

Lanit-Tercom Video Analytics Technologies

Lanit-Tercom brief facts

- Founded in 1991
- 300+ employees
- 3 production sites in St. Petersburg
- 500+ completed projects
- Customers from the EU and USA
- Partnership with leading educational and research institutions
- Gold Certified Microsoft Partner

Video processing experience gave Lanit-Tercom the opportunity to implement several technologies that can be divided into 3 groups:

Video processing: improving the quality of images in video stream	2
Objects extraction	4
Objects activity analysis	6

Video processing: improving the quality of images in video stream (a face, text or number)

Lanit-Tercom technology improves the resolution of the needed objects in video stream. The object can be defined by the operator or automatically.

1. The face tracking system.

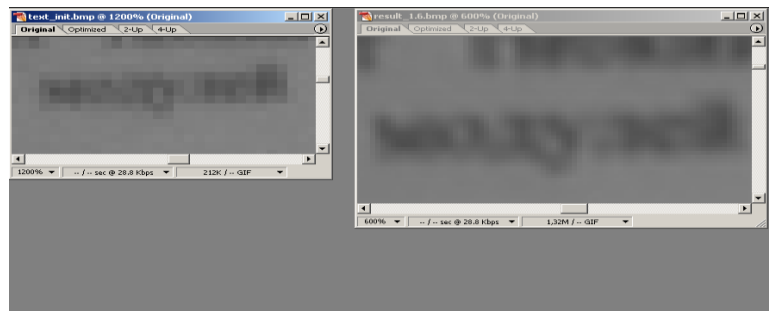
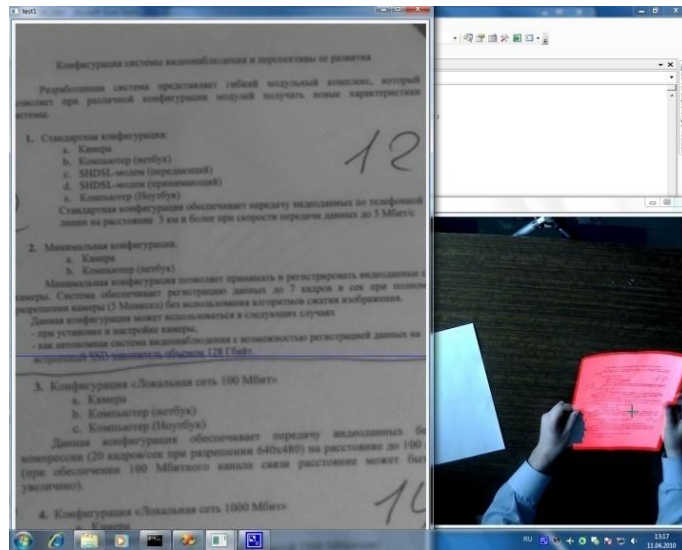
The face, which appears in video frame, is defined and analyzed during the number of frames. Such analysis allows to improve the quality of the needed face image that increases the probability of face recognition (see the example pic.1).

Extraction of moving objects under surveillance with noises is an important task for video surveillance automation systems. Those noises can appear from the low video quality, adverse weather conditions, background inconstancy, shadows or glares, etc. Lanit-Tercom methods of filtration based on randomized perturbation, effectively compensate the non-random noises to solve the task of resolution improvement.



Pic. 1. Improvement of face image: left frame – the initial image; right frame – the processed frame

