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# Analytics-driven video solutions for intelligent transportation systems

As city streets and sidewalks become more congested, city planners face new safety challenges – distracted pedestrians, more bicyclists, and an increase in public transportation. Smart and semi-autonomous vehicles are also on the rise in cities and on highways. The challenge for traffic engineers and planners is complex. How do you choose the right technology to improve mobility, safety and efficient use of roadways now and into the future?

For decades, Bosch has developed Video Analytics technology for driver assistance and autonomous driving applications, and intelligent safety systems. This same technology is inside Bosch IP cameras, bringing intelligence to infrastructure through traffic flow and smart parking solutions. Video Analytics built-in to the cameras enables intelligent devices that can alert to safety risks and deliver valuable data for highway and urban infrastructure planning.

## Enhance safety

Improve safety by alerting traffic and transportation operations centers and drivers to risks on the road. Intelligent IP cameras deliver automatic incident detection for stopped vehicles, objects in the road, vehicles traveling the wrong way, and more. The result:

- ▶ Early incident detection enables operators to implement the necessary workflows to resolve incidents faster
- ▶ Integration with dynamic message signs and DSRC broadcast messages ensure drivers are instantly alerted to safety issues and improves situational awareness
- ▶ Detection of pedestrians in a crosswalk can alert the traffic controller to preempt traffic signals to increase safety for people in the intersection
- ▶ Jaywalkers at night can trigger the IP camera to activate an onboard white light illuminator to make pedestrians more visible for drivers

## Beyond safety

With Video Analytics, the IP camera becomes an intelligent sensor. Using video as a sensor, city traffic planning directors can continuously collect real-time data to analyze traffic flow and implement new policies that result in safer and more efficient roadways. Data examples include:

- ▶ Pedestrian, bicycle, and vehicle counts
- ▶ Average speed and direction
- ▶ Road occupancy

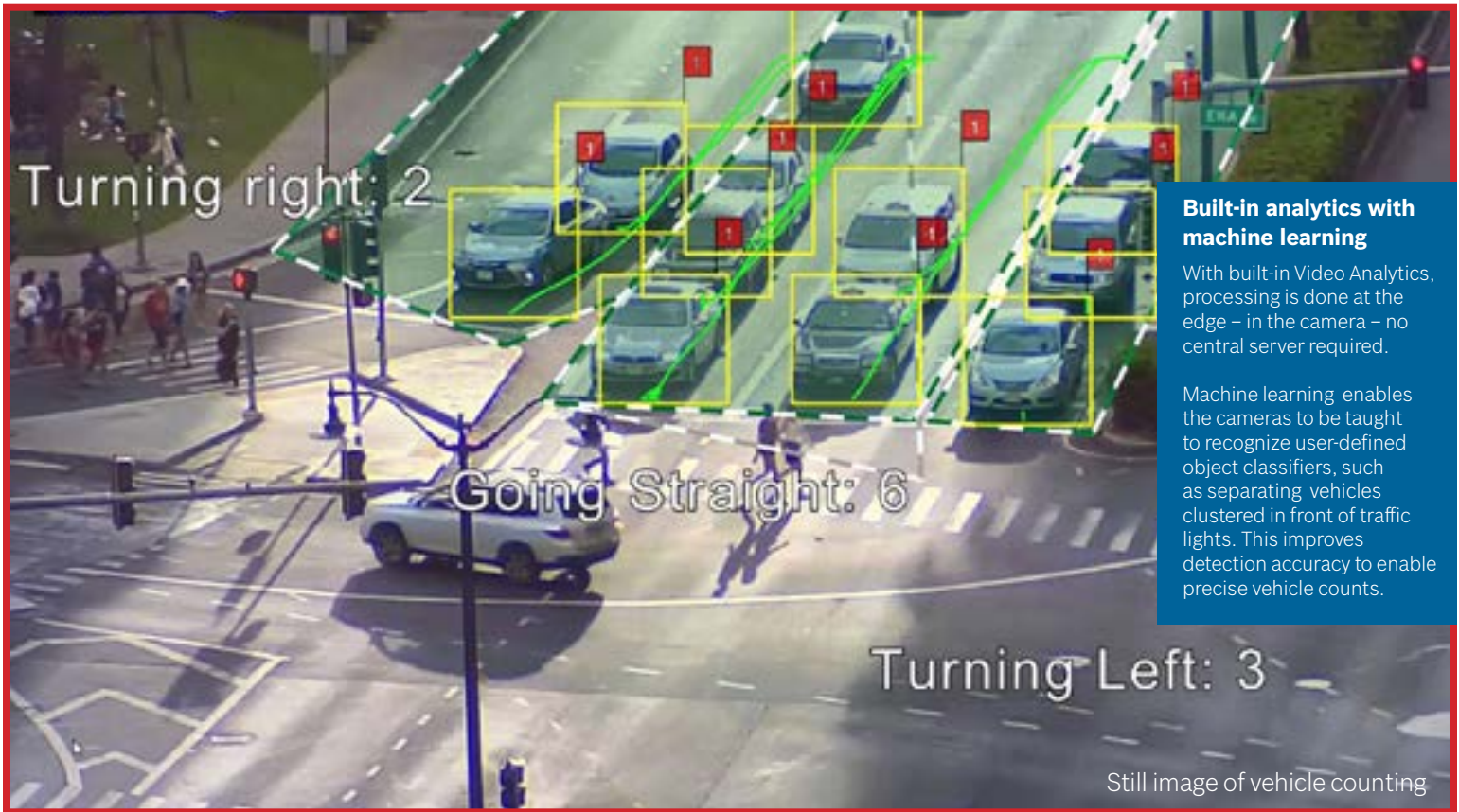
In busy cities, Video Analytics can also help monitor parking lot occupancy, curbside parking, and enforce no-parking zones. In lots, cameras can count open parking spots or track ingress and egress, and relay this data to the video management and parking management systems. Sharing this information and alternative parking locations on a dynamic message sign can help drivers find open parking faster and reduce traffic congestion and emissions.



