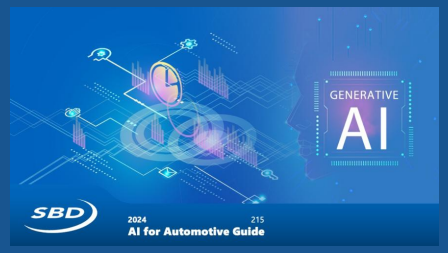

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Connected Services Guide – 526

The opportunities to benefit from connectivity are rising, but so are the risks associated with implementing the wrong strategy or falling behind competitors. It's therefore important to ensure that you always have the latest, most comprehensive, and most accurate information at hand. These reports are the reference guide to OEM connected car services offerings.

OUT LOOK

Outlook

#215

AI for Automotive Guide

Generative AI is already making significant inroads into applications spanning a broad range of use cases across consumer electronics, advertising, and many digital industries. While its initial use cases in automotive span product development, image classification, path planning, in-car personalization, and more, the technology's true impact is more likely to extend beyond applications and reach a functional level. With the rapid growth of generative AI to date, and its strong potential within automotive, it is critical for OEMs, suppliers, and start-ups to identify and forecast its impact on the automotive value chain.

This report takes a deep dive into the current and future automotive use cases for generative AI while mapping out how it will impact the industry at large. Here, it understands the functional application levels where it will deliver this impact in the next five years and highlights case studies on the technology in both upstream automotive applications and functional verticals. The report's scope extends further to account for generative AI's short, mid-, and long-term use cases in automotive while providing an extensive list of potential AI partners and identifying the different approaches being taken towards it by various players today.

COVERAGE

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PAGES

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Key questions answered

- What are relevant functional application levels where generative AI will have an impact in the next 5+ years?
- What are the main case studies within automotive and how do they vary across the industry landscape?
- What technology streams are likely to co-exist in the AI roadmap for automotive?
- What are the short, mid- and long-term use cases of generative AI in the automotive value chain?
- How will the product creation process be impacted by the use of generative AI?
- Who is likely to lead the race in the use of generative AI?

This research supports

- Product Planners
- USER EXPERIENCE
- IT
- Engineering
- Cyber

Do I have access?

100+
Reports published per year

50k+
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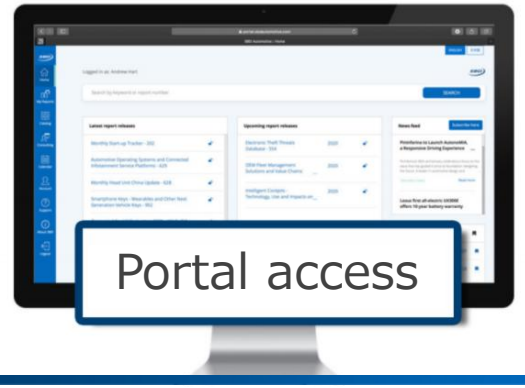
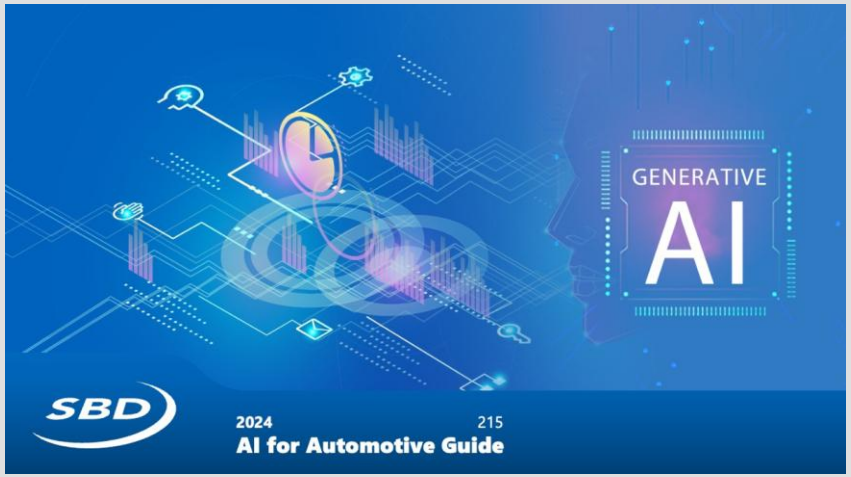
4,000+
# of auto professionals who access our reports





