

Master Thesis Topic:

On-road driver behavior data collection and analysis: safety tolerance zone evaluation

(Multiple) Study Project and/or Master's Thesis Description & Overview:

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Starting date:

As soon as possible.

Background:

Several factors of driver state (e.g., distraction, fatigue and drowsiness, health concerns, extreme emotion) have been persistently demonstrated in the literature as critical for safe transport systems as well as traffic environments and vehicle operation status. The i-DREAMS project aims to define, develop, test and validate a context-aware "safety tolerance zone" for on-road driving by taking into account driver-related background factors (age, driving experience, safety attitudes, etc.), real-time physiological indicators (fatigue, distraction, stress, etc.) as well as driving complexity indicators (time of day, speed, traffic density, vulnerable road users, adverse weathers etc.)¹. Moreover, safety-oriented interventions will be developed to prevent drivers from getting too close to the boundaries of unsafe operation and to bring back the driver into the safety tolerance zone. Initial testing will take place in a driving simulator environment after which promising interventions will be tested and validated under real-world conditions in a pilot testbed.

Methodology:

This study aims to support the driver behavior experiments and analysis based on real-time safety tolerance zone evaluation and real-time safety-oriented interventions. The main objectives include (i) data collection from on-road experiments and (ii) analysis of the collected data. During the data collection, the master students will contribute in the daily running and operation of the on-road trial experiments. Expert technicians will be installing equipment in participants' vehicles, and the student will be present to overview, and plan the different logistical aspects of the data collection. During the data analysis, several research questions may be investigated, including but not limited to (a) comparing the driver behavior difference between with and without real-time safety-oriented interventions, (b) exploring the impact of important factors on driver behavior and traffic safety, and (c) special driver behavior analysis and prediction, such as car-following and lane-changing behavior.

Who can apply?

The potential applicants need to show high interest in the topic, and must have a relevant background, including, but not limited to, transport engineering (or other fields of civil engineering), mechanical engineering, computer science, or other relevant social science fields, like psychology

¹ <https://www.bgu.tum.de/en/tse/research/projects/idreams/>



and ergonomics. The Master thesis topic will be tailored to the skills and interests of each applicant.

Key skills that are needed:

- (i) fluent in German and English (preferably German native-speaker)
- (ii) strong analytical skills
- (iii) strong communication skills and ability to work independently.

More information about the field trials can be seen in our website (link:
<https://www.bgu.tum.de/en/tse/news/news-single-view-tse-en/article/wanted-drivers-for-field-trials/>

How can I apply?

Interested candidates are kindly asked to directly contact Christelle Al Haddad (christelle.haddad@tum.de) or Kui Yang (kui.yang@tum.de), by sending an email including your resume, and a short explanation of why you are interested in this thesis topic.