CCTV

BUT NOT AS WE KNOW IT

New technologies such as computer vision and machine learning are transforming CCTV & enhancing public safety writes James Slessor, Managing Director, Accenture Public Safety

Today's CCTV technology is the sophisticated great-grandchild of early 'closed circuit', low-resolution, analogue cameras. For many, CCTV still evokes a giant control room, with many moving images flickering across a wall of screens. However, new innovations in software and hardware are quickly replacing this expensive and often inefficient model. In the early 2000s when digital Internet Protocol (IP) cameras exploded onto the scene, the resolution of the most expensive commercial models was only 640x480 pixels. In contrast today, the typical home surveillance kit in 2017 provides

full HD (1080x1920 pixels) at a fraction of the cost. The 'internet everywhere' trend of the last decade has accelerated the distribution of IP cameras that can be accessed remotely and securely from anywhere on earth.

Thanks to advances in camera quality and new technologies such as computer vision and machine learning, public safety agencies, local authorities, and private-sector organizations can now access and utilize data from a plethora of connected devices and sensors. In 2017, Gartner estimated that 8.4 billion connected devices are in use worldwide. Beyond the cameras and sensors within an organization's surveillance estate lies a wealth of open, third-party and cross-agency data, only consumable via the adoption of analytics and machine learning technologies.

These technologies offer enormous potential to improve citizen safety while simultaneously lowering the operating costs of running CCTV networks. However, to take full advantage, public safety agencies and city authorities must be able to aggregate a vast amount of data, apply analytics to deliver insight, and make those insights consumable and actionable for human audiences. Structuring data from CCTV and other sources such as field officer location or historical crime records calls for a highly flexible, and scalable technology platform, able to ingest all the information available and process it in near-real-time, to deliver a complete 'situational awareness' picture for users.

The next-generation Public Safety Platform
Any solution attempting to tackle the big data challenge must provide a holistic platform to operate and manage multiple information sources. Ready-made 'connectors' for cameras or sensors, with integral device management and security modules, are crucial. Likewise,

comprehensive application management tools are necessary to make data integration a centralized and scalable process across the organization, as are best-of-breed analytics engines capable of turning unstructured data into meaningful, real-time insights.

> ## These technologies offer enormous potential to improve citizen safety while simultaneously lowering the operating costs of running CCTV networks.

All of this output should be visible from a single vantage point, a 'situational awareness' view, providing users with a complete understanding of their public safety operating environment. The platform must also remain highly agile, technology agnostic and flexible enough to adapt over-time to the changing needs of each organization. If designed from the ground-up as a collection of microservices, public safety agencies and local authorities can 'pick and choose' the components most relevant to their existing infrastructure and strategic objectives, whilst retaining the ability to additional services with ease in the future.

Going further than visualization, situational awareness must be able to identify trends in real-time and send automated alerts or co-ordinate proactive action by responders. A public safety platform must also lay the foundation for increased deployment of 'smart city' technologies, acting as the gateway for a myriad of connected devices, unlocking insights for agencies and supporting cross-

agency collaboration. Machine-vision can help aggregate video streams (with the associated network, security and storage requirements) and provide constant monitoring of each CCTV feed with a superhuman attention to detail. It can also distinguish 'structured' events from the 'unstructured' continuum of images, displaying them in an accessible and understandable way, and ensuring appropriate responders are notified in real-time to enable an effective response.

Accenture recently worked with the London Borough of Newham to demonstrate the potential of a public safety platform, situational awareness tools and computer vision with CCTV

In Singapore, the government has already implemented a public safety platform as part of their Safe City programme, integrating existing video management systems into a common streaming solution. This allows public safety agencies to increase the return on investment from existing CCTV infrastructure. Within minutes of the first deployment, Singapore officials successfully detected and verified several incidents, and sent alerts to the appropriate public safety agency.

In the UK Accenture recently worked with the London Borough of Newham to demonstrate the potential of a public safety platform, situational awareness tools and computer vision with CCTV. Focusing on a small number of use cases for a 'Proof of Concept', the project delivered an interactive cartographic view of the borough to serve as the front-end

to an advanced video analytics and automated alerts solution. Data integrated from the local authority systems, London's transport network, IP cameras, national weather sources and other open data was visualised geographically in easily toggled 'mapping layers'. The solution used machine learning to detect objects from internet-connected CCTV cameras with a high degree of accuracy, and automatic alerts were configured to display events such as crowd build-up and suspicious object detection, in real-time alongside other useful operational information.

New digital technologies are enabling the conversion of previously under-used data sources for the public good. Whether to secure borders, upgrade the functionality of high-street security camera or augment police efforts in the line of duty, platforms are efficient, flexible and ready to be exploited by public safety agencies and city authorities. As we seek innovative ways to tackle crime, terrorism and to ensure citizen safety, new technologies such as video-analytics and machine vision must become part of our digital arsenal.

*This article was published on the Policing Insight (U.K) news-site on December 13th 2017