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215

AI for Automotive Guide

Contents

215 – AI for Automotive Guide

Total number of pages - 89

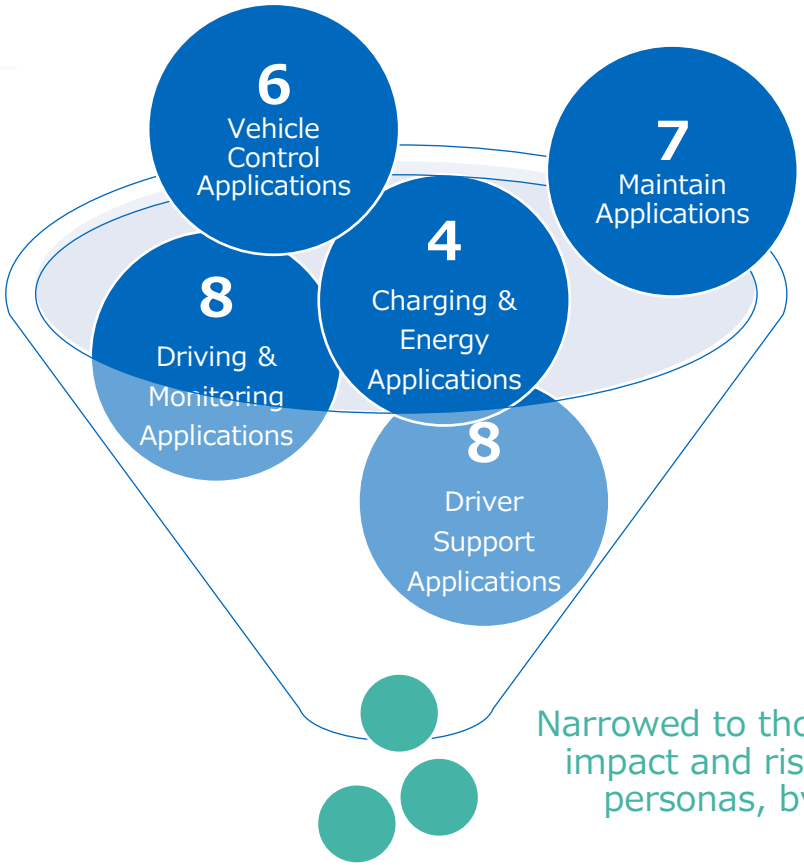
Introduction

Introduction

The automotive industry increasingly uses AI to enhance vehicle capabilities and user experience. Understanding and anticipating AI's impact on the automotive value chain is essential. AI adoption is not limited to the automotive industry; it's also growing in consumer tech, advertising, and digital industries. Initial applications for AI in automotive applications include product development, image classification, path planning, in-car personalization, and more. This impact will likely extend to a functional level, requiring identifying the key innovators driving change and how OEMs will need to adapt. This is crucial for software functions, corporate strategy, marketing, M&A, and partnership identification divisions.

This report provides insights into the application of AI and highlights its potential impact. It identifies the key AI applications and the trends that drive them, envisions the future of these applications, and outlines the challenges the value chain may face in implementation. Additionally, the report includes a list of potential partners and discusses the various approaches industry players are currently taking toward the technology.

