How to **Reduce Shrink** and **Maximize Profit** in Retail?

AxxonSoft Retail Solution is a comprehensive, flexible suite for retailers that matches technologies for ensuring point-of-sale safety and security with video analytics for gathering useful information.

It supports automatic reactions to different events as well as a range of forensic video analytics tools. You can add an unlimited number of servers and remote workstations. The result? A protection system that is perfectly adapted to the needs of your point of sale or retail chain.

With AxxonSoft Retail Solution, retailers can: supplement strategic and short-term planning by capturing and cataloging real-world marketing information, reduce expenses, improve return on capital, gain a powerful system for managing company resources, and boost the bottom line.

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What AxxonSoft Retail Solution Can Do?

- ☑ Combine video surveillance with powerful, AI-based and classic computer vision analysis, in both live and recorded video modes.

- ☑ Count visitors to deliver traffic data for analyzing a stores' foot traffic, sales conversion rate, and customer acquisition efficiency.

- ☑ Detect queues to know how many customers are in line so as to facilitate the handling of human resources in both the short- and long-term.

- ☑ Recognize faces to identify known shoplifters or any other subjects of interest right at the door to then notify store personnel.

- ☑ Guesstimate visitors' age and gender to collect data for customer analysis, digital signage targeting, and other marketing purposes.

- ☑ Heatmap visitor activity within a salesfloor to represent the number of visitors and time spent in different store areas.

- ☑ Supervise cashiers' operation to offer a complete picture of what is happening at the checkout.

- ☑ Utilize any specific or combined data from the Retail Solution tools to build custom online reports for any store in the retail chain.

- ☑ Control the number of visitors entering a store to comply with anti-pandemic restrictions.

Smart Surveillance for Retail

Video Protection and Security 24 Hours a Day

AxxonSoft Retail Solution allows creating a video surveillance system with an unlimited number of cameras, servers, and operator and administrator workstations. Remote management and administration allow setting up a central monitoring hub for collecting information from all of your chain's stores.

Retail Solution supports both analog and IP cameras and encoders — over 10,000 models from various manufacturers can be plugged in without a hitch. The solution also incorporates support for the ONVIF industry standard and H.264, H.264+, H.265, and H.265+ video codecs. Here is how standards compliance pays off for you: You can efficiently budget for diverse camera types based on the type best suited for the job, whether it's expensive IP hardware for resolution intensive areas (such as cash registers) or analog cameras for elsewhere, and reduce security costs by smoothly integrating Retail Solution with the cameras you already have installed.

AxxonSoft Retail Solution also allows to perform remote video surveillance and viewing of recorded video. You can even manage PTZ cameras through a web browser on your PC — or from your Android or iOS device.
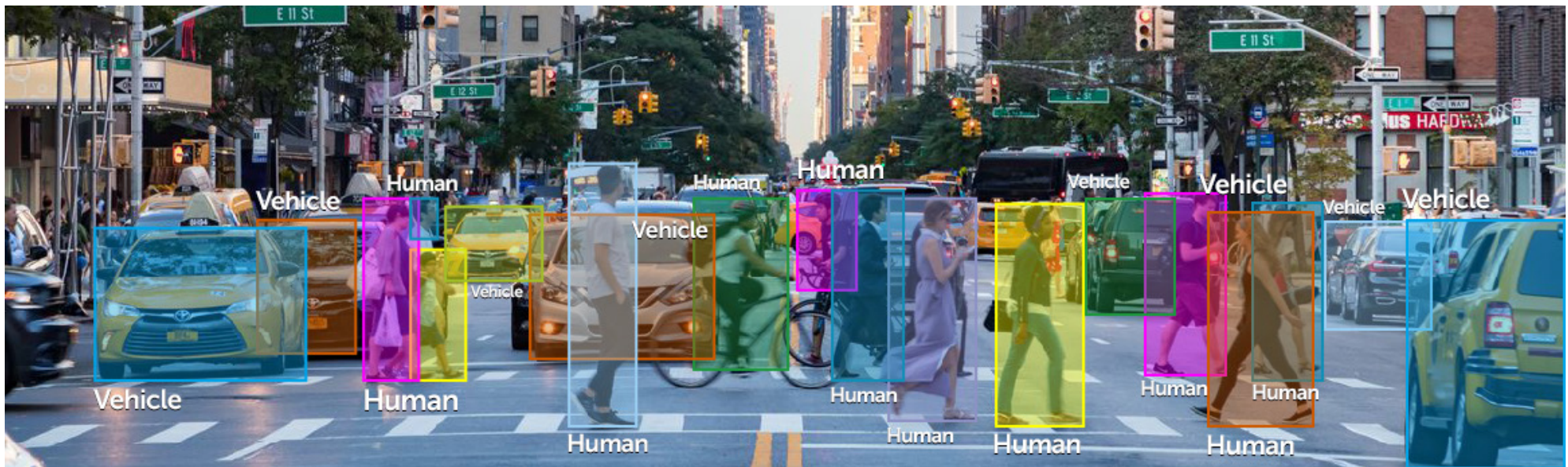
Powerful Video Analytics

