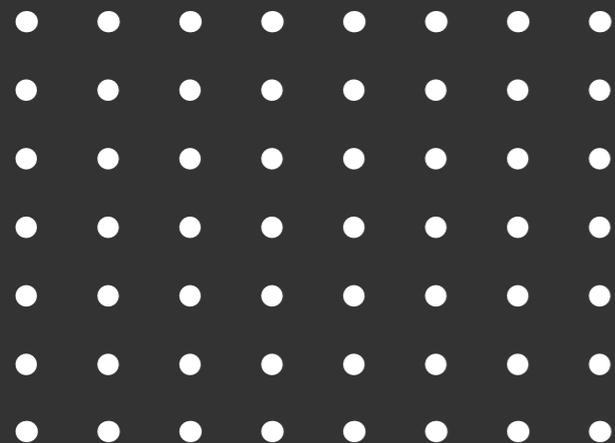
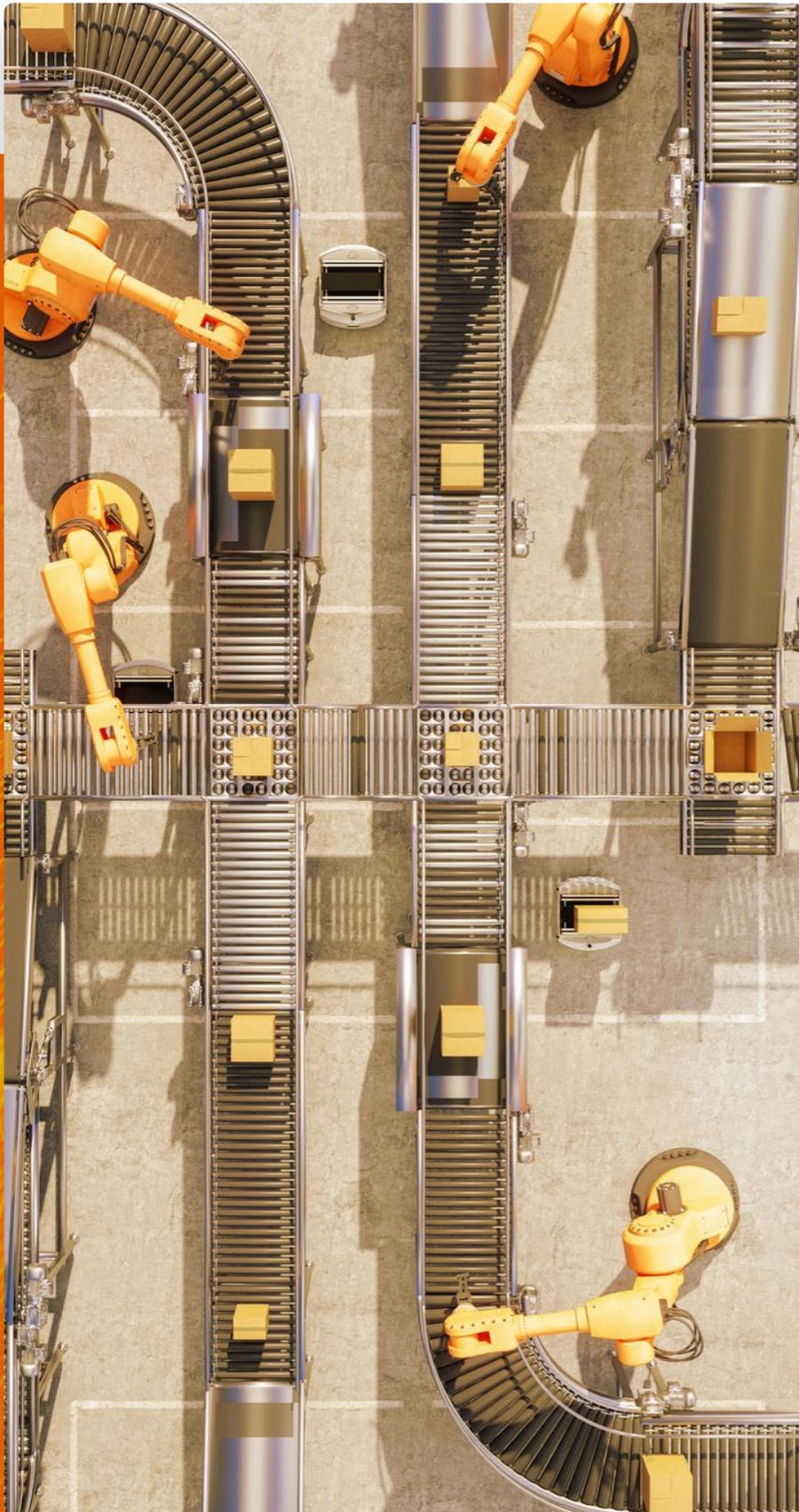


