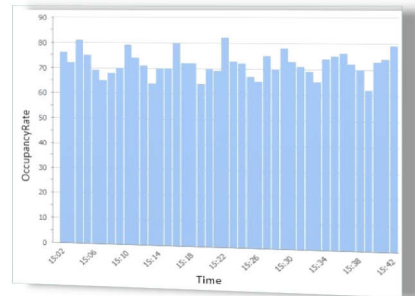


The function **VTrack-OccupancyRate** allows the automatic and real time estimation and collection of the percentage of occupancy of virtual areas by subjects of interest, and for each area the signaling of an occupancy percentage higher than a defined threshold

- ✓ Web based on-line visualization of the estimated occupancy rate for each configured area
- ✓ Web based off-line manual or automatic reports of the occupancy rate within configured time intervals for each configured area
- ✓ Automatic and real time detection and signaling of percentage of occupancy of a configured area higher than a defined threshold



## VALUE AND APPLICATIONS

### CUSTOMERS FLOWS AND BEHAVIOURS ANALYSIS (BUSINESS INTELLIGENCE)

- ➔ More targeted and effective marketing actions
- ➔ Increasing the effectiveness of trade promotion

*..through collecting the data related to the presence of customers, for verifying the ratio between the presence and the selling, or the best placement of a product, or the impact of a promotional campaign*

### OPTIMIZATION OF SERVICES AND OF MANAGEMENT ACTIVITIES

- ➔ Increasing of the efficiency of personnel and facilities
- ➔ Significant reduction of management costs
- ➔ Monitoring of the utilization of services and facilities

*..by estimating the length of queues at cash, or box offices, or check-in, or accommodations; or by verifying the istic data related to the presence of people, for the optimization of the displacement of the personnel, or of the opening/closure time of shops, cash, public services or facilities, or of the timetables of public transports*

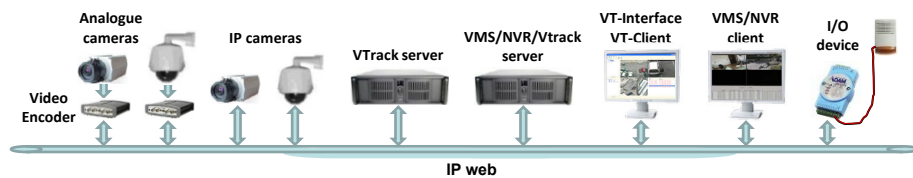
### MORE EFFECTIVE VIDEOSURVEILLANCE FOR SAFETY AND SECURITY

- ➔ Prevention of critical situations for personnel and facilities
- ➔ Prevention of possible criminal acts

*.. by estimating the overcrowding of people in areas with limited accessibility, or the detection of abnormal gatherings within sensitive areas or environments*

## FUNCTIONAL SPECIFICATIONS

- ✓ Modular software architecture, available for o.s. Windows/Linux, 32/64bit
- ✓ Unlimited virtual areas configurable, of any shape and dimension
- ✓ Robust and effective in filtering out false alarms due to atmospheric phenomena, variations in environmental conditions, vegetation, thanks to the most advanced self-adaptive algorithms based on Self Learning Background Modelling, Foreground Filtering and Multitarget Tracking
- ✓ Specific algorithms for filtering shadows and light changes
- ✓ 3D perspective management, by perspective interpolation on the image or by image calibration
- ✓ Ability to inhibit the processing in virtual areas not of interest
- ✓ Integrated web server and database for the visualization and management of the on-line and off-line occupancy rate results by web page
- ✓ Possibility to export queries to the database for off-line reports of the stored occupancy rate results within configured time intervals in csv format
- ✓ Possibility to configure automatic off-line reports of the stored results
- ✓ Possibility to crop from the source image unlimited image portions to process separately
- ✓ Possibility to activate/deactivate the processing by an external input or by a configured timetable
- ✓ Possibility to process at a different resolution and frame rate than the ones coming from the source
- ✓ Possibility to generate an alarm by correlating in logical AND and in time multiple configured alarms
- ✓ Processing results simulation interface, for the immediate verification of the correct configuration
- ✓ Client-based interface VTClient for the visualizations of the real time live view and of the generated alarms, with bounding boxes overlays for each detected subject
- ✓ Watchdog function to restart automatically the service in case of critical errors or unit shutdown
- ✓ Possibility to send automatically and in real time the generated alarms to:
  - compatible VMS platforms
  - I/O contacts, alarm control units, external DVR or NVR, via I/O Modbus device
  - e-mail, with in attachment the image related to the generated alarm
  - FTP server
  - serial port, PLC
  - units connected to the network, via customizable http call
  - VTrack-Recorder, for the storage in local directory of continuous or event-based videos



## TECHNICAL REQUIREMENTS

- Hardware unit required, with o.s. *Windows (XP or later) or Linux, 32/64bit*
- Video flows grabbing from:
  - IP cameras compatible or through rtp/rtsp or mjpeg standard protocol
  - analogue cameras by compatible IP video encoder or by video frame grabber *DirectX* or *Video For Linux* compatible
  - compatible VMS platforms
  - off-line videos in any standard format (avi, asf, mov, ...)
  - streaming server via rtp/rtsp
- Conditions on subjects of interest in the image in order to be efficiently detected:
  - clearly visible and well contrasted by naked eyes in the image, even in critical environmental conditions (night, heavy rain or snow, fog, glare of sun or of other sources of artificial light, ...)
  - entirely visible in the image for at least 10-15 continuous frames
  - minimum dimensions: area of 100 pixels, or 10 pixel/meter in the image at the farrest point where it must be detected (for example 5x20 pixels for a person)
  - maximum dimensions: about 1/4 of the image
  - minimum frame rate: 8fps in outdoor or very dynamic environments, 4fps in low dynamic ones
- Suggested image resolution: CIF (352x288) or QVGA (320x240)
- Computational need:
  - CPU: up to 6 video flows in CIF/QVGA resolution at 8fps per single 2,8GHz core
  - RAM: about 80MB per single video flow