Quick Reactions to Alarms and Efficient Post-Analysis

Rich tools for video analysis in AxxonSoft Retail Solution automate video surveillance and reduce the room for human error inherent to less advanced methods. The solution also supports on-board video analytics bundled with IP cameras by various manufacturers.

Why choose AxxonSoft for your video surveillance system with forensic video analysis?

- Recognize situations of risk early on by detecting specific human postures: for example, a cashier's raised arms, a person in a shooting position, or a man lying down.

- Pinpoint unusual activity in store departments and street/sidewalk areas, for timely reaction to attempted intrusion, burglary, and vandalism.

- Monitor when a camera goes offline, which may indicate a criminal threat.

- Use smart forensic search to find video nearly instantly based on criteria that you set regarding object behavior in the field of view.

- Apply search by faces and plate numbers across multiple cameras to quickly retrieve video episodes with a person or car of interest.

Intel® Products to Increase Video Analytics Performance

Video analytics requires sizable computing resources. For example, if the number of camera channels exceeds 10–20, it's almost impossible to build a cost-effective AI video surveillance system without using dedicated AI accelerators. To optimize the workload and ensure that video analytics operate quickly, AxxonSoft have partnered with Intel and now uses their accelerators and specialized tools in its products.

Intel® Distribution of OpenVINO™ Toolkit

OpenVINO™ is a toolkit for computer vision applications which extends workloads across Intel® hardware (including accelerators) and maximizes performance. Intel® Distribution of OpenVINO™ toolkit is applied for neural network inference in AxxonSoft AI analytics tools.

Intel® Vision Accelerator Design Products

AxxonSoft boosts AI performance using Intel® Vision Accelerator Design products with Intel® Movidius™ VPU:

- Mustang-V100-MX8 accelerator card,
- Neural Compute Stick 2.

Intel® Quick Sync Video

Intel® Quick Sync Video is a technology available on Intel® processors that provides hardware acceleration for video decoding. The decoding is performed by GPU, which significantly reduces the server's CPU load when applying video analytics, and the client's CPU load when displaying video feeds.

Using client-side hardware video decoding results in:

- Dramatically improved decoding times, which is essential for smooth playback.
- The client can display more cameras, or you can use client computers with lower performance specs.

Benefits of server-side hardware video decoding:

- Servers can handle more concurrent video streams at HD resolution and even higher.
- More cameras can be connected to a single server, reducing hardware expenses and support issues.

This is how Intel® products and technologies help you build value-added solutions with AxxonSoft software.

