An integrated and customised video-analytics solution for real-time traffic monitoring
The human eye is not enough when it comes to detecting danger or threats and enforcing high standards of traffic safety and infrastructure security at all times.

**AiVu-Smart AID** is a video-analytics solution that integrates video-surveillance for real-time detection of intrusions, stationary vehicles, queues, tailbacks, speed-drops, vehicles moving along forbidden detection, smoke and more. The system may also be set to perform such tasks as tallying and classifying.

**AiVu-Smart AID** processes live or recorded footage from IP cameras positioned in key traffic areas, both in town and along road routes.

By integrating existing video-surveillance systems, through a set of smart traffic monitoring functionalities, critical situations and on-going traffic changes can be managed promptly and effectively.

Video Content Analysis and Automatic Incident Detection algorithms supply users with real-time alerts to traffic anomalies as well as significant statistical data – such as vehicle counting or size classifying – that aid traffic-flow analysis.

Thanks to know-how matured from the development of applications able to accommodate the needs and requirements of our domestic and international customers, **AiVu-Smart AID** is a video-analytics solution best-suited to toll-road operators and large system integrators managing large volumes of data and video.

**Accidents, gridlocks, speed-drops, road-works and dangerous behaviour often impact heavily on road, motorway and tunnel efficiency and safety.**

- Tracking of vehicles/people
- Detection of vehicles in lay-bys
- Intrusion detection
- Detection of stationary vehicles
- Lane change detection
- Detection of vehicles moving along forbidden direction
- Queue and speed drop detection
- Vehicle speed estimation
- Interdistance measurement
- Vehicle counting
- Linear / spatial measurements of vehicles
- Abandoned object/spilled load detection
- Automatic smoke detection
- Traffic management
The video analytics modules run on the device hosting the video recording software (DVR, NVR and HDVR) without requiring any specific hardware.

Image acquisition, processing and sending are performed by the device independently of the type and model of connected video cameras. Each server can manage up to 64 video cameras, maintaining the same quality of the video.

Fixed, dome, PTZ video cameras: Aitek video analytics can be integrated on board a wide range of video-cameras.

Highly reliable and with excellent performance, Aitek video analytics are a cut above the rest. Their wide range of software modules allows to design flexible and effective solutions, with significant benefits in terms of computational resources.

Aitek is a technological partner of world-leading video-camera manufacturers. Providing Clients with secure and reliable solutions, always.
Features

AiVu Smart AID configuration interface

Front-end is a web-based interface, accessible via mainstream browsers, easily exported to workstations equipped with different OSs (Windows, Linux), allowing for the drawing of virtual sensors on an image or sections of it.

Sensor number and type on cameras are easy to modify. A number of sensors can be configured on a single camera to simultaneously detect different events without altering processing performance.

All alarms, and their corresponding images, can be automatically signaled to a control center provided with our AiVu-VMS video management portal or to a third-party supervisory system, using either Aitek’s own format or the Onvif standard. The control center automatically receives alarms from the video cameras any time a relevant event is detected, thus supporting security personnel by displaying the recordings associated with the events and allowing to carry out the appropriate procedures.

Post-event analytics on recordings

The AiVu-Smart AID platform software modules can also be applied to recordings, allowing to quickly and automatically recreate events of interest without having to examine hours of recordings.

Events can be quickly detected just by drawing the virtual sensors on the images: post-event analytics are performed at the highest possible speed, allowing to process hours of recordings in a few minutes!

AiVu-Smart AID functionalities

- Modular standard video analytics functions, for the design of solutions tailored to the Clients' needs
- Easily expandable with new functionalities
- User-friendly web-based configuration interface that does not require specific know-how
- In case of variations in video camera positioning, full functionality may be restored simply by re-defining the virtual sensors
- Real-time detection of critical events and support for proactive decision-making for preventive actions
- Increased operating efficiency and reduced response times in case of emergencies
- Automatic forwarding of alarms and relevant recordings to the control centre and to hand-held devices
- Simple configuration procedures, allowing even non-video analytics experts to manage the system
- Default values and/or advised interval ranges for each parameter
Applications

Traffic monitoring
- Size-based vehicle classification (up to 7 vehicle categories)
- Vehicle counting
- Accident detection
- Detection of vehicles in lay-bys or other non-entry areas
- Detection of vehicles moving along forbidden direction
- Queue and speed drop detection
- Interdistance measurement
- Vehicle speed estimation
- Automatic smoke detection

Safety and security in tunnels
- Detection of stationary vehicles
- Smoke detection
- Intrusion detection
- Queue and speed drop detection
- Accident detection
- Detection of vehicles moving along forbidden direction
- Interdistance measurement
- Spilled load detection
- Lane change detection

