

DATA ANALYSIS

FOT-Net Seminar6: FOT Achievements and opportunities for the future

Versailles, 23rd September 2013

Adrian Zlocki, ika, zlocki@ika.rwth-aachen.de





FOT-Net is a support action co-funded by the European Commission to network FOT activities at European, national and international level.

DATA ANALYSIS IN FOT PERSPEKTIVE



DATA ANALYSIS IN THE FESTA V





DATA ANALYSIS STEPS ACCORDING TO FESTA





DATA QUALITY STEP 1





DATA PROCESSING STEP 2

- Data encryption & Data decompression
- Data conversion
 - Conversion to standardizes file format (e.g. MATLAB format)
 - Data anonymization
- Data enrichment
 - Attributes from digital map (based on GPS information)
 - Road type, Speed limit, Curve radius
- Event recognition and annotation
 - Detection of relevant events
 - Incidents, lane change maneuver, braking maneuver
- Derivation of additional signals
 - Time-Headway (THW), Time-To-Collision (TTC)



PERFORMANCE INDICATOR STEP 3



- Comparison measure = Performance indicator (PI)
- Performance indicator is calculated for baseline as well as treatment
- Testing of hypothesis by means of comparison of PI
- Examples: Number of incidents, Hard braking, Average speed



HYPOTHESIS TESTING STEP 4

- Comparison situations
 - Baseline vs. Treatment
- Filtering criteria
 - Vehicle speed > 50km/h
 - Minimum mileage for drivers
- Situational variables
 - Road type, weather, lighting
- Performance Indicators
 - Hard braking
- Used data set
 - Mileage, number of subjects
 - Distribution male/female
- Statistical method
 - ANOVA, P-test



GLOBAL ASSESSMENT STEP 5

- Problem: How to generalize results from a certain FOT to a global level
- Two step solution:
 - Step 1: Scaling up FOT results to higher level (higher penetration rates, larger regions)
 - Step 2: Translate results from the PI level to the level of effect (e.g. what is the effect on safety from an increase in average speed)



LESSONS LEARNED

Data analysis

- Recommended to take a layered approach to data analysis
- Check before data analysis, if **selected data** sets are **feasible** for analysis
- Methods for automation of the analysis are necessary
- Video data analysis is generally quite time consuming
- Real-time data synchronization is mandatory
- **Research needs**
- Development of sophisticated models (context, conditions, driver etc.)
- Map matching technologies
- Analysis of driver relevant data
- Video analysis
- Common analysis tools / standardised data analysis tools
- Common incident definitions necessary (e.g. triggers, quality indicators, definition of relevant events)
- Standardization partly available for accident data. For FOT/NDS data in the future ?!

INVENTORY OF LESSONS LEARNED/ PRACTICAL GUIDELINES – RESULTS FROM DISCUSSION

- Be involved in the overall FOT/NDS process from the very beginning, not only focusing on data analysis
- Less is more, since in the end the complete data set cannot be analysed due to delays, missing data, data quality, budget
- Open communication with regards to project monitoring in order to reduce expectations, if things go wrong in step 1 or 2
- Follow-up data analysis (e.g. in new project) is only possible, if raw data and good documentation is available.
- In depth analysis of few RQ vs. general analysis of many RQ (especially for uncontrolled NDS data) → focus on few RQ to get scientific sound results
- Researcher will look as deep into data as necessary to explain all effects found in data set
- Limit video analysis to minimum
- Wish for quality analysis of data at RQ definition stage in order to get overview on significance
- How to get driver to fill out questionnaire and provide information? -> Maybe Smartphone App? Keep driver in analysis loop?

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