



# How AIoT Technologies Help Drive Manufacturing Digitalization

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**New Artificial Intelligence of Things solutions are transforming safety, efficiency, and plant operations.**

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## Introduction

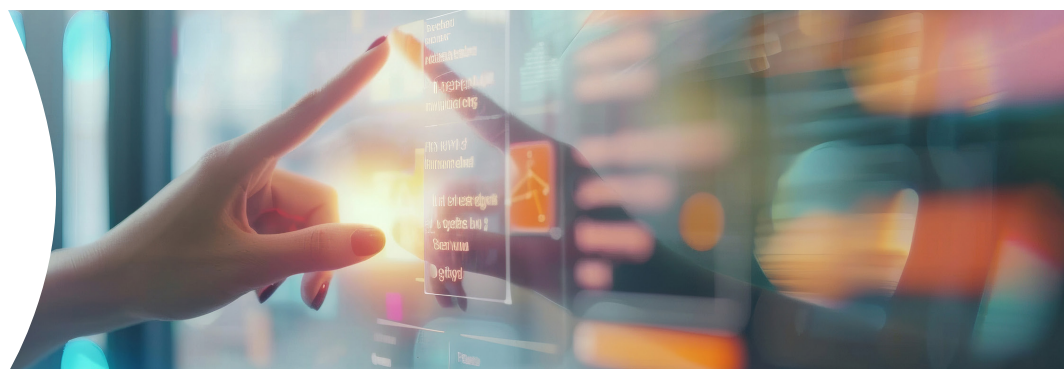
In the rapidly evolving digital age, manufacturing is undergoing a profound transformation. Advanced technologies are reshaping the industry, and manufacturers worldwide are actively seeking innovative ways to optimize production and maximize efficiency. AIoT (Artificial Intelligence of Things) is becoming a powerful technological solution across various industries. Its applications range from security and protection to measurement and manufacturing production enhancements. AIoT technologies and their associated hardware can help manufacturers achieve even better results.

## Production workshop digitalization

Production efficiency is a top concern for manufacturing managers. However, they can alleviate some of their fears through workshop visualization, intelligent quality inspection and control, as well as equipment inspections. Hikvision's workshop visualization management solution overcomes the inefficiencies of traditional onsite inspections. It makes the production process visible, traceable, and controllable. Compact, high-frame-rate cameras enable detailed observation of production lines. Remote video inspection breaks spatial limitations by displaying workshop conditions.

Video recordings link to every aspect of the production line, which enables positioning and traceability within seconds. Accuracy is efficiently ensured whether receiving parts and materials, sorting, producing, checking, packaging, or loading. The AR workshop breaks data barriers, overlaying real-time data and visuals for improved clarity. Industrial digital signage displays operational instructions, production data and status, safety reminders, and updates to fuel an informed and proficient workforce.

A workshop visualization management solution overcomes the inefficiencies of traditional onsite inspections and makes the production process visible, traceable, and controllable.



For example, in a cement manufacturing enterprise in China, Hikvision's radar technology-based solution significantly boosts the efficiency of aggregate production. A single aggregate warehouse with a capacity of 250,000 tons can be smartly inventoried in just two minutes, accurately counting the vast amount of aggregates in the warehouse. The stability of aggregate output quality improves by 60 percent, ensuring efficient and precise production.

Smart manufacturing solutions also transform factory operations with efficient, precise quality inspection methods. Quality inspection using X-ray technology and AI algorithms detects hidden product imperfections automatically. AI-equipped smart cameras detect flaws and provide instant alerts, exceeding the capabilities of manual inspections. For example, Hikvision's X-ray-based intelligent object and defect detection solution has successfully helped a food company in China to inspect 650 cans for impurities in 1 minute, and up to 600,000 cans daily, ensuring faster and safer quality checks.

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When it comes to equipment maintenance, Hikvision uses video and Internet of Things (IoT) predictive measures to prevent operational downtime. Thermal cameras maintain watch over equipment health and trigger alarms when anomalies are detected. Acoustic sensors locate equipment faults and leaks. Remote equipment inspection with video, sensors, and AI reduces onsite visits and strengthens maintenance effectiveness.

