AV OCCUPANTS' PERCEPTION OF SAFETY IN RELATION TO AV BEHAVIOUR

SHAPE-IT

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Introduction

Will the passengers feel safe in automated vehicles? Will they trust the driving automation? This study will give you the answer and try to enhance perceived safety and trust in driving automation.

Simulator study I

Objectives

- Develop perceived risk and trust models
- Unravel the dynamics of perceived safety and trust in highway scenarios.
- Find the relation between perceived risk and pupil or heart activities.

Methodology and Equipment

Merging with hard braking in highway in SAE 2. The experiment devices are driving simulator (DAVSi), pressure sensor (with LED bar) for continuous ratings, ECG device (TMSi) and eye tracker glasses (Tobii Pro 2).

Experiment devices

Results and conclusions

- Neighboring road users' **relative motion** significantly influences perceived risk and trust.
- **Experienced drivers** and **male drivers** are less sensitive to risk.
- **Pupil dilation** can indicate perceived risk if the event is sufficiently risky.
- The merging and braking events increased **heart rate**.
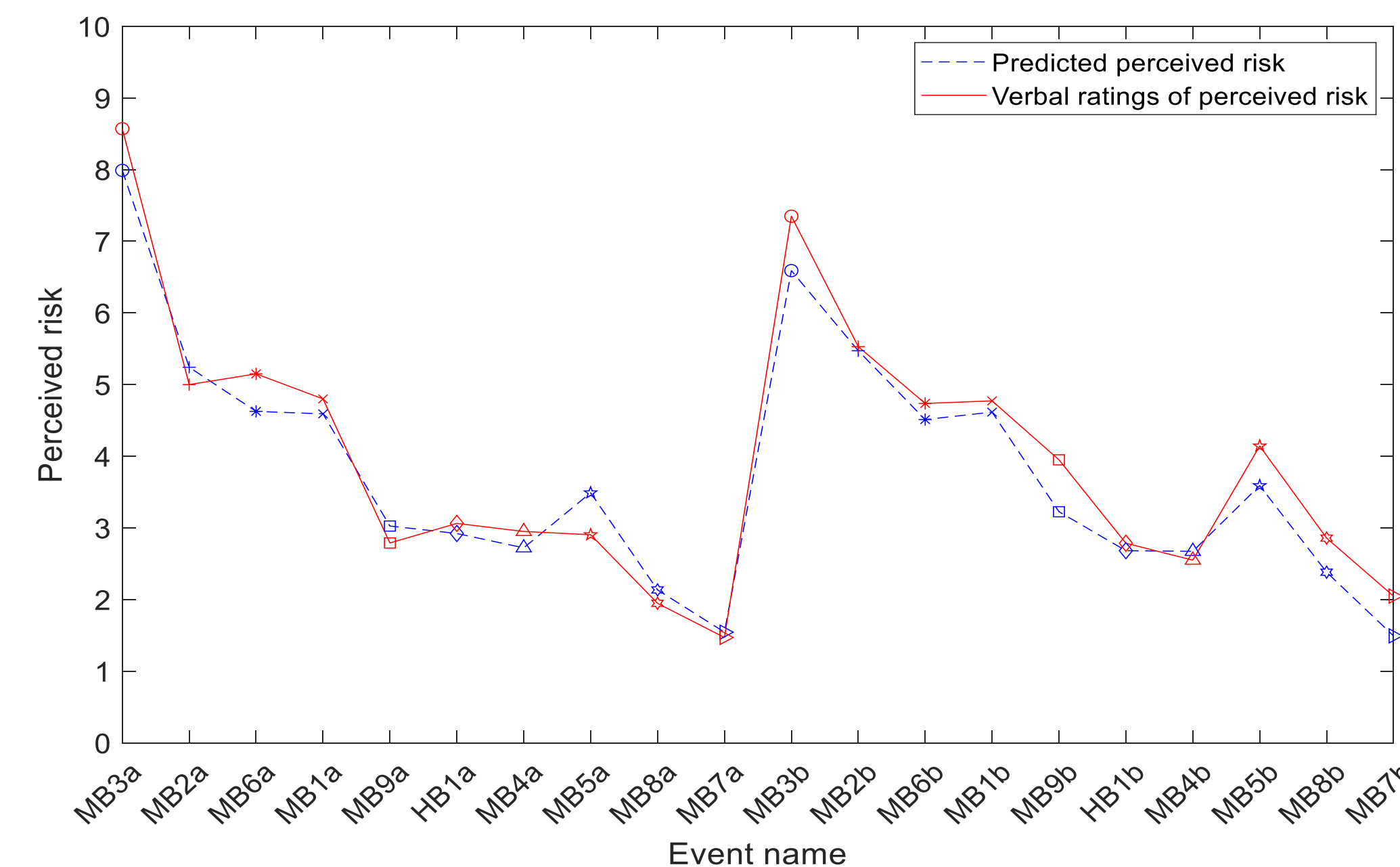
Output of perceived risk prediction model