Programming cameras to track vehicle counts and speeds can provide meaningful data.



Bosch makes it easy to collect and filter data from multiple cameras to feed business intelligence dashboards.



**Built-in analytics with machine learning**

With built-in Video Analytics, processing is done at the edge – in the camera – no central server required.

Machine learning enables the cameras to be taught to recognize user-defined object classifiers, such as separating vehicles clustered in front of traffic lights. This improves detection accuracy to enable precise vehicle counts.

Still image of vehicle counting

**Bosch cameras for intelligent transportation systems**

Bosch offers a full line of fixed and moving, optical and thermal IP cameras that are ideal for intelligent transportation systems. All Bosch IP 7000-9000 series cameras feature built-in Intelligent Video Analytics as standard. This includes MIC IP cameras, a series of extremely rugged moving cameras that are ideally suited for intelligent transportation systems.

MIC IP starlight 7000i	MIC IP fusion 9000i	AUTODOME IP starlight 7000i	FLEXIDOME IP starlight 8000i	DINION IP thermal 8000	DINION IP starlight 7000 HD
1080p@60fps	1080p@60fps	1080p@30fps	1080p, 6MP or 4K ultra HD	VGA or QVGA	720p@60fps
IP68	IP68	IP66	IP66	IP66	Outdoor housings available
IK10	IK10	IK10	IK10+	-	-
Starlight technology with optional illuminator	Dual optical and thermal imager with sensor data fusion	Starlight technology	Starlight technology with remote commissioning capabilities	Fixed thermal camera in an outdoor housing	Fixed camera with starlight technology



See the full portfolio of Bosch IP cameras with built-in Intelligent Video Analytics and watch them in action at [www.boschsecurity.com](http://www.boschsecurity.com)

To contact Bosch for more information on solutions for intelligent transportation systems, email [intelligent.transportation@us.bosch.com](mailto:intelligent.transportation@us.bosch.com)