Safety within the facility is paramount. Hikvision uses AIoT technology to prevent accidents with early hazard warnings. For example, thermal cameras monitor temperature irregularities to prevent fires, as previously mentioned. In addition, AI cameras assist forklift drivers by detecting personnel in blind spots and providing warnings. The same technology protects workers from robotic arms that exceed travel limits.

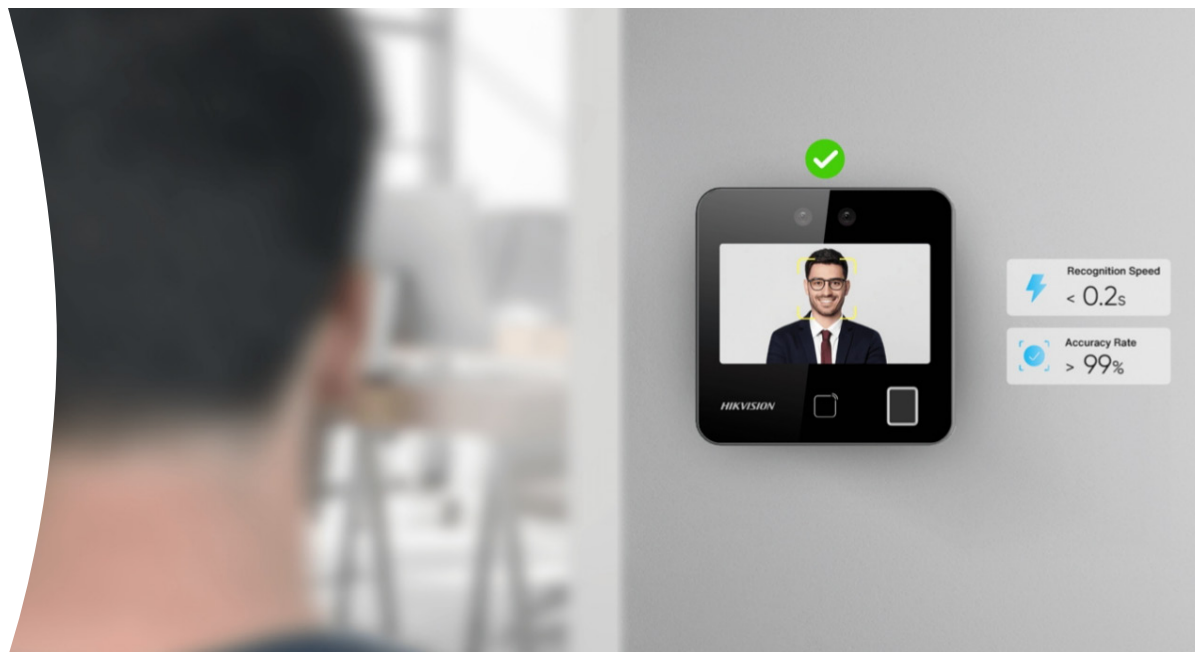
Hikvision's vision-based AI algorithms also assist compliance monitoring for production safety. For example, AI cameras check and remind employees about personnel protective equipment (PPE) compliance. They also provide 24-hour protection in high-risk areas and warn against unauthorized entry risks.

## Smooth personnel access management

A full-process facial recognition system for access control makes personnel management in the facility refined and efficient. The noncontact and non-stop facility access enables both efficiency and property security. Visitor, main, and production entrances as well as office access, cafeteria transactions, and facility exits are managed efficiently and accurately without having to swipe a key card. Hikvision's non-contact security gates and electrostatic discharge (ESD) turnstiles protect electronics from static electricity and interference.

A single credential system facilitates the flow of people through the plant. During commuting hours, the facility's turnstiles control access. Real-time access data is transmitted for attendance verification in the human resources (HR) system. The same credential is used for seamless consumption in the canteen/cafeteria. In the production area, employees access work zones based on permissions.