This report looks at **Six key OEM Desired AI Commercial outcomes** of AI for Automotive:



Evaluated 33 applications of AI by OEMs or suppliers

Narrowed to those AI applications that deliver OEM and supplier **desired outcomes** by considering **Why?**

Narrowed to those matching the desired impact and risk appetite for five OEM personas, by considering **What?**

Identifying the necessary **Technical and Operational Enablers** by considering **How?**

...and identifying AI and cloud vendors OEMs are **partnering** with

June 2025 edition will provide deeper analysis into partners, to aid you in identifying who to partner with to best deliver your desired AI commercial Outcomes

Example slides from the report

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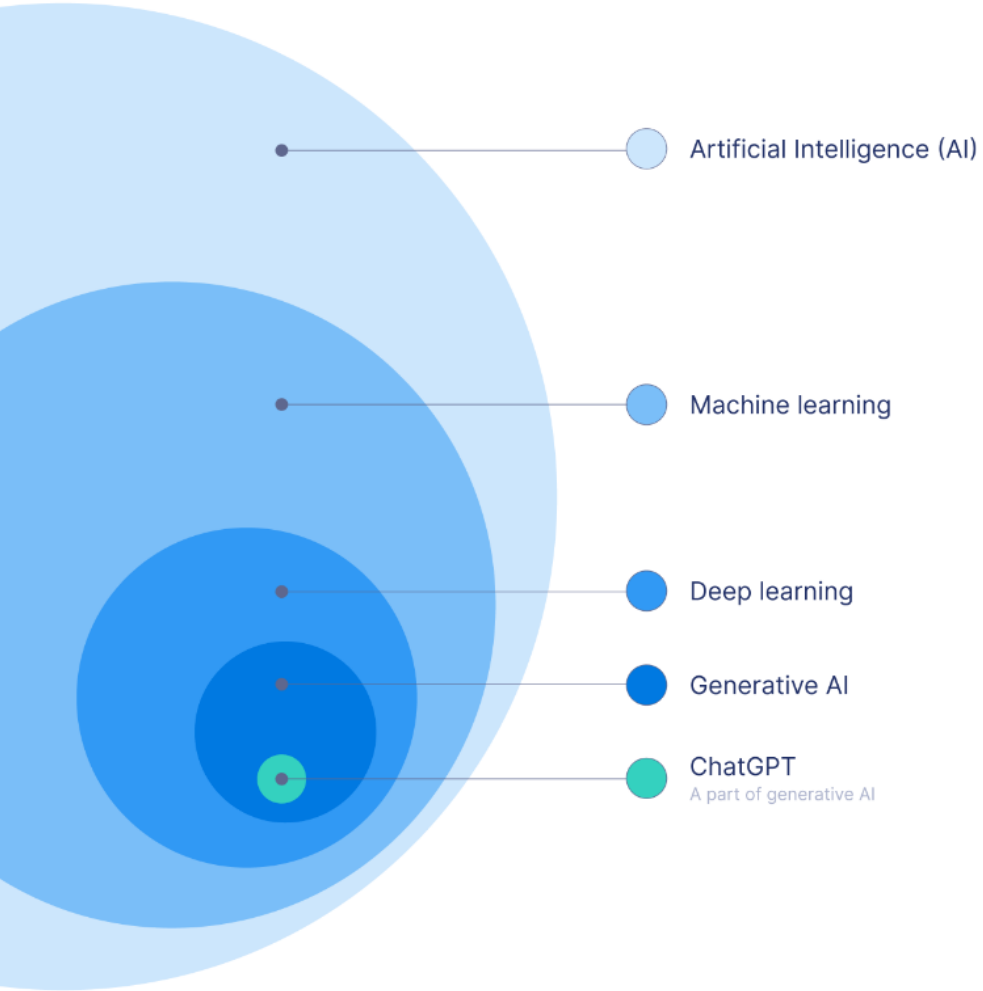
Artificial Intelligence: What you need to know



Artificial Intelligence (AI): The broadest category, encompasses a wide range of computer systems designed to execute tasks that usually require human intelligence. This field includes capabilities such as reasoning, learning, and adapting that enable these systems to enhance their performance and solve problems more effectively.

