



Driver monitoring system



A driver monitoring system that can detect if a driver is fit to drive in the case of semi-autonomous driving

What is a driver monitoring systems?

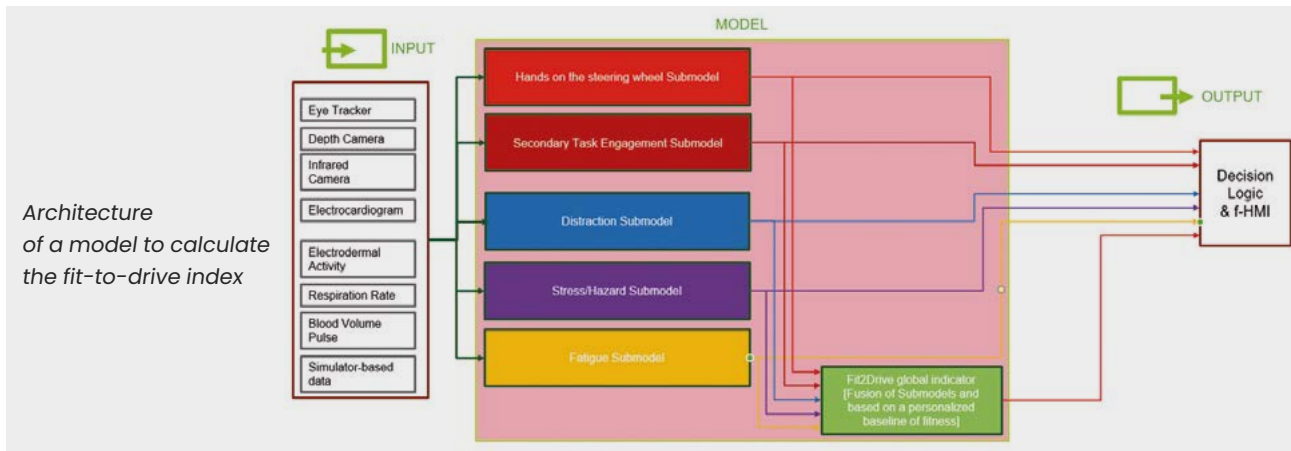
The driver monitoring systems offers a unique solution to facilitate communication between a driver and an autonomous vehicle. As a result, the system enables the creation of an easily readable, fluid and safe environment to ease the transition of driving control between driver and autonomous vehicle.

Three key advantages:

- **Fit2drive index:** a holistic index that encompasses the driver's physiological and behavioral states.
- **High quality database:** the use of numerous sensors and more than 150 simulator drivers ensured the creation of a high quality database to develop this system.
- **Variety of models:** the Fit2drive index is built upon a variety of sub-models that analyze everything from driver respiration to eye movement or steering wheel grip.

Applications

The driver monitoring system offers an amazing solution for car and truck markets to create a fluid interface between driver and autonomous vehicle. Thanks to its innovative Fit2drive index, the system provides a way to simplify communication between driver and vehicle thus easing the transition between various levels of autonomous driving from fully manual to fully automated.



What's new?

Two important advances

First, the system benefits from a huge, qualitative database that was built using a variety of sensors: Electro-Cardio-Graphy (ECG), Electro-Dermal-Activity (EDA), Respiration Rate (RR), Eye Tracker, Thermographic camera, and a steering wheel grip sensor (developed by CEA).

More than 150 drivers participated in the data acquisition phase.

Second, this qualitative database enabled the development of a variety of sub-models to detect the state of the driver and deliver an index representative of this state. These sub-indexes are merged into an innovative Fit2Drive index that can be used by the Human-Machine-Interface in order to offer the driver information, warnings and recommendations for the use of autonomous driving capabilities.

What's next?

Three phases of development:

1. Creation of a database thanks to more than 150 test drivers and numerous sensors in our driving simulator.
2. Development of models to detect various driver states (visual concentration, fatigue, manual activities, etc.) in order to provide a holistic Fit2Drive index.
3. Underway: design and implementation of live tests in real demonstration vehicles.

Transfer of Technology expected to be feasible by mid-2023.

Once models are used for car and truck markets, the system can be expanded to support other markets such as production lines that require interactions between operators and robotic machinery.

European project



This research is carried out as part of the HADRIAN project (Holistic Approach for Driver Role Integration and Automation—Allocation for European Mobility Needs), which received funding from the EU Horizon 2020 research and innovation program (grant agreement No 875597). hadrianproject.eu

HADRIAN
Holistic Approach for Driver Role Integration and
Automation Allocation for European Mobility Needs

Interested in this technology?

Contact:

Philippe Despesse

philippe.despesse@cea.fr

+33 438 785 842

CEA-Leti, technology research institute

17 avenue des Martyrs, 38054 Grenoble Cedex 9, France

cea-leti.com

@CEA-Leti

Research
for industrial
innovation