Automotive technology and personalised models to reduce road accidents

Human error is estimated to play a role in 94% of accidents, making failures or mistakes by drivers a major public safety concern. Intelligent systems that can monitor the driver’s state and behaviour show promise in contributing to citizens’ collective safety.

By incorporating the latest advances in sensors, data fusion, machine learning and user feedback, the capability to better understand the driver’s state and the driving context has improved. This represents a major step towards truly semi-automated and automated vehicles. However, there’s still a long way to go as vehicle automation needs to support and eventually replace the need for a driver.

Technology and models to boost situational awareness

To tackle this issue, the EU-funded VI-DAS initiative will develop enhanced driving scene models that include driver behaviour, a significant milestone that the automotive industry hasn’t achieved yet. It will also develop the technology required to analyse the driver’s state to considerably improve safety and efficiency.

VI-DAS is designing next-generation 720° connected advanced driver assistance systems (ADAS) on scene analysis and driver status. “The project is addressing the goals of improved road safety by developing and deploying ADAS and navigation aids in a societally acceptable and personalised manner,” says project coordinator Dr Oihana Otaegui. “This will be based on both the global understanding of a traffic scene and consideration of the driver’s physical, mental, demographic and behavioural state.”

So far, the focus has mainly been on completing the development and integration of the alpha and beta VI-DAS prototypes. Work began by defining specifications in line with driver needs, requirements and system architecture. Then, the research and technological development activities began for the main interrelated modules of the VI-DAS system that provide a comprehensive analysis of the driver’s situational context: Sense (outside and inside the vehicle); Understand, Decide and Check; Connect and Cooperate; Assist and Act; and Risk.

After defining the modules, the project team defined the testing and validation methodology and integrated the first prototype. The outputs of this prototype served as inputs for the second prototype, which consisted of an integrated feature-ready system deployed on a simulation environment and a vehicle for conducting test activities.

Smoothing the path towards fully automated vehicles
Project partners are currently developing the third and final prototype. Dr Otaegui further explains: “We’re addressing a set of real challenges for the automotive industry, including reliably assessing the driver’s condition, evaluating danger after gathering information about surroundings at any given time and adapting behaviour accordingly, adapting legislation to fully automated transport, as well as standardising an approach to risk assessment in the insurance sector.”

The prototype will be showcased during the European ITS Congress in June 2019 in the Netherlands. This Congress is one of the largest events dedicated to intelligent transportation systems and smart mobility in general. “VI-DAS is positioned to accelerate the development and inclusion of ADAS and navigation aids in vehicles, while considering the driver’s mental state and behaviour when responding to everyday traffic conditions,” concludes Dr Otaegui.

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**Keywords**

VI-DAS, driver, safety, advanced driver assistance systems (ADAS), traffic, autonomous vehicles

**Last updated on** 2019-03-12  
**Retrieved on** 2019-07-16

**Permalink:** [https://cordis.europa.eu/result/rcn/254162_en.html](https://cordis.europa.eu/result/rcn/254162_en.html)  
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