

LeddarVision

Sensor Fusion and Perception Solution Delivering Highly Accurate 3D Environmental Models for ADAS and Autonomous Vehicles

Solution Overview

In an autonomous vehicle, reliable and accurate perception of the environment is critical to enable safe driving decisions. The output from the various sensors needs to be fused with no loss of information to produce an accurate model of the environment that captures every surrounding object.

The standard approach used by perception platforms currently available in the ADAS and AD market is object fusion, where information about object detection performed by each type of sensor is brought together to support the driving decision-making.

The main limitation of this approach, however, is that no single sensor on its own possesses sufficient information to support all possible driving scenarios. For example, HD cameras do not see depth, while distance sensors such as LiDARs and radars may lack resolution.

The [LeddarVision™](#) sensor fusion and perception platform provides a different, innovative approach to understanding the vehicle's changing environment with raw-data fusion. Through a leveraged algorithmic approach, the software solution encompasses 3D reconstruction, artificial intelligence (AI), and computer vision to turn sparse data into a most precise dense 3D environmental model, contributing to improving the perception system's performance, an essential component of autonomous vehicles.

Customer Benefits

- Hardware and software-agnostic sensor fusion platform
- Perception software product that enables the fusion of camera, radar, and LiDAR, leading to accelerated time-to-market
- Cost-efficient solution to leverage off-the-shelf sensors
- Flexible hardware solution that is adaptable to any sensor setup
- Platform that can scale from L2 to L5, from a single sensor up to fifteen sensors
- Access to value-added solutions of the Leddar™ Ecosystem and strategic partners

For more information on
LeddarVision solutions, please contact:

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LeddarVision™

A BETTER PERCEPTION PARADIGM FOR AUTONOMOUS DRIVING

LeddarVision is a sensor fusion and perception solution that delivers highly accurate 3D environmental models for autonomous cars, shuttles, and more. The full software stack supports all SAE autonomy levels by applying AI and computer vision algorithms to fuse raw data from radar and camera for L2 applications and camera, radar, and LiDAR for L3-L5 applications.



Raw sensor fusion increases performance and reduces computing needs & costs

Architecture

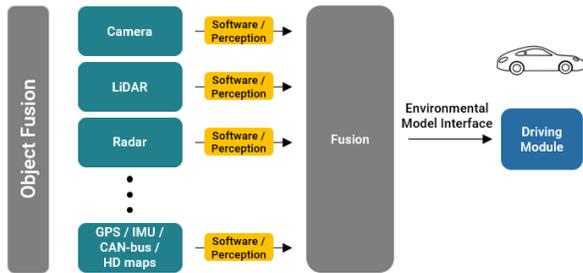


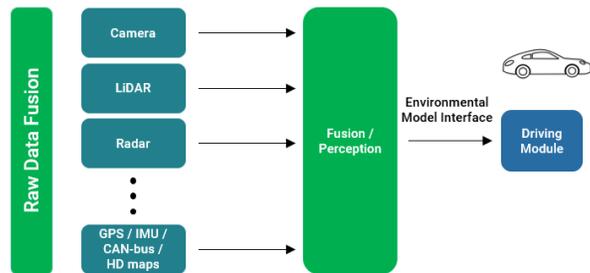
Image Quality



Single-frame sparse LiDAR data

Highlights

- Performance is not sufficient in terms of safety and driving comfort (too many missed detections and numerous false positives)
- Current cost structure of self-driving car platforms shows that this approach is inadequate for large-scale commercialization
- Each sensor has separate "cognition engine" that detects and classifies the scene
- Output from each sensor is then fused into coherent model (i.e., "environmental model")
- Data cannot be added back once filtered



Single-frame fused LiDAR & camera data

- Raw data from sensors is fused together
 - Detection and classification algorithms then run on fused model rather than each sensor separately
 - Functional safety can improve if done properly
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- Model is richer and more robust with fewer false positives, as each sensor complements each other's strengths
 - Lower cost structure due to a leaner architecture and savings on 3D sensors and on-sensor processors



LeddarVision excels at detecting even unknown objects that are absent from training dataset.



Our novel approach comes with inherent functional safety, detecting objects and dangers even during a sensor malfunction.

**SAFER
AUTONOMOUS
DRIVING**
With Better
Detection