White Paper

Intel® Core™ Processors

# Empowering Loss Prevention and Fresh Food Identification: Checkout Transformation Accelerated with HiStone Smart POS Solution Powered by Intel® Core™ Processors

HiStone

"Checkout efficiency and cost are critical to the core competitiveness of the retail industry. HiStone smart POS solution, powered by Intel® Core™ processors, fully leverages the exceptional computing power, flexibility, and scalability of Intel processors, meeting the demanding requirements of AI algorithm inference without the need for additional accelerators. This enables retail service providers to build advanced self-checkout facilities and enhance their competitiveness."

– Li Haomin
Vice General Manager, Qingdao HiStone Intelligent Commercial System Co., Ltd.

## Overview

Today, the retail industry is ushering in a new round of technological innovation amid fierce competition. To enhance competitiveness and deliver better consumer experiences, retail service providers are accelerating the adoption of digital and intelligent technologies such as artificial intelligence (AI). This drives the implementation of innovative concepts like unmanned retail, precision retail, and personalized retail, thereby improving operational efficiency and unlocking the value of retail data.

In this context, Qingdao HiStone Intelligent Commercial System Co., Ltd. (HiStone) has launched a smart POS solution powered by Intel® Core™ processors. By integrating cutting-edge AI technology with intelligent hardware, it enables loss prevention in both manual and self-checkout scenarios, helping merchants minimize product loss through real-time product movement tracking and anomaly detection. In addition, its leading image recognition algorithms provide smart fresh food identification to enhance self-checkout efficiency.

## Challenges: Retail Checkout Struggles with Loss Prevention, Fresh Food Identification, and More

Checkout is a crucial component in the retail industry. Therefore, a high-performance checkout system can streamline processes such as item scanning, price determination, and payment, not only enabling faster transactions and shorter wait times for consumers but also helping retailers cut costs, thereby fostering a more efficient retail model.

However, the path to building a performant, secure, and low-cost checkout system is fraught with challenges, with price calculation of fresh food and loss prevention being two of the most pressing issues.

### ● Fresh Food Identification Challenge

Fresh food is a vital category for retailers like supermarkets, yet it presents great complexity during checkout. The category, price, and quantity variability of fresh food complicate cost calculation due to the absence of standardized price tags. As a result, additional staff is necessary to identify, weigh, and determine the price of these items. Moreover, the wide variety of fresh food requires cashiers to be well-acquainted with category-specific pricing to ensure smooth checkout, which increases training costs.

To address this, the retail sector universally seeks POS systems that integrate image recognition and smart loss prevention features, enabling more efficient and accurate self-checkout experiences.

### Loss Prevention Challenge

Despite the varying sizes and diversity of retail sectors, few retailers are immune to revenue loss due to inventory shrinkage, with POS-equipped stores bearing the brunt of the financial impact in most cases. The key is to prevent failed scans, missed scans, and barcode replacements. According to media reports citing data from the Beijing Municipal Public Security Bureau, theft incidents related to self-checkout are on the rise. Beyond intentional theft, over 80% of cases are unintentional, such as misunderstandings arising from customers not scanning items correctly[1].

The risk of theft persists regardless of whether retailers use manual cashiers or self-checkout systems. For example, in manual checkout scenarios, some customers may switch items after weighing and cost calculation for illegal benefits, while internal theft by cashiers remains a persistent issue. In self-checkout cases, missed or skipped scans – whether intentional or due to carelessness – are common, leading to significant losses for retailers.

As a typical countermeasure, adding staff for monitoring purposes proves costly but unreliable due to the limitations in monitoring frequency and coverage. Also, this approach increases the likelihood of conflicts between consumers and staff, which compromises consumer experience.

## Solution: HiStone Smart POS Solution Powered by Intel® Core™ Processors

In response to the self-checkout needs of retailers, HiStone offers a smart POS solution featuring smart loss prevention, fresh food image identification, and more. This solution comes with self-service devices and large-screen terminals, powered by hardware such as the 12th Gen Intel® Core™ processors and intelligent software and algorithms like AI image recognition and behavior pattern analysis. This delivers a fast, convenient, and flexible checkout experience, accelerating the transformation of the retail industry.

Powered by the 12th Gen Intel® Core™ processor, built on the Intel 7 process, the solution not only delivers powerful general-purpose computing and AI acceleration capabilities, but also excels in security, reliability, multi-OS support, low power consumption, and simplified thermal design. The processor features a hybrid architecture with Performance-cores (P-cores) and Efficient-cores (E-cores), ensuring a balanced use of computational resources.

To further enhance the inference efficiency of image recognition algorithms, HiStone also optimizes inference performance using the OpenVINO™ Toolkit, a comprehensive toolkit from Intel designed to accelerate high-performance computer vision and diversify deep learning applications. It boasts three key features: high-performance deep learning inference, an easy-to-use, streamlined development process, and the ability to write once and deploy anywhere. It offers hundreds of free pre-trained neural network models and reference code, supporting model quantization and tuning to accelerate deep learning inference.

With the exceptional hardware and software acceleration capabilities of the 12th Gen Intel® Core™ processors, the HiStone smart POS solution is well-equipped to handle the needs of applications such as fresh food identification and smart loss prevention.

### Fresh Food Identification

HiStone's AI algorithms quickly and accurately identify various fresh food placed on the scale, including vegetables, fruits, snacks, and baked goods. By examining their appearance features, such as color, shape, and texture, the system categorizes the item and finds the matching info automatically.

