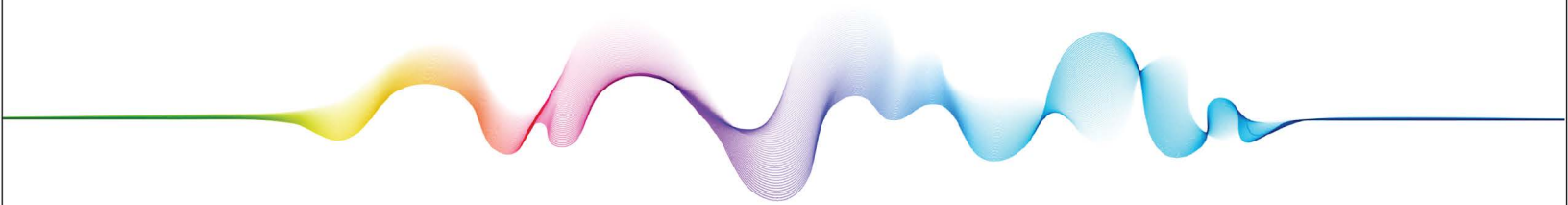


I N S I G H T R E P O R T

AN OVERVIEW OF AI  
FOR AUTONOMOUS  
VEHICLES  
COMMERCIAL  
MARKET



A R T I F I C I A L  
I N T E L L I G E N C E



# TAG Insights Report: An Overview of AI for Autonomous Vehicles Commercial Market

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## Introduction

This TAG Insights Report on *Artificial Intelligence (AI) for Autonomous Vehicles* is intended to help companies, managers, practitioners, researchers, investors, and commercial vendors better understand current trends, issues, and market opportunities in this area. A list of representative commercial vendors working in various areas of AI for autonomous vehicles is included. The five specific areas covered in this report include:

1. Intelligent Fleet Management
2. Smart Manufacturing and Design
3. AI-Assisted Mobility Services
4. AI-Based Delivery Services
5. Next-Generation Ride Sharing

This report is intended for general and unrestricted use, but interested readers are encouraged to connect with the TAG research and advisory team for more information on the private [TAG Research as a Service \(RaaS\)](#) community that covers, discusses, and shares information on these topics in more depth and includes a wider range of startups, vendors, and companies.

## TAG Taxonomy for AI

Our advisory work at TAG is guided by our TAG AI Taxonomy which includes twenty different market categories, with one hundred associated subcategories – all developed consistent with our research into emerging and existing commercial offerings. Subscribers to TAG Research as a

Service (RaaS) have access to the more detailed specifics of the taxonomy and the full set of companies working in each area.

The taxonomy is intended to be interpreted as a market guide for commercial (and in some cases, open source) platform, tools, products, and services. The day-to-day tasks of any practitioners focused on AI will include many considerations such as dealing with regulators, addressing compliance issues, and keeping up with legislation that will not typically be represented in our taxonomy. We focus here on products and services.

