

📍 INFRASTRUCTURE 🚦 TRAFFIC MANAGEMENT 🚨 ROAD SAFETY 🅐 PARKING 🅑 SMART MOBILITY



2022

# INTERTRAFFIC WORLD



## The electric revolution



Transport has a huge role to play in the international effort to decarbonise – find out how EV infrastructure, kerbside management and smart data will all play their part

🅑 | MaaS in the Netherlands

How the race to implement Mobility-as-a-Service in Intertraffic's homeland is sparking productive competition

🚦 | Real-time data in Mexico

Making sense of informal public transport in Mexico City is just one way in which real-time data is aiding mobility

📍 | Digital twins in cyberspace

Discover how creating exact, virtual replicas of transport infrastructure is aiding road construction and traffic management



# The potential of multi-camera object tracking

When you combine advances in AI with a multi-camera object tracking system, traffic monitoring becomes more accurate, more accessible and more reliable

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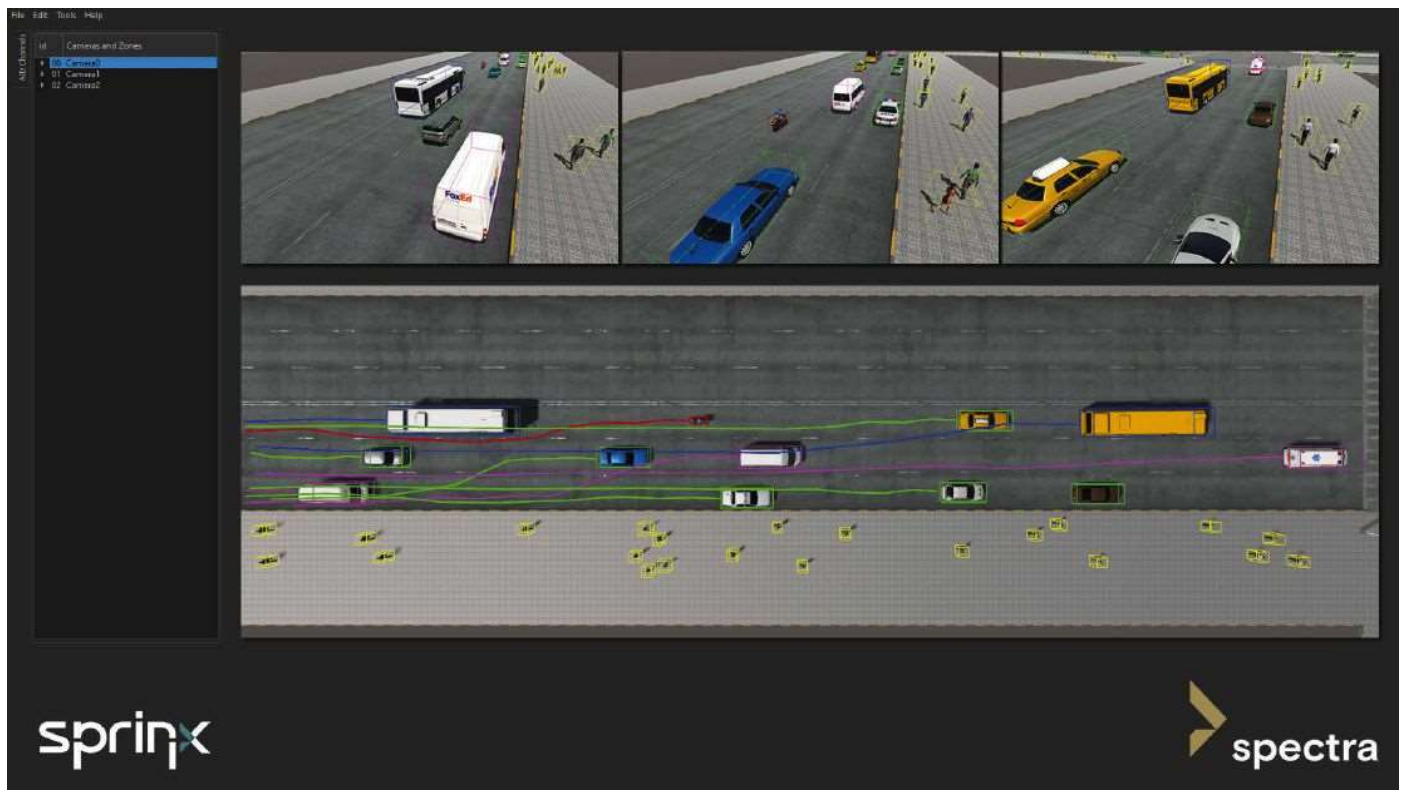
**N**owadays, most efforts in traffic management systems are focused on finding the best solution for detection and trajectory reconstruction using AI techniques. Many companies are engaged in improving deep learning models that will build algorithms more efficiently and that will be better able to generalize.