Visitor Counter

More Effective Planning of Marketing Promotions and Staff Allocations

The visitor counter uses video footage to count the number of people who have entered or exited a store, as well as those inside a designated area inside a store.
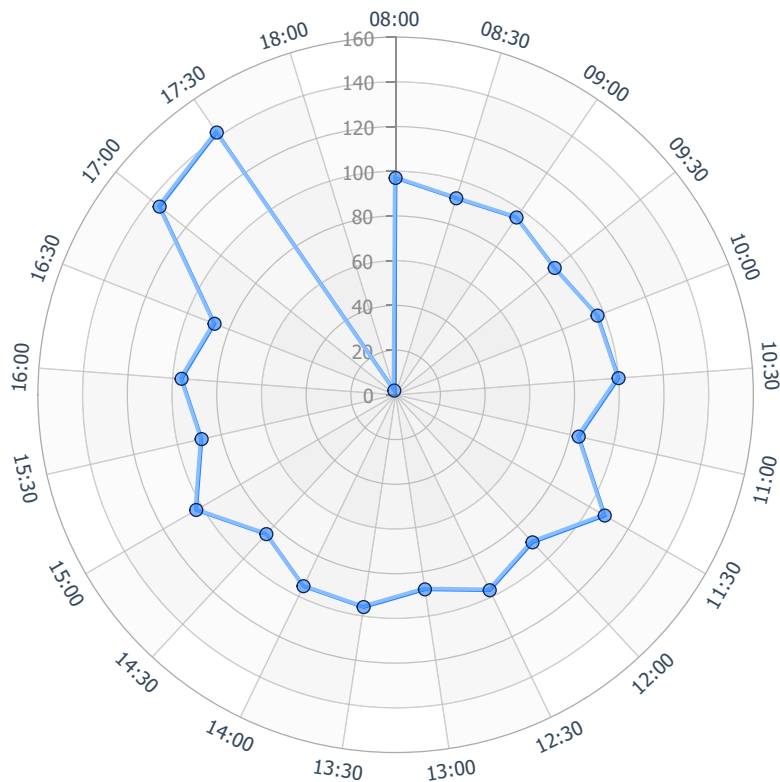
Why use the visitor counter?

- Know how many visitors there are. Accumulate and analyze data on how many people visit the store and when.

- Compare visit statistics on different days of the week, for improved planning and marketing.

- Improve customer service by smartly planning staff hours around peak times.

- Perform long-term and short-term strategy planning based on statistics about store visits.

- Compare performance between stores.

- Combine visitor data with transaction information in order to calculate the conversion rate at which visitors follow through on purchases.
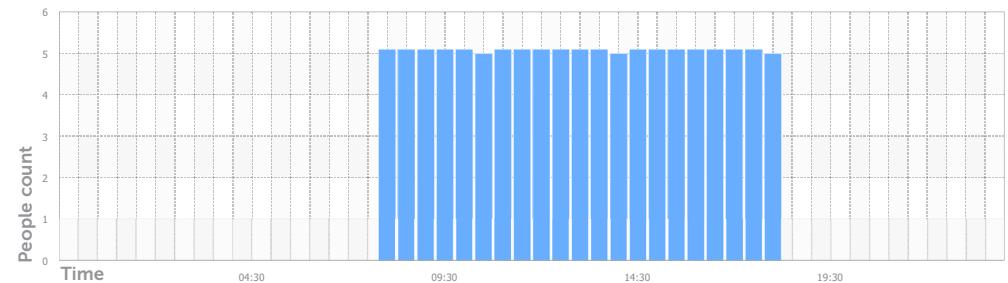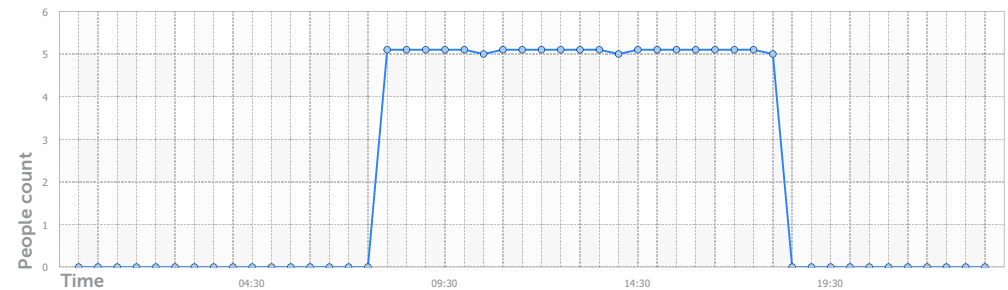
Visitor distribution by hour
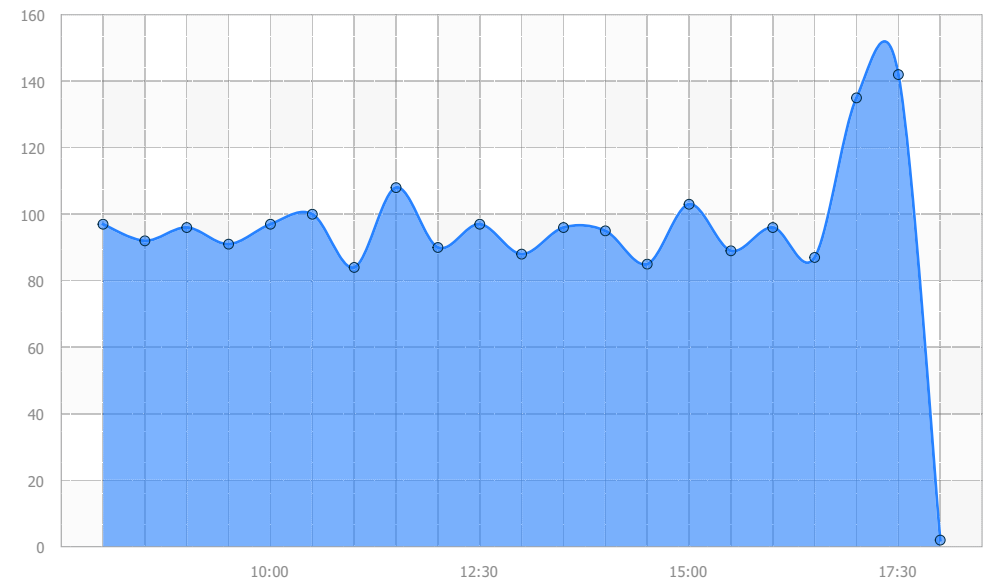
Queue Length Detection