With the powerful processing capabilities of the 12th Gen Intel® Core™ processors, the solution identifies fresh food images and processes data in less than 200 milliseconds[2], ensuring a time-saving and smooth checkout process. In addition to product identification, the solution works with smart scales to automatically weigh and check out items. This reduces the need for manual intervention, improves checkout efficiency, and provides more accurate weighing data, minimizing human error.

[1] Data Source: Best Practice: 2024 CCFA China Retail Risk Management by China Chain Store & Franchise Association.

[2] The data is sourced from HiStone's internal testing results. Intel does not control or audit third-party data. Please review this content, consult other sources, and verify the accuracy of the mentioned data.

## Manual and Self-Checkout Loss Prevention

The HiStone smart POS solution supports both manual and self-checkout loss prevention.

### Manual Checkout Loss Prevention

Running on HiStone's new supermarket checkout terminal, this solution features AI-based missed scan detection in the scanning area and real-time monitoring of shopping cart lanes. Through gesture and product identification, the system logs missed scans in the background or provides direct alerts, continuously guiding the cashier's checkout workflow to ensure adherence to established practices.

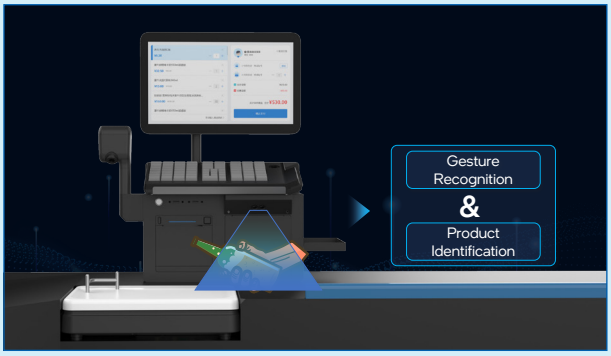


**Fig 1.** HiStone's New Supermarket Checkout Terminal Supports AI-Based Missed Scan Detection in the Scanning Area

### Self-Checkout Loss Prevention

Built on HiStone's self-checkout kiosks, the solution quickly identifies potential risks by monitoring the scanning area without human intervention. It offers multiple alerting options that deliver more effective loss prevention at a lower cost. The solution also features powerful data management, allowing administrators to view real-time alerts, photos, and historical records through a WeChat mini-program or data management platform. This enhances the overall coverage and accuracy of loss prevention management.

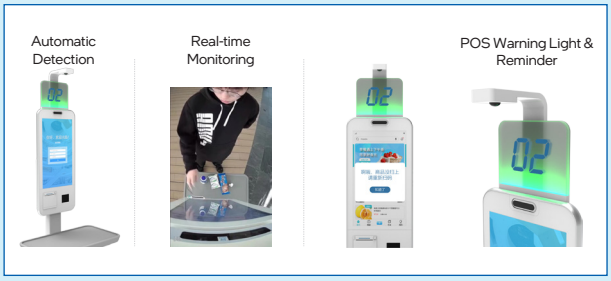


**Fig 2.** HiStone's Self-Checkout System Provides Real-Time Identification of Loss Prevention Risks

## Benefits: Improving Core Competitiveness of Retail Stores

The HiStone smart POS solution, powered by Intel® Core™ processors, excels in performance, features, efficiency, and safety. It enables retail service providers to accelerate the adoption of self-checkout with improved business and user experience.

- The fresh food identification feature enables rapid product identification and payment at checkout, improving the overall shopping experience while shortening queuing time.
- The smart loss prevention feature provides real-time monitoring of products, effectively preventing theft and losses. It can offer intelligent analysis to optimize inventory management, enhancing operational transparency and efficiency.
- The solution provides an intuitive interface with a large display and an interactive touchscreen, allowing customers to independently complete ordering, payment, and receipt printing. This streamlines the payment process and elevates the user experience.

## Outlook

As industry competition intensifies and consumers demand higher efficiency and better experience, self-checkout is becoming a critical component of retail. The HiStone smart POS solution, powered by Intel® Core™ processors, excels in features, performance, and user experience, supporting agile operations of smart loss prevention and image recognition. This helps retail providers overcome self-checkout challenges and accelerate the transition to smart retail.

Intel will deepen its collaboration with partners like HiStone in smart retail, an inevitable development trend. Leveraging its comprehensive AI software and hardware products, Intel will drive the application and expansion of technologies such as smart loss prevention and product identification in the retail sector. The aim is to build capabilities in intelligent operations and digital innovation to enhance the overall user experience.

## About HiStone

Qingdao HiStone Intelligent Commercial System Co., Ltd. (HiStone), formerly known as Qingdao Hisense Intelligent Commercial System Co., Ltd. was established in 1989. As a leading provider of advanced commercial technology solutions, HiStone leverages over three decades of expertise to stay at the forefront of industry trends and drive industry progress. The company delivers comprehensive solutions, including intelligent hardware, business software, and operations and maintenance services, tailored to the evolving needs of global users.

## About Intel

Intel (Nasdaq: INTC) is an industry leader, creating world-changing technology that enables global progress and enriches lives. Inspired by Moore's Law, we continuously work to advance the design and manufacturing of semiconductors to help address our customers' greatest challenges. By embedding intelligence in the cloud, network, edge and every kind of computing device, we unleash the potential of data to transform business and society for the better. To learn more about Intel's innovations, go to newsroom.intel.com and intel.com.