Identification of evasive action in traffic conflicts

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Why bother?
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Traffic dynamics

Undisturbed

Conflict

Evasive action

Traffic continuation

successful

Collision

not successful

Güttinger, 1982
Why bother?

Güttinger, 1982
Why bother?

Continuous indicators (t.ex. TTC)

(TTC at onset of evasive action)
Why bother?

**Traffic dynamics**

Undisturbed

Conflict

Evasive action

Collision

**Traffic continuation**

Successful

Not successful

**Güttinger, 1982**

**TA**

*(TTC at onset of Evasive Action)*

**TTC\textsubscript{min}**

Normal traffic

Conflict

Collision
Why bother?

Continuous indicators

Motion prediction issues

Lefèvre et al. (2014)
Mohamed & Saunier (2013)
Why bother?
Continuous indicators
Motion prediction issues
Severity is ‘decided’ at EA onset

Yastremska-Kravchenko (2022)
Kruysse & Wijlhuizen (1992)
Kruysse (1991)
Why bother?

Continuous indicators

Motion prediction issues

Severity is ‘decided’ at EA onset

Validation studies

Svensson (1992)
Grayson (1984)
Method
Studied site & interaction

Barcelona, Spain
Trajectory ‘similarity’
Similarity measure

\[ \text{Similarity}_t = \frac{\sum_{i=1}^{n} \Delta s_i}{n} \]
Number of ‘similar’ trajectories

onset of Evasive Action
Motion prediction

Probability of a collision course (PCC) + Probabilistic TTC

\[ \text{TTC} = \frac{\sum_{i=1}^{n} (p_i \cdot TTC_i)}{\sum_{i=1}^{n} p_i}, \]

Saunier et al. (2010)
Calibration & validation
Exploration
Interaction types

No detected evasive action
Interaction types

No detected evasive action

Detected evasive action, no collision course (PCC=0)
Interaction types

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Detected evasive action, PCC>0
Interaction types

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Immediately detected evasive action:
Interaction types

No detected evasive action,

Detected evasive action, no collision course (PCC=0)

Detected evasive action, PCC>0

Immediately detected evasive action:

- ‘abnormal’ manoeuvres
- already in an interaction
## Normal interactions vs. conflicts

<table>
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<td>1. No evasive action</td>
<td>26 (6%)</td>
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<td>2. Evasive action detected, PCC=0</td>
<td>286 (69%)</td>
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- mostly ‘abnormal’ manouvres
- mostly secondary interactions
Conclusions

High reliability in primary interactions
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Fails in secondary interactions
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High reliability in primary interactions
Fails in secondary interactions
Many traffic conflicts involve secondary interactions
Conclusions

High reliability in primary interactions
Fails in secondary interactions
Many traffic conflicts involve secondary interactions
Increased reference dataset may solve abnormal manoeuvres, but not multiple interactions
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References