A Boost in Operational Efficiency

The queue length detection tool is designed to measure the load on checkout registers. The detection tool derives data from video sent by a camera aimed at the checkout area.

Why use the queue length detection tool?

- Get real-time information on how busy cash registers are, allowing you to:

  1. optimize staff working schedules,

  2. redesign floor layouts if necessary,

  3. calculate the necessary number of cash registers based on actual customer demand.

- Improve customer satisfaction by quickly reacting to changes in the check-out area and activating additional cash registers.

- Perform both short-term and long-term management of human resources based on historical data on cash register loads during certain time periods, seasons, days of the week, etc.

# Facial Recognition and Age and Gender Guesstimation

Identify Subjects of Interest and Collect Data for Customer Analysis

You can create watchlists and list-specific response scenarios and synchronize them across all servers. Upon detecting a face, a response scenario is launched. Use this option to create lists of VIP and/or unwanted visitors, and automatically notify retail and security staff on their entry. The watchlists can be replenished using footage from video surveillance cameras installed in stores.

The facial recognition tool guesstimates the age and gender of visitors as well. The visitor demographic data helps effectively manage the assortment of each store and plan sales promotions.

Why use the facial recognition?

- Increase the speed of security staff reaction to the appearance of shoplifters and known offenders.

- Enhance customer service and improve customer satisfaction.

