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Road vehicles — Data communication between sensors and data fusion unit for automated driving functions — Logical interface

*Véhicules routiers — Communication de données entre capteurs et
unité de fusion de données pour les fonctions de conduite automatisée
— Interface logique*



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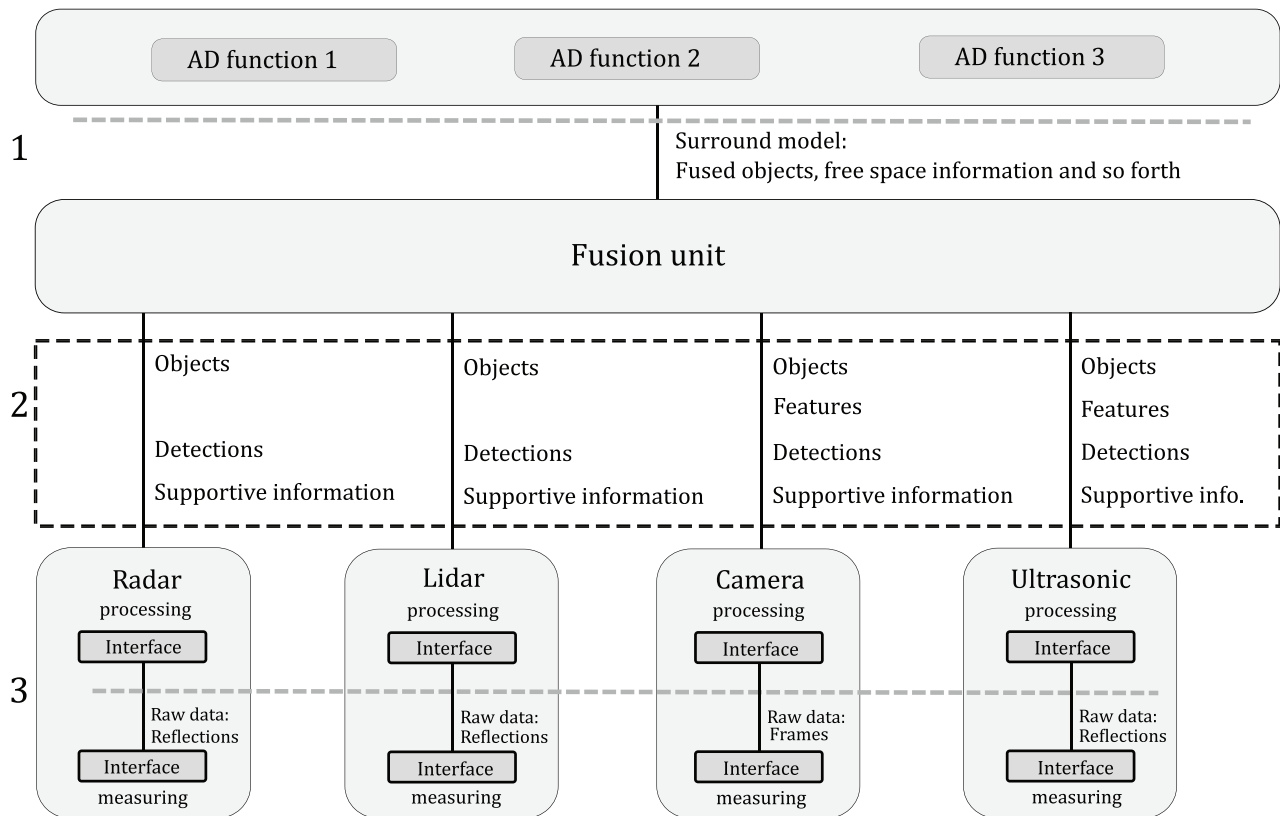
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Introduction

Highly-automated driving (AD) functions for road vehicles require a situation awareness of the surroundings of the vehicle and a, preferably, comprehensive scene understanding. For the fast and reliable recognition of real-world objects, a sensor suite is necessary to provide information for the fusion unit. Utilisation of different sensor technologies like radar, lidar, camera and ultrasonic with different detection capabilities is indispensable to ensure both complementary and redundant information. The fusion unit analyses and evaluates the different sensor signals and finally generates a dynamic surround model with sufficient scene understanding.

While current partly-automated functions utilise only particular objects (for example, vehicles, pedestrians, road markings) to generate a simple surround model, it is necessary for future highly-automated driving functions to merge not only the recognised objects but also to include other sensor-specific properties and characteristics of these objects for the generation of a coherent model of the surroundings. To minimise the development efforts for the sensors and the fusion unit and to maximise the reusability of development and validation efforts for the different functions on the sensor and fusion unit side, a standardised logical interface layer between the sensor suite and the fusion unit is worthwhile and beneficial for both the sensor and the system supplier.



Key

- 1 logical interface layer between the fusion unit and automated driving functions
- 2 logical interface layer between a single sensor as well as a single sensor cluster and the fusion unit
- 3 interface layer on raw data level of a sensor's sensing element

Figure 1 — Architecture: sensors/sensor clusters – fusion unit – automated driving functions

The logical interface layer between a single sensor as well as a single sensor cluster and the fusion unit [see key 2 in [Figure 1](#)] addresses the encapsulation of technical complexity as well as objects, features and detections to enable object-level, feature-level and detection-level fusion. Additional supportive information of the sensor as well as the sensor cluster will supplement the data for the fusion unit.