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THE MAIN OBJECTIVE OF THE REFLECT PROJECT IS TO DEVELOP PERVASIVE-ADAPTIVE ENVIRONMENTS BASED ON THE MAXIM THAT "THE BEST ASSISTANT IS THE ONE YOU DO NOT NOTICE". THE NEW GENERATION OF SMART SYSTEMS USING REFLECTIVE TECHNOLOGY SHOULD UNDERSTAND USER'S EMOTIONS, NEEDS, INTENTIONS AND SOCIAL SITUATIONS AS WELL AS PROVIDE APPROPRIATE ASSISTANCE IN A DISCRETE AND PERSONALIZED MANNER.

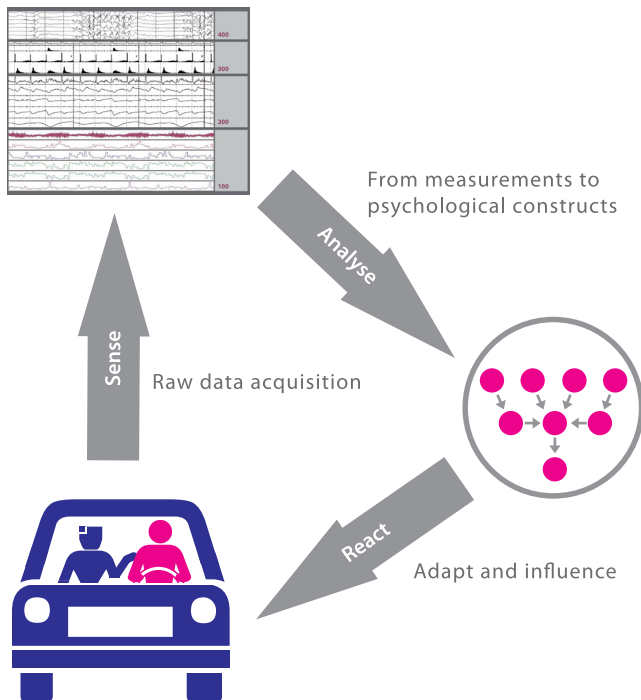
[HTTP://REFLECT.FIRST.FRAUNHOFER.DE](http://reflect.first.fraunhofer.de)

REFLECTIVE VEHICLE
**Never Alone
at the Wheel**



Vehicle as a Co-driver

A co-driver usually observes the driver carefully, watches out for obstacles the driver cannot see, provides for a lively atmosphere on longer trips, and generally assists the driver. Yet most drivers are alone. The idea behind the reflective vehicle is to overcome the potential shortcomings of a solitary drive by providing a friendly co-driver. Its task is to observe the driver and take into account his emotional, cognitive and physical states, as well as the vehicular, driving and traffic conditions, to optimize the vehicle's configuration and actively participate in the complex process of driving. The reflective vehicle concept aspires to implement adaptive control in vehicles to achieve more secure, more pleasant and more effective driving.



TECHNOLOGY

The system uses reflective technology to exercise non-explicit man-machine interaction and is based on context awareness. The reflective vehicle monitors, diagnoses and responds to the affective, mental and bodily states of the driver in a closed-loop fashion. The biocybernetic loop consists of:

- **Sensing:** a) The driver's psycho-physiological characteristics (measuring skin temperature, heart rate, pupil diameter, etc.), b) engine parameters (using existing CAN bus parameters) and c) the road conditions (using external measurements, GPS, etc.)
- **Analysing:** Diagnosing the driver's emotional cognitive and physical conditions (based on the collected measurements and an intelligent diagnostic system)
- **Reacting:** Changing the engine settings, cabin ambience and seat position to adapt to the condition of the driver

In a closed loop, the system re-examines the effects of its (re-)actions to further refine its behaviour. The ultimate goal is to ensure that the driving experience becomes safer, more comfortable and as effortless as possible.

Reflective technology controls multiple sensor and actuator devices in an environment based on the distributed OSGi platform (Open Services Gateway initiative), which deploys a service and component-oriented programming in Java that features event-driven pervasive adaptation.