SOLUTION BRIEF

Intel® Vision Accelerator Design Products
AI in Retail

Intel® Vision Products Help Advantech Address Major Retail Dilemmas

Real-time shopper traffic mapping helps retailers compete in an ever-changing marketplace

"Advantech is dedicated to developing video analytics software as the core technology. Powered by the new OpenVINO™ toolkit, which delivers a comprehensive toolkit for developing and deploying vision-oriented solutions, and is capable of delivering higher computing and graphics performance, Advantech is launching several solution-ready packages for vertical markets, including people counting, heatmap analysis, facial recognition, and loss prevention. With the OpenVINO™ toolkit, we can easily process real-time video recording and transcoding, human detection and counting, as well as signage management."

—MC Chiang, associate vice president of Service-IoT, Advantech

ADVANTECH

Executive summary

With the rise of e-commerce as an alternative to traditional brick-and-mortar retail, companies are adapting their own innovations around artificial intelligence and computer vision to meet new demands from customers and the modern supply chain.

Technology plays a key role in the current environment of online shopping, enabling online retailers to gain greater understanding of their customers through data acquired from their browsing and purchasing habits. Today, when consumers shop in brick-and-mortar stores, they expect the same personalized and responsive service they receive online. In order to help retail customers achieve that level of service, Advantech deploys a combination of hardware and software: cameras, AI deep learning video analysis technology, and Intel® Vision Accelerator Design products.

Challenges

With foot traffic falling and online shopping options growing, retailers must find new ways to "digitize" and understand real-world behavioral data—such as in-store browsing patterns, staff attentiveness, and specific product interest—in the same way that online retail utilizes big data to optimize online experiences. They must also find innovative ways to keep customers engaged with their brands, especially in expensive brick-and-mortar locations. In this environment, managing labor costs is critical, as these costs are second only to real estate. Assigning and enabling sales associates cost-effectively is key to profitability.

Retailers have an opportunity to meet their challenges by putting new data and Internet of Things (IoT) technologies to work. These can help them gain knowledge about customers and supply chains, and use that knowledge to improve operations and service. But first, they must master the data in their world and determine the right data to capture, then gather that data and use it to drive insights and business decisions.

Solution

Improving traffic counts in retail environments—ranging from small shops to megastores—is vital in maintaining proper inventory levels and managing staff. With the use of the OpenVINO™ toolkit, Advantech is able to enhance the counting efficiency of the UShop+ solution in these very environments. With its UShop EIS AI system, Advantech uses AI video analysis technology, including gateways with Intel® Core™ processors and the new Intel Vision Accelerator Design products, in order to detect human heads and bodies precisely, enabling more precise staff allocation and merchandise adjustment.

Because the UShop system utilizes the OpenVINO toolkit, part of Intel's robust portfolio of deep learning software, Advantech is able to achieve a new level of customization, allowing the company to match performance to the application's requirements, and then deploy it across any product in the Intel Vision Accelerator Design product family. This comprehensive toolkit supports the full range of vision solutions, speeding computer vision workloads, streamlining deep learning deployments, and enabling simple execution across a variety of Intel® platforms from device to cloud.

How it works

The Advantech UShop solution overcomes a hurdle that has hindered widespread adoption of similar retail technology: less-than-perfect accuracy. Intel Vision Accelerator Design products enable Advantech to take advantage of vision-based inference for advanced, highly accurate, and fast edge visual intelligence.

Shopper traffic and heatmap data from the store is collected by IP cameras, stored in UShop EIS, which utilizes Intel® Vision Accelerator Design with Intel® Movidius™ VPU for deep learning inference acceleration, and then transmitted and analyzed on the UShop+ cloud. Retailers can access this data via either a public or private cloud.

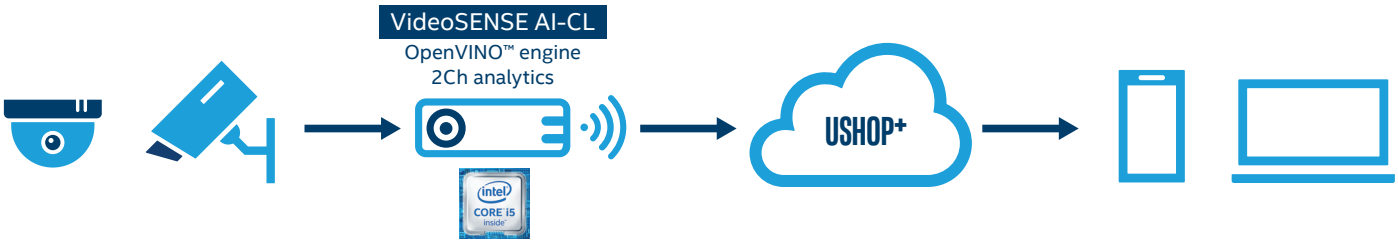
The Advantech system uses the Intel Vision Accelerator Design with Intel Movidius VPU to generate heatmaps and perform traffic pattern analysis to identify how shoppers walk around the store, information that aids retailers in proper merchandise placement in near-real time. This Intel® technology also interprets shopper behavior (such as gestures or reaching for a product), which can be combined with RFID data to identify which items are picked up and purchased versus which items are picked up and put back down thus gleaning further insight into customers' preferences and behaviors.

