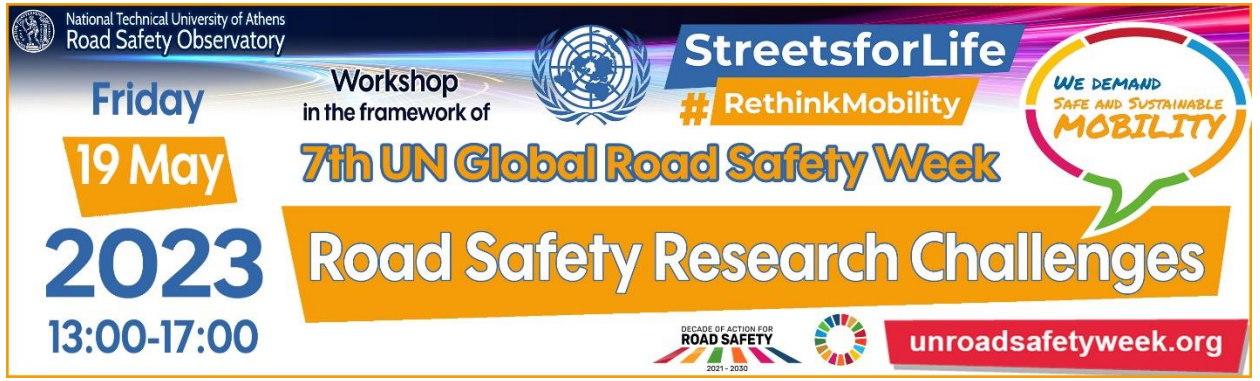

Smartphone applications for driver safety behaviour support

Virginia Petraki

Transportation Engineer, PhD Candidate

Together with:

Apostolos Ziakopoulos, Armira Kontaxi, George Yannis

The BeSmart project

BESMART

- **Project partners**:
  - National Technical University of Athens, Department of Transportation Planning and Engineering www.nrso.ntua.gr
  - OSeven Private Company 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)
- **Project Website**:
  - www.besmart-project.gr

European Union
European Regional Development Fund

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΕΡΕΥΝΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ

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ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ ΕΠΑνΕΚ

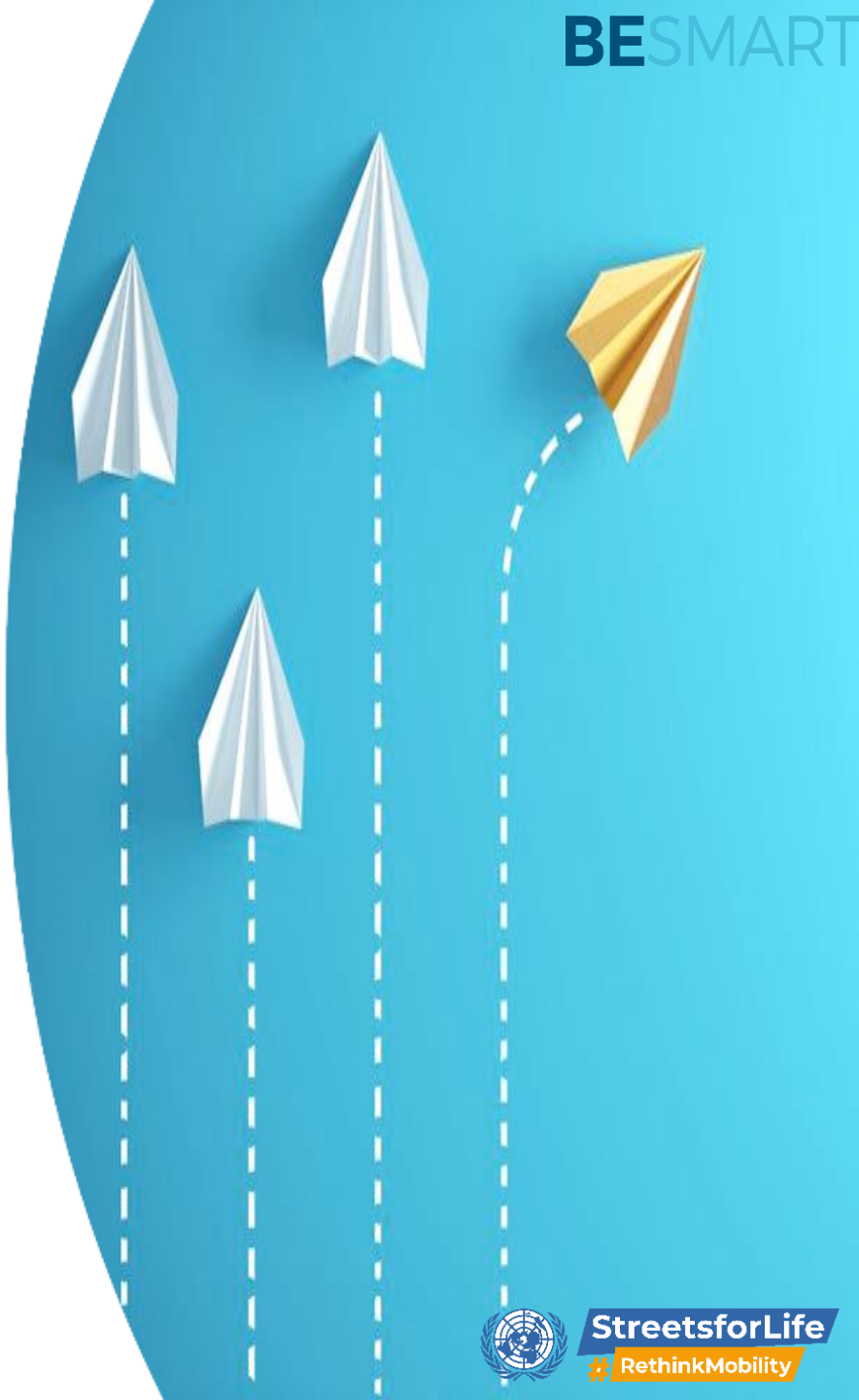
EPAnEK 2014-2020
OPERATIONAL PROGRAMME
COMPETITIVENESS • ENTREPRENEURSHIP • INNOVATION