MEDIATEK

IoT Innovation Guide: AI and the Future of Industrial Manufacturing





Introduction

The use of AI poses questions about what the future of work will look like, among them: “What are the possibilities for smart, connected industrial manufacturing systems?” AI extends the capabilities of machines to sense, learn, reason, and interact with humans in ways that are natural, intuitive, and complementary to the way we work.

By pairing AI with IoT (Internet of Things) and connecting insights across the production process, manufacturers can achieve higher quality final products, while also increasing the safety, efficiency, and sustainability of industrial processes. In fact, a recent McKinsey survey found that AI has the potential to unlock approximately \$1 trillion in value from the global industrial sector.¹

¹ Source: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year>

How to Apply AI to the Production Ecosystem

How can industrial manufacturers capture value from AI? A recent survey by Deloitte identified 8 use cases for smart manufacturing:²

Use Cases for Smart Manufacturing



Some of the innovative IoT and AI technologies behind the top use cases include:



[Vision Systems](#)



[Speech-to-Text Systems](#)



[Enhanced Connectivity](#)



[Smart Power Consumption](#)

Read on to learn how to use these technologies in your industrial processes.

² Source: <https://www2.deloitte.com/us/en/insights/industry/manufacturing/accelerating-smart-manufacturing.html>



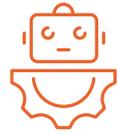
Vision Systems

Vision systems like cameras or LIDAR/radar provide powerful sensing and surveillance that, when paired with AI, machine learning and connectivity, can recognize faces, spaces, products, parts, and scenes, even in low-light conditions.

To make the algorithm faster and capable of real-time interactions with other systems or humans, use of high-speed edge processing and visual Simultaneous Localization and Mapping (SLAM) is required.



Industrial Applications



Augmented workforce efficiency: Let robots (or collaborative robots, known as ‘cobots’) take on repetitive or dangerous aspects of the production process, while adding manufacturing capacity with 24/7 availability.



Quality assurance (QA): Use automated optical inspection (AOI) to unlock big data insights that can help identify product quality using images from the production line.

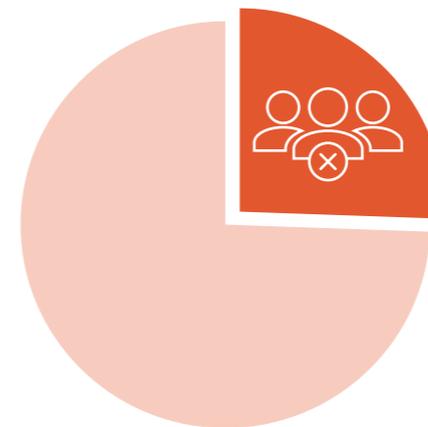


Process improvement: Identify and correct machine or process bottlenecks using visual data analysis to help save costs from unnecessary downtime and recommend process improvements.



Access management: Use cameras and edge visual processing for facial recognition, clocking in/out on the manufacturing floor, signing in to industrial PCs, or providing access control to locks and doors within a building.

