Driver needs and behaviour in automated traffic

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Together with:
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The Drive2theFuture project

- **Full project name:**
  - Needs, wants and behaviour of “Drivers” and automated vehicle users today and into the future

- **31 Project partners from 13 countries:**
  - Universities, Research Institutes
  - Industries, SMEs

- **Duration of the project:**
  - 36 months (May 2019 – April 2022)

- **Framework Program:**
  - Horizon 2020 - The EU Union Framework Programme for Research and Innovation – Mobility for Growth
Background

- Automation brings **revolution** to the transportation systems
- All transport modes are moving towards the era of automation
- **Penetration rate** of autonomous vehicles depends on:
  - User acceptance
  - User willingness
  - Safety
  - Compliance
  - Sustainability
Research Questions

- Investigation of the needs and wants of the "Driver" and the potential user of AV

- Transition from driver behavioral models to behavioral models for autonomous driving

- Identification of the factors influencing user acceptance
  - Appropriate HMI
  - Training schemes

- Observation and prediction of user acceptance
Methodological Challenges

- Development of the first AV behavioral model
  - Literature review and analysis of three driver behavioral models
    - Multiple comfort zone, Risk Allostasis model, Risk Monitor Model

- Collection of data from more than 20 relevant European projects
  - User behavior, acceptance, HMI, accident data

- Identification of data science techniques for user acceptance prediction

- Pilots for testing automated driving behavior
  - 12 Pilots in 8 European Countries
  - Training schemes for AVs
  - HMI development
Simulation modelling

- Identification of the interface between drivers’ behavior models and AV behavior models

- Identification of different type(s) of simulated environments/tools to study
  - the acceptance of AVs
  - their critical components for each transport modes

- Identification of the most relevant KPIs for automation impacts evaluation

- Integration of different tools (simulation, data driven techniques etc) in a common operational platform
Pilots

- Development of 3 pilot phases:
  - Phase I: Setting the scene
  - Phase II: Iterative development, verification and optimization, initial demonstrations
  - Phase III: Final, wide-scale demonstrations and training pilots across Europe

- All transportation modes
  - Road (passenger cars, shuttles, motorcycles)
  - Maritime
  - Aviation (drones)

- Interaction with non equipped vehicles
- Interaction with vulnerable road users
- Different levels of automation
- Assessment of AV’s behavior and experience of the users and the participants
Scientific and Social Impact

- **Improvement of safety levels** in all transport modes
- **Raise user acceptance** towards automated driving
- **Increase user awareness** through participation in the pilots
  - Various modes
  - Different traffic environments
- **Development of the first AV behavioral model**
- **Creation of a simulation suite** for designing and assessing AV functions and the estimated user acceptance
Future Challenges

- Extension of the AV behavioral models from passenger cars to other transport modes

- Development of HMIs capable of handling any emergency situation

- More pilot tests for autonomous transportation modes besides passenger cars
  - Ships
  - Trains, etc

- Further increase user acceptance and trust in automation
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