Traffic Participants at a Glance

Smart Cameras in Traffic Security and Surveillance Applications

Current traffic statistics unearth the truth: Due to increasing traffic, each road user is more stressed. This leads to low driver attention and mistakes which increases the accident risk especially at ambiguous and confusing traffic sites. Intelligent, robust and compact systems are needed to examine and protect traffic sections, even in poorly accessible environments. Matrix Vision's smart camera mvBlueLynx shows how traffic security is improved on land and on water in France.

Mounted smart camera mvBlueLynx with removed weatherproof housing surveilling traffic on the Ardeche

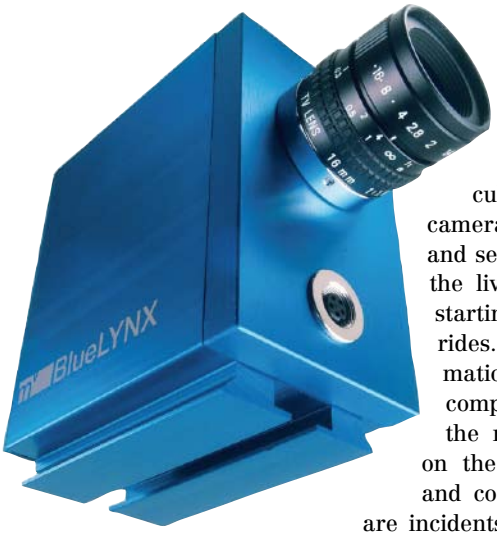
Dangers Caused by Wrong Way Drivers

According to the German Statistisches Bundesamt, there were approx. 340,000 accidents with personal injuries in the year 2004. Wrong way drivers account for 0.45% (approx. 1,800) of these accidents. This seems to be a small amount, however due to material damages, medical treatment etc. these accidents result in costs of approx. 35 million Euros per annum. In Austria, these numbers are comparable. At mid-year 2005, the number of wrong way drivers in Austria rose by 10% to 233 (source: Ö3 Verkehrsservice). In 2004, the total number of accidents was 42,500 (source: Bundesanstalt Statistik Österreich), which means that accidents caused by wrong way drivers correspond to 1 %. Reasons for wrong way drivers include drug and alcohol abuse, complex traffic signs near road works and motorway exits, inattention, suicide attempts and tests of courage.

Using Smart Cameras to Avoid Accidents on Motorway Exits

Taking the numbers from Germany and Austria as a base, there are approx. 820 motorists driving against the traffic in France (in the year 2004 there were 109,000 accidents with personal injuries in France; source: French Ministry of the Interior). For this reason, in 2005 some French motorway associations installed a smart system to prevent accidents. The system is based on the mvBlueLynx smart camera with an additional weatherproof housing and works independently. This means that the system features a transmitter and receiver. Furthermore, due to solar elements, no additional power supply is necessary. Thus, the intelligent system can record irregular incidents around the clock. Each camera observes one motorway exit and detects wrong way motorists, cyclists and pedestrians. The digital I/O generates a signal and sends it to a light system, which warns the offending road user visually. Of course, this does not prevent suicide attempts or tests of courage. However, the monthly downloads of the recorded images help to clarify the circumstances. In future versions, it would be possible to send the images of irregular incidents live to a central traffic surveillance center, which could then be used by the police or radio stations.

Watching out for wrong way drivers: mvBlueLynx located at a motorway exit



mvBlueLynx is a smart camera with a CPU up to 400 MHz, up to 64 MB RAM and Embedded Linux OS. The camera is available with CMOS sensors up to 1,280 x 1,024 pixels as well as CCD sensors with maximum of 1,600 x 1,200 pixels or as line scan up to 2,048 pixels.

Crowding on Waterways

Problems of this nature are not restricted to asphalt roads. Waterways are concerned, too. The river Ardèche, located in the south of France between Massif Central and the Rhone valley, is a popular destination for tourists from France and abroad. A popular attraction on the river is canoeing, as demonstrated by an increasing number of visitors. Nevertheless, there are disadvantages to increasing tourist numbers: the boat hire companies have to face an increased risk of accidents, tourists dissatisfied by a lack of solitude on the water and increasingly complex canoe traffic management. The latter actually led in some instances to attempts to defraud by tourists.

Traffic Management Supported by Smart Cameras

To counter these problems, at the beginning of 2005 the boat hire companies installed the mvBlueLynx smart camera with an additional weatherproof housing. The mobile and compact design pays off: neither a big housing nor a big power supply unit is needed to mount the camera on places with a good survey of the river and which are difficult to access. The camera counts the boats and sends the data and the live images to the starting point of the rides. With this information the boat hire companies can handle the number of boats on the river, intervene and counteract if there are incidents. The expansion of the system in every direction is also possible. The complete survey of the river is thinkable. Dangerous spots like hazardous shallow water could be marked in the system and image processing could detect whether a boat is approaching this danger. The system could also warn the canoeists or the hire companies to react.

Outlook

The current buzzword in the industrial image processing market is Gigabit Ethernet. Using Gigabit Ethernet has several advantages: high data rates, cable distances up to 100 meters, easy network mounting and Power over Ethernet. Furthermore, it is possible to use existing network infrastructure. Since 2007, Matrix Vision has combined Gigabit Ethernet with intelligence in one small camera called mvBlueCougar-P. This combination opens up new horizons, not only in traffic surveillance applications.

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