Did you know? A joint study by Vanson Bourne and GE found that



23%

of all manufacturing downtime was caused by human error, which if corrected by machine support, could generate substantial savings.³

³ Source: <https://lp.servicemax.com/rs/020-PCR-876/images/After%20The%20Fall%20whitepaper%20-%20updated%20global%20numbers%20FINAL%20refresh.pdf>

The MediaTek Advantage at the Edge

MediaTek Genio supports high-speed camera processing and visual SLAM, adding computer power with GPU & AI engines right from the highly capable System on a Chip (SoC).



Speech-to-Text Systems

Voice recognition uses always-on microphones connected to an SoC that runs software to help machines detect words and sounds to understand human language as it is spoken, heard from a distance and isolated from noise.

With New Language Processing (NLP), vast amounts of audio data can be processed without even having to send it to the cloud, saving on cloud storage and processing costs, and reducing concerns about data privacy and confidentiality by keeping this data at the edge, in the device. With speech-to-text systems, workers can give commands, ask questions, and record observations and issues instantly, without having to stop handling the machine, or removing protective gear.

Industrial Applications



Voice commands: Talk to the industrial machine or robot like a voice assistant; for example, ask it to retrieve data from the backend manufacturing system instantly without having to stop handling the machine or remove protective gear.



Ask for instructions: Ask for instructions, hands-free, for guidance or help with training and safety.

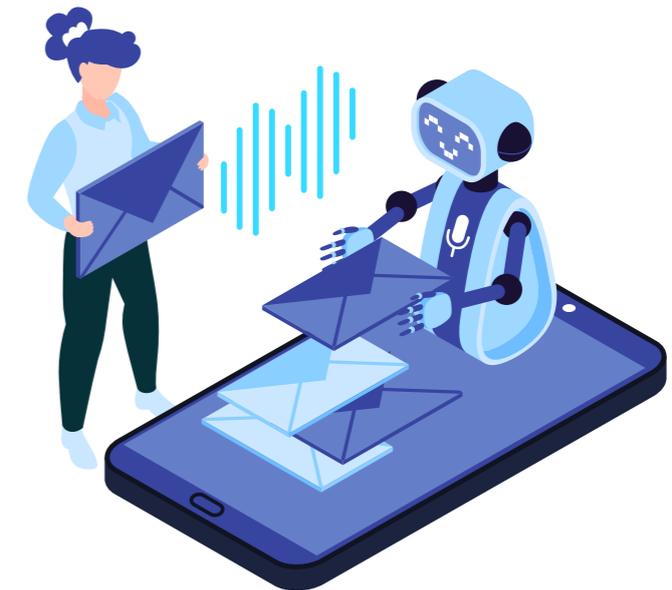


Take notes: Ask the machine to keep track of key observations or relay the current situation.



The MediaTek Advantage at the Edge

Genio enables New Language Processing (NLP) on the device, which eliminates the need for a cloud-supported dictionary for audio language processing (ALP).





Enhanced Connectivity

For AI to support manufacturing systems and workers in real time, IoT connectivity must have minimal latency to analyze data and make split-second decisions, where even a second or two of latency from sending data to the cloud and waiting for a decision could have business consequences. Enhanced processing at the edge helps to process large data volumes closer to the source in order to reduce latency to the cloud.

With edge AI, processing happens where the data is created, instead of being sent offsite to a remote data center. Industrial gateways process data efficiently and safely on the manufacturing floor with an intelligent hub that interfaces between local networks and the cloud.



