ARES as a Complement to Human Intelligence

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Executive Summary

Traditionally, security, surveillance, and intelligence gathering have primarily been functions of human effort. Personnel who are depended on for such efforts can be generally broken down into three categories: (1) Active security forces, wherein people specifically designated for the task (e.g., security guards or police) actively monitor potential areas of concern and act upon detecting suspicious activity; (2) Place managers, people whose occupations place them in a position with some authority to act in a secondary surveillance capacity (e.g. bus drivers); (3) "Ordinary" people who witness and report suspicious activity or evidence. All of these categories have one common defining shortcoming, in that even the most dedicated, highly trained, and observant person is still subject to human imperfections such as fatigue and distraction.

When video analytics first began to emerge, the security industry was abuzz with excitement about the promise of this new technology. It was believed that in very short order, security systems would be able to automatically detect and track faces, objects, gestures, and more, making human involvement in the process simply a matter of following a simple computer-generated pathway of evidence straight to a criminal or a terrorist. Security staffs, it was thought, would be significantly reduced and money and effort saved. The need to rely on people for surveillance and intelligence gathering would be rendered all but obsolete.

Unfortunately, this did not come to pass. For a variety of reasons, principally having to do with the low resolution of security cameras at the time and the relative lack of sophistication of video analytic algorithms, users of the technology were constantly subjected to a flurry of false alarms, among other issues. As a result, they ended up wasting a great deal more time and effort than they saved. In the end, video analytic technology did not become a replacement for human intelligence.

While improvements in the technology have been made in recent years, video analytics has still not lived up to initial expectations; rather, it has been relegated to the category of "over-promised and under-delivered." Looking at the technology in 2014, with a more mature perspective, it is now understood that video analytics is most effective as a complement to human intelligence, rather than as a replacement for it, and will continue to be so for the foreseeable future.

Cyclops Technologies has created one of the most versatile, powerful, and cost-effective video analytics solutions on the market in ARES (Analytic Recognition Enterprise Solutions). Capable of data acquisition both internally and from external sources, ARES also features

advanced analytics for providing mission-critical actionable intelligence in real time, delivering the situational awareness needed to ensure that human security and intelligence gathering functions at its peak.

Video Analytics—Over-Promised and Under-Delivered

Video Analytics began to emerge as a technology in the first few years of the 21st Century. At the time, it was generally thought that a new era in artificial intelligence was at hand—computers, connected to video cameras, would recognize faces, detect gestures or suspicious movements, detect and track unattended objects, and more, all automatically and without human intervention.

In practice, however, Video Analytics technology failed to deliver on these expectations. Owing principally to the low resolution of existing surveillance cameras and the relative lack of sophistication of analytics algorithms, many users experienced a multitude of false alarms from their systems. These sometimes numbered dozens per day, causing security personnel to waste a great deal of valuable time and defeating the purpose of having the technology in the first place. This problem was often exacerbated by changes in the environment, weather, or position of the sun, which could drastically alter the images captured by the cameras and thereby further confuse the analytics software. Issues such as this necessitated rigorous and difficult maintenance regimens for many systems. Additionally, the video analytics systems that suffered least from the aforementioned issues were prohibitively expensive, often making it difficult to justify the expense from a Return On Investment (ROI) standpoint.

Over time, there have been significant advances in Video Analytics technology. However, even the best systems on the market today are still not the end-all, be-all solutions that the technology was promised to be, and users have begun to accept that fact. Along with the inevitable improvements in cameras and computer hardware and new software algorithms that have been created has come a new, more mature perspective on the role of video analytics in intelligence gathering and analysis. While traditional human intelligence is still understood to be critical, video analytics has now reached the point where it can be considered a worthwhile complement to more traditional methods of acquiring and processing information. This is especially true in the case of Cyclops Technologies' ARES (Analytic Recognition Enterprise Solutions), a complete end-to-end video data intelligence tool that is on the forefront of the security and intelligence gathering industry.

ARES and Human Intelligence Working Hand-in-Hand

As a general rule, there are three categories of "human intelligence;" that is, intelligence information gathered by people as opposed to technology. These are: (1) Intelligence supplied by active security forces; i.e., personnel specifically trained and hired for the purpose of maintaining security in a specific place; (2) Intelligence supplied by "place managers." Place managers are personnel whose jobs are not specifically geared toward maintaining site security, but which do confer upon them sufficient authority to act in a secondary surveillance capacity; and (3) Intelligence supplied by "ordinary" people, meaning those who happen to witness and report information in the course of going about their own business, often in a public space. Each of these different types of information can be crucial to maintaining security, solving crimes, preventing acts of terrorism, or even gathering customer information for a business. However, human intelligence is only as good as the humans providing it, and can be affected by memory, eyesight, emotions, and a host of other factors; this is especially true in the case of category 3. To help ensure not only the reliability of the information gathered, but also that no crucial data has been missed, technology such as Cyclops Technologies' ARES solution is needed to fill in these critical gaps and aid in the interpretation of data.

