AI@Edge: Intelligent Loss Prevention for Self-Checkout

Industry: Retail

Product: RICO-3399

Introduction

Self-Checkout Lanes have helped improve the convenience of shopping for both consumers and retailers. Consumers can avoid waiting in long lines, and retailers can increase the throughput of checkout lanes without the need of additional staff. Together this means an improved shopping experience for consumers, retailers, and staff.

Despite the convenience for customers and retailers, self-checkout systems are often the largest source of loss caused by shoplifting. Loss prevention at self-checkout lanes relies on equipment which can be inaccurate or frustrate shoppers with false alerts. Staff are often too busy assisting customers to be able to keep a sharp eye out for shoplifters taking advantage of the self-checkout machines.

One company is developing an AI powered solution for loss prevention in self-checkout systems. Utilizing behavioral analysis and object detection, the system uses two cameras—one above the customer to analyze body movements and another pointed at the barcode scan area to confirm items are scanned by the barcode reader—to determine if an item wasn't scanned. The system can even tell if a shoplifter places an item into their pockets. With edge computing operation, the system can detect shoplifting behaviors in real-time and alert in-store loss prevention staff.

Challenges

The company needed an embedded board that could overcome several key challenges: capable of AI processing, support for multiple camera inputs, connect with checkout equipment, and integrate with in-store networks.
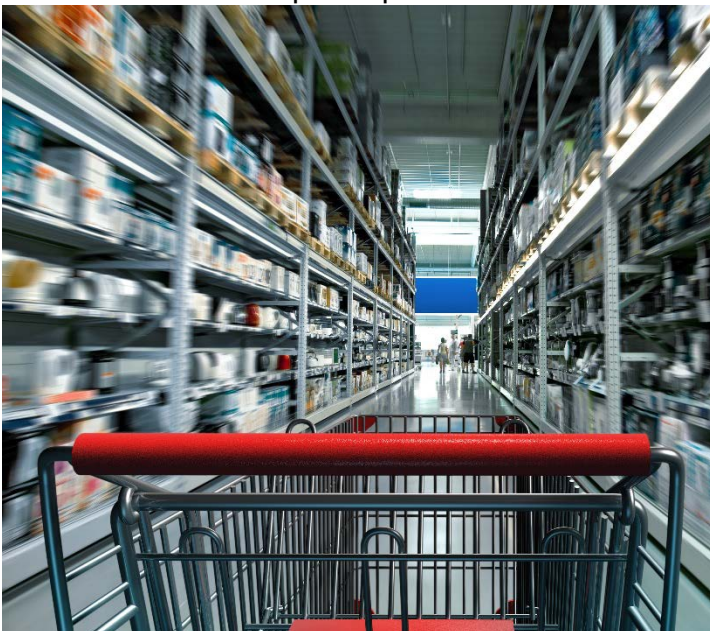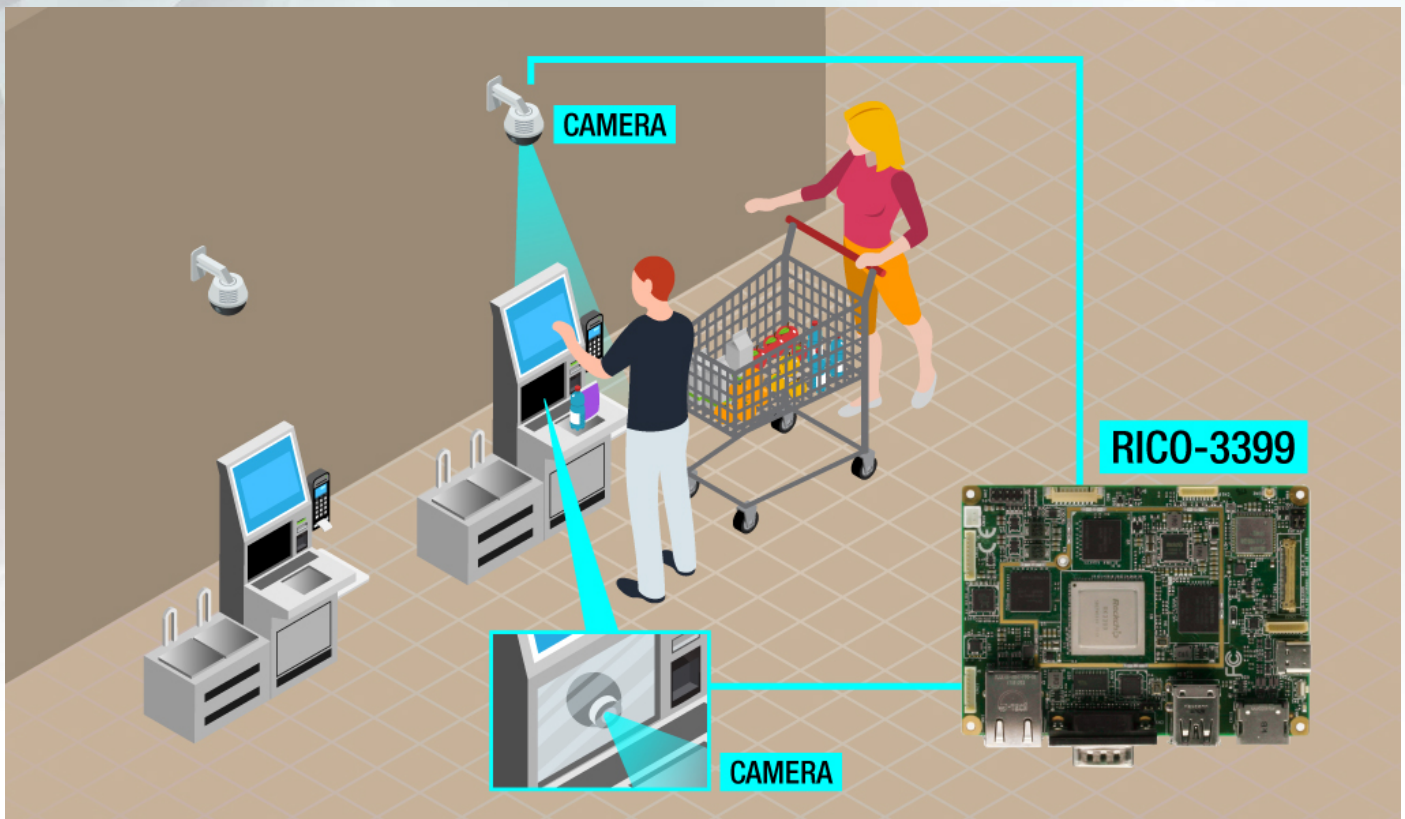
AI Capable