- Utilize data for customer analysis, digital signage targeting, and other marketing purposes.
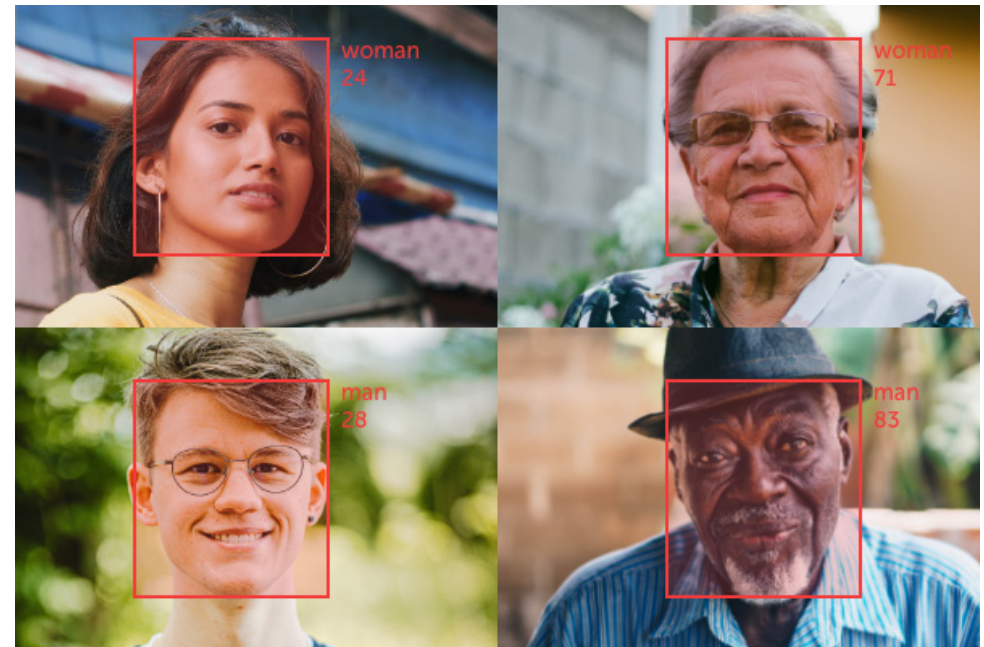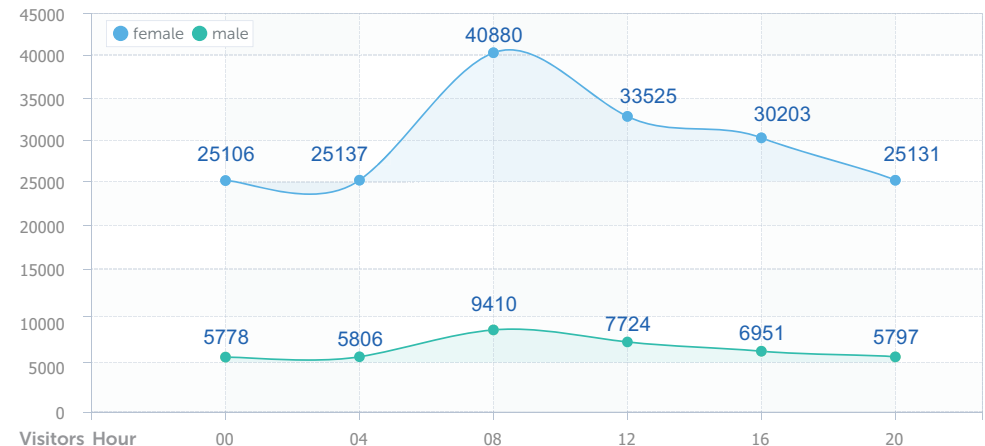
Visitor Activity Heatmapping

A Potent Way to Understand Customer Behavior

The motion heat map is designed to gauge visitor interest in different areas of a store: stands, showcases, shelves, advertising areas, etc. Based on the video received from cameras, the detection tool determines where visitors stop as well as how long they linger. The ratio of total stops at a place of interest to the total period observed is reflected in the visitor activity value for the place in question.
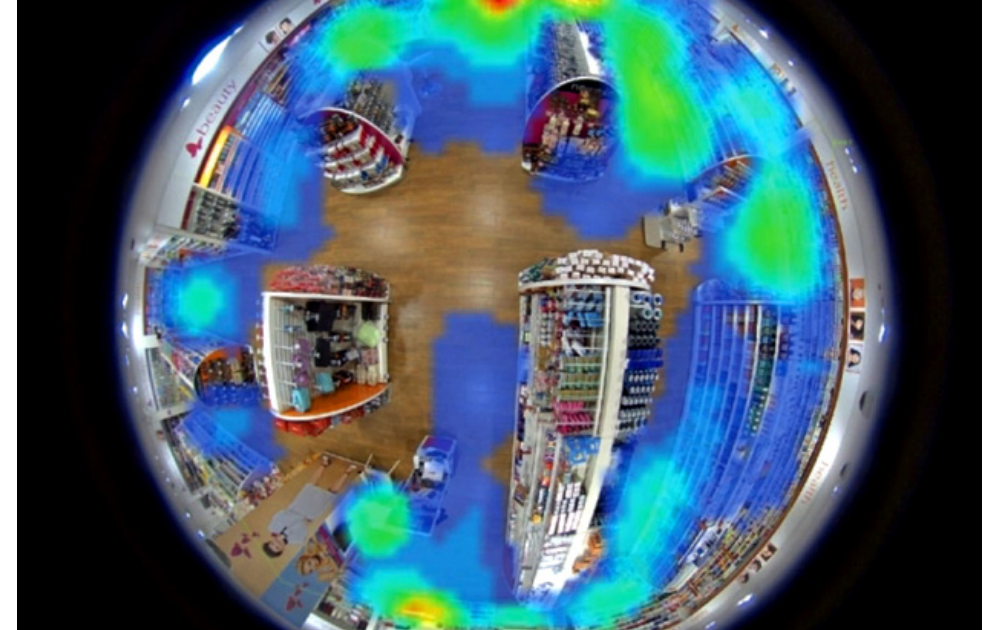
Why use the motion heat map?

