Abstract:
A key criterion for launching autonomous vehicles on real roads is the knowledge of their capability to ensure traffic safety. In contrast to ADAS, deriving this measure of safety is difficult to achieve as the functional scope of an autonomous driving function exceeds by far the one of ADAS. As a consequence, real-world testing solely is not sufficient enough to cover the required test volume. This assessment problem imposes new requirements on a valid test concept for automated driving. A possible solution represents simulation by enabling it to generate reliable test kilometers. As a first step, we discuss in this paper the feasibility of simulation frameworks to re-simulate a real-world test in certain scenarios. We will demonstrate that even with ground truth information of the vehicle odometry and corresponding environment model an acceptable accordance of functional behavior is not guaranteed. Hence, to yield a reliable degree of confidence in a risk assessment a single scenario has to be represented by an ensemble generated from a local variation considering both, ground truth information and odometry including the environment model. In order to achieve these statements we first
introduce a valid representation of traffic scenarios acting as a test case description for an autonomous driving function. Afterwards, the description based on the vehicle odometry and created environment model as well as the description based on the ground truth measured via Differential GPS are re-simulated using the same autonomous driving function as deployed in the test vehicle. The reprocessed traces are compared to the corresponding real-world data to illustrate resulting behavior changes in the autonomous driving function. To make the behavior changes interpretable for the assessment process a sensitive risk value is deployed containing information about the reprocessing quality of the chosen description and simulation.