Smartphone applications for driver safety behaviour support

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Together with:
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The BeSmart project

- Project partners:
  - National Technical University of Athens, Department of Transportation Planning and Engineering
    [www.nrso.ntua.gr](http://www.nrso.ntua.gr)
  - OSeven Telematics
    [www.oseven.io](http://www.oseven.io)

- Duration of the project:
  - 36 months (July 2018 – July 2021)

- Operational Program:
  - "Competitiveness, Entrepreneurship and Innovation" (EPAnEK) of the National Strategic Reference Framework (NSRF)
Background

- Accurate monitoring of driver behaviour has scientific and technical requirements

- The Internet of Things (IoT) constantly offers new opportunities and features to monitor and analyse driver behaviour through:
  - Affordable On-board Diagnostics (OBD)
  - Widescreen use of smartphones and social media
  - Effective data collection and handling
  - Big Data Analysis
The BeSmart Objectives

- Development of an innovative and seamless Internet of Things application
- Assessment and improvement of behaviour and safety of all drivers (car drivers, powered two-wheelers, cyclists, professional drivers) along multi-modal trips
- Organization and exploitation of a naturalistic driving experiment of 200 drivers for 12 months
Research Questions

- Identification of critical **risk factors** affecting driver behaviour and road safety

- Investigation of the **impact of speed** (inappropriate speed, percentage of time exceeding speed limits, etc.) on road safety

- Analysis of the impact of driver behaviour on **harsh events** (harsh acceleration, harsh deceleration, harsh turn)

- Assessing the impact of personalized **feedback on driving behaviour** through smartphones
Methodological Challenges

- Adaptation of the BeSmart application
  - International literature review on driver behavior monitoring and feedback tools
  - Adaptation requirements for accurate recording of powered-two-wheelers behaviour

- Recruitment of 200 drivers to conduct the experiment
  - Different types of drivers (cars, vans, PTW, cyclists)

- Implementation of algorithms and statistical analyses
  - Machine Learning
  - Structural Equation Models (SEMs)
  - Road Safety Toolbox
The BeSmart Experiment (1/2)

- **All driver types** included:
  - car drivers, powered two-wheelers, cyclists
  - professional drivers (Nea Odos fleet)

- Unobtrusively **data collection** along multi-modal trips by means of smartphone technology

- **Identification of critical risk factors** affecting driver behaviour and road safety resulting from speeding, harsh maneuvering, distraction, etc.
The BeSmart Experiment (2/2)

- Development of measures by means of smartphone applications and a web-platform, allowing to inform, notify, motivate and train the drivers.
- **Personalised feedback** will be communicated to all drivers, with statistics and reports, allowing them to identify their critical deficits or unsafe behaviours.
- Incentives within a **social gamification** scheme, with personalised target setting, benchmarking and comparison with peers.
Scientific and Social Impact

➢ Innovative monitoring driver behaviour
  • Seamless behaviour monitoring in all vehicles including vulnerable road users (PTW, cyclists)

➢ Driver training and support
  • Significant improvement of driver behaviour
  • Continuous driver feedback to achieve road accident reduction over time
  • Development of better road safety culture for all road users
Future Challenges

- Integration of a multitude of IoT technologies, development of advanced know-how

- Development of new smartphone applications, for all road users and all transport modes

- Exploitation of know-how for the safe integration and monitoring of automated vehicles

- Enhancement of innovation capacity and creation of new market opportunities for businesses
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