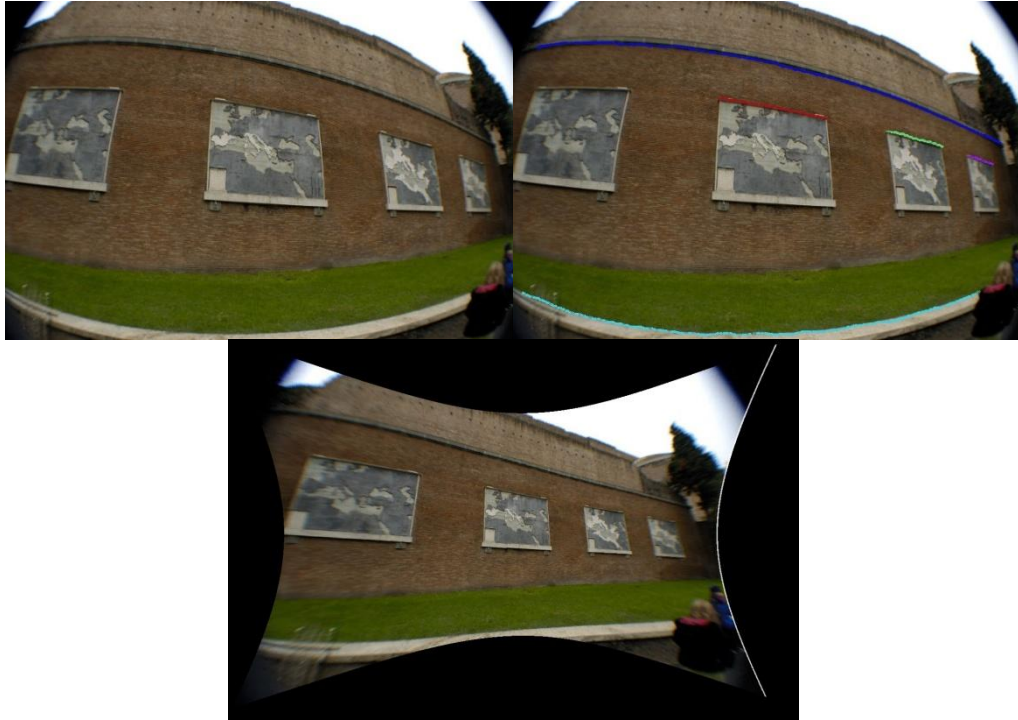
2. *The tracking system for car registration numbers (even in bad weather conditions and dust).*
3. *The tracking system of documents on the table to improve the text quality (pic. 2).* Lanit-Tercom solution combines the algorithms of document tracking and improves the text legibility, at the same time the solution is adjusted to pin-hole cameras. It makes the system more effective for hidden surveillance or for tracking the activity of the decision making persons (for example on the strategic objects)



Pic. 2. Filtering and enhancing text resolution

Improving the quality of video

- Compensation of video defects, received from the unknown objective screen parameters, by image analysis (curve lines correction)
- Programming improvement of object image resolution which allows to enlarge and see the image in details (e.g. face, text)
- Sharp image focus allows to choose the sharpest shot from the existing set of images (Pic. 3)



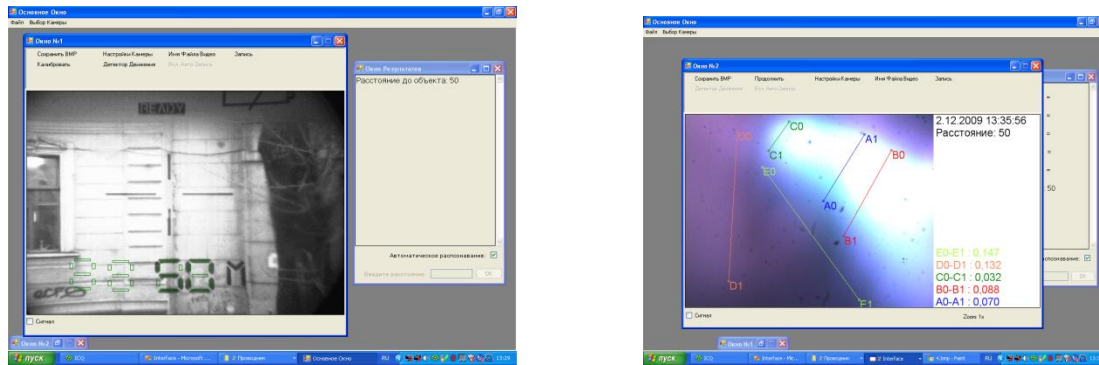
Pic.3 Improving the video quality

Objects extraction

Extraction of moving objects under surveillance with noises is an important task for video surveillance automation systems. Those noises can appear from the low video quality, adverse weather conditions, background inconstancy, shadows or glares, etc.

All objects have the set of properties, e.g. color, shape, texture, that can be some means of object's identification on different videos.