He, X., Stapel, J., Wang, M., Happee, R. (2021). Modelling perceived risk and trust in driving automation reacting to merging and braking vehicles (submitted)

Simulator study II (in progress)

This study aims to investigate how UI affects perceived safety and trust. The impact of different types of information and the information modalities were tested. The scenarios and measures are the same as those in simulator study I.

UI design. Left: The UI in the cabin; right: the surrounding information and pop-up message

Perceived risk modelling

2D modelling of perceived risk by using probabilistic driving risk field (PDRF) theory based on the data collected from the two simulator studies.
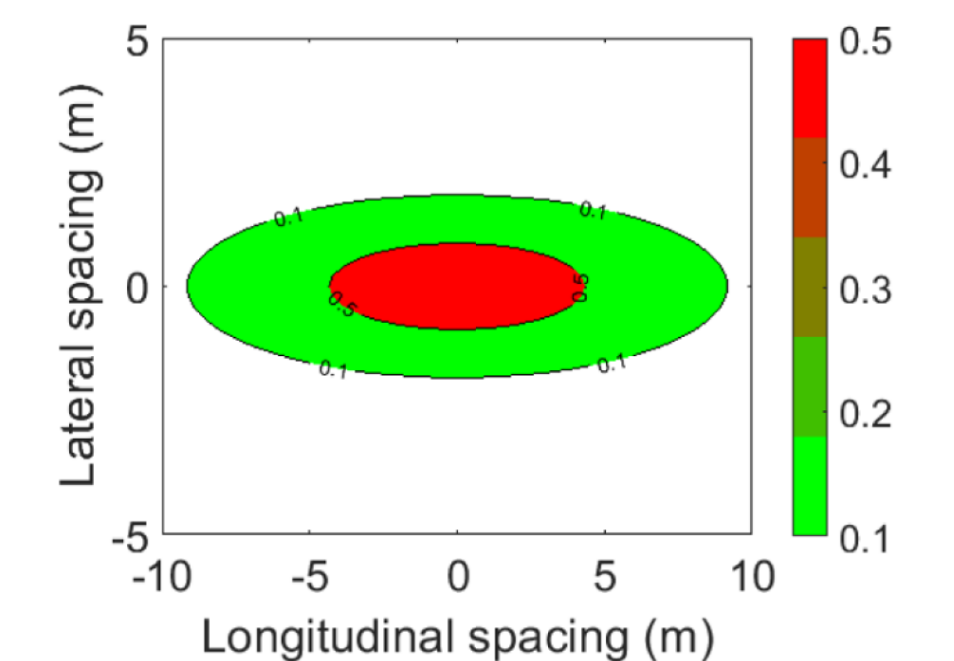
Collision likelihood calculated by PDRF around a neighbor vehicle