

Generation of scenarios for the simulation of real world accidents

Context

Road accident research is a major concern in many disciplines. Traffic engineers aim at identifying accident hotspots in the transport network in order to find measures to improve the road conditions. Researchers in automotive industry and insurance companies analyze accidents with regard to the vehicle safety. In order to provide data for such analyses, severe accidents are recorded in GIDAS database.

For developing automated driving functions or active safety systems, the recorded accidents could serve as input in form of simulation scenarios. Such real-world scenarios would be a valuable addition to synthetic scenario catalogues as described e.g. by NCAP (see figure below). Integrating these scenarios in a high-fidelity vehicle and environment simulation would help researchers and developers to identify, develop and test suitable mitigation measures in a virtual environment.



Simulation of an NCAP maneuver to test Automatic Emergency Braking (AEB) algorithms in DYNA4

Tasks

The student will be provided with test data sets from real world road accidents which shall be transformed into scenarios in a virtual environment. A tool is to be developed which reads the accidents descriptions in a pre-defined format and automatically generates scenarios for the vehicle dynamics software DYNA4 from that.

- transform the data into a scenario: dynamic part in DYNA4 mechanism and static part in OpenDRIVE road (manually / half-automated)
- re-simulate accidents from GIDAS database
- detailed technical outlook towards “OpenSCENARIO” and a fully automated transfer from GIDAS to DYNA4

Requirements

- Good programming skills, preferably familiar with Matlab/Simulink
- Knowledge of vehicle dynamics simulation software is recommended but not required

The student will be provided with test data sets as well as the required license for the simulation tool DYNA4. The research institution (VUFO) providing the accident data as well as the developing company of the simulation tool (Vector Informatik) will be involved in the IDP and can give the student guidance to get familiar with the tool and the datasets.

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