Data Mining for driver behavior in normal driving

Laurette Guyonvarc'h
Francoise Josseaume
Cyril Chauvel
Anne Guillaume

Michel Lutz

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Accidentology, Biomechanics, Driver behavior

- Common research laboratory between French car manufacturers

- Missions
  - Road safety and cars safety
  - Safer and supporting cars
  - Real performance of safety devices and ADAS
Innovative applications and Information Systems in line with complex business challenges

Architecture & Technology
- Architecture design
- Technical Assessment
- Expertise: Big Data, Data science, Web, Cloud, NoSQL, BI, IAM, UeX
- Choice of technologies

Information Systems Management
- IT master plan
- IS Assessment
- Application Portfolio Management
- IT Governance

Change management
- Agile methodology, Team dynamics improvement
- Lean IT
- Software factory
- Software quality, testing strategy
- Training & conference

Design of innovative applications
- 360° project scoping
- Lean startup
- Agile development

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- French FOT
- Part of Drive C2X European project
- IT Systems potential

**Technical systems**
- V2V
- I2V
- V2I

**Use cases**
- Road safety
- Traffic management
- Mobility / Comfort services

**Outcomes**
- System engineering
- Accidentology
- Acceptability, driver behavior
FOT 38

- 30 drivers
- 1h30 trips
- CAN / GPS data

Information / alert messages on Ipad
- Road safety
- Point Of Interest
- Traffic management
Drivers reactions to on-board message?

- Methodology
  - Variables, time window,…
  - Data mining methods
  - Frequent behavior

- Use case
  - Speed limit message
  - Sequence analysis in TraMineR

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Data example: speed

Max authorized speed

Speed over time for the 30 participants
States distribution visualisation

- Throttle pedal

Message influence on driver’s behavior

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Sequential pattern mining results

- Behavior patterns
  - One or more throttle pedal release after message
  - Slight throttle release (47%)
Discriminant analysis

Speed profiles for the 3 groups around message time

Max authorised speed

Group A speed profile
Group B speed profile
Group C speed profile
State sequences for 3 groups

Throttle slight release significantly more frequent for A group
Conclusion

- Sequential pattern mining to evidence frequent behavior

- Clustering method to evidence behavioral subgroups

- Innovative techniques
  - New use case for data mining methods
  - Complementary method for NDS
Perspectives: project applications

- **U-Drive**
  - European naturalistic driving project
  - Focus on ADAS use and distraction
  - 120 cars in 4 European countries

- **SCOOP@F**
  - Large scale deployment of ITS in France
    - 3000 cars
    - All types of roads (urban / rural / highway)
  - Set up for a new French FOT
    - SCOREF use case + other mobility services
    - Benefit evaluation
    - Distraction linked to Intelligent Telecommunication Systems
SCORE@F VOUS REMERCIÉ!

COFIROUTE