"NEXCOM was able to gain more business opportunities with the support from the Intel® Distribution of OpenVINO™ toolkit. The OpenVINO toolkit allows access to data analysis, letting retail and hospitality reach their customer groups in the end, increasing revenue and reducing stock waste, and, overall, increasing our drive into the smart city era."
—Lisa Chen, assistant vice president, NEXCOM International Co., Ltd.

For grocery retailers, gaining the ability to track the changing demographics of shoppers throughout the day unlocks the potential to deliver targeted promotions with greater accuracy at the point of sale. But until recently, the graphics and processing horsepower required for this kind of AI analysis simply wasn't available at the edge of the network—and especially not in a fanless system that could run two video cameras 24/7 in a retail environment.

To empower retailers at an Asian supermarket with the freshest data about shoppers in their stores, NEXCOM developed the AIEdge-X®100, powered by an Intel® Celeron® CPU and Intel® Movidius™ Myriad™ X VPU (via the NEXCOM AIBooster®-X2 module). This “AI at the edge gateway” includes Intel® Distribution of OpenVINO™ toolkit and third-party 3D software for demographic analysis, plus two ports for video cameras to stream shopping behavior, two ports to connect dual displays, and a port to send information to a control center at the edge for big-data analysis.

By leveraging OpenVINO’s pretrained deep learning models for age and gender recognition, the NEXCOM system can identify different shopper demographics and display a changing mix of targeted ads throughout the day—for bottom-line benefits like lower labor costs, less stock waste, and increased ad revenue for retailers.

**Challenge: Deploy AI at the edge for real-time information about shoppers in the store**

For retailers, accurate market research is critical to increasing sales and optimizing inventory. But traditional marketing research is all too often seen as expensive and labor intensive, requiring big budgets and long lead times to gather the information needed to formulate strategy.

That’s why traditional marketing research is typically used only to validate high-stakes decisions at the corporate level, such as branding and product design—it’s seen as too costly for decisions made at retail locations, such as merchandising and inventory management.

Precision marketing is the latest data-driven trend for retail: using AI to target the right message to the right audience in order to optimize marketing ROI. By using AI analysis to power market research at the point of sale, businesses can speed up data collection, reduce marketing research costs, and view results in near-real time.

Until now, latency problems and power supply challenges in confined retail spaces have limited the opportunities for AI deployment in retail locations. Before the arrival of the Intel Movidius Myriad X VPU and OpenVINO solutions, most AI processing had to take place in the cloud, with graphical processing units (GPUs) typically not available for applications like retail.
**Solution: Deliver video image processing power in a retail-friendly package**

The introduction of the Intel Movidius Myriad X VPU enabled NEXCOM to fit graphic processing power into a compact, fanless form factor for point-of-sale access to powerful AI video image analysis, enabling use cases like these:

**Target advertising**
Retailers can target advertisements based on demographics and shopping patterns by running youth-focused promotions at times when there are more young people in the store, for example, or ads for parents when there are more adults with children.

**Focus marketing efforts**
Retailers can adjust promotions based on up-to-the-minute information rather than guesswork.

**Reduce promotional costs**
Targeted onscreen messages can help reduce the labor and materials costs of live tastings and promotions.

**Manage inventory**
Ads can be used to adjust purchasing patterns so as not to waste or deplete stock.

**Track ad reach**
Data collected can be used to track point-of-sale ad reach, enabling retailers to charge more for ads in areas of the store where there are more shoppers.

**How it works**

With a high price-performance ratio, the AIEdge-X 100 relies on Intel technology—a combination of CPU, GPU, and deep learning toolkit. Available for Windows and Linux, the quiet fanless system uses an Intel Celeron processor to deliver performance and value on top of power efficiency. The AIBooster-X2 deep learning accelerator card, which includes two Movidius Myriad X VPUs, provides enough processing power to simultaneously operate two cameras for capturing shopping footage. The fanless gateway includes the OpenVINO toolkit to facilitate inference of deep learning models. Along with third-party 3D software, the system uses the OpenVINO toolkit to perform facial recognition and analyze customer demographics and behavior.

The onboard USB 3.0 ports support cameras for streaming video of shopping behavior to the AIEdge-X 100 gateway. The gateway then performs preliminary analysis before sending information via LAN connection to a control center at the edge for big data analysis. Advertising is transmitted back via LAN to display on two HDMI monitors that support 2K and 4K resolution images.

Powered by an Intel Atom® processor, the Neu-X100 fanless embedded player can handle two independent display outputs. The Neu-X100 supports HDMI display, USB 3.0 ports, and a RS232/RS422/RS485 interface, making it an ideal embedded player for optimizing information visualization, conveying brand messages, promoting customer engagement, and identifying efficiencies to boost in-store traffic and sales.

Intel provides both the processors that provide the computational power for the AIEdge-X®100, along with the OpenVINO toolkit, which includes AI software tools for video image analysis.

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**Figure 1:** The AIEdge-X®100 is a compact, fanless, AI-capable system that can run two video cameras and two displays simultaneously.
The Intel Distribution of OpenVINO toolkit

With preoptimized libraries of functions and kernels, the Intel Distribution of OpenVINO toolkit helps developers code, optimize models, and deploy deep learning inference, computer vision, and hardware acceleration models in heterogeneous environments. OpenVINO’s pretrained deep learning models, which are compatible with a wide variety of open source frameworks, reduce the effort of implementation for retail developers, speeding deployment of the NEXCOM system on Intel® CPUs.

**Intel Movidius Myriad X VPUs**

The AIBooster-X2 deep learning accelerator card includes two Movidius Myriad X VPUs, which are programmable with the Intel Distribution of OpenVINO toolkit for porting neural networks to the edge, and via the Myriad Development Kit (MDK), which includes all necessary development tools, frameworks, and APIs to implement custom vision, imaging, and deep neural network workloads on the chip.

**Intel Celeron processor**

The AIEdge-X system uses an Intel Celeron processor to deliver performance and value on top of power efficiency, enabling it to fit in form factors as small as the palm of a hand.

**Conclusion**

NEXCOM’s AIEdge-X 100 and its AI precision marketing system combine superior performance with advanced technology for precision retail marketing that eliminates the guessing game for retailers and delivers an outstanding shopping experience for customers.

**Key benefits of the solution**

For an Asian supermarket, the NEXCOM’s AIEdge-X 100 and its AI precision marketing system delivered results like these:

- **Reduced stock waste by 20%**
  - By promoting inventory that needed to move, the retailer reduced waste.

- **Increased advertising revenue by 13%**
  - Reach tracking enabled the retailer to charge more for advertising in locations with greater foot traffic.

**Learn more**

**NEXCOM AIEdge-X 100**

The NEXCOM AIEdge-X series is designed to acquire data from devices in the field and analyze and respond in a timely matter from the edge of the network. These compact, fanless embedded players can handle powerful multimedia content in order to increase product interest and dwell time.

**Learn more**

**Intel Distribution of OpenVINO toolkit**

This toolkit gives developers easy-to-access libraries, frameworks, and pretrained AI models to achieve faster time to market for AI vision solutions.

**Learn more**

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1. Source: internal NEXCOM data.

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