Data Analytics (Non-AI): Data analytics is a process that examines datasets to extract meaningful conclusions about the information they contain. This is achieved through advanced techniques derived from statistics and information systems, without relying on AI algorithms.

Traditional Machine Learning: Traditional Machine Learning refers to algorithms that enable computers to learn from data and make predictions or decisions without being explicitly programmed for specific tasks. Similar to this is **Reinforcement Learning**, a type of machine learning where an agent learns to make decisions by taking actions in an environment to maximize cumulative rewards. This approach involves the agent acquiring optimal behaviors through trial and error.

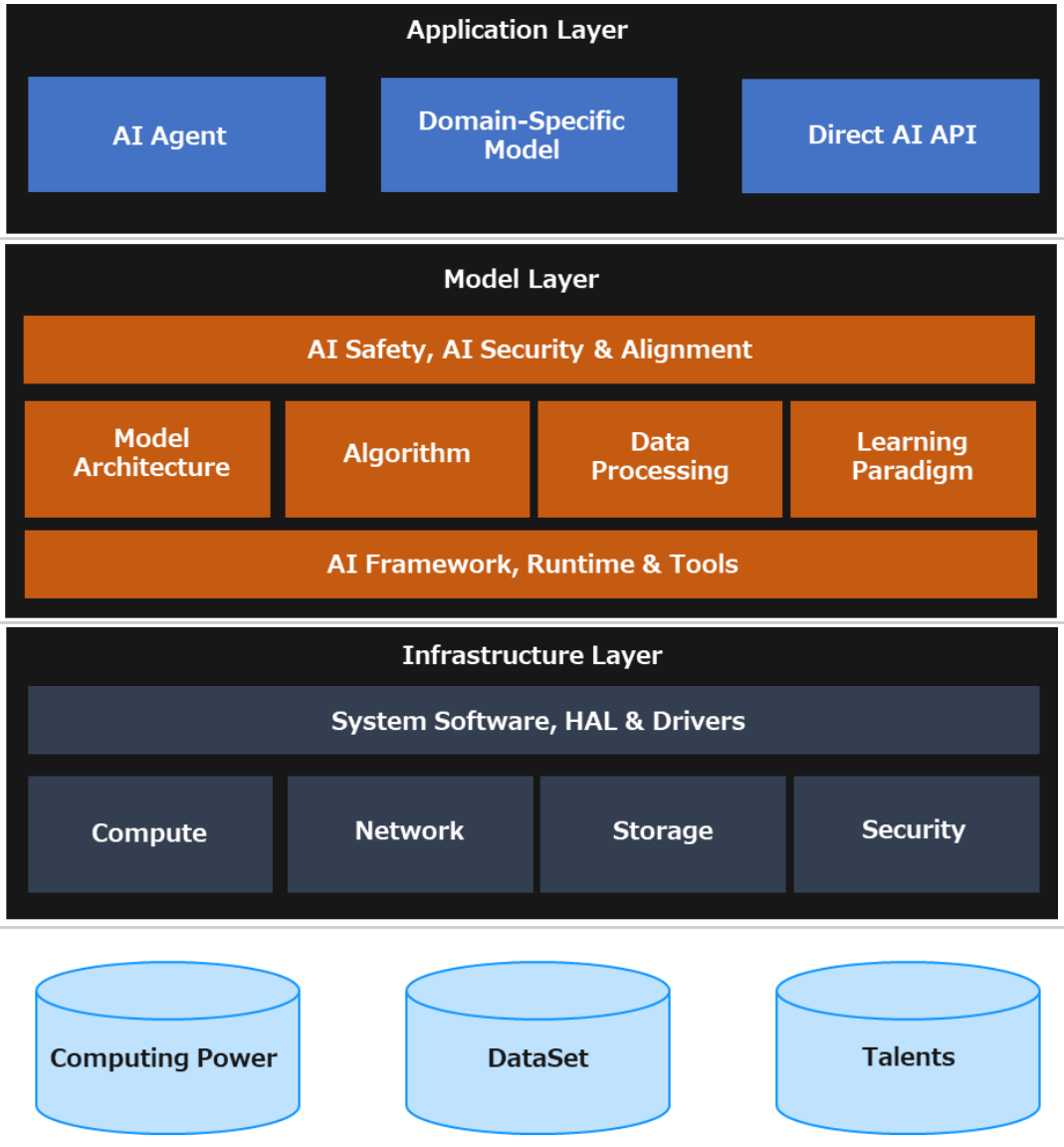
Deep Learning: A further subset of machine learning involving neural networks with multiple layers that learn from vast amounts of data. It is particularly effective at processing unstructured data, including images, audio, and text.

