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Using Video Surveillance To Improve Retail Operations

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USING VIDEO ANALYTICS TO FIGHT RETAIL SHRINK

by Marc Holtenhoff, Aimetis

The economy may be improving, but some retail challenges just won't go away. Global shrink cost retailers \$107 billion last year, according to the Global Retail Theft Barometer, an annual study by the Centre for Retail Research. In the United States alone, that figure was \$39 billion, representing 1.5% of retail sales. The study also shattered the myth that retailers need only worry about shoplifters. In fact, it identified employee theft (44%) as the primary source of shrink in North America, followed by shoplifting (35%) — meaning retailers need to be vigilant in both areas.

The good news is that there are more and better tools to combat theft, including video analytics software. In a nutshell, this technology automatically analyzes video to detect and determine events based on multiple images. The best way to appreciate what video analytics does is to compare it to traditional video motion detection. Unlike motion detection, which assumes every pixel change is significant, analytics filters out uninteresting store activity or irrelevant scene changes, such as shadows or change in weather to ensure that only qualified alarms/events are delivered to users.

Retailers have gradually reduced the use of motion detection because of its shortcomings. Even something as benign as light changes caused by headlights after hours may cause alarms to trigger. In contrast, video analytics is capable of distinguishing relevant activity in a store when it occurs and then "remembering" the details of that activity so that it can be easily found during an investigation or to provide intelligent information in the form of reports or graphs that can be interpreted by users. As a result, video analytics greatly reduces false alarms and provides better loss prevention capabilities as well as other functions such as safety, marketing, operations, etc., which will be discussed in the next column.

In recent years, four factors have propelled the increased use of video analytics, including increased processing power, algorithm optimization, VMS integration and mobility.

Increased processing power in cameras and servers: Moore's law applies to the exponential increase in processing power that has been made available in both cameras and servers. As a result, retailers can run analytics directly on cameras, while in the server, the use of OpenCL with analytics enables the use of processing power available in graphic processing units (GPUs) available from companies such as ATI and NVIDIA. As in PCs, an increase in power enables applications that simply weren't pos-

sible before. For example, more CPUs are required for detecting small objects moving quickly. This is because the engine needs to run at a high resolution (to detect small objects) and also at a high frame rate (track fast objects). That has enabled retailers, for example, to identify and track small items that shoplifters may grab and carry quickly to exits, such as iPods, or better segment individual items removed from a shelf.

Optimized algorithms: With increased processing power have come better algorithms. This has not only enabled new applications but improved existing ones. For example, consider the advantages of better segmentation. Knowing whether it was one or five people who just walked onto a loading dock gives you a better sense of what may be happening and reduces false conclusions.

VMS integration: Since the value of analytics is only as good as the video management software (VMS), some providers have been integrating them into their systems. VMS's can integrate the metadata, making data more usable for alarming, reporting, video review, etc.

Mobility: With more retailers installing cameras, video data is being created at an unprecedented rate. Meanwhile, it becomes a nearly impossible task for security monitoring personnel to notice all relevant or potentially threatening activity. The ability to send alarms directly to mobile devices on roaming staff enables those close to the scene to be directed there immediately for either security or to assist customers.

Whether it's to protect loading docks, exit points or merchandise on shelves, video analytics now offers a number of proven loss prevention applications:

Outdoor perimeter: Many retailers, including big box stores, are located in rural areas far from police stations. That may encourage thieves to break in, stuff bags full of valuable merchandise and then escape before the police can arrive. By monitoring the outdoor perimeter, video analytics can be set up to identify and send an alert when a vehicle or individuals approach the building within, say, 150 feet after hours. Then central monitoring or mobile personnel can examine the

situation to determine if there is a crime in progress. One retailer that had been using motion detection gave up after a week because it averaged 300 false alarms per night. By implementing video analytics, it reduced the number of alarms to a manageable four.

Loading docks: One of the ways employees steal from retailers is to leave loading dock doors unlocked or hide goods nearby the dock for afterhours pickup. Using analytics, an application can be set up so that anytime an individual or vehicle stops for more than one minute outside the loading dock an alarm is sent.

Exit points during store hours: Many large retailers use electronic article surveillance (EAS) to notify them if customers are taking merchandise through exit points without being disarmed at the point of sale. The problem is, as anyone who shops knows, that often when the EAS alarm sounds, cashiers either ignore it or wave the shopper through. Video analytics can be set up to automatically shoot video following an alarm to determine if staff is checking these shoppers. In one case, a retailer suffering high level of shrink noted that alarms went off 20 times during a day without staff verifying purchases. Once staff were identified and warned, this problem didn't reoccur and shrink dropped dramatically.

Protecting high theft items: Every retailer has its own set of high-theft items. Video analytics can be set up in different ways to address the problem. First, it can notify roaming staff if someone is loitering next to high theft items for more than one minute. In such cases, they can come over to assist the customer and perhaps even make an up-sell. As a practical matter, such interventions also scare away potential shoplifters. Another approach is to have analytics focus on high-theft shelf items and trigger an alarm if more than a certain number are removed from the shelf, since we know that this behavior is a leading indicator of theft. At that point, roaming staff can determine whether that the shopper is paying for these items.

Video forensics: Most retailers aren't staffed for real-time video analysis. With sophisticated video analytics, retailers can quickly review video to

identify specific employee or shoplifter activities. For example, with motion detection, it may take hours of review to identify who stole a Blu-ray DVD during the past 24 hours. That likely wouldn't be worth a store's time. But with video analytics, a retailer could set up a search for when someone stopped at that location for more than five seconds and then dropped a wrapper in the aisle before leaving. That review would only take seconds.

Employee and shopper thefts remain difficult and costly problems. Considering the total price of a video surveillance system, it may cost only 5% more to add sophisticated video analytics. And with recent advances in video analytics, which have reduced the number of false alarms and increased the number and quality of loss prevention applications, retailers can put a serious dent in their shrink problem at a reasonable investment.



ABOUT THE AUTHOR

Marc Holtenhoff is CEO and director at Aimetis. Holtenhoff has close to 20 years of leadership experience at successful, growth oriented technology companies. At Aimetis, Mr. Holtenhoff is responsible for the organization's corporate strategy, financial performance and overall growth. Prior to Aimetis, Mr. Holtenhoff was the CEO of California based 1GlobalPlace, Inc.,

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