TAG Artificial Intelligence (AI) Taxonomy V0.0

<b>1 Agriculture and Farming</b> 1.1 Precision Agriculture 1.2 Intelligent Predictive Maintenance 1.3 Advanced Yield Management 1.4 AI-Based Disease and Pest Control 1.5 Intelligent Livestock Monitoring	<b>6 Conversational AI</b> 6.1 AI Chat Interfaces 6.2 AI Bots 6.3 Intelligent Text Analysis 6.4 Virtual Assistants 6.5 AI-Based Search	<b>11 Entertainment</b> 11.1 AI-Based Sports Analysis 11.2 AI Support for On-Line Dating 11.3 AI-Generated Multimedia Content 11.4 AI-Based On-Line Gaming 11.5 AI Support for Gambling	<b>16 Manufacturing</b> 16.1 AI-Based Predictive Maintenance 16.2 Advanced 3D Printing 16.3 Smart Robotic Assembly 16.4 AI-Based Factory Operations 16.5 AI-Assisted Product Design
<b>2 Autonomous Vehicles</b> 2.1 Intelligent Fleet Management 2.2 Smart Manufacturing and Design 2.3 AI-Assisted Mobility Services 2.4 AI-Based Delivery Services 2.5 Next Generation Ride Sharing	<b>7 Core Technology</b> 7.1 AI and Machine Learning Algorithms 7.2 Natural Language Processing 7.3 AI Software Platforms and Tools 7.4 Intelligent Computing Devices 7.5 Smart AR/VR Devices	<b>12 Finance</b> 12.1 Intelligent Fintech 12.2 AI-Based Insurance Business 12.3 Smart Investment Support 12.4 AI-Assisted Loan Reviews 12.5 AI-Based Credit Process	<b>17 Marketing and Sales</b> 17.1 AI-Assisted Advertising 17.2 Intelligent Support for Sales 17.3 AI-Based Marketing 17.4 Smart Social Media Marketing 17.5 Advanced Predictive Modeling
<b>3 Biotechnology</b> 3.1 AI-Assisted Drug Discovery 3.2 Personalized Medicine 3.3 Intelligent Medical Diagnostics 3.4 AI-Based Health Analytics 3.5 Intelligent Clinical Trial Support	<b>8 Customer Service</b> 8.1 Smart Help Desk 8.2 AI-Based Product Support 8.3 AI-Assisted Customer Success 8.4 Personalized Customer Support 8.5 Smart Customer Crowd Management	<b>13 Human Resources</b> 13.1 Intelligent Career Support 13.2 AI-Based Personal Coaching 13.3 AI-Based Performance Reviews 13.4 Smart Recruiting and Workforce 13.5 AI-Based Compensation Management	<b>18 Military and Security</b> 18.1 Advanced Surveillance 18.2 AI for Cybersecurity 18.3 AI-Based Law Enforcement 18.4 AI Support for Warfighter 18.5 AI-Based Weapons and Deep Fakes
<b>4 Business Operations</b> 4.1 Smart Supply Chain Optimization 4.2 Intelligent Inventory Optimization 4.3 AI-Based Demand Forecasting 4.4 Intelligent Quality Control 4.5 Smart Contracts	<b>9 Data Analysis</b> 9.1 AI-Based Predictive Modeling 9.2 AI-Based Business Intelligence 9.3 AI-Based Data Normalization 9.4 Intelligent Big Data Analytics 9.5 Smart Simulated Data Generation	<b>14 Information Technology</b> 14.1 AI-Based IT Support 14.2 AI-Based IT Design 14.3 Advanced AI-Based Search 14.4 AI-Powered Apps 14.5 AI-Generated Websites	<b>19 Software Process</b> 19.1 AI-Based Coding Support 19.2 Smart Software Lifecycle Support 19.3 AI-Based Software Quality 19.4 AI-Based Test Case Generation 19.5 Intelligent Software Test and Analysis
<b>5 Commerce</b> 5.1 AI Support for Retail 5.2 AI Support for Warehousing 5.3 Intelligent Product Exchanges 5.4 Smart Auctions 5.5 AI-Based Professional Services	<b>10 Education</b> 10.1 AI-Based Remote Learning 10.2 AI-Based Remote Teaching 10.3 Smart Tailored Education 10.4 Smart Learning Management 10.5 AI-Based Standardized Testing	<b>15 Machines</b> 15.1 Next Generation Robots 15.2 Computer Vision 15.3 Computer Speech 15.4 Autonomous Internet of Things 15.5 Agricultural Robots	<b>20 Transportation</b> 20.1 AI-Based Transportation Logistics 20.2 Personalized Transportation 20.3 Smart Mapping Tools 20.4 AI-Based Flight Operations 20.5 AI-Based Rail Operations

Figure 1. TAG AI Taxonomy

### Overview of AI for Autonomous Vehicles

The following emerging global commercial opportunities involving AI for autonomous vehicles are covered in this report, including the listing of several viable commercial entities providing solutions on the market today:

- AI optimizes fleet management by using real-time data analytics for route planning, predictive maintenance, and fuel consumption reduction, thereby increasing efficiency, and reducing operational costs.
- AI accelerates the design process of autonomous vehicles through generative design algorithms that can propose optimized structures and materials, and it ensures quality control on the manufacturing floor through machine learning-enabled robotics and inspection systems.

