Your Partner in Simulation and Validation



OSI @ dSPACE Hendrik Amelunxen July 29, 2020

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OSI Components

OSI integration in dSPACE



Key takeaways

OSI as standardized format for **sensor model coupling**

dSPACE **Hardware and Software** for Simulation and Validation

dSPACE Automotive Simulation Models (ASM) for vehicle, environment and sensor simulation

Provision of **SensorView/Ground Truth** as basis for external sensor coupling



OpenX-Workflow

OpenX-Workflow at dSPACE



*in different variations

https://dspace.com/shared/data/pdf/dwc2019/BMW_Dr_Tim_Fricke.pdf

Key takeaways

OpenX-Workflow

Details of OSI-Groundtruth



- Object- and road-information for groundtruth area
- Objects: Moving objects, stationary objects, traffic signs, traffic lights, etc.
- Road: Lanes and lane boundaries as discrete points (discretization according to curvature and line/gap lengths)



Toolchain-integrated OSI interface

Provision of OSI **road- and object-information in real-time**



Animation in MotionDesk



Groundtruth visualization in ControlDesk

Visualization/measurement of groundtruth information



OSI for external Motion Planner

Current project: Coupling of external motion planner



- BEV simulation
- Environment and traffic simulation
- SIL-Simulation on VEOS using V-ESI API

- Motion planning based on OSI::GT
- Combined rural-highway scenario
- Smooth driving trajectories
- Deterministic SIL-Simulation

Key takeaways

Coupling of **external motion planning algorithms** using OSI::GT

Deterministic SIL-Simulation layout (faster than real-time)

Motion planning in combined **rural-highway scenario**

Further extension to **multi-agent** scenario possible





OSI for Validation of Sensor Perception

Validation of Sensor Perception for SIL Use-Cases

- Time synchronous provision of
 - Physics-based sensor signals (e.g. camera-, radar- and lidar data)
 - OSI groundtruth data
- Currently used for testing of perception algorithms



Key takeaways

Time-synchronous OSI::GT signals with accuracy down to a millisecond

Can be used for validation of perception-, sensor-fusion-, and object-tracking algorithms

Can be used as **complementary ideal-sensor** in sensor-fusion applications



OSI for Validation of Sensor Perception

Validation of Sensor Perception for SIL Use-Cases

Combined Visualization in RT-Maps



Key takeaways

Time-synchronous OSI::GT signals with accuracy down to a millisecond

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