Traffic managers want a system capable of recognizing each type of vehicle, behaviour and anomaly, in a way that is not affected by weather, light or environmental conditions.

No matter what type of object these analytics are being trained to recognize, the approach is always based on the analysis of a single camera. Cameras are being treated as independent to one another and data collected by these cameras is isolated. One camera can only monitor a fixed view and there is no bridge to share the information. Further, data coming from a previous observation will not be propagated through to the next element in the chain of computation. This information will be lost.

Intra-camera correlation is usually manually carried out by traffic managers and operators, aided only by camera names, numbers and kilometres. Other times a certain degree of correlation is obtained by applying logical rules between cameras (i.e., suppressing alarms from the following camera if something was already detected by the previous one).

**Exploiting unlimited potential**  
Sprinx believes that in the future, a surveillance system will be



considered as a whole. All information is valuable to simplify, accelerate, focus and pre-alert operators and traffic managers. With the exponential growth of IP video surveillance cameras, the opportunity to take advantage of the rich information that comes from multi-camera systems is immense.

Sprinx's Spectra solution enables a network of connected cameras to be represented as a single entity. This video-based solution can identify and reconstruct the trajectory of all objects moving within the complex field of view of all the cameras. As such, it enables the detection of long-term vehicle behaviours and can make inferences throughout a vehicle's journey.

Furthermore, information from previous observations can help to reduce noise in measurements, remove ambiguities in detection and improve tracking performance by focusing only on specific regions of interest.

When compared to traffic information based on single-camera, multi-camera systems are more challenging but, as previously outlined, they are highly accurate. Spectra enables monitoring of real-

Above: Spectra processes live video streams to obtain every object's trajectory through all of the cameras in the system

world scenarios, extracting features of the same object from several camera views, even if orientation and lighting conditions create variations.

Spectra overcomes spatial-temporal constraints to correctly track objects as they pass through the network of cameras. The system can even estimate the relative position of road lanes and surfaces between the different cameras. This means it knows on which camera an object will appear when exiting from another one. This enables the creation of graphs of connected lanes.

tasks and obtain every object's trajectory through all of the cameras in the system. This is achieved despite problems such as occlusions, missed detections and view changes. Traffic managers can follow objects at single-camera and system-wide levels.

The key element of the system is the data association process, which deals with recognition and reidentification. This process enables the system to understand that it is observing the same object from different perspectives. Once Spectra has associated all of the data, it can start to integrate information into a common reference system. Spectra can then aggregate all of the raw data; some data will be duplicated, and some will be complimentary. The idea is

“With the exponential growth of IP video surveillance cameras, the opportunity to take advantage of the rich information that comes from multi-camera systems is immense

To reach these objectives, Spectra has been designed to tackle a variety of tasks: single-camera calibration, multi-camera calibration, multi-camera tracking, data fusion (data association), global inference and data visualization.

Spectra processes live video streams to perform all of these

to combine all of the data from both noisy and clean inputs to obtain a more consistent, accurate and precise output. The integrated information dashboard visualizes new information in an accessible way, making it easier for operators to understand and identify patterns and behaviours. ■



SPIRIT OF RESEARCH AND INNOVATION



## AI VIDEO ANALYTICS FOR VEHICLES AND PEOPLE MOBILITY

Since 2009, **Sprinx** has been one of the most innovative companies capable of providing solutions for intelligent monitoring of people and vehicles mobility in the Traffic and Transportation market.

After 3D object tracking technology and the deep-learning approach, **Sprinx** presents Spectra, a new AI multi-camera tracking solution that turns a network of connected cameras into a single entity.

This advanced system opens up new horizons in interfacing with operators and will enhance user experience!

Find out more!

Come visit us at Intertraffic Amsterdam  
29 March - 01 April 2022  
Hall 05 - Booth 05.313



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