- AI enhances mobility services by personalizing user experiences through learning individual preferences, improving safety with dynamic response systems, and streamlining traffic flow with adaptive control systems.
- AI revolutionizes delivery services by employing autonomous drones and vehicles that can navigate to the doorstep, plan optimal delivery routes, and update schedules in real-time based on traffic and customer availability.
- AI transforms ridesharing by matching passengers with suitable rides in real-time, optimizing pickup and drop-off points, and integrating with urban transport systems to reduce wait times and improve convenience.

### Focus Area: Intelligent Fleet Management

AI-powered fleet management opens numerous business prospects for both established vendors and startups across various domains. One avenue is optimizing operations by using AI for route planning, vehicle maintenance scheduling, and fuel consumption reduction. These improvements lead to cost savings and greater efficiency.

Predictive maintenance is another area of interest. AI systems that forecast maintenance needs help fleets minimize downtime and lower maintenance costs. Enhancing safety through AI, which monitors driver behavior and provides real-time feedback, reduces accidents and insurance expenses. Telematics and tracking, utilizing AI for real-time vehicle monitoring and driver performance assessment, contribute to improved security and efficiency. Sustainability concerns drive the demand for AI-optimized routing to reduce emissions, aligning with the green fleet management trend.

Data analytics is essential, with AI platforms converting fleet data into actionable insights for better decision-making. Integration services facilitate the seamless adoption of AI into existing fleet management systems. The rise of autonomous vehicles offers opportunities for managing and optimizing autonomous fleets. Customization caters to specific industry needs, such as logistics and transportation. AI transforms fleet management, offering practical solutions aligned with evolving fleet operator requirements.

### Focus Area: Smart Manufacturing and Design

Exploring AI for smart manufacturing and the design of autonomous vehicles reveals business opportunities for both established vendors and nimble startups. One avenue lies in optimizing manufacturing processes through AI-driven automation. This technology streamlines production, reduces waste, and enhances quality control, leading to cost savings and improved efficiency.

AI can also play a pivotal role in the design phase of autonomous vehicles, aiding in simulation, prototyping, and optimization. Vendors and startups can develop AI-powered tools that enable engineers to create more efficient and safer autonomous vehicles, potentially revolutionizing the automotive industry. Furthermore, AI can improve supply chain management by predicting demand, optimizing inventory, and reducing lead times.

Companies that offer AI-based solutions in this area can help manufacturers reduce costs and improve their overall competitiveness. Cybersecurity is another vital area, where AI can be used to protect autonomous vehicles from cyber threats, opening up opportunities for cybersecurity-focused startups. AI-driven smart manufacturing and autonomous vehicle design present a broad canvas for innovation, cost reduction, and improved performance, with vendors and startups at the forefront poised for significant growth.

### Focus Area: AI-Assisted Mobility Services

The business of AI-assisted mobility services using autonomous vehicles represents a transformative shift in the transportation industry. Autonomous vehicles, powered by advanced artificial intelligence algorithms, are poised to revolutionize the way people move from one place to another. This burgeoning industry offers a plethora of opportunities and challenges for entrepreneurs, tech giants, and traditional automakers alike.

First and foremost, the adoption of autonomous vehicles promises to improve road safety by reducing human error, which is a major cause of accidents. This safety enhancement alone presents a compelling business case, as insurance costs could decrease significantly, and lives could be saved. Furthermore, AI-assisted mobility services offer the potential for increased efficiency and reduced congestion on our roadways. This means shorter commute times and less environmental impact, factors that are appealing to both individuals and governments focused on sustainability.

However, challenges like regulatory hurdles, cybersecurity concerns, and the high cost of developing autonomous technology must be addressed. Nevertheless, the business of AI-assisted mobility services using autonomous vehicles is on the cusp of transformation, and those who can navigate the complexities stand to reap substantial rewards in the form of safer, more efficient, and sustainable transportation solutions.

