



## **BMVI-Workshop series “Data Innovations for Smart Mobility in Europe”**

### **Workshop No. 5: Safe and sustainable mobility supported by data**

**Date:** Wednesday, 06 October 2021

**Location:** Virtual Room (Zoom)

**Time:** 09.30 – 12.00 h (CET)

## **Summary**

With the increase of the average global temperature in the past decades and the transportation sector’s contribution to greenhouse gas emissions, smart mobility solutions have become an important tool to achieve more sustainable mobility. At the same time, several new forms of transportation, especially in the realm of micro-mobility, have been introduced into the mobility system making it more complex to plan and manage. More and more innovative solutions making use of open data are addressing these challenges and promising to contribute to achieving a higher degree of safety and sustainability in road transport in varied environments.

### **Thematic overview**

With the objective of exchanging information and experiences on smart, innovative solutions for safe and sustainable mobility in Europe, Christian Schlosser, head of division 25 of the German Federal Ministry of Transport and Digital Infrastructure (BMVI) welcomed the participants, summarized the objectives of the workshop and provided a short introduction to the programme mFUND. This event is part of a series of workshops conceived after the conference “Open Data for Smart Mobility in Europe”, held in 2020 under the auspices of the German EU Council Presidency. Following this short introduction, the keynote speaker, Francesco Viti (University of Luxembourg), provided a presentation on leveraging big data and open data for multimodal transport modelling showing some outcomes of projects carried out in his research group.

### **Innovative solutions**

Several examples of innovations using data were presented after the thematic overview. The first part of the session on data innovations focused on the use of data-driven approaches to improve traffic safety for pedestrians and drivers. The second part was dedicated to smart systems contributions to more efficient and sustainable transport operations.

#### *Improving traffic safety using data-driven approaches*

Joost de Winter and Tom Driessen (both from TU Delft) and Angele Picco (University of Groningen) introduced the project Towards Safe Mobility for All. The project team is



exploring the use of data to assess the driving skills and styles of the drivers of vehicles at various temporal levels and to facilitate changes in behavior and ultimately a societal transition towards safer mobility. The efforts in the project to effect a change in driving behavior focus on elderly, professional and young drivers. The results of the project could potentially support driver's license examinations and relevant policy decisions in Europe.

The objectives and achievements of the project SmartHelm were presented by Johannes Schering (University of Oldenburg). Bicycle couriers face many challenges in their working environment, as many cities and neighborhoods do not have adequate infrastructures for cargo-bikes. Moreover, while under constant time pressure, they have to simultaneously process a lot of information about traffic, their routes and their payload. In an effort to make the daily work of bicycle couriers as pleasant and safe as possible, the SmartHelm consortium has developed an intelligently networked bicycle helmet (SmartHelmet) equipped with augmented reality glasses, multilingual voice control, an eye-tracking module for recording eye movement data, and special electroencephalography (EEG) electrodes to record the driver's attention. The first prototype has already shown very good results. A prototype with improved comfort for the user is currently under development and will be tested soon.

Patricia la Torre (Humanising Autonomy) explained that her organization approaches behaviour in the transportation system from a different angle. With the aid of its "Behaviour AI Platform", Humanising Autonomy uses computer vision software to better understand human behavior and teaches machines how to read and interpret human visual signals from cameras installed in vehicles and streets, making it possible to predict human actions and improve safety on the roads. In their projects, Humanising Autonomy enhances cameras with behavior artificial intelligence. Project results confirm the promising nature of this technology for improving road safety. In one of the case studies presented (Ceva logistics), a significant reduction of the risk of collision was achieved by decreasing the number of "near misses" by 30%.

### *Smart systems contributing to more efficient and sustainable transport operations*

Artificial Intelligence Passenger Counting – or AIPaC – a project funded by the programme mFUND, was presented by Oskar Haller (Isarsoft). AIPaC illustrates how data-based analyses and forecasts of passenger volumes in vehicles and on platforms can be used to improve the planning, reliability, operational processes and security in public transport. The main objective of AIPaC is to develop a high-precision passenger counting and forecasting software that evaluates data collected by existing security cameras in real time and in compliance with data protection regulations. The preliminary results show an accuracy of over 95 %. In addition to counting passengers, the system is able to recognize objects such as bicycles and luggage. It can be used effectively in crowded spaces and locations. The



project consortium is currently working on forecasting the number of passengers in vehicles and on platforms for improved operation and safety.

The optimization of traffic flows using artificial intelligence is the main goal of project KI4LSA. The project presented by Florian Hufen (Fraunhofer-Anwendungszentrum Industrial Automation des IOSB) is the world's first project to make use of a reinforcement learning agent to control traffic lights. The solution designed for medium sized cities could affect the lives of over 100 million citizens in Europe. The innovation presented in KI4LSA relinquishes costly manual programming, allowing for more efficient use of infrastructure and optimized traffic flow, with less congestion and consequently, less pollutant emissions.

Jörg Jonas-Kops and Agha Saad from Nxtbase Technologies provided an overview of the complexity of maintenance and repair processes for public transport vehicles. In order to improve these processes, Nxtbase developed a smart, predictive maintenance and logistics system which has received several innovation awards in Germany. In the project SensoDIMARIS, sensors affixed to the chassis of a tram are used for the collection of data which is subsequently analyzed for the monitoring and forecasting of maintenance. The process includes the use of digital end devices such as augmented reality glasses and voice control tools to support operations and maintenance personnel during the execution of their tasks.

### Discussion and wrap up

In the first part of the session, the selected projects presented innovative solutions centered around the understanding and prediction of human behavior. In these projects, data on the behavior of drivers and pedestrians were collected and analyzed. The participants of the workshop engaged in a lively discussion on issues like the role of different cultures, languages (including accents) and ethical questions which arise when making use of digital images. There was broad agreement that the involvement of stakeholders in the design and implementation of processes are necessary to create trust. In the second part, attention focused more on operational issues and the support of smart systems to improve processes. Nonetheless, human beings stayed in the center of the approaches in most projects. The key role and contribution of passengers, drivers and operators remains undeniable. Without understanding and influencing human behaviors, most of the systems developed cannot achieve the full potential added value. Furthermore, the role of (international) collaboration was discussed. Participants expressed very positive feedback on the kind of exchange used in the workshop. Several projects professed their intention to continue the exchange in the future and to build future collaborations with other national or international organizations.