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Video Analytics at the Edge Deliver Immediate, Actionable Insights

Outdu's Intel®-based devices analyze video at the edge to serve retail and other high-footfall environments

Executive summary

In the digital world, retailers can easily track metrics such as how many people visit a site, who they are, and how much time they spend looking at each item. However, in the physical world of retail stores—as well as schools, airports, hotels, and other large establishments—gathering and analyzing such data is far more difficult.

Outdu's real-time video analytics solution, built on an Intel® platform, provides an elegant way to meet these challenges. Cameras with built-in artificial intelligence (AI) locally analyze visitors who walk into a site and deliver deep insights that lead to greater understanding of visitor behavior. That, in turn, leads to better customer relationships and the customized experiences people desire in the digital age.

Challenges

For decades, organizations have been trying to learn more about the customers and other visitors who enter their physical environments. To provide more personalized and targeted service, organizations want answers to a litany of questions, including:

- How many people walk in over a given time?
- Who walks in—by day, time, age, and gender?
- How much time do they spend inside?
- What is the average queue length and wait time at each counter?
- Which sections of the store attract more customers (by age and gender)?
- How much time do people spend viewing a specific display or exhibit?
- How many repeat and preferred customers visit?

Manually counting the number of walk-ins was an early way to track visitors, but doing so is costly, prone to errors, and time-consuming. Later, video camera solutions were introduced that feed video to a central server for processing. Video can be an effective tool for gathering deeper information and customer insights, but transmitting video streams requires dependable, and often costly, high-bandwidth connections.

In addition, the servers and other equipment required for many video analytics solutions is expensive, and packaging and sending video data for centralized processing leads to delays. Some solutions also limit participation by requiring customers to alter their behavior—downloading an application or connecting with in-store Wi-Fi, for instance—to receive discounted offers, loyalty benefits, or other rewards.

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Solution

For more than a decade, Outdu has been delivering digital video solutions based on its software products for organizations across India. The company's digital video solutions have been deployed successfully in thousands of locations to drive better customer experiences.

Outdu's solution combines a full-HD camera with in-device edge processing featuring Intel® hardware and software solutions. Out of the box, the solution provides basic guidelines on camera setup and placement, as well as a range of prebuilt analytics, including:

- **Walk-in counter:** Accurately count and profile all walk-ins by age, gender, and other attributes.
- **Audience metrics:** Compare relative attractiveness of exhibits and products.
- **Mapper:** Track journey maps of visitors.
- **Recognizer:** Recognize preferred customers who have registered for or opted in to a loyalty program, and alert staff or trigger other actions such as serving promotions to the customer.
- **Recognizer/enroller:** Recognize repeat customers and alert staff or trigger other actions to initiate opt-in or enrollment.
- **Queue counter:** Manage queue lengths and flow rate.
- **Dwell counter:** Determine time spent in a specific section or aisle of the store and alert staff for possible intervention and assistance.
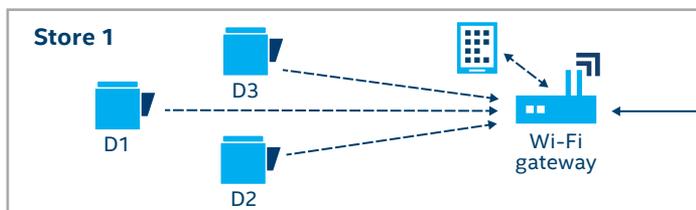- **Responsive signage:** Change signage based on audience.

Outdu also works with customers to develop customized analytics, such as analyzing shelves to ensure that they are stocked appropriately.

The video analytics solution is available for direct purchase or on a subscription model. It can also be bundled by partners such as digital signage providers and kiosk vendors that want to add service lines to their customers.

