

IMAGE ANALYSIS TAKES HOLD AS THE EVOLUTIONARY CCTV TREND

One of the most critical aspects of successful digital CCTV security systems is the analysis of the images recorded. Systems currently make the images available but it is left to people to analyse, deduct and draw conclusions from the recorded camera images.

The question is now being asked: To what degree can this human image analysis process be automated within a digital CCTV system?

Dr Bennie Coetzer, joint managing director and co-founder of image processing, data communications and digital CCTV surveillance solutions provider Thales Advanced Engineering, says automated Image analysis is important, firstly because it enhances the ability to proactively detect and prevent crime, and secondly because it speeds up the security reactive processes, saving time and costs in the follow-up procedures.

“To some degree, automated image analysis is already happening with facial and number plate recognition technology in CCTV security systems where the system can be programmed to match facial images and vehicle number plates and raise a control room alarm when a specific face or number plate image is recorded on camera.

“Image analysis has the potential to very rapidly become a pervasive technology – it can be used in a host of applications such as manufacturing and production for quality control; to automatically grade fruit by size, colour and other parameters; in military applications to track targets and guide missiles; for traffic pattern analysis monitoring and adjustment of traffic lights to ease congestion, the list is endless.”

For the security industry, image analysis technology has many positive implications. Dr Coetzer says the industry currently relies largely on trained human observers, although some algorithms have already been developed that claim to automatically detect behavioural changes in people on camera, indicating that they are agitated or aggressive and should therefore be followed by the cameras as an incident could take place.

“Image analysis is being applied to recognise number plates of vehicles and the faces of known undesirables at parking areas and entrances to airports and railway stations. It could also be applied at casinos, shopping centres, and other high traffic public facilities.”

At a shopping centre fitted with a state-of-the-art digital CCTV security system, image analysis is applied to recordings of incidents. The build-up to incidents is analysed to determine modus operandi similarities that may apply to previous incidents, to recognise faces of individuals involved or in the vicinity of the incident to determine whether they have also been captured on camera at previous incidents. Vehicles and number plates entering the parking areas are also analysed for the same purpose.

Dr Coetzer says such analyses often result in the perpetrators being apprehended. They provide valuable information for the police in terms of suspect identities, modus operandi, the vehicles used and escape routes – all information that helps to track down the culprits.

Image analysis is also currently applied where bags, boxes or luggage are left unattended at public facilities such as shopping centres and airports. Analysis of the footage recorded by cameras in the area can reveal a great deal. The person who left the item may be identifiable, thereby dictating a certain course of security action. The images may reveal if the person leaving the article acted deliberately or casually, which again can dictate a certain course of action.

Another use for image analysis that has come to the fore is in the identification and detection of ‘sports hooligans’ at sports stadiums. An automated image analysis system can identify known hooligans at stadium entrances and prevent their entry or enforce attendance bans. They can also home in on crowd sections where there are disturbances to identify culprits for apprehension and to have images for future facial recognition when such people try to re-enter the stadium in future.

“Of course, the technology should be applied sensibly with consideration for people’s basic rights so that these are not infringed upon willy-nilly,” says Dr Coetzer, who adds that great care should also be taken to verify that camera identifications are correct.

“On this basis, image analysis will influence the technologies that we will build and implement with our systems in the future. We are going to require systems that present the information in the best possible way for analysis. Digital CCTV systems with compression technology can compress images and reduce the storage requirements but such images are distorted and can therefore be rendered unsuitable for image analysis. But this technology is moving forward and analysis tools are likely to improve considerably as time goes by. Processors are becoming more powerful while digital storage is becoming cheaper so automatic image analysis by computers, not humans, is a likely and viable security system option in the not-too distant future.”

Note to Editors: Thales Advanced Engineering is a wholly South African company, formed in 1987 and headquartered at Lonehill, Sandton. It should not be confused with a French defence electronics company now calling itself Thales but formerly known as Thomson-CSF.

Thales Advanced Engineering specialises in image processing, data communications and digital CCTV surveillance systems for defence, commercial security and specialised imaging. Thales provides system engineering, high-speed digital design, image processing, embedded software design, digital signal processing, high level software design, data communications and general RF communications.

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