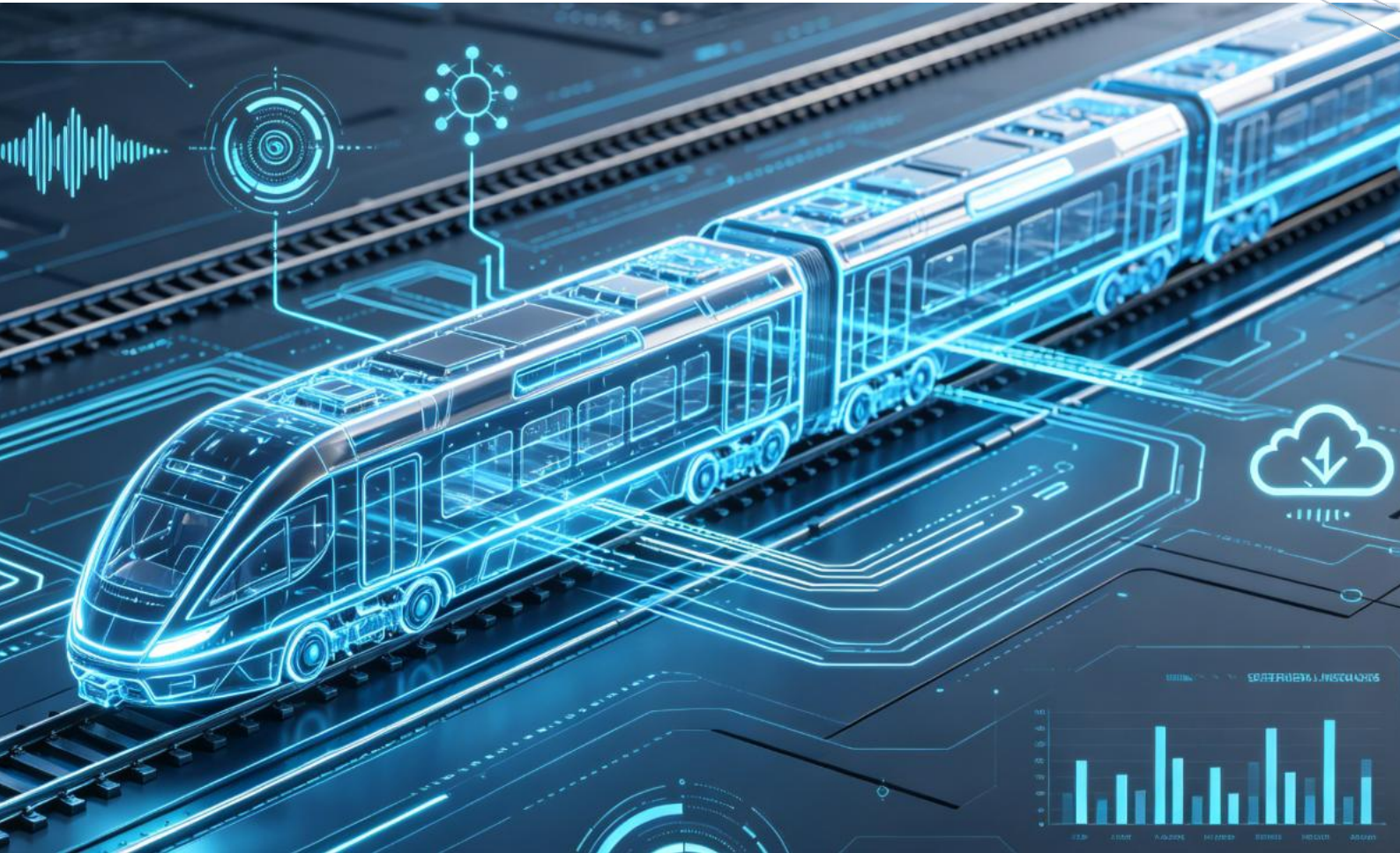


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China's Rail & Commercial Vehicle Intelligent Perception Industry Report

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Executive Summary

This report provides an overview of China's intelligent perception solutions for rail transit and commercial vehicles, outlining how these AI-driven multi-sensor systems address critical safety challenges including track obstacle detection and vehicle blind spots, and projecting that strong drivers such as heightened safety demands, technological advancements and favorable policies will drive robust market growth.

