Securing Highways with iCAT Traffic

NETAVIS iCAT Traffic is a module which extends Observer to enable applications for roads, expressways, and highways. Its reliable analytics algorithms combined with an easy-to-configure interface are a powerful combination to analyze traffic and detect dangerous situations.

The module's three main applications are:

▶ **Traffic Monitoring**
▶ **Stopped Vehicle Detection**
▶ **Wrong Way Detection**

All three applications have been designed for robust performance and a low false alarm rate in a broad spectrum of environmental conditions. Additionally the module can be easily combined with other features of the strong NETAVIS Observer video management platform.

Traffic Monitoring

Traffic monitoring assesses the speed and density of road traffic for each lane. It can thereby detect traffic jams, low traffic, and other traffic patterns and alert responsible monitoring centers accordingly. More specifically the module measures the average speed of traffic in km/h and the density in terms of the percentage of the road which is occupied by vehicles. It then classifies the status into one of five categories: Low traffic, Normal traffic, High traffic, Congested traffic, Stopped traffic. Events and optional notifications are raised whenever there is a change between any such states.

For traffic monitoring the camera should see at least 100 meters of the road, whereby the road section to be analyzed should be almost straight, between 70 and 100 meters long and have one to three lanes. The camera must provide at least VGA resolution at a frame rate of 12fps, whereby high quality cameras are recommended. Low-light cameras or strong infrared lighting are highly recommended for nighttime operation.

Stopped Vehicle Detection

A vehicle which stops on a road, an emergency lane or an exit lane is detected by the system. Such an event then raises an alert or other type of notification so traffic monitoring operators can react accordingly. The module keeps track of individual vehicles within a pre-defined area and creates an event when one of them stays motionless for longer than a pre-defined period of time.

For stopped vehicle detection the road section to be analyzed should be 50 to 60 meters long. The camera must provide at least VGA resolution at a frame rate of 12fps, whereby high quality cameras are recommended. To be detected reliably vehicles have to cover at least 5% of the image dimensions (in pixels), both in their width and height, even in the position furthest away from the camera. At VGA resolution this means a vehicle size of about 30x30 pixels.

Wrong Way Detection

A vehicle going into the wrong direction on a normal road or special segments such as an exit lane raises an alert. These alerts can then be handled by operators, e.g. to warn other drivers of the dangerous situation. The module learns the typical traffic direction within a pre-defined area over the course of a calibration period. After this process is completed any vehicles going into a different direction are detected.

For wrong way detection the road section to be analyzed should be 50 to 60 meters long. The camera must provide at least VGA resolution at a frame rate of 12fps, whereby high quality cameras are recommended. To be detected reliably vehicles have to cover at least 6% of the image dimensions (in pixels), both in their width and height, even in the position furthest away from the camera. At VGA resolution this means a vehicle size of about 40x40 pixels.

24/7 Operation with Nighttime Detection

To enable 24/7 operation of these applications the modules recognize whether it is day or night. It then automatically adjusts its settings to meet the current requirements. The nighttime detection also includes a learning component to adapt itself to the different seasons and changing day and night times.

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