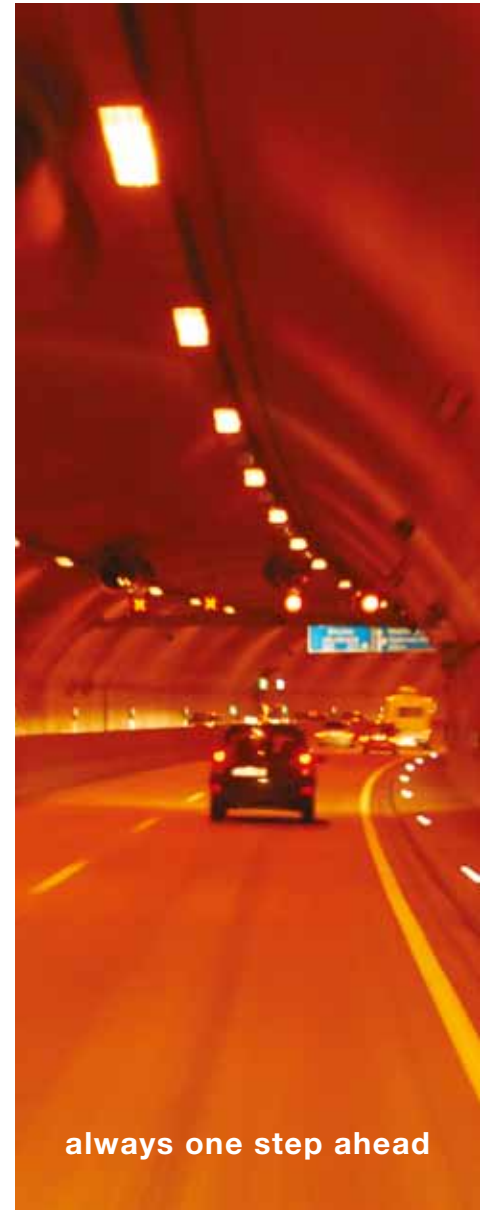


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Traffic Surveillance: Kapsch Incident Detection System.



always one step ahead

The Kapsch **Incident Detection System (IDS).**

In accidents, seconds can be crucial. Fast and efficient coordination of the rescue effort is imperative to save human lives, avoid danger and keep infrastructure damage to a minimum.

The Kapsch Incident Detection System allows reliable detection of any events or anomalies within seconds and therefore assures safe operation and traffic flow on critical infrastructures such as tunnels, bridges, open roads, intersections and more.



Kapsch IDS integrates main functions within one system:

Video Analysis.

Images from cameras mounted on roadside provide the basis for mathematical image processing algorithms used for object detection and object tracking.

Traffic Flow Data Generation.

One of the results gained from video analysis is traffic flow data generation. It allocates information for speed measurement, distance measurement, vehicle classification, distinguishing between passenger cars and trucks, and vehicle counting, as such enabling connected control systems to provide several traffic statistics (e.g. vehicles per day and traffic density).

The Kapsch system includes a License Plate Recognition Module that automatically identifies and reads the number plate of all vehicles and can be used in a variety of add-on applications for multipurpose access- and control-information



Event Detection.

The prime motivation for traffic safety technology is to protect and safeguard human life and infrastructure from harm or threats in dangerous traffic situations as well as to enable the road authorities in order to control the traffic flow.

For detection of incidents in tunnels, such as smoke or visibility degradation, the whole tunnel profile is analysed. The system continuously measures visibility quality and immediately detects strange movements, such as people or lost cargo. Wrong way drivers, traffic jams, slow or stopped vehicles and hazardous goods plates can be reliably identified and reported.

The system is suited for detecting and evaluating the following incidents in tunnel facilities and other harsh environments such as low illumination or reduced contrast due to low visibility:

Traffic Jam

Traffic jam detection is based on the speed and distance measurements of discrete vehicles. The distance between two vehicles is measured on the basis of the time that passes between the end of a vehicle present in the visual range of the camera and entry of the following vehicle into that range.



Lost Cargo

Detection of lost cargo is based on continuous monitoring of the lane-surface as a background model. If a passing vehicle loses an object and the object comes to a rest in the lane, the detection module reports this obstruction to the control system.

Smoke

The smoke detection system analyses and classifies every area of the image into smoke or no smoke. Only when a freely parametrizable limit value is exceeded does the system trigger an alarm.

As the smoke module analyses and evaluates the entire image area several times per second, the system can trigger an alarm immediately upon exceeding of the permissible smoke quantity.



Stopped Vehicles

The detection of stopped vehicles is based on speed measurement.

This speed measurement is selectively performed for each lane. If an individual vehicle has a constant speed of zero, a standstill is detected and reported to the control system.

Pedestrians

The prime motivation for every technology to increase safety is to protect human beings and to safeguard against any harm or threats in dangerous traffic situations.

The digitized camera image is constantly analysed by the software for moving objects. The objects are catalogued in shape, size and speed. If all three parameters fit to a person, an alarm will be triggered.

Hazardous Goods

This Module identifies hazardous goods plates on trucks. When a truck passes the camera an image is taken and the system is able to recognise the hazard warning panels of vehicles carrying dangerous goods (e.g. European Directive 94/55 EC) and generates an alarm accordingly.



Slow Vehicles

This module is based on the Speed Measurement Module and enables the road management to indicate when a motorist reduces his speed under a free configurable value from 10km/h to 50km/h. The measurement is done over a distance of approximately 15 meters. Sudden speed reduction after the initial speed measurement will be noticed in the following camera of this section. The outstanding accuracy of this module has been certified by the Austrian Federal Office of Weights and Measures.

Wrong-way Driver

Wrong-way driver detection is based on tracking a vehicle's direction of motion. The vehicle's direction of travel is constantly compared with the permitted direction of travel. If the vehicle deviates from this, it is reported as a wrong-way driver.

This monitoring takes place constantly and on all lanes.

Digital Storage and Playback.

Kapsch Incident Detection System offers an integrated digital recording of 25/30 frames per second per camera.

All camera images are permanently stored in separate buffers. A ring-buffer enables access to past events and keeps live images from each camera. The buffer capacity is freely configurable within the storage capacity.

In a situation of alarm, Kapsch IDS starts recording the event. This event record is combined with the pre-record period from the ring-buffer and stored in the permanent event buffer.

The user accesses the ring and event buffer via a digital video recorder where videos may be reviewed, sorted, filtered (e.g. by camera, date, event, etc.) and exported to an external media.

Digital Image Transmission/CCTV.

Live images are sent from the camera to the corresponding camera node, where the signal is digitized and compressed (encoded).

These digital video streams are transmitted by a local area network (LAN) to a playback unit, where the images are decoded and being displayed on designated monitors.

Integration in Control Systems.

Kapsch IDS offers a wide range of supported interfaces to provide full integration into any given Supervisory Control and Data Acquisition (SCADA) system. With integration into the SCADA system, the scope of information is expanded, system use is considerably eased (digital video recorder), the work load is distinctly relieved by automated, event-triggered alarms rather than constant monitor watching, and user workplace remains unchanged.

Benefits.

- High performing and robust algorithms for maximum detection quality with low false alarm rate
- Modular and lean architecture allows flexible setups in various environments
- Short project rollout time
- Easy to operate – high usability
- Minimized Total Cost of Ownership



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