Hiwi project proposal

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Starting date: immediately

Context

Driver assistance systems exist for over three decades now with increasing functionality and the overall goal of highly autonomous driving seems to be not out of reach anymore [1]. However, the systems are getting increasingly complex as they are not only passive, but active systems interfering with the driver. Thus, for advanced driver assistance systems (ADAS) extensive testing needs to be performed, before they can be deployed for series production [2][3].

For an autonomous highway pilot, it is estimated that approximately 6.62 billion kilometers of test driving on highways are necessary [4]. Considering this and other complexity and feasibility issues, simulation is arguably the most practical and effective way of testing software systems used for autonomous driving [5].

A lot of such simulation tools exist, e.g. CarMaker by IPG Automotive [6]. However, within these tools, test scenarios are created in a manual and very ad hoc manner. Every single test parameter (street position, pedestrian position and walking direction, timers for lights, ...) is set for every test case. Parameters are adjusted by “trial & error”. Test results are evaluated manually or the test evaluation script is written manually.

To improve this process, we want to automate these working steps.

Figure 1: Screenshots from CarMaker
Your Tasks
1. Learn the basic things to get into the topic (by help of your supervisor)
2. Implement different aspects of automated test generation, execution and evaluation
3. Feel free to contribute with your own ideas

Our Offer
1. Ample time to ramp up on and get familiar with involved techniques
2. Support by and discussions with supervisor
3. Use of top notch industrial tools
4. Work on industrial and research state-of-the-art approaches
5. Learn about the techniques of the future
6. Flexible working hours
7. Possibility of publishing papers in top-tier conferences

Desired Qualification
1. Basic MATLAB knowledge
2. Interest in testing advanced driver assistance systems and automated driving systems

References