



Adapting driver behaviour for lower emissions

MODALES D5.2: Functional specifications – *Executive Summary*

WORK PACKAGE	WP5: Guidelines and tools for low emission training
TASK	T5.2: Functional specifications of tools
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Executive Summary

This deliverable is part of Work Package 5 "Guidelines & tools for low emission training," one of the project's five technical work packages. Furthermore, this deliverable is the result of Task 5.2. "Functional specifications of tools," which aims at defining the specifications to develop MODALES' mobile app and web dashboard in Task 5.3. The aim of these tools is to collect and analyse the driving patterns of individuals to adjust a user's driving style, with a specific aim on emission reduction. To achieve that, relevant user information such as accelerometer, gyroscope, location and OBD data will be collected transparently and continuously for the sake of developing a Driving Assistance tool for Low-Emission Driving (current working name: DALED). Based on the collected information, the proposed system would aim to provide two types of recommendations. On one hand, active recommendations will offer straightforward recommendations while the driver is on the way, which would reduce high-emission driving styles by providing immediate corrective actions. On the other hand, passive recommendations will be about analysing and understanding a user's driving behaviour patterns and contextual information (e.g., on traffic jams, weather) to generate a post-driving report that could be used for encouraging users for safe driving practices and possibly offer rewards for good driving behaviour.

The present specification document includes use-cases, mock-ups of graphical interfaces, development timelines, architecture designs, analysis of required technologies, data definitions, and the connection with the various theoretical aspects defined in previous deliverables. It is broken down as follows:

- This document starts with an introduction, which recalls the project's objectives, states the deviations from the Declaration of Action, and delimits this deliverable's scope.
- The background section analyses and compares the most popular smartphone apps related to car monitoring or emissions reduction. It includes a study that employs clustering for grouping existing apps. It then offers recommendations for developing the project based on the predicted cluster for our future mobile app.
- Based on the knowledge acquired from the second section, and building on the project's objectives, the next section presents the functionalities that are to be developed, i.e., the actions a user can perform by interacting with each of our tools. These actions are described with clear use-cases, along with a diagram that connects them.
- The next section enumerates all the hardware and software requirements for the development of the tools. It proposes a high-level system architecture and states security and privacy concerns. Furthermore, it presents details about the experimentation, testing, and deployment processes.
- The data specification section describes the factors related to the environment, vehicles, and users that the mobile app will estimate and analyse to offer precise and coherent driving recommendations. Additionally, the section enumerates parameters, sources, and methodologies related to the data collection.
- The next section focuses on user recommendations, how to generate them, and how to incentivise users to follow them (e.g., by implementing gamification).
- The graphical user interface section describes the visual elements for both tools and presents the mobile app's first mock-ups.
- Finally, the conclusion section offers closing remarks.



As of November 2020, it should be noted that some of the parameters that could influence the tools' development are unknown. Most of them will be determined empirically with the start of the experimental campaigns in 2021. This deliverable therefore serves as an initial guide proposing an approach for developing the project tools, which will be adjusted throughout the project. The definitive parameters will be detailed in an appendix provided along with the mobile app at its final release (Month 24 of MODALES: August 2021).

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