹ **skill levels:**
beginner < 500 lines of code (LOC)
advanced 500 – 5000 LOC
proficient > 5000 LOC

¹Piotr F. Orzechowski, Christoph Burger, and Martin Lauer (2020). “Decision-Making for Automated Vehicles Using a Hierarchical Behavior-Based Arbitration Scheme”