### Focus Area: AI-Based Delivery Services

AI-assisted delivery services using autonomous vehicles is rapidly gaining traction as technology continues to evolve. These services are poised to disrupt the traditional delivery industry, offering efficiency, cost savings, and convenience to businesses and consumers alike. As one would expect, drones will be a major future factor in the development of AI-based delivery services.

One of the most significant advantages is increased delivery speed and accuracy. Autonomous vehicles equipped with AI algorithms can navigate traffic, avoid obstacles, and optimize routes, ensuring timely and precise deliveries. This efficiency can translate into lower operational costs for businesses, reduced delivery fees for customers, and potentially even 24/7 delivery options. Moreover, AI-assisted delivery services can enhance safety by minimizing human error and decreasing the risk of accidents. This can lead to reduced insurance premiums and liability concerns for companies.

However, there are still challenges to overcome, including regulatory hurdles, public acceptance, and cybersecurity concerns. Companies in this space must also invest heavily in research, development, and infrastructure. AI-assisted delivery services using autonomous vehicles represent a promising frontier in the business world, offering the potential for improved efficiency, safety, and customer satisfaction. As technology continues to advance, this industry is poised for substantial growth and innovation.

### Focus Area: Next Generation Ridesharing

AI-assisted next-generation ridesharing using autonomous vehicles is driving transportation innovation, poised to redefine the way people move within cities. This emerging industry combines artificial intelligence, autonomous vehicle technology, and ride-hailing services to create a more efficient, convenient, and sustainable urban transportation ecosystem.

AI-powered autonomous vehicles offer several advantages for ridesharing businesses. They can provide 24/7 availability, reduce operating costs by eliminating driver wages, and optimize routes to minimize travel times and congestion. This translates into competitive pricing for passengers and increased profitability for companies. Additionally, AI-assisted ridesharing promises enhanced safety through advanced sensors and real-time monitoring, reducing the risk of accidents and improving public perception of autonomous vehicles.

However, challenges such as regulatory compliance, public acceptance, and the high initial investment in autonomous technology must be addressed. Successful businesses in this field will need to collaborate with local authorities and continuously innovate to stay ahead in a rapidly evolving market. AI-assisted next-generation ridesharing using autonomous vehicles represents a promising business opportunity with the potential to revolutionize urban transportation, offering benefits for both companies and passengers while addressing environmental and congestion challenges in cities.

### Companies and Contributions

The companies listed below emerged as part of our research at TAG. Our goal in listing these fine firms is to provide a starting point for buyers, advocates, stakeholders, and researchers trying to make sense of the commercial landscape for artificial intelligence as a means for driving toward improved methods for autonomous vehicles.

### Intelligent Fleet Management Vendors

1. [AEye](#): AEye develops advanced perception systems for autonomous vehicles, which can be integrated into fleet management solutions for enhanced safety.
2. [Aidrivers](#): Aidrivers provides autonomous vehicle solutions for industries such as mining and agriculture, including fleet management capabilities.
3. [Aptiv](#): Aptiv provides advanced technology for autonomous driving, including software and hardware solutions for fleet management.



4. [AssetWORKS](#): AssetWORKS FleetFocus can provide autonomous vehicle fleet managers with better control over diagnostics, fuel consumption, maintenance and more.
5. [Aurora](#): Aurora is a startup working on autonomous vehicle technology and offers a platform for autonomous vehicle fleet management and ridesharing.
6. [CYNGN](#): Cyngn Insight is a comprehensive platform to manage, monitor, and command your self driving vehicles.
7. [DDS Wireless](#): DDS Wireless provides SaaS AI routing tools for paratransit, taxi, and school transport.
8. [LogisFleet](#): Manage, track, and setup up compliance rules and checks with LogosFleet's vehicle management software.
9. [Oxa](#): (AKA Oxbotica) A UK-based startup, Oxa, specializes in autonomous vehicle software and is involved in various autonomous fleet projects.
10. [Robomart](#): Robomart is a startup that focuses on autonomous grocery delivery using self-driving vehicles with an integrated fleet management system.