In active security

At present, ARES is most widely used in active security scenarios; that is, it is utilized by personnel whose main function is to provide security and intelligence, whether for a building, a business, or a nation. In these situations, the purpose of any surveillance technology is to act as an extension of the security staff's eyes, helping them figuratively be in multiple places at once. Video Analytics technology such as ARES provides a brain to go along with those eyes, automatically detecting and extracting vital information from video and providing the means to turn it into actionable intelligence in real time.

The current version of ARES extracts license plate numbers and state jurisdictions from vehicles via its advanced Object Recognition engine. With this information, a security staff is able to have a more complete picture of who is entering and leaving the property, where they are parking, and how long they are staying. By entering a "hotlist" into the system containing the license plates of staff and authorized personnel, the presence of an unauthorized vehicle can be known immediately. Furthermore, the recurrent appearance of one particular unauthorized vehicle can be recognized as a pattern that may represent danger to the facility. As good and necessary as human intelligence is, this kind of real-time knowledge and pattern recognition is only possible with video analytics. Furthermore, this represents only the smallest fraction of the potential of ARES; versions being introduced in

the near future will allow for facial recognition, thermal imaging, camera coordination, importation of third party data from databases such as CargoNet, and more. The system will combine all of these disparate sources into real-time, comprehensible, actionable real-time intelligence.

Consider this example: A license plate associated with a known terrorist is detected via License Plate Recognition entering an airport parking garage. Security personnel are automatically alerted. Seconds later, another camera detects the face of the person to whom the vehicle is registered. The alert is escalated and the system automatically tracks the movement of the face through the facility. Now, security personnel not only have a live real-time track of the suspect, but a complete, easily accessible video record of his entire visit. Nothing he does goes unnoticed. Security is able to apprehend him quickly and turn him over to law enforcement along with unimpeachable evidence.

For Place Managers

Some employees, whose job it is to manage a particular location, are not specifically tasked with security or intelligence gathering; however, their position of authority means that those tasks are a secondary function of what they do. These staff members, sometimes referred to as "Place Managers," in a sense have a greater responsibility than security staff, since their jobs require them to maintain order, protect company or public property, and help ensure that their organization's goods or services are delivered. In such a scenario, ARES is particularly valuable, as it becomes the "eyes in the back of the Place Manager's head."

A good example of such a scenario would be the job of a city bus driver. In many large cities, special recessed parking spaces are designated along the streets as bus stops. When vehicles park illegally in these spaces, as often happens, it becomes more difficult for drivers to provide their services to passengers. In this case, an ARES system can be installed on all city buses that has been customized to recognize not only license plate numbers and state jurisdictions, but also vehicle make and model. Illegally parked vehicles are automatically tagged and the information sent to law enforcement. The bus now becomes not only an efficient means of transportation, but also a deterrent to parking scofflaws.

For Public Spaces

One of the greatest areas of potential for video analytics is in the public square. Often, public spaces are physically designed to remove visual obstructions and generally improve sight lines to make it easier to spot suspicious or illegal activity. Even with such improvements, however, the "regular people" in these spaces, the ones going about their daily lives, will not always see or remember clearly when a criminal or terrorist activity occurs.

In this situation, ARES video analytics combines with eyewitness accounts to fill in the gaps in the narrative and help ensure that persons of interest are detected.

This type of video data intelligence is finding a home in the arena of city surveillance. As more municipalities adopt citywide camera networks for surveillance, the more the authorities in those areas discover that the simple "monitor-and-record" functionality supplied by their systems is not enough to provide them with the intelligence necessary to prevent and punish crime and terrorism.

A complete ARES-based system will automatically be able to extract license plates, vehicle makes, and faces from live video feeds. It will also incorporate thermal imaging capabilities to determine numbers of people. The ARES system can also integrate data produced by shot locators to instantly trigger multi-angle recording in the event of gun violence. Combined with the other forms of data mentioned above, a complete picture begins to emerge that will enable law enforcement to track and apprehend the offending parties.

Conclusion

While video analytics technology has improved in recent years, it is still not the security and intelligence panacea that it was widely thought to be at its inception. Rather, it is at its best working hand-in-hand with human intelligence. In that capacity, the capabilities of video analytics have improved dramatically with new camera hardware and ever more sophisticated algorithms running on more powerful computers. ARES, the video analytics solution from Cyclops Technologies, is the best example of the cutting edge of video analytics. Founded on industry-leading License Plate Recognition, ARES is on the cusp of adding new data acquisition features such as facial recognition, thermal imaging, camera coordination, and third-party data importation for a combination of capabilities never before seen on the market. Additionally, ARES includes state-of-the-art video data analytics for the best possible real-time actionable intelligence. This entire software-only solution will be available either for purchase or for subscription in a cloud-based SaaS (Software-as-a-Service). The price points for both are more cost-effective than any comparable technology on the market.