Case Study

Camera Injection System

Validating Key Driving and Parking Functionalities, including ACC and LCC

About the Cooperation

Konrad Technologies collaborates with a pioneering and globally influential automotive R&D company to develop an advanced video injection solution, enabling the testing of various camera models on the customer's HIL system. This solution is crucial for validating key driving and parking functionalities, including Adaptive Cruise Control (ACC) and Lane Centering Control (LCC).

Project Scope

Challenges

- Manage the serialization and de-serialization of various data streams.
- Synchronize 11 video signals simultaneously.
- Meet the demanding application requirements of diverse cameras across hardware platforms.
- Implement parallel procedures for activating multiple cameras.
- Integrate the video injection system into the customer's HIL platform, supporting sensor fusion.

Objectives

- To get the simulated video stream generated by virtual scenario simulation software, and then feed the converted camera signal into the ECU.
- To ensure easy customization and extension of the system for support of more camera injection demand on both hardware and software levels.
- To ensure a driving environment that simulates real road conditions.
- To develop a customized automatic testing solution that is compatible with customer's existing test software.
- To implement calibration of 11 individual cameras in accordance with real camera requirements for functionality testing.

- **Distributed VTD Simulation:** Successfully implemented distributed simulation across 11 channels, offering high flexibility and increased bandwidth for seamless virtual test driving (VTD) scenarios.

- **Camera Distortion Calibration:** Precise camera calibration with distortion correction ensures accurate functionality testing and reliable test outcomes.

- **Camera Signal Conversion:** Captured camera signals from the image workstation are converted to meet specific customer requirements, ensuring compatibility with their systems.

- **Synchronized Camera Signals:** Multiple camera signals are fed into the ECU synchronously, based on ECU triggers, ensuring accurate and coordinated input.

- **Customized API Integration:** Developed API interfaces that integrate with customer simulation software, enabling fully automated HIL testing.

Solution

Konrad Technologies designed a camera data injection system including customized software engineering and hardware set up:

Customer Benefit

- **Local Support:** Konrad Technologies offers available local support with strong problem-solving capabilities, including assistance with camera/ECU software upgrades for the camera data injection system.

- **Fast Turnaround with High Quality:** Complex technical challenges are resolved efficiently within short lead times, ensuring top-quality outcomes.

- **Comprehensive Test Coverage:** Extensive testing applications support various camera systems, covering test cases for both driving and parking algorithms, delivering consistent and expected results.

Our Know-how

- **Expertise in System Construction:** Extensive experience in designing and building custom testing systems tailored to specific needs.

- **Proficiency in Camera Data Injection:** Utilized cutting-edge technologies for Camera Data Injection.

- **Comprehensive Testing:** Conducted thorough functional camera tests to guarantee the highest quality and reliability.

- **Commitment to Precision and Innovation:** Maintained a strong focus on quality and innovative technology in custom data injection.

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