Video Analytics - Trends

Video analytics is the practice of using computers to automatically identify things of interest without an operator having to view the video. Video Analytics is focused on automating video analysis and security alerts, thus eliminating the need for manual work and the huge cost of monitoring. It also increases productivity and efficiency of video surveillance systems and the people who monitor them. It automatically tracks and identifies objects, analyzes motion and extracts video intelligence from analog, digital, or IP video streams. These analytics can output real-time events and object data for video data mining or storage in a database.

Trends

- **Growing Retail Applications.**
- **More Sophisticated and more IntelligentAnalytics.**
- **Customized Analytics**
- **Analytics for Special Events**
- **Stored Video Data for non-security apps.**
- **Business Intelligence**
- **Mobility**
- **Analytics to reduce false alarms**
- **Interoperability - Standardization**

In addition to the obvious applications in safety, loss prevention and security, video analytics is also used as a tool for business intelligence and customer analysis. It is widely deployed in vertical such as Airports, Ports & Maritime Security, Critical Infrastructure Protection (Plants & Nuclear Facilities), Border Control and Perimeter Security, Commercial/Office/Govt. Buildings, Factories and Industrial plants, Urban Security and public safety, Banking and Financial Sector, Entertainment and Casinos, Retails Stores, Malls and shopping centres, Transportation and logistics, Healthcare, Housing and residential, Sports, and others.

There are also a number of different architectures that support video analytics :

- **Server based** - IP Cameras or Encoders connected via Ethernet to a Server. The analytics is carried out at the Central Server, generally located at the Central control room.
- **Edge based** – This uses smart Cameras with a built-in intelligence.
- **Hybrid systems** – A suitable mix of the above.

Analytics at the Edge – growing retail applications.

The trend is for video analytics embedded in a network camera. Applications run "at the edge" with minimal software. **As powerful processors at affordable price points are becoming available to video surveillance manufacturers, there is an increase in the analytics that are being added to the Cameras.** More intelligence is being built into cameras and encoders connected to cameras. The trend would be to offer basic analytics as a standard feature and advanced analytics at the edge but for a fee.

Video analytics at the edge provides pioneering applications in retail. It offers abnormal scene detection that allows the user to set specific object criteria and direction. The scene is analyzed continuously and "abnormal" behaviour, differing from the majority of the scene content is detected and either triggers an alarm or marked for later review. A typical retail application could be to determine when someone steals top-shelf item in a retail store or if a person enters through an exit only gate. Flame and smoke detection is also possible. By setting a normalized baseline of information, it can detect these abnormal conditions.

Man walking in the wrong direction

The video surveillance system with analytics serves as an accurate indoor secondary detection system, permitting safety personnel early notification and the opportunity to investigate. Camera manufacturers are increasingly placing such technology inside the camera itself, to run at the edge. Heat mapping provides real-time images showing how people have moved throughout the camera scene for a fixed duration. This has applications in environments where business intelligence (BI) data is needed. This type of video content analysis also helps improve safety by analyzing the flow of pedestrian and vehicular traffic flow in a facility.

More intelligence and processing within the camera or encoder means the most important data is captured, sent and/or stored for post-incident retrieval and analysis. This makes it possible to better manage security video data transmission and ingression challenges through a video management system or at network or cloud storage. Cameras equipped with advanced processing capabilities as well as solid state storage are more expensive. However the cost is going down rapidly.

More sophisticated and more intelligent analytics.

Numerous advances have been made in cameras, analysis tools and reporting techniques. Video surveillance with intelligent analytics enables early detection and possibly prevention of criminal

incidents. **Beyond mere people-counting and crowd detection, systems are being developed to alert individual agitation and aggression detection.** This is based on tracking a set of salient points in the foreground of the scene and performing aggression/non-aggression classification based on features extracted from these tracks.

Crowd detection

Hemispheric cameras can capture an entire room with no blind spots. Hemispheric cameras integrated with video analytics can be deployed at retail stores as well as in public buildings such as museums or airports to receive important information. Analytics makes it possible to reliably capture and evaluate the movement of people or objects in the live image. The most frequented areas can be highlighted on a heat map in a predefined area. The areas with the most movement and those with little movement can be identified in different colours. Analytics also allows counting of people and objects. It can provide data on how many people pass by a specific entrance in an hour or a day. **Such systems provide information beyond mere security. They also provide information on traffic patterns.**

Customized Analytics

The use of video analytics can be customized to serve a combination of public and private needs. Video cameras, analytics and the cloud can provide a wealth of real time information like traffic condition on the roads, beach conditions for holiday goers, creating a trip wire for perimeter protection etc.