Intel® Vision Accelerator Design with Intel® Movidius™ VPU

Intel Vision Accelerator Design products provide power-efficient deep neural network inference for fast, accurate video analytics. Intel Movidius VPUs are capable of operating on customizable complex networks and network layers with high compute and ultra-low power consumption, resulting in industry-leading performance/watt/$.

These VPUs are full-fledged systems-on-chip (SoCs), supporting ecosystem solutions for high-quality image processing, computer vision, and deep neural networks. They drive a demanding mix of vision-centric tasks in modern smart devices. Solutions can scale simply by adding VPUs while retaining their core efficiency. The elegant balance of performance and efficiency enables deployment for well-defined deep learning and machine vision workloads. Highly parallel programmable compute is co-located on a common intelligent memory fabric with workload-specific hardware acceleration.

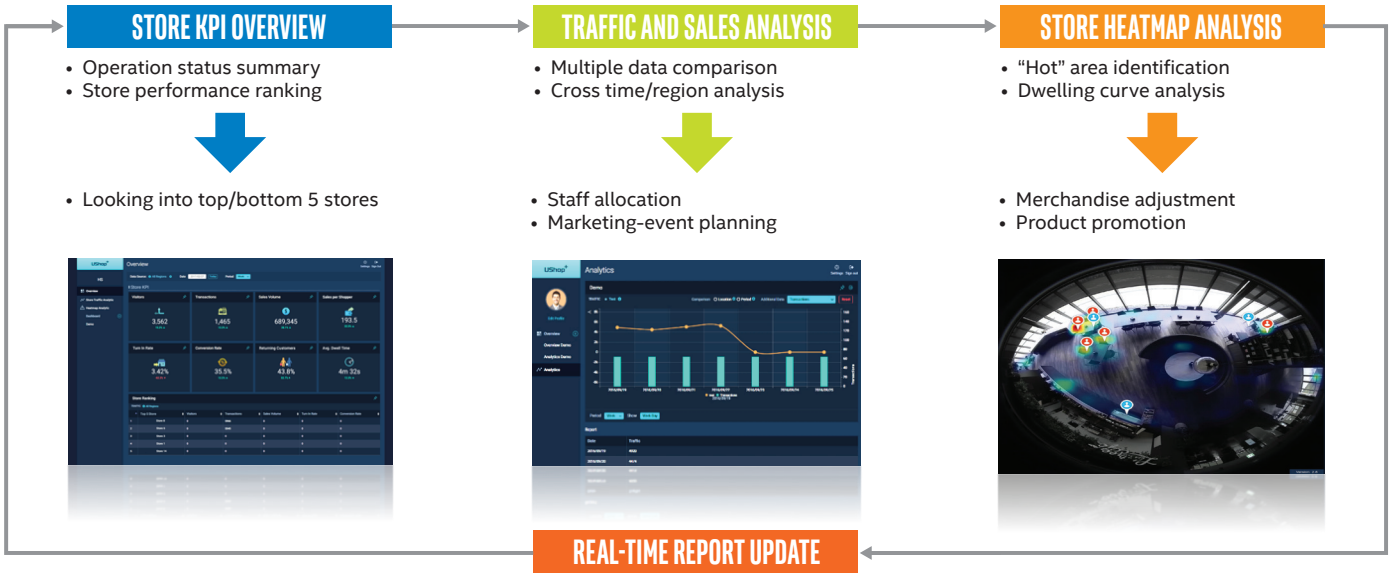
It also enhances the consumer experience with near-real-time intelligent vision by identifying active shoppers and alerting store staff based on the shoppers' behavior. AI algorithms can identify when people are close to the high-end products and alert staff that customers may need help. The technology provides data such as the number of visitors and transactions, point-of-sale data, sales per shopper and the store's ranking, and can distinguish traffic patterns by weather and time of day.



The UShop solution is powered by VideoSENSE AI-CL, an OpenVINO™ toolkit-enabled engine, an Intel® Core™ i5 6300U processor, and two-channel analytics

OpenVINO™ toolkit

The OpenVINO toolkit is a free, downloadable toolkit that helps developers fast-track the development of high-performance computer vision and deep learning into vision applications. It enables deep learning on hardware accelerators and streamlined heterogeneous execution across multiple types of Intel® platforms. It includes the Intel® Deep Learning Deployment Toolkit with a model optimizer and inference engine, along with optimized computer vision libraries and functions for OpenCV* and OpenVX*. This comprehensive toolkit supports the full range of vision solutions, speeding computer vision workloads, streamlining deep learning deployments, and enabling easy, heterogeneous execution across Intel platforms from device to cloud.



Conclusion

Using Intel Vision Accelerator Design products, Advantech has brought to market a store traffic analytics system, the UShop EIS AI, that provides retailers with the information to analyze customer traffic, interpret customer behavior, and improve sales—right in the store. Through an edge-based approach to advanced analytics, Advantech delivers on high accuracy, immediacy of results, and improved data privacy.

Learn more

Explore Intel® Vision Products at intel.com/visionproducts.

About Advantech

Founded in 1983, Advantech is a leader in providing trusted, innovative products, services, and solutions. It offers comprehensive system integration, hardware, software, customer-centric design services, embedded systems, automation products, and global logistics support. They cooperate closely with their partners, such as Intel, to help provide complete solutions for a wide array of applications across a diverse range of industries. Their mission is to enable an intelligent planet with automation and embedded computing products and solutions that empower the development of smarter working and living.

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