Methodological challenges related to real-world automated driving pilots

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**FOT vs. On-road pilot**

- **FOT (Field Operational Test)** is “to evaluate functions, **under normal operating conditions in road traffic environments typically encountered by the participants using study design so as to identify real-world effects and benefits**”

- Large-scale tests with **ordinary drivers** using the system as part of their daily lives

- **Pilot** is “to test novel practices or technologies” where the main characteristic is “to be implemented on a smaller scale than that of the ultimate objective”

- Controlled tests with safety drivers of systems at **an earlier technology readiness level** (prototypes)

- Produces partly indicative estimates of impacts with assumptions about the eventual use of market-ready versions
Methodological challenges and solutions
Set-up of the experiments

**Challenges:**
- Testing is **restricted** by many factors
- It **not possible** to study the interactions and behaviour of ordinary drivers, using the vehicles during their daily routines

**Solutions in L3Pilot:**
- Feasibility of research questions checked against possibilities for data provision (sensors, logging, features of test rides) as well as the role and type of participants (drivers)
- Equipping vehicles with driving-school-style pedals, or ordinary driver in the passenger seat
Methodological challenges and solutions
Assessing the impacts on driving behaviour

Challenges:
• Non-mature prototype system may not fully offer a representative and realistic driving scenario
• Collected data may limited to certain test routes, within certain speed ranges, and in certain weather conditions
• Important to ensure that vehicle telemetry data is kept confidential also within project

Solutions in L3Pilot:
• Use of ‘mature’ ADF descriptions for impact assessment
• Sophisticated data sharing process designed to anonymize the data
• Common data format, methodology and analysis toolkit for all
• Merging of results from several pilot sites
Methodological challenges and solutions
Assessing of user experience and acceptance

Challenges:
• Exposure to prototype HMI and AD control systems, potentially resulting in unpleasant driving and interaction experiences
• Participants not able to use the systems in their daily lives
• Participants either being trained safety drivers or being recruited from the OEM workforce

Solutions in L3Pilot:
• Behaviour and opinions of those who have participated in the test rides arguably have some value, and may be more valid, than those who have had no such physical experience
• Some aspects excluded from U&A study
• Supplementing methods to fulfil some of the gaps in the field tests
Methodological challenges and solutions
Assessing of societal impacts

Challenges:
• Complexity of assessment
• Additional level of assessment, involving the assessment of any differences between piloted versions of prototypes, and their mature version
• Selection of a meaningful baseline
• Influence of the other trends affecting mobility and transport

Solutions in L3Pilot:
• Combining different best-practice solutions for different evaluation areas
• Mature functions are defined with OEMs
• Baseline selection based on available data and statistics
• Snap-shot approach for socio-economic assessment
Conclusion

• Started with methods developed and used for ADAS adapting and further developing them for SAE level 3 automation

• L3Pilot method relates to the full chain of assessment

• Evaluation process can be adapted to suit the needs of automated driving pilot projects - as long as some caveats related to the pilot nature of automated driving studies are acknowledged

• AD pilots provide important insights into the impacts of automated driving on their users, other road users and society
  • As these systems mature, large-scale field operational tests will be needed as (closer to) ex-post evaluation, to verify the assessed impacts
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