Background

- Accurate monitoring of driver behaviour is progressively established in the transportation field
- The high penetration rate of smartphones and social networks provide new opportunities and features to monitor and analyze driver behaviour by adopting low-cost collection and processing methods
- Naturalistic driving experiments by means of mobile phone allow researchers to examine the effect of various risk factors on driving performance, identify aggressive and dangerous driving profiles and provide driver feedback

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



Methodological Challenges

- Development of the BeSmart application
  - International literature review on driver behaviour monitoring and feedback tools
  - Adaptation requirements for accurate recording of powered-two-wheelers behaviour
- Organization and exploitation of a naturalistic driving experiment of 200 drivers for 12 months
  - 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

- A 200-driver naturalistic experiment
  - 21 months (extension due to COVID-19)
  - 4 driver types included:
    - ✓ Car drivers, powered two-wheelers, cyclists
    - ✓ Professional drivers (Nea Odos fleet)
  - 6 different phases differing in the type of feedback provided to drivers:
    - ✓ No feedback
    - ✓ Personalised feedback with scorecards, statistics and reports
    - ✓ Incentives within a social gamification scheme, with personalised target setting, benchmarking and comparison with peers

Results

- There is an overall improvement of driving behaviour in terms of speeding, mobile phone use and harsh events from no feedback to feedback phases

- The greatest improvements were observed during the appearance of the personalised trip scorecard and during an one-month competition for a number of prizes and awards

- Private car drivers and professional drivers: speeding was the most enhanced driving behavioural indicator; 30% of drivers showed a reduction greater than 50%

- PTWs: the number of harsh accelerations was the most improved risk factor; an average reduction of 30% for the total of PTWs

Streets for Life

- Through monitoring, evaluating, and providing feedback to drivers, the BeSmart application can successfully encourage safer driving practices, making city streets safer for everyone

- The project not only raises awareness among drivers about their driving habits and the potential risks associated with unsafe behaviors, but also fosters a sense of accountability, contributing to a culture of responsible driving

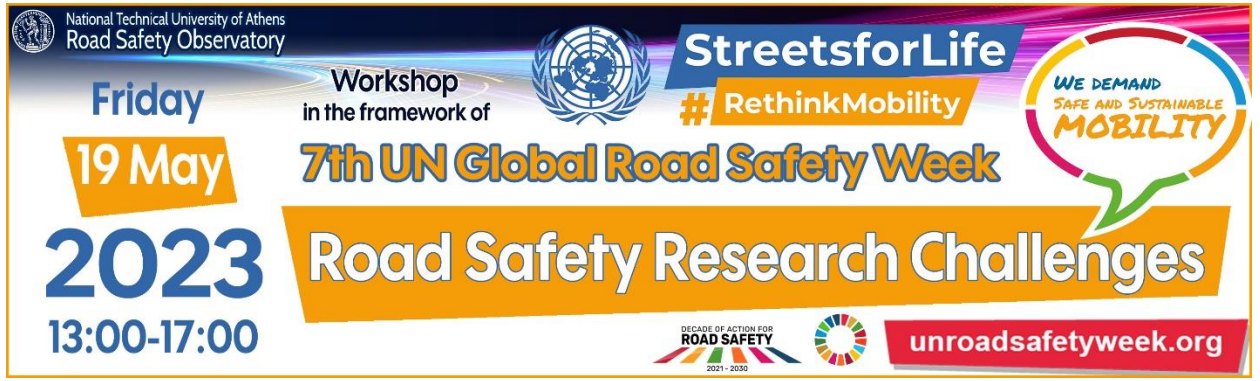
- With the potential for widespread adoption of the application, the cumulative effect of improved driving behaviour can significantly reduce the occurrence of accidents, injuries, and fatalities, creating safer city streets for all road users

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
- Properly matching telematics metrics with crash risk
- Exploitation of know-how for the safe integration and monitoring of automated vehicles
- Enhancement of innovation capacity and creation of new market opportunities for driver behaviour telematics



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