FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK

6-12 May 2019

Save Lives #SpeakUp

Smartphone applications for driver safety behaviour support

BESMART

Armira Kontaxi

Transportation Engineer, Research Assistant

Together with:
Apostolos Ziakopoulos, Panagiotis Papantoniou, George Yannis

The BeSmart project

- Project partners:
  - National Technical University of Athens, Department of Transportation Planning and Engineering
    www.nrso.ntua.gr
  - OSeven Telematics
    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)

BESMART

European Union
European Regional Development Fund

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΕΡΕΥΝΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ

ΕΣΠΑ 2014-2020
ανάπτυξη - εργασία - αλληλεγγύη

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΟΙΚΟΝΟΜΙΑΣ & ΑΝΑΠΤΥΞΗΣ
ΕΙΔΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΠΑ & ΤΣ
ΕΙΔΙΚΗ ΥΠΗΡΕΣΙΑ ΔΙΑΧΕΙΡΙΣΗΣ ΕΠΑνΕΚ

EPAnEK 2014-2020
OPERATIONAL PROGRAMME
COMPETITIVENESS • ENTREPRENEURSHIP • INNOVATION

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

BESMART

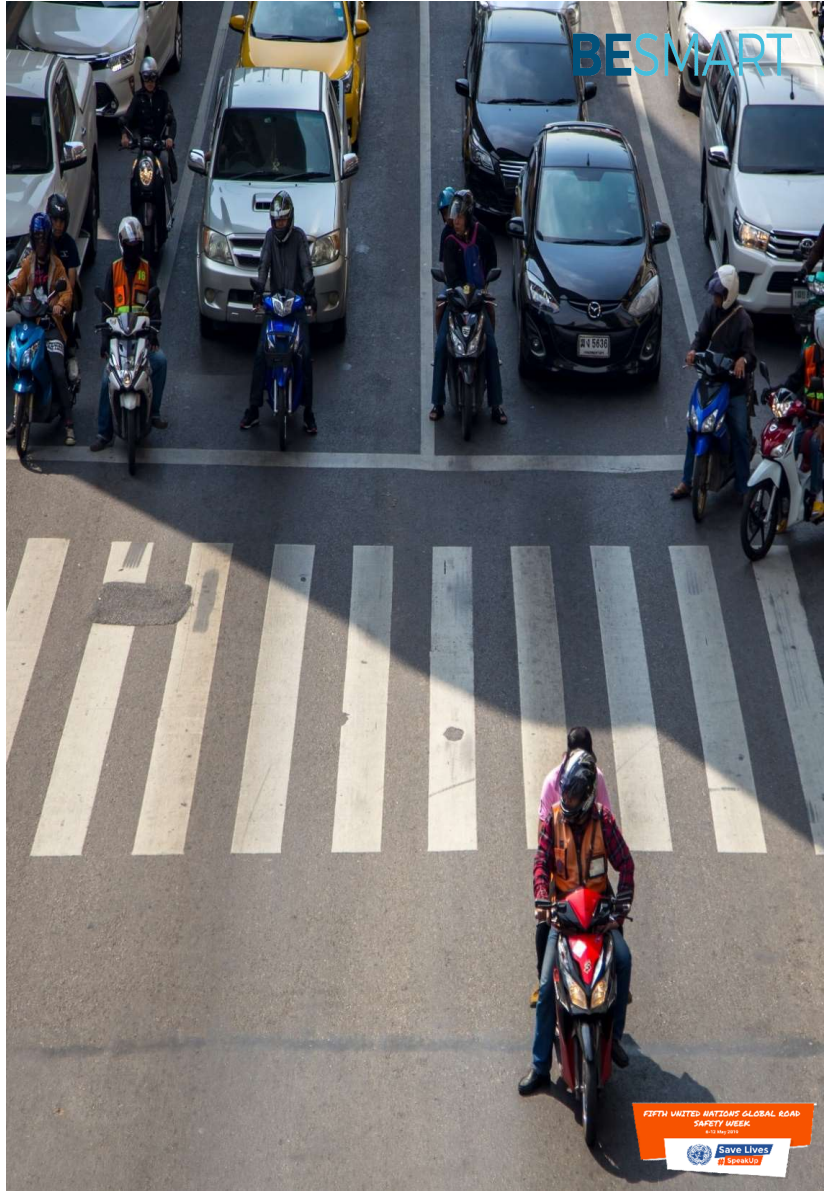
- Identification of critical risk factors affecting driver behaviour and road safety
- Investigation of the impact of speed (inappropriate speed, percentage of time exceeding speed limits, etc.) on road safety
- Analysis of the impact of driver behaviour on harsh events (harsh acceleration, harsh deceleration, 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

FIFTH UNITED NATIONS GLOBAL ROAD SAFETY WEEK

6-12 May 2019

Save Lives #SpeakUp

Smartphone applications for driver safety behaviour support

BESMART

Armira Kontaxi

Transportation Engineer, Research Assistant

Together with:
Apostolos Ziakopoulos, Panagiotis Papantoniou, George Yannis