Reliable Verification of Object Recognition Algorithms of Driver Assistance Systems

Case Study BMW

The Customer
The BMW Group is one of the ten largest car manufacturers in the world, and its BMW, MINI and Rolls Royce brands are three of the top premium brands in the automotive industry. One of the key factors of this success has been, and continues to be, the enduring customer perception of the Group's innovative leadership in car making.

The Challenge
Objective evaluation of the object recognition algorithms of an ACC ECU
Since all metallic objects are detected by the ACC (Adaptive Cruise Control) system’s radar unit, the evaluation electronics must decide whether the object is even a vehicle and whether it is relevant as a control object. In adapting the vehicle’s speed to the distance to the next car, only the data of vehicles within the car’s own lane are considered. To objectively evaluate the ACC system’s reliability and operating safety, BMW developers use visible evidence (video image) to verify the acquired data (signals).

The Solution
Visual comparison of object coordinates with the real environment
Besides internal ECU data – such as signals from the bus systems, peripheral measuring equipment and audio signals – CANape also time-synchronously logs video and GPS signals. The CANape Option Advanced Multimedia overlays relevant ACC coordinates over the video image as defined bitmap information in a perspective view. This gives BMW developers a tool for observing and verifying the positional data and performing necessary online or offline parameter optimizations via CCP/XCP.

The Advantages
Simple, reliable and efficient comparison of detected objects with the real environment
BMW’s use of CANape and the Option Advanced Multimedia to implement essential checking of acquired signals based on visible evidence has been a success because:
> CANape’s standardized calibration protocols and flexible interfaces enable simple integration in existing tool environments
> Flexible display of objects, from a bird’s eye perspective or side view, simplifies data evaluation
> Time-synchronous logging of all internal ECU data enables 100% reproduction of the driving situation in the laboratory
> Cooperative teamwork between BMW and Vector facilitated functional extensions for integrating a "driving tube" and a Parking Assistant