- Evaluate the effectiveness of direct advertising (LCD advertising, booklets, advertising posters, banners, etc.) by measuring the duration of visitor presence and calculating the advertising ROI (return on investment).

- Measure how effective promotions are:

  1. compare different promotions for a product held at different times and

  2. identify the areas of the store best suited for events and promos.

- Based on information about the busiest store areas, optimize store layout by eliminating bottlenecks and less-trafficked areas.

- Measure the effectiveness of product choice and placement, in order to find the best price proposition for manufacturers.

- Compare the results of placing a product in different areas of a store.

- Build on successful tweaks to store layout, product selection/placement, and promo events to replicate improvements at other stores.

- Allocate staff hours and locations efficiently.

- Gauge store efficiency and visitor load.

POS Supervision

Loss Prevention and Improved Service

Thanks to monitoring of checkout transactions, AxxonSoft Retail Solution allows synchronizing information from a cash register with the video from a camera overhead.

The data from the cash register is analyzed to check for suspicious events, theft, fraud, etc. Any retailer knows about the kinds of events that can serve as «red flags» — here are some of the most common situations:

- Fraud with credit and discount cards.

- Theft of cash disguised as giving change.

- Failure to print a receipt or ring up part of a product.

- Change in receipt contents in favor of the cashier.

- Barcode swapping with a cheaper product.

- Unauthorized use of the discount option.

- Ruses that allow accomplices to carry goods out of the store without paying.

- Cancellation of a receipt (canceling a sale) after the customer pays, pocketing the money.

- Acceptance and pocketing of a returned product without ringing up the refund transaction.

- Fake refunds/returns.

How does AxxonSoft Retail Solution help to stamp out fraud?

During surveillance in real time or when viewing previously recorded video, the operator sees video of the transaction on the screen, which shows the customer at the register and text information as captions. This information includes the text of the receipt and events at the cash register that are not displayed in the receipt, such as opening of the cash drawer or manual entry of a product code. This approach allows seeing the full picture of events occurring at the point of sale.

There are many reasons to trust AxxonSoft Retail Solution, but perhaps the biggest one is this: If left with just the naked eye for monitoring video feeds, even the most experienced and trustworthy operator runs the risk of human error and not noticing an important event. A solution to this problem is supplied by the robust system for automating processes and writing scripts to react to defined events.

One automatic reaction, for example, could consist of generating an alarm about an important event that occurs at a cash register and displaying it on the operator's screen. As crooks cook up new fraudulent schemes, you can respond in record time, by entering potentially dangerous events in the system and programming automatic reactions to them. Now your security staff can stay a step ahead of the bad guys!

Checkout transactions monitoring

Search of captions. AxxonSoft Retail Solution allows searching for recorded video based on caption contents. Searched text includes all text information contained in receipts. This means you can search by product name, discount code, cashier number, receipt amount, etc.

Replays and freeze-frames. When viewing recorded video, you can adjust playback speed and view individual recorded frames — such as when a particular product is swiped — so you won't miss a single detail.

