City Surveillance

Britain is reputed to have the highest number of surveillance cameras in its streets on a per capita basis. Unfortunately most of it is not connected to effective video analysis and hence can only be used after the event.

In contrast there are cities especially in Asia that have implemented state of the art Video Analysis systems to enable their police and other staff to manage their environment more effectively.

In one large city they use a video analysis system to detect large construction trucks travelling onto small suburban streets that are not designed to carry their weight. If such a truck is detected its location is identified on GIS (Geographical Information System). This essentially pinpoints the location of the vehicle on a map. Based on these co-ordinates the system searches for a police vehicle within the vicinity using a GPS system) Information on the infringement is automatically sent to police vehicle so that action can be initiated.

This type of comprehensive ability to perform detections and use this to generate an automated response (in this case providing instructions and information to a police vehicle that is closest to the scene) is called an Automated Surveillance Action Program. This concept is discussed in a later chapter. At this stage it is sufficient to note that this type of sophistication is available off the shelf from the more advanced suppliers of video analysis.

City Surveillance needs can be quite varied. There will be groups that are responsible for protecting building assets. Graffiti and Vandalism detection can be an important application for them. Traditional motion detection systems can detect graffiti but they would also detect all the many passersby on the street. A non-motion detection algorithm based system is required (IQ 140) to detect the graffiti while ignoring innocent people who are just walking past. In one European city they had a very severe graffiti problem. Each time the buildings were repainted the graffiti artists struck again. Repainting buildings can be very expensive and hence the city council had to find a solution. They put in an IQ 140 level Graffiti detection system mounted on a van. Using infrared cameras the system was able to catch the culprits on the first day after it was installed. The news spread very quickly among graffiti artists and the problem disappeared overnight – at least in their neighbourhood.

Other groups will require the city surveillance system to monitor traffic. Often there are special slow speed zones near schools or beside shopping malls and hospitals Monitoring such locations has traditionally been very expensive because the detection of speed and the recognition of vehicles previously required significant civil works such as the digging of roads for the laying of magnetic loops as well as very expensive cameras. With modern systems where the video analysis system can do everything (triggering of the event, detection and recognition) the economics have changed and these systems can be widely implemented at a tenth of the cost of the traditional systems.

The most important focus of city surveillance systems however is on the people themselves. The objective is to keep people safe and prevent accidents or criminal activities. Not all activities are easy to detect. As has been discussed it is very difficult to detect if two people are fighting as this can take many different forms. However many associated behaviours can be detected. For instance, if a person falls down as a result of a fight, this can be detected. If a person begins to run suddenly – this too can be detected. If crowds gather suddenly this

could be a symptom of some unusual activity as well. Having a system that can monitor various types of human behaviour can help the city's officials ensure the safety of their citizens.

City Surveillance Applications

Security

- ♣ Identification and tracking of suspects/criminals even in a crowded and uncontrolled environment
- ♣ Detection of suspicious behaviours (e.g. man-down/fighting, loitering, running, crowd gatherings/formation etc). Be able to automatically IDENTIFY the culprits using many-to-many facial recognition system.
- ♣ Be able to link different events from large number of cameras and to provide full picture and event association for immediate actions.
- ♣ Immediate Alert for people who wear masks, helmets when entering specific areas (e.g. the money exchangers or near an ATM)
- ♣ Recognition of suspicious activities determined by using a combination of video and voice recognition systems. Generate an alert for incidents like gun shots, serious car accidents and screaming sounds.
- ♣ Surveillance system health check to prevent camera tampering or sabotage

Operations

- ♣ Prevent hawkers, ad posting, graffiti and vandalism
- ♣ Data collection before any construction plan and street planning activities – the use of a counting system to understand the traffic flows and distribution of people/vehicles at different times of the day

Safety

- ♣ Prevent over crowding
- ♣ Detect Slips and falls
- ♣ Smoke and Fire Detection for outdoor environment

Law Enforcement

- ♣ Detect Vehicle speeding
- ♣ Prevent illegal parking for all kinds of vehicles or for specific vehicles
- ♣ Prevent Vehicles that cross the line at the traffic lights when the light is red
- ♣ Able to automate the law enforcement and "fining" process for any vehicles violating rules using License Plate recognition system together with IQ-Hawk

Police and Law Enforcement

Every country has agencies similar to the FBI. They have a different role and hence a different requirement to traditional security groups. They may require surveillance, for example, to watch a house over a period of time to see who comes and goes. They may want to know if certain cars stop outside the house and they may want to know if a crowd of people gather nearby. The surveillance may be needed over a long period of time – possibly for several months.

The use of agency officers for such surveillance can be expensive as it will involve tying up a lot of highly paid people for a long period of time. Instead it is possible to use a couple of cameras for the surveillance. Officers are then only required to view the video footage where they can easily "jump to the events" that have been detected.

A simple motion detection system is not usually of much use for such an application. Often the house under surveillance may be in a busy area. Lots of people may walk up and down in the street in front of the house. They may just be passers-by and need to be ignored. The only people of interest may be those who enter or leave the building. The system must therefore be smart enough to differentiate between passers-by and those who enter or leave the premises.

An important task for such agencies is the protection of Very Important Persons (VIPs). Let us assume a visiting head of state is to arrive in a particular city. The Police would be expected to secure the route, hotel and other venues and ensure that the visiting VIP is not exposed to any danger. Video surveillance and analysis can be very useful in this activity. Consider the team that has been asked to secure a hotel for a VIP. Securing the hotel room itself may be easily done. The real danger to the VIP is more likely to be in a public area like the hotel lobby. In a situation like this the police can install a number of wireless cameras connected to a notebook computer. The video surveillance system can analyse the video feeds and provide information on suspicious events. If a bag or parcel is abandoned in the hotel lobby it can easily be picked up by the video analysis system.

If people of interest are recognized in the hotel the police can be alerted.

The lobby can be secured without having to maintain a very visible security presence. At the end of the day, when the VIP departs, the entire system can be dismantled and taken away.

The system does not have to be perfect. It just has to be better than the manual system in use today.

Secret Services, Defence and Law Enforcement Applications

Security

- ♣ Detect and track suspects or criminals accompanied with many-to-many facial recognition system
- ♣ Detect and track suspicious vehicles accompanied with detection of vehicle stopped and License Plate recognition system
- ♣ Detect suspicious behaviours including man-down or attack, loitering, running, crowd gathering etc. It can be accompanied with both video and voice recognition system
- ♣ Perimeter protection along the fence line or intrusion detection at the border control (e.g. landline or sea line)

Operations

- ♣ Monitoring of Guard attendance at the mission critical sites using a facial recognition system
- ♣ Provide not only real time video analysis system but with forensic capabilities to process large pre-recorded video
- ♣ Mobile video analysis system that can be easily installed and setup
- ♣ Surveillance system health check to prevent camera tampering or sabotage

Safety

- ♣ Protect air force runways to ensure they are clear of obstruction using unattended object detection system and to identify small object like a small nail even it is not visible to naked eye. (e.g. with patented iOmniscient's IQ-180 system)