### Smart Manufacturing and Design Vendors

1. [Ansys](#): Ansys provides engineering simulation software that can be used for virtual testing and validation of autonomous vehicle systems.
2. [Aras](#): Aras specializes in Product Lifecycle Management (PLM) software, which can be applied to manage the development and manufacturing processes of autonomous vehicles.
3. [Autodesk](#): Autodesk offers software tools for computer-aided design (CAD) and engineering, which can be used in autonomous vehicle development.
4. [Canoo](#): Canoo is known for its electric, autonomous vehicle platform, which can be customized for various transportation needs.
5. [Clearpath Robotics](#): Clearpath Robotics offers autonomous mobile robots and simulation tools for research and development in autonomous systems, including manufacturing applications.
6. [Cognata](#): Cognata provides a simulation platform for autonomous vehicle development, which can be used for design and testing.
7. [CYNGN](#): Cyngn produces autonomous vehicles for managing warehouse operations.
8. [Dassault Systèmes](#): Dassault Systèmes provides 3D design and engineering software, including solutions tailored for autonomous vehicle design and simulation.
9. [Horizon Robotics](#): Horizon Robotics develops AI chips and software for autonomous vehicles and smart manufacturing applications.
10. [Luminar Technologies](#): Luminar specializes in lidar sensors and perception software for autonomous vehicles, which can be applied to manufacturing quality control and design validation.
11. [Magna](#): Magna is an automotive supplier that acquired autonomous vehicle technology from Optimus Ride to advance its R&D.
12. [Motional](#): Motional formerly known as Aptiv Autonomous Mobility, combines expertise in autonomous vehicles with manufacturing and deployment capabilities.

13. [NVIDIA](#): NVIDIA's AI and GPU technologies are used in various aspects of autonomous vehicle design, from perception and simulation to training neural networks.
14. [Outrider](#): Outrider focuses on autonomous yard operations for logistics and manufacturing facilities, using AI to automate tasks such as moving trailers.
15. [Qualcomm](#): Qualcomm's Snapdragon Ride platform is designed to enable rapid development of future-proof automated driving solutions.
16. [ZF Group](#): ZF Group offers AI-powered manufacturing and testing solutions for automotive components, including those used in autonomous vehicles.
17. [Zoox](#): In addition to autonomous ride-hailing, Zoox is involved in the design and manufacturing of autonomous electric vehicles.

### AI-Assisted Mobility Services Vendors

1. [Airobotics](#): While not exclusively focused on autonomous vehicles, Airobotics develops autonomous drones that could play a role in future mobility services.
2. [Cognata](#): Cognata offers a simulation platform for testing autonomous vehicles, aiding in the development of AI-assisted mobility services.
3. [Cortica](#) – Self driving company that mimics the brain of a mammal, enabling vehicles to learn, identify scenarios before they happen, and react to dangerous situations.
4. [Einride](#) - Best known for their self-driving Einride Pod, Einride as a company is completely focused on freight hauling and trucking.
5. [Euler Motors](#) – Euler is an Indian electric vehicle technology startup that is focused on developing and manufacturing commercial electric vehicles.
6. [Ghost Autonomy](#) – Focuses on developing autonomous systems that can operate in harsh weather and low-light conditions.
7. [Luminar](#): Luminar produces LiDAR technology used in autonomous vehicles to enhance perception and safety.
8. [May Mobility](#): May Mobility offers autonomous shuttle services for urban mobility.
9. [Mobileye](#): Mobileye, an Intel company, develops driver-assistance systems (ADAS) and autonomous driving technology, aiming to provide mobility solutions with AI.
10. [Motional](#) (formerly Hyundai-Aptiv): Motional, a joint venture between Hyundai and Aptiv, focuses on autonomous technology for mobility applications.
11. [Nexar](#) – Nexar's dash cams are part of their master plan to build the world's first "safe driving network".
12. [Nissan](#): Nissan is actively working on autonomous driving technology as part of its Intelligent Mobility initiative.
13. [Nuro](#): Nuro specializes in autonomous delivery vehicles and is exploring the use of AI for autonomous last-mile delivery services.
14. [RoboSense](#): RoboSense develops LiDAR sensors and perception solutions that are crucial for autonomous vehicles' AI systems.
15. [WeRide](#): WeRide is a Chinese startup focused on autonomous driving technology for mobility services and has conducted autonomous taxi trials.
16. [ZF](#): ZF's platform is focused on autonomous driving technology and has collaborations with various partners for mobility services.