Customizable search and report display. You can use standard queries or create your own when searching for recorded video. The query result will be displayed on the screen as a list of retrieved receipts. You can then view the video fragment corresponding to the selected receipt, together with captions, as well as print the receipt text or still frame for a selected receipt line or save it to a file.

The set of standard queries in the system includes searches by:

- Product list.
- Product returns/refunds.
- Receipt total.
- Number of receipt items.
- Discount amount.
- Product weight.
- Multiple item swiping.
- Discount information.
- Product code, list of all receipts during a specified time period.
- Total receipt amount within a selected range.
- Report on all products.
- Canceled sales.
- Cashier number/last name, or for all cash registers simultaneously.

- Receipt number and product name/code.
- Presence of multiple identical products in a receipt.
- Presence of certain products in a receipt.
- Product price.
- Canceled receipts (with negative amounts), canceled receipts (with receipt numbers), and double-swiped products.
- Ten most sold products.
- Sales per time period.
- Receipts with canceled items.
- Top products by sales amount.
- Top products by quantity sold.
- List of all postdated receipts.

Automatic highlighting. To make sure that operators don't miss any events, you can designate special text that, when found in the captions of a transaction, will be highlighted in a unique color. For example, such text could be the name of a certain product or the word "canceled". This function improves efficiency and reaction times for installations with real-time video surveillance.

Why monitor checkout transactions?

- Investigate shrink using combined video and transaction data.
- React quickly to alarms in real time, preventing theft and fraud and reducing losses.
- Efficiently monitor staff and cash register actions.
- Improve customer service.
- Resolve disputes with customers in a more efficient way.

Online Reports

Remote Access to Useful Data

One of the most liberating features of AxxonSoft Retail Solution is centralized monitoring and analysis of all of a retailer's locations. This is implemented through web reports, which can be securely accessed from any ordinary web browser on any Internet-connected device, allowing you to:

- View reports on cash register events, with corresponding video and receipt text.

- Get a heat map of visitor activity at a retail location.

- Get statistics on the number of visitors to a retail location or store department during a defined time interval.

- Get information about the number of customers in cash register lines.

- Get visitor demographic data statistics.

- Print and email reports.

Web reports can be made available both to operators at a central monitoring hub and to managers, security staff, and executives for remote access to necessary statistics.

Real-Time Occupancy Monitoring

Compliance with Anti-Pandemic Restrictions

To help people maintain social distancing, supermarkets, grocery stores, drugstores, banks, and other facilities allow a certain number of customers per square foot to enter. They have to pay a staff member to stand at the door and count people who enter and exit. This approach has several drawbacks: the count may be inaccurate, customers have no idea how long they have to wait to enter, and only one entrance can be open at a given time.
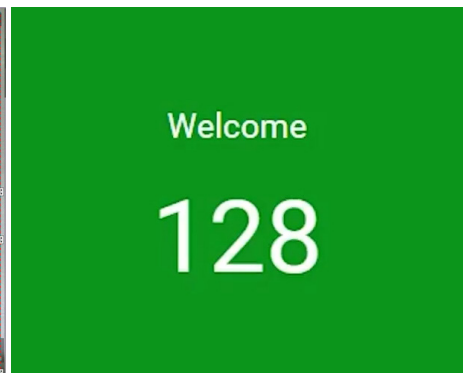
AxxonSoft's people counting tool provides automatic real-time occupancy monitoring based on camera video feed. No physical personnel are required to control traffic at the entrance, while data from multiple doorways is combined.

It is quick to install and easy to configure:

1. Set two areas in the image.

2. Specify direction of movement: arrival from area 1 to area 2, exit from area 2 to area 1 (or vice versa).

3. Calibrate the approximate size of a person in the image or use AI object detection, which accurately detects humans.

4. Install a display panel at the entrance to inform customers whether they can enter or whether the maximum occupancy has been reached and they should wait.

5. Alert staff if the capacity limit is breached.

Unlike hardware sensors, AxxonSoft's detection tool handles situations when several people walking side by side enter the store, as well as when several people are moving in different directions at the same time.

Visit statistics can be accessed through web reports or used in numerous ways through configuration of automatic scenarios.