Generative AI: Generative AI refers to models that can create new content similar to the training data. These models learn the data's underlying distribution and can produce original outputs. There is a more advanced model architecture called a **World model** that combines deep learning, generative AI, and machine learning. These AI systems can create an internal representation of their external environment. They can also simulate and predict future states, which can greatly support planning and decision-making.

ChatGPT: An example of generative AI that specializes in generating human-like text based on the input it receives. It's part of the generative AI circle, showcasing its specialized focus within the broader AI landscape.

Some Technology examples are presented in the following slide

AI tech stack requires three distinct technology layers



Application Layer	This layer consists of end-user applications and services utilizing AI. It directly interfaces with users, delivering specialized or generalized AI-driven functionalities through autonomous agents, domain-specific models, and APIs.
Model Layer	This is the core layer for AI systems. It encompasses the core frameworks and methodologies that guide the creation and operation of AI models, focusing on safety, alignment, architecture, algorithms, data handling, and learning approaches. For the latest generative AI systems or other large models, this layer represents the Foundation Model Layer.
Infrastructure Layer	This foundational layer provides the essential hardware and software resources necessary for AI operation, including computational power, networking, data storage, and security measures.
Supporting Pillars	These are the foundational elements underpinning the AI stack. They include different AI computing resources (Computing Power), the vast data that fuels AI learning (Dataset), and the skilled workforce (Talents) responsible for advancing AI technology.

Established Vehicle Innovators

1

This slide summarizes the 'Established Vehicle Innovators' Persona. **Two examples of the OEMs that may align with the activities of this Persona are:**

2

Technology considerations that this Persona may apply…

I prefer technology that has clear user-facing and in-vehicle applications, for example virtual assistants and maintenance solutions. Recently looking to expand to further applications and domains.

3

Business considerations that this Persona may apply…

I generally operate in the more expensive segments. I believe that my customers purchase my vehicles because they are seeking a certain experience, and my products are among the best for providing them with that experience.

4

What?

Established vehicle innovators are focused on delivering the consumer experience that they are known for - mainly focused on convenience application offering novel features. While these applications can be complex, they can be integrated through existing supplier solutions.

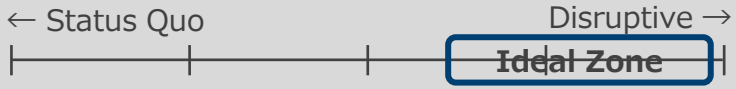
1. Smart battery management
2. ADAS visualization and augmented reality
3. Virtual customer service agent

5

How?

LLMs and generative AI are being used for entering queries to educate the user on the vehicle, and to address other ownership-related questions. Machine learning is similarly being used for augmented reality solutions to educate the user on vehicle functions.

Technology innovation level



Technology status

6

Who?

Currently, OEMs that SBD perceive to reflect this Persona behave in a similar manner to the 'high volume all rounders' Persona when choosing partners. Here, they have a multi-partner strategy while established vehicle innovators may have a low partner redundancy (where each partner supports distinct applications).