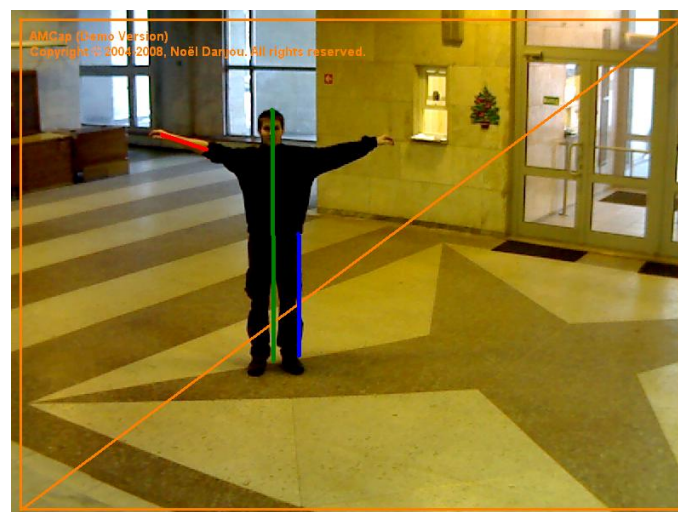
Video cameras array with the use of stereo effect and the use of laser or ultrasonic range finder can provide 3D objects parameters (coordinates, speed, size). Pic.4 describes the system "Motion" interface which consists of range finder, telescope and laptop, to identify the linear size of the object.



Pic. 4 “Motion” system. Left: Range finder defines the distance to the object. Right: linear object size is defined.

If objects move on the smooth surface (road, floor) and the camera parameters are defined, then it is possible to extract 3D object parameters from the video (coordinates, speed).

Camera parameters identification (objective glass position properties according to the surface) is done by the calibrating, what means that the object with known size is recorded on video in several different positions. Calibrated video recording allows to identify the height of a person (Pic. 5), hands and legs size, movements (run, pace) or, in other words, identify non-typical or dangerous situation – fight or the running person (as shown at Pic.6).



Pic.5. Human’s height and extremities measuring

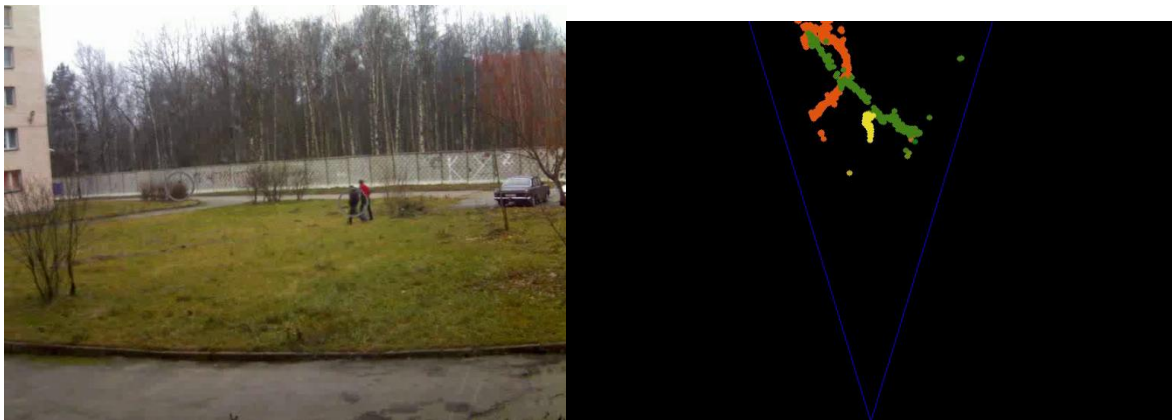


Pic. 6. Running human detector

Objects activity analysis

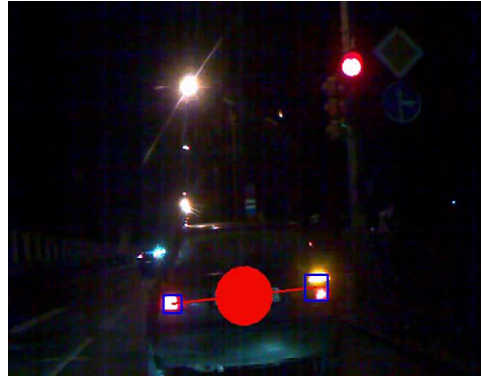
3D object parameters can provide the restoration of their motion path, form the path projection on any flat area, and reflect its trajectory on the map (Pic. 7)

Thus, it is possible to automatically identify the type of the object (car, human), secure zone unauthorized entry by the 3D parameters, meanwhile without these 3D parameters the risk of false identification is really high (e.g. the bird in front of the camera can be identified as a big object).



Pic.7 Motion path on the map

Dangerous situations can be predicted by the motion dynamics analysis, e.g. collisions on the road or other emergencies (Pic.8).



Pic.8. Frontal collision alarm

The object can be identified by the set of parameters – color, shape, texture (e.g. motion path inside the building). Moreover, it is possible to watch the human in the crowd. See the picture below (Pic.9).



Pic.9 Watching a human in crowd