

Ensuring Safe Operation by Providing an End-To-End Field Monitoring and Incident Management Approach for Autonomous Vehicle Based on ML/DI SW Stack

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Abstract : By achieving the first commercialization approval in San Francisco the Autonomous Driving (AD) industry proves the technology maturity of the SAE L4 AD systems and the corresponding software and hardware stack. This milestone reflects the upcoming phase in the industry, where the focus is now about scaling and supervising larger autonomous vehicle (AV) fleets in different operation areas. This requires an operation framework, which organizes and assigns responsibilities to the relevant AV technology and operation stakeholders from the AV system provider, the Remote Intervention Operator, the MaaS provider and regulatory & approval authority. This holistic operation framework consists of technological, processual, and organizational activities to ensure safe operation for fully automated vehicles. Regarding the supervision of large autonomous vehicle fleets, a major focus is on the continuous field monitoring. The field monitoring approach must reflect the safety and security criticality of incidents in the field during driving operation. This includes an automatic containment approach, with the overall goal to avoid safety critical incidents and reduce downtime by a malfunction of the AD software stack. An End-to-end (E2E) field monitoring approach detects critical faults in the field, uses a knowledge-based approach for evaluating the safety criticality and supports the automatic containment of these E/E faults. Applying such an approach will ensure the scalability of AV fleets, which is determined by the handling of incidents in the field and the continuous regulatory compliance of the technology after enhancing the Operational Design Domain (ODD) or the function scope by Functions on Demand (FoD) over the entire digital product lifecycle.

Keywords : field monitoring, incident management, multicompliance management for AI in AD, root cause analysis, database approach

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