Table of Contents

1. Market Overview

1.1 Market Definition

1.2 Market Size and Growth

2. Key Growth Drivers

2.1 Key Drivers

2.2 Future Outlook

1. Market Overview

1.1 Market Definition

Intelligent perception solutions utilize various sensors, such as cameras, radar, LiDAR and mmWave radar, along with AI algorithms and data processing technologies, to actively monitor and perceive the surrounding environment, vehicle conditions, and driver status. These systems provide key functions including smart object detection and classification, AEB (Automatic Emergency Braking), BSD (Blind Spot Detection), FCW (Forward Collision Warning), LDW (Lane Departure Warning), and DMS (Driver Monitoring System), offering strong support for the safe operation and efficient management of rail transit and commercial vehicles.

In **rail transit** scenarios, the primary challenge is the real-time assessment of the operating environment ahead. Intelligent perception solutions enable real-time environmental perception ahead of the train for timely obstacle detection and emergency braking, which addresses the limitations of signaling systems that cannot directly monitor track conditions; meanwhile, they serve as a redundancy system that complements existing signaling systems to

potentially expedite fault recovery during system failures, and can reduce trains' reliance on trackside equipment, thereby lowering the overall construction costs of signaling systems.

In **commercial vehicle** scenarios, the large size of vehicles and limited driver visibility often result in significant blind spots. Intelligent perception solutions effectively address these challenges by providing intelligent solutions with products installed as components on commercial vehicles to monitor the surrounding environment, vehicle status, and driver behavior in real-time, thereby enhancing driving safety and reducing traffic accidents.

1.2 Market Size and Growth

The market size of China's intelligent perception solutions for rail transit and commercial vehicles reached RMB1.3 billion in 2024 and is projected to grow to RMB10.2 billion by 2030, at a CAGR of 41.4% from 2024 to 2030. The potential market size for these solutions in China is also substantial, with a total addressable market size of approximately RMB530.0 billion in 2024.

2. Key Growth Drivers

2.1 Key Drivers

Heightened Safety Demand

The increasing volume of traffic and the growing complexity of road conditions have made it imperative for commercial vehicles to prioritize reducing accidents and ensuring the safety of drivers and cargo. Meanwhile, rail transit, as a crucial component of urban transportation with significant daily passenger volumes, also plays a vital role in public safety. Utilizing advanced sensing and control technologies, intelligent perception solutions significantly enhance transportation safety of rail transit and commercial vehicles and reduced accident risks, leading to increased demand for rail transit and commercial vehicles.

Technological Advancement

Technological advancements, such as artificial intelligence and big data analytics, lay the foundation for the intelligent transformation of rail transit and commercial vehicles. For instance, AI algorithms based on computer vision can efficiently process images and accurately identify objects, enabling real-time detection of obstacles

ahead of trains and enhancing operational safety.

Favorable Policy

The Chinese government prioritizes the safe operation of commercial vehicles and development of smart urban transportation. Various policies have given clear direction for promoting intelligent perception solutions and supporting relevant enterprises with financial subsidies, tax incentives, and research funding.

2.2 Future Outlook

Looking ahead, fueled by escalating safety imperatives, rapid advancements in AI-driven multi-sensor fusion, and sustaining government policy tailwinds, China's market for intelligent perception solutions in rail transit and commercial vehicles is poised for exponential growth



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Intelligent Perception Industry Report

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CIC Reports & Industry Overview

At CIC, we employ a rigorous, multi-method research framework, combining primary and secondary sources to underpin our analysis. Primary research involves in-depth engagements with industry thought leaders and practitioners, particularly in supply chain finance. Secondary research synthesizes publicly available datasets from authoritative bodies, including the National Bureau of Statistics of the People's Republic of China, the State Administration of Financial Regulation (SAFR, formerly the China Banking and Insurance Regulatory Commission), the China Securities Regulatory Commission (CSRC), and public company filings. We apply proprietary data analytics frameworks to process collected information, validating findings through cross-referencing data from multiple research streams to ensure analytical rigor and reliability.

All statistical data presented is verifiable and grounded in information available as of the date of this report.



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Intelligent Perception Industry Report

Extracts are refined summaries of in-depth CIC industry research reports, highlighting supply and demand trends, key growth drivers, R&D trends and future outlook, etc. of various segmented fields, integrating multi-dimensional insights such as expert interviews, market surveys and industry data analysis.

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Intelligent Perception Industry Report

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