In order to overcome the shortcomings of safety analyses based on crash data (underreporting, quality issues and rare nature) a number of Surrogate Measures of Safety have been developed and proposed by various researchers. One of the most widely used temporal indicator is time-to-collision (TTC) which can be calculated for any moment as long as the road users are on a collision course. Previous research has proven that road users that are strictly speaking not on a collision course actually might behave and take evasive actions as if they were, thus indicating that such near-miss situations might also be relevant for safety analysis. To account for this, a more flexible indicator, $T_2$ was proposed describing the expected time for the second road user to arrive at the conflict point. This indicator is more flexible than TTC as it does not require the two vehicles to be on a collision course, and it allows a smooth transfer between collision and no-collision course interactions. Thus, $T_2$ seems to be more suitable for detecting potentially dangerous situations, but it has not been explicitly tested and validated so far.

Aim

Recently the Extreme Value Theory (EVT) to estimate crash probabilities using surrogate measures of safety has been more frequently applied. This theory offers two approaches to sample extreme events, in this case near crashes, the block maxima (or minima using Generalized Extreme Value distribution) and the peak over threshold (using Generalized Pareto distribution). In the former case the maximum (in this case the minimum) values over time are considered, whereas in the latter case values over a certain threshold are used. In this paper univariate models are used with an intention to investigate the differences in using $T_2$ versus TTC.

Method or methodological issues

A regular signalized intersection with two-phases in Minsk (Belarus) was recorded for three days (from 6 AM till 9 PM). The video footages of two cameras were then analyzed in the software T-Analyst allowing the manual tracking of straight going and left turning vehicles as well as the calculation of various surrogate measures of safety. For this study approximately 1600 interactions were detected and subsets were created where $T_2$ and TTC values were available. For both indicators the minimum values are used ($TTC_{\text{min}}$ and $T_2\text{min}$) representing the moment in time when the two vehicles are closest to each other. These subsets then are analyzed using EVT applying both the block maxima and the peak over threshold approaches.

Results expected

This is an on-going research, it is expected that by testing the efficiency of both EVT approaches comparing the two surrogate indicators we can make conclusions on 1) the differences in the applicability of the two surrogate indicators and 2) the differences in the two EVT approaches based on their yielded results.