Road safety and security
- Queue and speed drop detection
- Detection of pedestrians on the carriageway
- Detection of stationary vehicles
- Detection of vehicles moving along forbidden direction
- Accident detection
- Spilled load detection
- Detection of vehicles moving along forbidden direction
- Detection of vehicles in lay-bys or other non-entry areas
- Lane change detection
- Automatic smoke detection
### Software modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AiVu-Smart AID-Calibration</strong>&lt;br&gt;Size-based vehicle classification</td>
<td>Automatic classification of vehicles by size. This module is best suited to classify vehicles transiting through a defined virtual sensor (up to 7 vehicle categories, from motorcycles to trucks).</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Cover</strong>&lt;br&gt;Camera covering</td>
<td>Detects camera obscuration incidents that prevent video-analytics (vandalism, dirty lenses and obstructions).</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Count</strong>&lt;br&gt;Vehicle counting</td>
<td>Counts vehicles transiting through a sensor-defined area. This newly devised technology replaces existing, easily-damaged, induction-coils embedded in the tarmac. This module is best suited for counting transit flows along a selected lane or through a selected access-gate.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Direction</strong>&lt;br&gt;Wrong way detection</td>
<td>Detects vehicles transiting in a chosen direction. An alarm signal is generated each time a vehicle transits the wrong way through a sensor-defined area. It is best suited to detect vehicles committing wrong way infractions.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Fire&amp;Smoke</strong>&lt;br&gt;Detecting smoke/fire</td>
<td>This module allows to automatically detect smoke, both outdoor and indoor scenarios (e.g. in tunnels).</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Intrusion</strong>&lt;br&gt;Intrusion detection</td>
<td>This module allows to detects unauthorized people in a monitored area. It is ideal for perimeter protection and detecting trespassing over gates and fences in industrial sites, port terminals, warehouses and depots, military sites, etc.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Lane Change</strong>&lt;br&gt;Lane change detection</td>
<td>This module detects vehicles moving in a virtual sensor corresponding to a road lane. An alarm is created any time a vehicle exits the sensor, allowing to detect vehicles changing lanes, driving off the road, merging onto a road and passing illegally.</td>
</tr>
</tbody>
</table>
## Software modules

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Function Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AiVu-Smart AID-Position</strong></td>
<td>Detecting vehicles in lay-bys or other non-entry areas</td>
</tr>
<tr>
<td></td>
<td>An alarm signal is generated each time a person or vehicle transits through a monitored area. This module is best suited to the surveillance of non-entry or restricted areas, such as parking-lots, depots, road-works, etc.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Queue</strong></td>
<td>Detecting vehicle queues</td>
</tr>
<tr>
<td></td>
<td>Generates an alarm signal each time traffic within a sensor-defined area exceeds a configured threshold. This module is best suited to monitor vehicle queues and detect gridlocks or accidents.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Ranger</strong></td>
<td>Interdistance measurement</td>
</tr>
<tr>
<td></td>
<td>Automatic estimation of the interdistance between vehicles (in metres). This module allows to acquire data about traffic conditions along a road infrastructure (real-time measurement of the interdistance between two vehicles, minimum and maximum interdistance values detected by the virtual sensor and average calculation).</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Speed</strong></td>
<td>Vehicle speed detection</td>
</tr>
<tr>
<td></td>
<td>Automatic speed estimation of vehicles in transit through a virtual sensor. This module allows to acquire data about traffic conditions along a road infrastructure (real-time estimation of the speed of each vehicle, minimum and maximum speed values detected by the sensor and average calculation).</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Speed Drop</strong></td>
<td>Speed drop detection</td>
</tr>
<tr>
<td></td>
<td>Detects speed drops within a sensor-defined area. An alarm is generated each time the average speed of vehicles transiting through a sensor falls below a configured threshold for longer than a defined time. This module is best suited to manage vehicle flow and detect gridlocks or accidents.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Stop</strong></td>
<td>Detecting stationary vehicles and/or spilled loads</td>
</tr>
<tr>
<td></td>
<td>An alarm signal is generated each time stationary objects or vehicles are detected within a configured sensor area for longer than a defined time. It detects vehicles or objects stationing on carriageway and/or inside tunnels, accidents, spilled loads, abandoned objects, etc.</td>
</tr>
<tr>
<td><strong>AiVu-Smart AID-Tampering</strong></td>
<td>Camera moving or tampering</td>
</tr>
<tr>
<td></td>
<td>Detects camera movements that prevent video-analytics. This module is best suited to detect vandalism.</td>
</tr>
</tbody>
</table>