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Unlocking Success: Finding the Right ADAS Software Solution for Automotive OEMs and Tier 1-2 Suppliers

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Abstract

As the automotive industry is heading towards a new era of mobility, car manufacturers and suppliers find themselves at crossroads where software prowess reigns supreme. Gone are the days when success was measured by production efficiency and vehicle performance. Today, the battle is taking place at a digital level, where automotive ADAS software is the key to unlocking a world of possibilities. In this White Paper[1], we delve into the pivotal role of advanced driver assistance systems (ADAS) and perception software in reshaping the automotive landscape, uncovering the disruptive technologies and game-changing strategies that are redesigning the industry.

Cutting Costs, Boosting Profitability: Sensor Fusion and Perception Strategies

ADAS features, such as adaptive cruise control (ACC), automatic emergency braking (AEB) and highway cruise control, are built upon the sensor fusion and perception sub-system that builds an environmental model for the vehicle, identifying objects, free spaces, lane markings and signs and enables the vehicle to navigate through the environment.

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[1] For brevity's sake, Tier 1-2 suppliers will be referred to as "suppliers" in this document.

For car manufacturers and their suppliers, ADAS is a double-edged sword –while it incurs substantial investment costs for research and development, it also presents a significant revenue stream through the sale of high-margin options, enticing customers with enhanced ADAS safety and convenience features. These dynamics are exemplified by the financial challenges faced by [Argo AI](#) and [Embark Trucks](#), as well as by announcements from automakers such as [Ford](#) and [GM](#) that expect to achieve significant gains in revenue and margins by offering ADAS features.

How can automotive OEMs and suppliers reduce financial risk while at the same time being pressured to go to market faster? Historically, OEMs and suppliers have been prolific in collaborating with vendors and partners to drive innovation. Similarly, this approach needs to be duplicated for the era of software-defined vehicles. Rather than developing complete in-house solutions that require massive R&D efforts and financial investments, increase risk and are time-consuming, OEMs and automotive suppliers should partner with companies with niche expertise in the sub-systems of ADAS, such as sensor fusion and perception providers and ADAS/AD decision-making providers. From a sensor fusion and perception sub-domain perspective, the following section describes **the key factors OEMs and automotive suppliers should consider when choosing a partner.**

Performance: When evaluating a sensor fusion and perception solution, determine the following.

- Does it show false positives and negatives? How many?
- What is the object detection range?
- How does it perform in adverse driving conditions such as fog, rain, snow and night time?
- How does it perform if a sensor is rendered inoperable?
- How well does the system classify and track objects?
- How does it handle unclassified objects?
- What is the sensor architecture used to demonstrate performance?
- How does it handle occluded objects?
- Are detections stable?

Cost: The costs associated with a sensor fusion and perception solution are not limited to the solution itself but also extend to other hardware, such as the sensor architecture required to deliver a level of performance and the necessary processing power to run the solution. Using lower-spec sensors and processors without compromising performance can result in a significant profitability boost to major OEMs and Tier 1s that install millions of cameras and radars on new vehicles.

Scalability: A key question to ask your sensor fusion and perception provider is if the solution is scalable. The ADAS space is continuously evolving, and choosing a solution that caters to one or two specific levels of autonomous driving (AD) is the wrong choice. Instead, the sensor fusion and perception must be able to scale from low to high levels of AD, such as from L2 to L5. A scalable solution reduces both rework efforts, R&D costs and time-to-market.

Flexibility: OEMs and automotive suppliers must also evaluate the solution's flexibility in terms of its ability to work with different sensor architectures. Car manufacturers produce vehicles for the global market, and local customer demands differ significantly. As a result, car manufacturers will reap great rewards and increased efficiency by leveraging a flexible solution to meet these needs and can handle various camera, radar and LiDAR sensor architectures to enable various ADAS features on a common software platform. While Asia might be a better fit for adaptive cruise control and blind spot detection (ADAS features that leverage camera-radar combination), North American and European car owners might demand highway pilot features in their new vehicle. This could add LiDAR to the vehicle's sensor architecture. Software that is able to provide this flexibility, from Asia to the Americas, is a key competitive advantage.

Mitigating Risks: Why Maturity and Work Processes Matter in Partner Selection

Finally, consideration must also be given to the company profile, such as geographical presence, industry recognition and quality certifications when evaluating vendors. Selecting a vendor that meets ISO standards in its operations indicates the vendor's ability to develop and adhere to work processes, practices and collaboration capabilities. These indicators are critical to successful long-term partnerships with vendors. Additional consideration must be given to awards and industry recognition. Has the firm received recognition for its solution from industry associations? Does the company have a regional or local presence? The geographical proximity of both parties fosters collaboration and a stronger understanding of local norms, cultures and work practices, enabling better project execution and faster delivery.

Summary

Developing ADAS and AD solutions is a highly complex task. LeddarTech emphasizes the importance of collaboration and partnering with niche expertise providers in specific ADAS sub-domains to address the challenges in developing ADAS solutions. This approach helps ADAS developers reduce financial risk, accelerate time-to-market and enhance profitability, and grants access to new technologies, techniques and knowledge. Factors such as performance, cost, scalability and flexibility must be considered when selecting a partner for sensor fusion and perception solutions. LeddarTech's LVF-E, LVF-H and LVS-2$^+$ products, built on LeddarVision's low-level sensor fusion and perception technology, are a family of front-view and surround-view comprehensive software stacks targeting entry to premium ADAS applications. Learn more about how LeddarTech enables high-performance and cost-effective ADAS by reviewing the Product Briefs.

LVF-E Product Brief   LVF-H Product Brief   LVS-2$^+$ Product Brief

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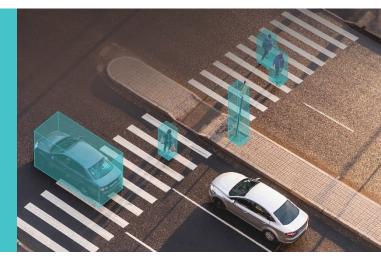
About LeddarTech
A global software company founded in 2007 and headquartered in Quebec City with additional R&D centers in Montreal, Toronto and Tel Aviv, Israel, LeddarTech develops and provides comprehensive AI-based low-level sensor fusion and perception software solutions that enable the deployment of ADAS, autonomous driving (AD) and parking applications. LeddarTech's automotive-grade software applies advanced AI and computer vision algorithms to generate accurate 3D models of the environment to achieve better decision making and safer navigation. This high-performance, scalable, cost-effective technology is available to OEMs and Tier 1-2 suppliers to efficiently implement automotive and off-road vehicle ADAS solutions. LeddarTech is responsible for several remote-sensing innovations, with over 150 patent applications (80 granted) that enhance ADAS, AD and parking capabilities. Better sensory awareness of the environment around the vehicle is critical in making global mobility safer, more efficient, sustainable and affordable: this is what drives LeddarTech to seek to become the most widely adopted sensor fusion and perception software solution.
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