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## Vehicle yard management

Hikvision's yard management system (YMS) controls entrance to and exit from the facility providing end-to-end vehicle management. Digitalization streamlines vehicle appointments and inspections, which shifts the process online. When a dock becomes available, waiting vehicles are called and displayed on a screen, maximizing efficiency and order. AI-equipped dock cameras intelligently manage vehicle queues at loading docks by monitoring occupancy and loading rates.

Using radar, vehicle speeds are monitored within the facility's grounds and roadways to prevent risks. Vehicle weighbridge data during plant entry and exit is digitalized, enabling easy querying and retrieval. When vehicles exit the plant, automatic number-plate recognition (ANPR) barriers control vehicle access based on the license plate. It uses cameras specifically designed for the task. Vehicle trajectory and records within the plant can be queried and traced after leaving.



## Stereoscopic facility security management

Stereoscopic facility security management involves designing a security solution for a plant in several dimensions, which include perimeter protection, public key area protection, key facilities monitoring, high point monitoring, and guard patrol. Cameras and other technologies protect the perimeter of the entire facility. Monitoring a facility perimeter for intruders and fire risks is frequently challenged by needing to observe activities and situations over long distances and in some cases, with insufficient lighting.

High-point cameras enable users to view the entire facility in most cases. The high-point camera system uses an augmented reality (AR) function.

Hikvision has different camera types to accommodate key public areas—some cameras work best for open areas, some are best for facility roadways, and some are ideal for buildings or structures, while others are meant for indoor spaces. The company also offers what it calls a “high-point camera,” which features a panoramic view. It is installed on a “high point” to monitor the entire facility grounds.

High-point cameras enable users to view the entire facility in most cases. The high-point camera system uses an augmented reality (AR) function. Users can put tags, which can be used to embed additional information and create a dashboard, on the live video view. A [video](#) provides more information.

Intelligent security patrol management involves facility public area protection and includes plant access and in-plant roadways, and office, operational, and storage facility areas.

Thermal cameras can proactively monitor temperature abnormalities to prevent fires and safeguard facilities. They can monitor hazardous material storage areas where certain chemicals can react with external conditions that could cause the risk of explosion or combustion. They also can monitor electrical equipment to detect situations such as overheating air conditioning, motors, or electrical distribution cabinets.

Hikvision can integrate the fire prevention system with the security system. If an event occurs, the fire prevention system provides alarms to the Internet-enabled security system. The system’s hardware transmits information by linking users to the camera to see what occurred to determine what to do next.

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## Innovating the future of manufacturing efficiency and safety with Hikvision's AIoT solutions

With integrated advanced technologies like AI and IoT—AIoT—manufacturing enterprises can experience high efficiency. Hikvision offers AIoT solutions, transforming safety, efficiency, and plant operations and shaping a new era for manufacturing. For the overall safety of the plant, Hikvision's smart manufacturing solution ensures centralized, visualized, and networked security management.

A company with multiple plants can centrally manage personnel and vehicle access, plant security, video monitoring, and other operations in a command center. Operators in the plant's monitoring center can use AR for intuitive and efficient video patrols of the plant.

Hikvision's smart manufacturing solutions have been successfully implemented globally, benefiting users in diverse industries like electronics, chemical processing, automotive, and food processing. With Hikvision, the future of manufacturing safety and efficiency is not just envisioned, it is realized, setting a new industry benchmark for a smarter tomorrow.

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### About Hikvision

Founded in 2001, Hikvision has grown from a 28-person start-up to a global tech company. Over the past two decades, Hikvision has been serving various industries with cutting-edge technologies such as machine perception, artificial intelligence, and big data.

Starting with visible light, Hikvision's perception technology has evolved into a comprehensive array of capabilities spanning the entire spectrum and integrating diverse AI technologies. While the security sector remains crucial, it represents just one aspect of our AIoT capabilities. Through continuous development, Hikvision has become the leading provider of AIoT products and solutions.

Customers can **[contact us](#)** to discuss their specific requirements and we'll be happy to help. To find out more about the Hikvision smart manufacturing solution, please visit **[here](#)**.