

THE BEGINNER'S GUIDE TO DEPLOYING INTELLIGENT VIDEO ANALYTICS



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CHAPTER 1 DERIVING EXPONENTIAL VALUE FROM YOUR VIDEO SURVEILLANCE INVESTMENTS

With more than one billion video surveillance cameras installed across the globe, to say video surveillance (CCTV) systems have been widely adopted is an understatement. Organizations typically monitor video in real-time to detect abnormal behavior and situations or review footage during post-incident investigations. The challenge, however, is that cameras create an overwhelming amount of video content. For any given instance, security operators may be tasked with reviewing thousands of hours of footage, but the lack of time and resources needed to review all the video or fully comprehend the data presents an impossible task. Even if staff had time to review all the footage, the risk of human error is always present in the evaluation. As a result, most video data goes underutilized.

This guide will explain how video analytics technology has emerged to empower organizations and will teach you how to harness video content as data intelligence, overcome the challenges of traditional video surveillance, and drive exponential value from video surveillance investments. It will explain what video intelligence software is, how it works, and important factors to consider when integrating video analytics in your organization.

CHAPTER 2 WHAT IS VIDEO ANALYTICS?

Video analytics technology is a software solution that transforms video data from surveillance networks into structured information that can be acted on and analyzed. By detecting, identifying, extracting, and then classifying and indexing the objects and behaviors in video footage, video analytics enables operators to organize the data for applications such as searching and filtering recorded footage, alerting on detected objects or behaviors in live video, and visualizing trends and patterns captured over time.

Video content analytics software identifies and recognizes objects in video and indexes them according to class or attribute criteria which can be searched, alerted on, and analyzed for developing strategies, benchmarking trends, and configuring rule-based alerts for anomalous activity and conditions.

By extracting the valuable insights in video content, organizations can:

SEARCH & FILTER VIDEO TO ACCELERATE INVESTIGATION

Rapidly pinpoint objects and people in video for forensic video review of crime, compliance, and other investigations.

TRIGGER ALERTS TO INCREASE SITUATIONAL AWARENESS

Real-time alert configuration based on object classification and recognition for responding to developing situations

AGGREGATE VIDEO DATA TO DERIVE INTELLIGENCE

Long-term trend analysis and data visualization for strategic decision-making

2000.0.

CHAPTER 3 HOW DEEP LEARNING & AI DRIVE VIDEO ANALYSIS

Comprehensive video analytics technology breaks video down into metadata to make video searchable, actionable, and quantifiable for various video analytics applications. This is made possible by Deep Learning, a type of Machine Learning in which Deep Neural Networks (DNNs) are trained — similar to the way humans are taught — to recognize and identify objects and patterns from massive amounts of data. This technology is what makes it possible to break live or archived video into structured data and leverage the resulting metadata for quantitative and qualitative analysis.

Traditionally, video surveillance cameras have been used by physical security and law enforcement teams to drive investigations and improve real-time situational response. However, in recent years they discovered that they can get much more value from video surveillance networks by complementing them with video content analytics solutions. As a result, video analytics is now used not only by physical security and law enforcement professionals, but by a variety of operators across a diverse array of organizations and industries.

WHO USES VIDEO ANALYTICS

- Physical Security & Law Enforcement Officers
- Compliance Officers
- Operations Directors
- Urban Planning
- Marketing & Merchandising Managers
- Corporate Headquarters & Cross-Site Managers

PHYSICAL SECURITY AND LAW ENFORCEMENT

The extensive search functionality of video content analytics software empowers security and law enforcement professionals to conduct forensic review of video footage, rapidly and accurately. This ability to filter and focus video review, across multiple cameras, accelerates post-incident investigations and reduces time to target. Officers can filter objects according to criteria such as gender, color of clothing, vehicle type and color, direction of travel, as well as by license plate or face recognition.

These filters can also be applied in real-time, across multiple cameras, to trigger alerts. For example, if officers are on the lookout for a red sedan, they can create a realtime alert that triggers if a vehicle match is detected in a live camera view. Similarly, if officers are looking for a specific suspect, missing person, or vehicle of interest, they can create a digital watchlist based on still images and use facial recognition or license plate recognition to receive notifications when possible matches for objects of interest are detected.

Security and law enforcement teams also use video analytics to increase awareness of unfolding situations, such as crowding, inactivity, dwelling or loitering, or sudden, unexpected environmental changes to prevent or quell incidents. Once the analytics system operators have aggregated data to determine benchmarks for normal activity in a camera view, they can create rule-based alerts to be notified when something unexpected occurs. For example, a person dwelling in an area for an unusual length of time, might be something worth investigating – it could indicate that he or she is having a medical emergency or is intending to commit a crime. A dwell alert would notify the video analytics operator and the security manager, who would then assess the situation and respond as necessary. Similarly, they can set up alerts to notify staff of lighting changes, when the number of people in a specific area exceeds a maximum threshold, or if a vehicle crosses a line into a pedestrian-only area. Attaining situational awareness empowers officers to respond to potential risk indicators in real-time.