Perimeter protection using a virtual trip wire

Analytics for Special Events

Towns hosting international events like world cup sports events or trade exhibitions need a complete situation management solution including video analytics. This is used by field agents and police to access live and playback video feed. Analytics is an integral part of a total technology and

personnel solution with the aim of real-time situation awareness of large, diverse crowds. Information can then be easily shared with law enforcement, city and arena security officers.

Stored Video Data for Non-Security Apps.

Video surveillance data requires a huge amount of storage space. Costs associated with this are borne entirely by the Security department and in times of budget constraints this, at times, becomes prohibitive. **Security personnel find it overwhelming to monitor and review all the video data. Analytics saves time and effort and tags 'incidents' that need to be reviewed** by the security personnel. **Further, the use of analytics makes it possible for 'other departments' in an enterprise to gain better information from the stored video.** Analytics enables the data to be of use to others in the enterprise. This in turn helps data storage costs to be shared.

Video analytics coupled with video surveillance system enables security personnel and related agencies to receive alerts "as they happen". This level of data sharing and interoperability helps in lowering response times. Depending on the threat, these several agencies are able to work collaboratively within the same situational awareness platform over multiple networks. Further it raises overall situational awareness during real-time events.

Video analytics integrated with other data, or by itself, makes an impact on the enterprise's overall bottom line. Integrating security video and video analytics into a total resource brings people at different levels and departments together and makes security more effective and efficient.

Business Intelligence

Analytics, storage, access control databases and other security control devices provide very useful information for business intelligence. **There is a marked shift in the application of security technologies. While security video will necessarily continue to be used in preventing and solving crimes, there is a growing trend for applications to help businesses save money and operate their businesses more efficiently.**

For example, security video integrated with analytics can alert the Management to keep track of queues and to take appropriate action. **Video data can be used to analyze traffic patterns and 'service' lanes can accordingly be adjusted to reduce waiting times. Such analytics offers efficient queue management.**

Ingress: 28
Egress: 21
Waiting time: 7 mins

Analytics for Queue Management

Not only does this improve the level of customer satisfaction it also helps the Organization to optimize duty hours for service staff.

Mobility

Mobile analytics implementation puts information at the fingertips of front-line personnel – anytime, anyplace, anywhere. Managers using mobility are able to make, instant, in real-time, operational decisions that keep the organization running smoothly. In contrast, decision-makers that only have access to conventional 'deskbound' security data do not have this freedom. They are restricted in the time windows available to them to make decisions. If these decisions are collaborative in nature or involve a chain of command, it will further slow down the entire decision-making process.

Advances in hand held devices, in applications and in the availability of bandwidth, has made it possible for real time access to video. Security staff using a Web-based solution can view, review, export and share data on any browser-enabled device. It is reported that Managers that use mobile business intelligence are able to make decisions in almost one-third of the time that it takes managers who don't use mobile business intelligence. **Mobility offers anytime, anywhere viewing for convenience, speed, sharing and more accurate response.**

Analytics helps reduce false alarms

Video analytics helps in reducing false alarms by providing assistance in distinguishing legitimate threats from benign activity such as blowing foliage, waves and animals on premises. With user-defined rules, pattern recognition and self-calibrating analytics that enable the system to adapt to the environment and "learn" to disregard some non-events, **video analytic solutions can help filter out non-threatening activity before an alert signal is sent.**

FALSE ALARM   REAL ALARM

This saves cost and time associated with responding to false alarms. Besides, **fewer false alarms results in an increase in confidence in the security system among the Security staff**. This finds

greater application in challenging environments such as Ports and remote utility sites that are susceptible to extreme conditions.

More Standardization

As video analytics evolves, so do industry-wide standardization efforts, that better ensure reliability and interoperability among components of a total video system.
The Physical Security Interoperability Alliance (PSIA) is a global consortium of physical security providers, focused on promoting the interoperability of IP-enabled devices. This includes a specification for video analytics. **It enables video analytics to more easily and consistently integrate with video management systems and physical security software platforms through standard interfaces.** The specification defines a standard way to share video analytics capabilities supported by an intelligent device to output, receive, store and use various video analytic events. The open interface addresses event output including security alerts, counting events and analytics system health messages. The interface also supports the streaming of object metadata output, which includes foundational analytic output regarding all objects tracked by the analytics, including object classification, bounding box data and velocities.
Open Network Video Interface Forum (ONVIF) is another leading standardization initiative for IP-based physical security products. This too has an ONVIF Core Specification, which covers video storage devices and video analytics engines, in addition to cameras and encoders.
Standards help the buyer to make decisions that can better ensure return-on-investment and smoother integration of components and software.

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