Current examples of AI Vendors used

cerence · Baidu 百度 · BOSCH

Current examples of Cloud (compute) Vendors used:

aws · Microsoft

Bosch offers a virtual customer service agent. Oracle is the AI vendor.

AI enables dynamic monitoring of Battery performance

Introduction

In battery management, AI has transformed the development of intelligent systems that learn from data and make informed decisions. These technologies utilize large amounts of data, often collected in real-time, and apply computational algorithms to extract valuable insights. By leveraging advanced techniques and robust decision-making processes, AI significantly enhances the performance and capabilities of battery management systems. Overall, this is a development application and is expected to improve efficiency.

Details

AI Technology

Data Analytics	Traditional Machine Learning	Deep Learning
Reinforcement Learning	Generative AI	World Models

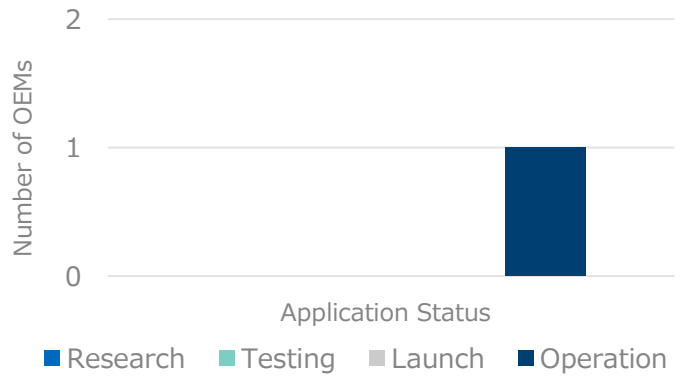
Application to Software Defined Vehicles

Low SDV application. Nice feature to have	Supports Features-as-a-Service	Virtual simulations of features and components
Provides data for developing software updates	Enables use of centralized E/E platform	Automated and digitized process

Enabler

Introduce Additional in-vehicle memory storage	Ensure Additional processing power across multiple domains	Put in place data security safeguards
Establish data partnership with cloud provider	Create OEM database to use for AI model training	Integrate with third party services, like charge providers

Status



Startup to consider

STELLANTIS Ventures

ELECTRA

AI EV Data Analysis

Electra is part of the Stellantis Ventures incubator. Electra is a software company developing platforms for battery analytics and fleet telematics. The battery management software uses a digital twin.

What's New?

TESLA

Tesla's AI-powered Battery management system predicts the car's energy needs based on driving conditions and driver behavior. It gathers data from various sensors to optimize range, even adjusting climate control or limiting acceleration for better efficiency. **(Link)**

Related SBD Products

Battery Management System

Insights

BMS and diagnostic tools advancement enable better assessment and utilization of second-life batteries.

For more information on EV Battery Technologies & Ecosystem, click here to read more- Link

Significant trend with major players like Audi and Chinese OEMs taking the lead

Introduction

AI in personal assistants is transforming how drivers interact with their cars. These advanced features enable drivers to effortlessly navigate to their desired locations, adjust the car's temperature, and receive personalized music recommendations. By providing a hands-free experience, these capabilities allow drivers to maintain their focus on the road. This service application not only enhances consumer experience but also promotes brand loyalty.

Details

AI Technology

Data Analytics	Traditional Machine Learning	Deep Learning
Reinforcement Learning	Generative AI	World Models