Because video content analysis records and aggregates events and objects over time, security and law enforcement teams can also derive operational intelligence to help prevent incidents and observe patterns, such as traffic volume, average vehicle speed, and traffic violations, like U-turns, to better enforce traffic safety. This long-term data can also help officers observe behavioral patterns to help them solve criminal investigations. For example, heatmaps that visualize pedestrian traffic have been used to help officers identify a "drug house" on a particular street.

COMPLIANCE

Many organizations and business sectors are driven by safety mandates and regulatory requirements that can be monitored, enforced, and improved based on video intelligence. In some industries, these compliance issues can even determine whether a business establishment is allowed to continue operating. Management can use video analytics to drive the compliance process, from assessing patterns to developing audit reports and detecting violations, both in real-time and post-event.

For example, construction sites and manufacturing plants typically require visitors and staff to wear hard hats. By leveraging video analytics, managers can generate reports that illustrate where and how often employees are complying with this workplace safety rule. Additionally, analytics operators can set up real-time alerts that notify managers when an employee or visitor is not wearing the required personal protective equipment on a jobsite. When writing an incident report, operators can search video to investigate whether injured parties were in compliance with safety mandates.

Compliance is also critical to the banking industry, as banks are required to have multiple tellers present when money is counted. In this situation, a video analytics system can provide video evidence, or it can send a real-time, peoplecount alert whenever the number of persons in a vault falls below a minimum threshold. Finally, for properties with occupancy limitations, video analytics can track the number of persons who have entered or exited the building and issue real-time alerts when building occupancy exceeds the predetermined threshold.





OPERATIONS

Operations managers are tasked with ensuring that facilities are well-maintained and functioning smoothly, staffing is sufficient, and customers are served efficiently. Video analytics enables them to operate productively in a number of ways.

Customer service, property management, maintenance teams, and operations managers can leverage video intelligence to streamline pedestrian or vehicle traffic flows inside and outside their facilities, reduce crowding or long queues, and optimize facility cleaning and maintenance. For example, when a specific threshold of people has entered a restroom, changing area, or food court, real-time alerts can notify maintenance managers to conduct cleaning based on actual facility usage rather than a time-based schedule. Likewise, crowding alerts can be sent when a crowd or traffic bottleneck is forming, and people-count alerts can flag whenever there are long queues at checkout counters.

Video analytics also generates data visualizations and heatmaps that illustrate trend activity such as object interactions, navigation paths, and dwelling duration. This allows managers to review reports that illustrate area usage, which supports intelligent decisions for scheduling and staffing to ensure positive guest experiences and optimized workflows.

URBAN PLANNING

Much like facility and operations managers, urban planners seek to make communities safer, cleaner, more efficient, and economically proficient. To accomplish their goals, they need to base their planning decisions on quantitative and qualitative data. Typically, urban planners need pedestrian, bicycle, and vehicle traffic data to inform their decisions about planning roads, intersections, parks, buildings, crosswalks, and street signage. They must identify areas that are most or least popular, or areas that commonly experience accidents. Video content analysis provides that data in the form of heatmaps, reports, or graphs.

CORPORATE HEADQUARTERS & CROSS-SITE MANAGEMENT

For organizations that operate multiple sites across a country or the globe, video analytics can offer value in providing a centralized overview of how each location is performing. While each individual site might leverage video analytics for its own performance monitoring, corporate headquarters may find it even more valuable to centralize business intelligence to evaluate regional or global trends. Analyzing this data from multiple stores, branches, or sites provides key business insight to corporate executives so they can see trend differences between locations, draw conclusions, and make strategic business decisions about their entire business operation.

MARKETING & MERCHANDIZING

Similarly, merchandise and marketing managers use video analytics to gather demographic data about customers and shoppers who walk by the store without entering. By gathering business intelligence, they can make datadriven decisions about store traffic, layout, and product placement. This includes granular data, such as how many people walked by the store entrance in a day, and how many entered the store; as well as trend data, including which aisles or product kiosks did they visit most often over the course of the day/week/month? By generating dashboard reports that offer visual graphs and traffic heatmaps, video analytics helps marketing and merchandising stakeholders understand behaviors, demonstrate trends, and improve customer experiences.

Furthermore, real-time alerts – such as occupancy or people counting alerts that notify customer service managers when there are long checkout queues or crowding in areas of the store – are instrumental to adjusting staff deployment for improving customer service. Video analytics can also be used to differentiate employees from guests so operators can understand whether there's adequate staff on the floor to serve customers. For loss prevention, asset protetion, and customer engagement alike, dwell alerts can indicate if a customer is spending an unusual amount of time in part of a store so an associate can be mobilized to assist or investigate.

