

Rapid Passenger Identification & Tracking

Crime Reduction & Incident Management

UPoint

Highlights

Accelerate vital incident management tasks and direct valuable resources to greatest effect using UPoint.

- **First Response:** Deploy first-response resources with greatest effect using UPoint to rapidly identify CCTV footage of greatest priority.
- **Casualty Identification:** Rapidly determine the station and time of origin for incident casualties.
- **Terrorist Identification:** Quickly acquire photographs of suspected covert or suicide terrorists.
- **Detailed Analysis:** Rapidly isolate the actual route taken by every relevant passenger.
- **Serial Petty Criminals:** Use UPoint's correlation capabilities to isolate photographs of suspected serial criminals (e.g. pick pockets).

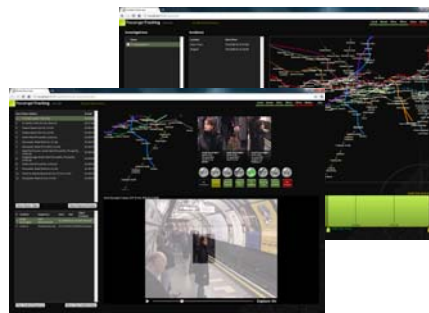


Innovation Science's Rapid Passenger Tracking software is a crime and surveillance investigation solution for rapidly identifying the set of passengers that are of interest to any mass-transit crime investigation. The patented solution is suitable for any complex, highly-interconnected passenger rail network that has a modern ticketing system, where passengers have the freedom to vary their route during their journey. This includes major networks such as the London Underground, Hong Kong MTR, Seoul MRT, and many others. The Rapid Passenger Tracking software minimises analysis time for major incident investigations and offers practical tools to assist in day-to-day crime prevention.

Solution Synopsis

Although more than a million passengers may be travelling on many of the world's largest mass-transit rail systems at any given point in time, relatively few of those people are ever relevant to an individual incident that occurs on a rail network. But how do you know which passengers are of interest?

The Rapid Passenger Tracking software ("UPoint") efficiently determines exactly which passengers could possibly have been witnesses, casualties and perpetrators of any crime within the ticketed area of a rail network.



The UPoint system delivers timely information to the first-response incident team to answer questions such as:

- Who may have been present at a nominated station or on a given train during the lead up to an incident?
- At which stations did casualties enter the network and when?
- Who may have been involved in the incident that is still on the network?

Further investigations can then be performed using UPoint's rapid analysis capabilities to answer questions such as:

- Is it possible for a given passenger to have visited a particular station during a nominated time period?
- How long could a given passenger have been present at a particular station during their journey?
- Is it possible for a given passenger to have been in contact with a specified train or a specific passenger during their journey?
- Which route did a passenger take during their journey?
- Can multiple incidents be linked back to a group of passengers that were physically together somewhere else on the network?

Minor crime can also be addressed via the use of UPoint's correlation capabilities to detect repeat offenders and help video surveillance personnel focus resources on likely suspects.

Innovation

Tracking millions of people through a complex, highly-interconnected rail network has largely been considered an insurmountable problem — until now. The Rapid Passenger Tracking solution uses unique, patented algorithms and an entirely new approach to deliver a practical tool for rapidly determining and tracking who is of relevance to any incident that occurs on a subway rail network.

Unlike pure facial recognition solutions, the Rapid Passenger Tracking software uses ticket turnstile transactions and knowledge of train motion to rapidly isolate ticket holders of interest. The software then identifies small amounts of surveillance footage that are of relevance to each incident investigation. A passenger search takes no more than a few seconds, and video analysis time can be reduced by up to 99.5% over traditional analysis methods^a.

Facial recognition technologies have progressed to a point where they are now capable of tracking anonymous individuals across multiple surveillance cameras. However, apply these technologies to crowded, low-light conditions and attempt to track millions of passengers over thousands of cameras, and it quickly becomes apparent that facial recognition technologies alone are not capable of providing the solution.

The Rapid Passenger Tracking software minimises the CCTV tracking problem by isolating small snippets of surveillance video that are likely to contain particular passengers of interest. This innovation in itself now makes it feasible to apply facial recognition algorithms in a domain where a brute-force search approach was previously the only option.

The software helps fight a wide range of crime and terrorism scenarios within mass-transit rail networks. Assaults, theft, and even hostile reconnaissance missions by potential terrorists can be efficiently analysed using the software. The result is a solution intended not only to increase the public perception of safety, but to achieve a measurable decrease in crime.

Deployment & Integration

Operational deployment of the technology requires timely access to passenger turnstile transactions, and train location information (specifically station arrival and departure times for each train).

Detailed route analysis and the provision of a photograph for each candidate passenger requires access to entry turnstile and platform CCTV footage. While there is no requirement for digital CCTV to be employed, route

- a. Morning peak-hour scenarios for the London Underground have shown that a photograph of each ticket holder of interest can be obtained using as little as 26 hours of CCTV video and proof of every ticket holder's route to the incident can be gathered using as little as 300 hours of surveillance footage. A 3% ticket fraud rate means approximately 97% of passengers of interest will be identified using UPoint.

analysis steps are simplified when swift access to digital video sources is available. It is likely that a migration towards digital CCTV will occur on most deployment networks. The Rapid Passenger Tracking technology is ready to take advantage of the capability as and when it becomes available.

Key Features

- Designed to support the world's most complex subway rail systems.
- Identifies the ticket holders of relevance to any incident within seconds of an incident being reported.
- Employs patented search technology.
- Rapidly isolates small snippets of CCTV surveillance footage from across the rail network that are relevant to any incident investigation.
- Pin-points an image of every relevant ticket holder using entry/exit turnstile CCTV footage.
- Provides efficient tools for resolving the precise route taken by every relevant ticket holder.
- Reduces the amount of CCTV surveillance footage that needs to be analysed for any incident by up to 99.5%.
- Correlates incidents to identify suspects of recurring crimes (including passenger property thefts).
- Practical for investigating both major and minor crimes on subway networks.
- Rigorously tested using peak-hour simulations of one of the world's most complicated and busy rail networks.
- Easily configured to support any major rail network.
- Designed with a small interface footprint to minimise integration effort.

About Innovation Science

Innovation Science Pty Ltd provides custom software engineering services and innovative off-the-shelf solutions to defence and commercial clients world-wide. Our customers include the Australian Department of Defence, Canadian Department of National Defense, L3 Communications, Thales Underwater Systems (UK) and Qinetiq.

Winner
of the
2009
Asia-Pacific
ICT Award (APICTA)
for
Research &
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