SUCCESS STORY

ASUS IoT empowers autonomous mobile robots to transform smart agriculture

Agriculture is undergoing its own form of digital transformation, with the introduction of autonomous mobile robots (AMRs) to speed production, packaging and distribution. However, introducing AMRs in this industry presents diverse challenges – and many of those demand innovative solutions. That's why a French fruit producer called on the expertise of ASUS IoT to develop a cutting-edge AMR solution centered around the ASUS IoT PE3000G Edge AI computer, designed to meet the rigorous demands of the burgeoning arena of smart agriculture.

The challenge

Transforming agriculture with autonomous mobile robots

In the agricultural sector, deploying AMRs for tasks such as fruit picking presents significant challenges. Traditional farming relies heavily on manual labor, which is constrained by factors like daylight hours and weather conditions. Additionally, there's a pressing need to maximize the efficiency of land use and crop yields, while ensuring sustainable practices. However, the implementation of AMRs in such settings is hampered by the lack of network connectivity and the demanding nature of outdoor environments, which require robust and intelligent systems capable of edge AI inferencing. That's when ASUS IoT's team of world-class engineers stepped up, ready to craft an innovative solution tailored to the client's specific needs.

The solution

PE3000G edge computer designed for smart agriculture

To tackle these challenges, ASUS IoT collaborated with a French fruit producer to develop an innovative AMR solution – with the versatile, powerful and rugged ASUS IoT PE3000G IPC at its core.

This solution was designed to operate autonomously in the challenging conditions of an orchard. PE3000G, a fanless edge AI computer optimized for computer-vision tasks, is central to the robot's functionality. With an Intel® Arc™ MXM GPU module, it enables the AMR to process sensor data in real-time, navigate complex orchards and identify ripe fruit for harvesting.

The outcome

Advancing the future of AMR applications, the ASUS IoT way

The Intel® Arc™ MXM GPU module's powerful capabilities are crucial for machine-vision recognition and edge AI inference, allowing for quick image processing to assess fruit ripeness, color, size and harvesting readiness, thus enhancing production efficiency and ensuring harvest quality. Its compact size, low power consumption and fanless design ensure reliability and shock resistance, even in dusty, undulating agricultural settings.

Powered by a 12th Gen Intel Core™ i7 processor, PE3000G accurately computes the robotic arm's coordination, enabling precise path planning and trajectory adjustments, while carefully controlling the arm's grip to prevent fruit damage.

Moreover, PE3000G's specialized thermal design is tailored for agricultural environments. Its dual-sided heatsink architecture and incorporation of a heat-spreader solve cooling challenges, maintaining system stability and precision. The patented, compact structural design minimizes mechanical tolerances, enhancing shock resistance and signal transmission, ensuring reliable operation from -20°C to 60°C, even with a 60 W MXM GPU module, without throttling.

The deployment of this advanced AMR, powered by ASUS IoT technology, has had a transformative impact on the fruit producer's operations. The robot operates continuously, regardless of time or weather, enabling a stable and predictable harvest process. The efficient and intelligent picking system reduces the need for wide spacing between rows of crops, leading to denser planting and increased yields. This solution not only improves productivity but also helps in optimizing land use and contributes to sustainable agricultural practices.

The successful partnership between ASUS IoT and the fruit producer demonstrates the potential of industrial PCs in empowering AMRs to overcome the challenges of outdoor environments – and highlights how ASUS IoT is developing technologies at the leading edge. ASUS IoT's powerful IPC platforms are becoming increasingly attractive to solution integrators across diverse industries, signaling a new era where digital transformation is accessible to all sectors, supported by the convergence of operational and information technologies.

PE3000G

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