## AI-Based Delivery Services Vendors

1. [Amazon Prime Air](#): Amazon has been developing Prime Air, an autonomous drone delivery service, aiming to deliver packages to customers' doorsteps.
2. [BoxBot](#): BoxBot uses autonomous vehicles equipped with AI and computer vision for last-mile package delivery and offers an automated locker system.
3. [Caterpillar](#): Caterpillar acquired Marble, which builds autonomous ground delivery robots and collaborates with companies for various autonomous delivery applications.
4. [Fabric](#): Fabric (formerly CommonSense Robotics) focuses on micro-fulfillment centers and autonomous robots for automated order picking and delivery.
5. [Flytrex](#): Flytrex offers autonomous drone delivery services for food and goods, partnering with restaurants and retailers for deliveries.
6. [Kiwibot](#): Kiwibot operates a fleet of small delivery robots designed for last-mile delivery in urban environments. They use AI for navigation and obstacle avoidance.
7. [Nuro](#): Nuro specializes in autonomous delivery vehicles and is known for its compact, purpose-built autonomous delivery vehicles designed for last-mile delivery of goods.
8. [Postmates \(Now part of Uber Eats\)](#): Postmates was one of the pioneers in on-demand food and goods delivery. They were exploring autonomous delivery options before being acquired by Uber Eats.
9. [Refraction AI](#): Refraction AI's REV-1 is an autonomous delivery robot designed for both pedestrian walkways and roads, focusing on food delivery.
10. [Starship Technologies](#): Starship Technologies focuses on small, sidewalk delivery robots equipped with AI and sensors for local deliveries of food and other items.
11. [Swoop Aero](#): Swoop Aero provides autonomous drone delivery solutions for medical and healthcare supplies, particularly in remote and underserved areas.
12. [Udelv](#): Udelv builds autonomous delivery vehicles for various goods, including groceries and packages, and uses AI for route planning and navigation.
13. [Zipline](#): Zipline specializes in autonomous drone deliveries of medical supplies and operates in several countries, primarily in Africa and Asia.

## Next Generation Ridesharing Vendors

1. [Cruise](#): A subsidiary of General Motors, Cruise is developing autonomous vehicle technology for ride-sharing services.
2. [easy mile](#): EZFleet is the electronic brain driving your fleet of autonomous vehicles.
3. [Lyft](#): Lyft also had initiatives to develop autonomous vehicle technology for ride-sharing services. They partnered with various autonomous vehicle technology companies.
4. [Navya](#): Navya is known for its autonomous shuttle solutions, including autonomous ridesharing services in specific locations.
5. [Pony.ai](#): Pony.ai is a startup specializing in autonomous vehicle technology and has been testing self-driving vehicles for ride-sharing purposes.
6. [Uber ATG](#): Uber's Advanced Technologies Group (ATG) is focused on developing autonomous vehicle technology for ridesharing and delivery services.

7. [Waymo](#): Waymo, a subsidiary of Alphabet Inc. (Google's parent company), is one of the leaders in autonomous vehicle technology offering autonomous ride-hailing services.
8. [Zoox](#): Acquired by Amazon, Zoox is working on autonomous ride-hailing services and autonomous vehicle technology.

### About TAG

TAG is a trusted research and advisory company that provides insights and recommendations in cybersecurity, artificial intelligence, and climate science to thousands of commercial solution providers and Fortune 500 enterprises. Founded in 2016 and headquartered in New York City, TAG bucks the trend of pay-for-play research by offering unbiased and in-depth guidance, market analysis, project consulting, and personalized content—all from a practitioner perspective.

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