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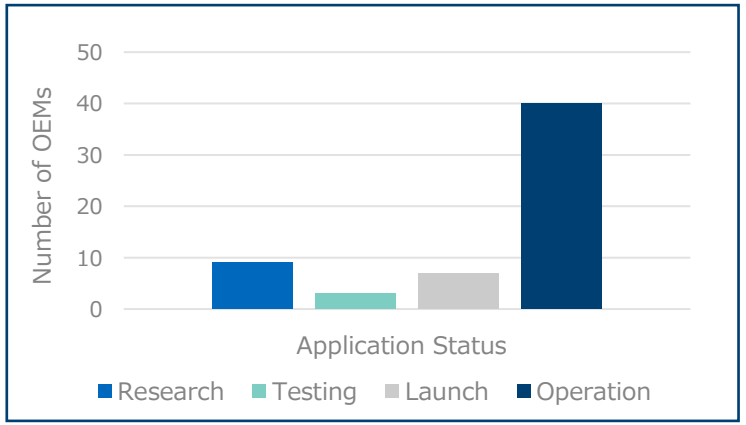
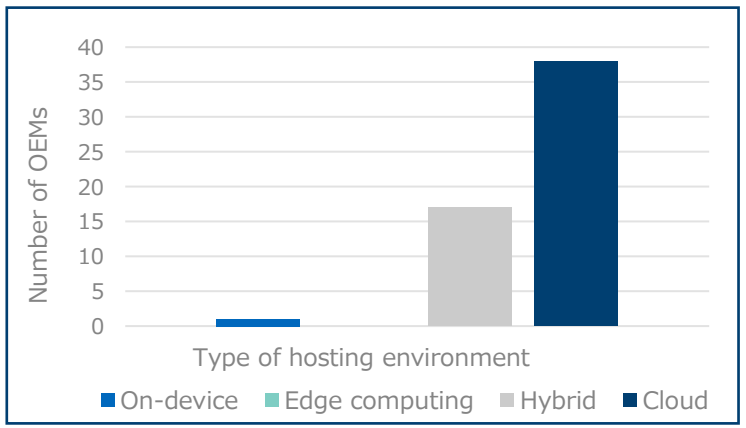


Hosting Environment



What's New?

NIO

NIO's AI-based voice assistant, NOMI, offers features such as personalization, in-car control functions, and access to entertainment. It's goal is to create an engaging environment inside the vehicle. **(Link)**

GM is collaborating with Google Cloud for their OnStar Voice Personal Assistant. This AI-based enhancement will improve various functions such as navigation and safety, ultimately connecting the driver to the vehicle and allowing for seamless access to information. **(Link)**

Audi has introduced an innovative creation: a human-like virtual assistant named AI.Leene for the Audi Q6 e-tron. This technology, developed in collaboration with DDB and The Clueless Agency, aims to "give technology a face and a soul." It demonstrates how innovation can bridge gaps and foster a deeper connection with artificial intelligence in a more human way. **(Link)**

Overview of various applications of AI

AI- Powered Vehicle Maintenance

Automotive Health Check/Scan

Data requirements

Images, diagnostic codes, and sensor data

OEM Benefit

Enhanced service efficiency and customer satisfaction

User Benefit

Quick and accurate problem detection ranging from engine problems to brake wear and electrical faults.

Automotive Damage Assessment

Data requirements

GPS, dashcam, fault diagnostics

OEM Benefit

Improved interaction with companion app

User Benefit

Instant solutions for damage

Automotive/ Intelligent diagnostics tool

Data requirements

Diagnostic codes, audio data, image data

OEM Benefit

Reduce the chance of misdiagnosis, improve diagnostic efficiency and maintenance processes

User Benefit

Reduce waiting time for maintenance along with repair time and costs.

Automotive Insurance Offerings

Data requirements

GPS, dashcam, fault diagnostics

OEM Benefit

Reduced cost by using a prediction system that helps prevent faults

User Benefit

Enables users to claim insurance more efficiently by minimizing both time and costs

Virtual Customer Service Agent

Data requirements

Audio data, contextual data

OEM Benefit

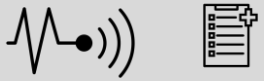
Provide consistent responses, continuous learning

User Benefit

Enhance service efficiency and offer customized recommendations and suggestions for any inquiries.

Predictive Maintenance

Data requirements



Sensor data, diagnostic codes, and vehicle operational data

OEM Benefit

Lower warranty costs and improved customer satisfaction.

User Benefit

Enhanced vehicle reliability and reduced unexpected breakdowns.

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