Sample use case

Outdu's video analytics solution is ideal for organizations with high foot traffic that are looking for greater understanding and classification of customers or visitors, including:

- Large-format retail and brand stores
- Airports and transit stations
- Hotels
- Restaurants
- Museums
- Resorts and parks
- Schools

Large retailer deepens customer understanding

A leading retailer in India sought deeper insights into the customers who walk into its more than 70 stores nationwide. The company has 2.9 million square feet of retail space and serves over 15,000 customers per hour.
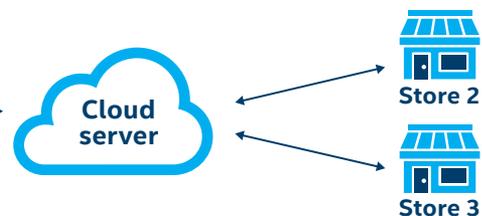
At multiple locations in each store, Outdu placed cameras with integrated Intel® Compute Sticks powered by Intel® Core™ M processors for edge processing. A cloud server was used for cross-camera analytics and reporting.

The video analytics solution not only counted the number of walk-ins but also classified them by time of day, gender, age, color of clothing, eyewear, headgear, and more and tracked their movements at different store locations.

To help the retailer better serve its top customers, Outdu's solution automated two actions whenever a preferred customer entered the store: staff were alerted via their smartphones, and a message was sent to the retailer's customer relationship management (CRM) system for further processing and actions such as delivery of promotional messages or coupons to customers' mobile phones.

How it works

Processing massive amounts of video data at the edge—and as part of small, unobtrusive devices—requires a unique solution.

Outdu's edge devices feature 4 megapixel, full-HD cameras integrated with Intel hardware and software. An Intel Compute Stick provides a compact design and a powerful platform with an Intel Core M processor and integrated GPU for processing video at 30 frames per second (fps). For 60 fps processing, an Intel® Neural Compute Stick is available, powered by the Intel® Movidius™ Myriad™ X VPU, which is found in millions of smart security cameras and other devices that depend on deep learning at the edge.

Outdu's video analytics solution also incorporates the Intel® Distribution of OpenVINO™ toolkit for optimized speed, performance, and scalability. All of the edge devices are connected through an internet connection and Wi-Fi, and data can be uploaded to a cloud server for reporting across multiple locations.

Cameras at different stores process data at the edge and transmit it to staff and to a central cloud server for further analysis and reporting.

Benefits of the Outdu video analytics solution

- **Unobtrusive:** Analytics take place without customers having to alter their behavior or take any action (such as connecting to in-store Wi-Fi).

- **Deep insights:** Video-based analytics provide rich metadata that can include gender, age classification, color of clothing, and more.

- **Limited connectivity requirements:** Edge processing eliminates the high-bandwidth connectivity requirements of other solutions that have to transmit videos to central servers for processing.

- **Low cost:** No additional investments are needed in back-end servers and analytics software.

- **High accuracy:** Analytics are performed on raw video frames, which ensures high accuracy compared to server-based solutions that work on encoded or compressed video data.

- **Detailed counts:** Video-based analytics can provide more-detailed counts than infrared and ceiling-mounted cameras by excluding store staff and avoiding duplicate customer counts.

- **Ongoing learning:** Outdu's AI software, which uses computer vision analytics and algorithms based on deep learning and neural networks, improve over time, as more data is collected. The algorithms can also be customized to meet specific requirements, and the software can be updated as needed, so, for instance, a device that monitored queues can be repurposed for use at the front of the store.

OpenVINO™ toolkit

The Intel® Distribution of 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 OpenCV* and OpenVX* libraries and functions for computer vision. 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.

About Outdu

Over the past decade, Outdu has designed, deployed, and supported telco-grade video logistics, analytics, and reporting solutions for clients across multiple industries. Outdu's cloud-ready software stack has been extended to work with a specially crafted, multisensing device to offer superior video, audio, motion, location, environmental sensing, analytics, and response. The entire software stack as well as the custom hardware has been designed by Outdu, providing a single point offering and support for rapid deployment. Visit outdu.com to learn more.

Conclusion

Using advanced Intel hardware and software and the Intel Distribution of OpenVINO toolkit, Outdu gives organizations a fast, accurate, and powerful video analytics solution. By processing data at the edge, Outdu gives retailers, schools, hospitals, and other organizations deep and immediate insights into visitor behavior—and does so without high server-related costs, disruptions to customers, or high-bandwidth connections.

Learn more

For more information about Outdu, please visit outdu.com or email sales@outdu.com.

For more information about Intel® IoT Technology and the Intel® IoT Solutions Alliance, please visit intel.com/iot.