CHAPTER 5 IMPORTANT FACTORS TO CONSIDER WHEN CHOOSING A VIDEO ANALYTICS SOLUTION

FLEXIBILITY & SCALABILITY

Because video intelligence software is applied so broadly and differently by each type of organization, the deployment requirements vary and are unique to the individual needs of the implementation. For this reason, organizations need flexibility when it comes to architecture and deployment options.

IT requirements and video surveillance technology trends evolve over time; so, when investing in a video analytics solution, organizations should seek freedom of choice when it comes to deployment (on-premise, cloud, or hybrid), cameras that can be integrated, as well as user types and permissions for accommodating growing organizations with various security, operational, and business needs.

Similarly, it is advantageous for end user organizations to invest in video intelligence solutions that are architected to ensure seamless and open integration with complementary technologies, such as Video Management Systems (VMS), Physical Security Information Management Systems (PSIM), Command & Control Systems (C&C), and Cloud-based Video Surveillance Solutions which might be required as the organization's IT scales.

PERFORMANCE & ACCURACY

Especially for security or law enforcement scenarios, the stakes are high when it comes to quickly identifying faces, license plates, and other objects. Precision and accuracy are critical. Consider the technical specifications of a solution that can provide fast performance, quality search, and accurate reporting results.

EASE OF USE

Technology investments that are easy and intuitive to use are the most beneficial to an organization and are more seamlessly adopted into everyday operations. Look for vendors that offer comfortable training options and usability.

COMMITMENT TO INNOVATION

A rapidly evolving technology landscape requires an agile vendor with proven technology and a track record for success. Consider providers who continuously develop and release new cutting-edge features and functionalities for their users.

CHAPTER 6 TECHNICAL CONSIDERATIONS & INDUSTRY EVOLUTION

When researching potential video analytics solutions, organizations must answer some technical questions about the volume and types of video they will be processing. The answers will determine the kind of hardware necessary to support processing, how demanding the processing will be, and how much the required hardware will cost. Assessing these technical issues is crucial for planning the types of servers, cameras, and appliances that are most appropriate for the implementation.

For example, when integrating video analytics with a video surveillance system, it is critical to know whether video will be processed directly from live cameras, from recorded footage, or both. Additional questions to consider are, what is the quality/resolution of the video you'll be processing? How many hours of video will require processing per day? How many concurrent users will be leveraging the system? Do you need real-time or post-event processing? You may also need to know about the video bitrate and frame rate to prescribe the supporting hardware for your integration.

The increasing availability of high-resolution video (4k, 8k) is enabling more sophisticated and accurate video analytics. Higher resolution video makes it possible to more accurately distinguish between people in crowds and capture individual faces, which can then be analyzed by state-of-the-art analytics to trigger real-time alerts when certain conditions are met. These new technologies enable capabilities such as people counting and face recognitionbased alerting. However, steep hardware requirements remain a barrier. As long as the cost of hardware is high, mass market adoption of these higher resolution cameras is slowed. This is one reason some providers are offering video analytics capabilities in the cloud, because these implementations offer ease of deployment and a low cost of entry.

EVOLUTION TOWARDS EDGE ANALYTICS

Due to rapid progress in hardware and software elements, edge cameras and appliances are becoming more prevalent. The transition to edge computing is part of the larger digital transformation and IoT trend, with IP cameras presenting an edge opportunity for physical security.

Edge devices are being manufactured with analysis capabilities to lower overall costs of computing, while ultimately enabling identification, extraction, tracking and classification of video objects. There are already oncamera analytics for point solutions, such as intruder detection, license plate recognition, and people counting. This technology is currently most useful in remote, low-bandwidth situations, but the trend towards edge appliances and analytics will to continue to rapidly evolve.

SUMMARY

Comprehensive video analytics software can be applied by a variety of departments in diverse organizations and industries to help increase efficiency and effectiveness. By harnessing the data that lies buried in video footage, organizations are empowered to achieve important goals that span departments like customer service, compliance, workplace health and safety, marketing, sales, operations, planning, and security. By enabling users to rapidly review footage, attain situational awareness, and gather business intelligence, video analytics software is the most powerful way for any organization to leverage its investment in video surveillance.



ABOUT BRIEFCAM®

BriefCam® is the leading provider of video analytics software that enables people, companies, and communities to unlock the value of video surveillance content. Delivering accurate, flexible, and comprehensive solutions, BriefCam's video analytics platform provides valuable insights for accelerating investigations, increasing situational awareness, and enhancing operational intelligence.

VIDEO SYNOPSIS® technology is a registered trademark of BriefCam, Ltd. For more information about BriefCam's video content analytics solutions, visit https://www.briefcam.com/.