The company needed a board capable of operating the company's AI software without reliance on extra hardware or connecting to a cloud service. This helps keep maintenance costs low and allows for real-time analysis.

Multiple Cameras

To effectively catch shoplifters and prevent loss, the company's AI application relies on analyzing input from two separate cameras. This means the hardware solution must be capable of supporting multiple camera inputs.

I/O Support

To appeal to retailers, the system has to function as both loss prevention and self-checkout system. This requires hardware support for typical checkout features such as a barcode reader, weight scale, distance sensor and interactive display.

Network Connection

Loss prevention is most effective if it can alert loss prevention staff immediately when it detects a possible shoplifter. This requires that the system can be easy and flexible to integrate into a retailer's in-store network to communicate with staff.

Solution

With industry leading expertise in embedded AI@Edge solutions, the company turned to AAEON to help find a hardware solution to meet their challenges. Working closely with the company, AAEON determined the RICO-3399 PICO-ITX fanless board as the best solution. The RICO-3399 features powerful processing, flexible I/O support, 4K HD graphics capability and easy network integration.

Rockchip RK3399 SoC

The RICO-3399 is powered by the Rockchip RK3399 ARM hexacore SoC processor. Using the latest in RISC technology, the

Rockchip RK3399 pairs the Rockchip Cortex A72 dual core and Cortex A53 quad core processors to provide high-performance computing capable of running AI inferences without the need of a dedicated neural network module.

Flexible I/O Features

The RICO-3399 can host multiple cameras, supporting USB and MIPI standard. It also features COM and GbE ports as standard to connect to other devices and networks. AAEON also offers OEM/ODM support, with options to configure I/O features to meet the specific needs of a developer's project.

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4K Graphics Support

The RICO-3399 with Rockchip RK3399 SoC features the Mali-T860 GPU. The Mali-T860 GPU is 50% faster than previous generations, allowing it to display 4K graphics at 60Hz with HDMI 2.0 support. This enables the RICO-3399 to support high-quality interactive displays and high resolution video encoding and decoding.

Easy Integration

The RICO-3399 can easily integrate into any network or workplace. Designed with a GbE LAN port standard, it also features a mini-PCIe slot which can support Wi-Fi, Bluetooth and even 4G LTE connectivity.

Impact

With the RICO-3399 PICO-ITX fanless board from AAEON, the company had a hardware solution capable of overcoming the challenges and requirements of their AI system. The company is now able to design, build and deliver intelligent self-checkout systems to retailers around the globe.

With the company's system in place, retailers are able to reduce loss related to self-checkout lanes and quickly identify would be shoplifters. Shoppers can also look forward to fewer frustrations when using self-checkout systems, and staff can focus their attention more towards assisting their consumers.

Product

The RICO-3399 single board computer is a RISC platform armed with the powerful Rockchip RK3399 ARM hexa-core processor. The Rockchip RK3399 ARM hexa-core processor is a SoC which combines two processors into one, along with a built-in Mali-T860MP4 GPU to provide 4K video decode capabilities and 4K Ultra HD graphics at 60Hz through HDMI 2.0. The RICO-3399 also features onboard 16GM eMMC storage, and 2GB LPDDR3 memory, giving it the intelligence to power AI and Edge Computing applications. The RICO-3399 supports Android 7.1 which can be configured to your project needs.

The RICO-3399 combines fanless design, RISC architecture, and the PICO-ITX form factor to be a platform that is powerful and energy conscious. The RICO-3399 features a wide array of I/O interfaces, including USB 3.0 and MIPI camera support. The RICO-3399 also features both a nanoSIM and a mini-PCIe slot to provide 3G and 4G capabilities for mobile applications. AAEON's manufacturer services offer both hardware and software customization options that ensure the RICO-3399 fanless SBC will be ready to go the moment you open the box.

About AAEON

Established in 1992, AAEON has become one of the leading designers and manufacturers of advanced industrial and embedded computing platforms. Committed to innovative engineering, AAEON provides Industry 4.0 integrated solutions, hardware and intelligent automated services for premier OEM/ODMs and system integrators worldwide, as well as IoT solution platforms that seamlessly consolidate virtual and physical networks. Reliable and high quality computing platforms include industrial motherboards and systems, industrial displays, rugged tablets, PC/104, PICMG and COM modules, embedded SBCs, embedded controllers, network appliances and related accessories. AAEON also offers customized end-to-end services from initial product conceptualization and product development through to volume manufacturing and after-sales service programs. It is also committed to continuously redefining and harmonizing the management and development processes of the industry.

With its constant pursuit of innovation and excellence, AAEON became a member of the ASUS group in 2011, enabling the company to further strengthen its leadership, access advanced technology from ASUS, and leverage resources from within the group. AAEON is poised to offer more diversified embedded products and solutions at higher quality standards to meet world-class design and manufacturing demands in the years to come.

AAEON is an Associate member of the Intel® Internet of Things Solutions Alliance.
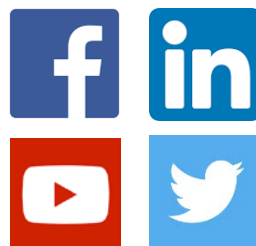
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