Project DROVA: Traffic safety analysis in temporary traffic regulations using drone videos

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**MOTIVATION AND GOAL**

- Increasing traffic volume on German roads
- Capacity issues on highways and motorways, old infrastructure
- Renovation works and constructions on German roads until 2030
- Further capacity problems, congestions, safety issues

![Total of driven km yearly on motorways per 1 km of motorway in Germany](chart.png)

*Federal Ministry of Transport and Digital Infrastructure: Traffic in Numbers 2020/2021*
MOTIVATION AND GOAL

- Limitations of traditional traffic safety analysis based on accident data in road work zones:
  - Temporary nature of road work zones
  - No precise location of the accidents are given in police reports
  - Weakness of infrastructure design might causing accidents cannot be derived from accident data
Motivation and Goal

- Providing a safety analysis method which:
  - reveals the issues of the design of temporary traffic regulations
  - can help to better understand the influence of design on traffic behaviour
  - can provide information for safety improvement measures in a short period of time
SAFETY ANALYSIS METHOD

- As-built infrastructure description
- Microscopic traffic data collection using drone videos
- Analyzing behavior and interactions using Surrogate Safety Measures
- Locating and aggregating the results of the analysis
TRAFFIC DATA COLLECTION AND INFRASTRUCTURE DESCRIPTION
TRAFFIC DATA COLLECTION AND INFRASTRUCTURE DESCRIPTION
Road work zone Kamen-Bergkamen

Work space
ANALYSIS AND RESULTS

Road work zone Bonn-Beuel
ANALYSIS AND RESULTS

Kamen-Bergkamen

Bonn-Beuel

80 m

250 m

← Travel direction

← Travel direction

33rd ICTCT Conference, October 29, 2021
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ANALYSIS AND RESULTS

Kamen-Bergkamen

Bonn-Beuel

Longitudinal velocity

Lateral velocity

Bonn - Beuel
ANALYSIS AND RESULTS

Longitudinal acceleration

Lateral acceleration

Kamen-Bergkamen

Bonn-Beuel
ANALYSIS AND RESULTS

- Interaction analysis with modified TTC (MTTC)
ANALYSIS AND RESULTS

Number of MTTC-values under 1.5 s per 100 passing vehicles

Kamen-Bergkamen

1. Passing lane 304
2. Passing lane 178

Entry lane 70
Main lane 249

Bonn-Beuel

1. Passing lane 266
2. Passing lane 197

Entry lane 50
Main lane 244
1. Passing lane 304
2. Passing lane 178
CONCLUSIONS AND OUTLOOK

▪ The presented method
  ✓ is suitable for safety analysis
  ✓ can help to better understand the influence of design on traffic behaviour
  ✓ is suitable for comparing different designs
  ✓ can quickly deliver information for safety improvement measures

▪ Further improvements and research are needed
  ➢ to fully automatize and generalize traffic data collection
  ➢ to analyze bigger amount of data to support safety improvement measures
Thank you for your attention!

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