Industrial Applications



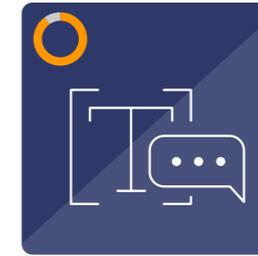
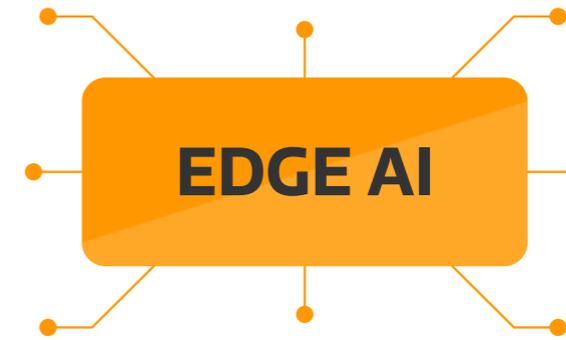
Real-time interactions: React to visual data and voice commands with minimized latency.



Split-second decision making: Process data quickly to prevent delays in decision making, especially amid dangerous activities.



Over-the-air updates: Add software features with non-disruptive over-the-air updates.



The MediaTek Advantage at the Edge

Genio brings connectivity anywhere with a 5G broadband or 5G RedCap connection that keeps manufacturing systems in contact, even when large amounts of data need to be transferred.



Smart Power Consumption

In smart systems that require vision or voice recognition, sensors (like microphones) are always on, requiring power-saving strategies, especially for battery-powered devices. Traditionally, in complex functions like facial recognition, the CPU can account for more than 40% of power consumption, contributing to the 1% of all global GHG emissions caused by end-user computing. Using dedicated AI processors can produce significant power-savings, as AI algorithms can be used within the design of the SoC hardware and software to help reduce and optimize power consumption.



Industrial Applications



Energy efficiency: Operate more sustainably, reduce the carbon footprint and cost of your data centers.



Maintenance reduction: Reduce costly maintenance of long-term installations and remote robots that require connectivity system upgrades or replacements due to diminished battery power.



Always-on connectivity: Stay connected throughout critical manufacturing processes and reduce downtime caused by power failures.

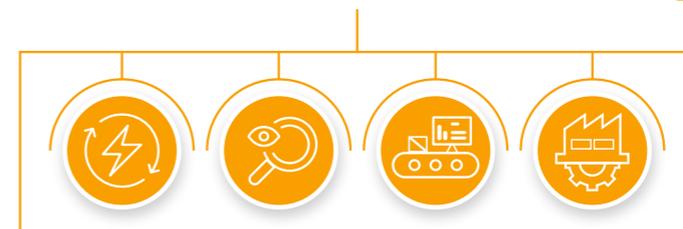
MediaTek NeuroPilot automatically works with all MediaTek Genio platforms and beyond, creating a multi-purpose software that helps reduce development costs and time to market.

The MediaTek Advantage at the Edge

To reduce power consumption, MediaTek engineers have pioneered several system optimizations.

- MediaTek's hardware cuts power consumption of internal components, such as the CPU, GPU, and AI processor when they are not being used, optimizing the operating power consumption in response to daily demands.
- MediaTek's Software Development Kits, such as the NeuroPilot SDK, allow developers to adapt and optimize their software for MediaTek AI processors, taking advantage of faster, more efficient processing.

Use Cases for Smart Manufacturing



Reduce development costs and time to market

Implement MediaTek Genio in Your Industrial IoT Manufacturing Processes

MediaTek provides a suite of advanced, intelligent IoT SoCs and an ecosystem of partners and smart modules. Together, we enable industrial manufacturers to develop intelligent devices for highly demanding, edge-weighted applications that need heavy IO, reliable connectivity, and the immediacy and reliability of embedded processing.

Designed for demanding AI and performance-centric IoT applications, MediaTek Genio is a premium IoT SoC that empowers the edge with multiple in-chip processors and extremely capable multitasking performance in the latest Open OS.

- Best-in-class CPU
- Advanced 3D Graphics
- Powerful AI performance
- Hardware support for the latest multimedia standards
- Multiple 4K displays
- Exceptional power efficiency
- Industrial-grade longevity

