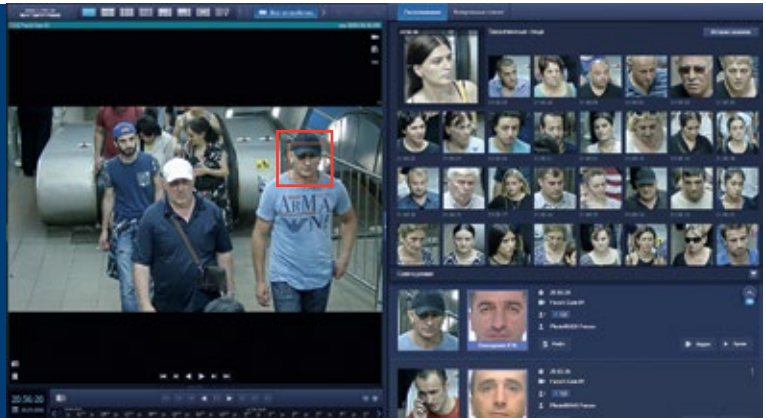


Convolutional neural network based facial recognition technology

SecurOS FaceX

SecurOS FaceX is an intelligent video analytics module for the SecurOS video management platform, which expands your video analytics application capacities for biometric control. With its extraordinary recognition accuracy, SecurOS FaceX operates in a wide range of external conditions, i.e. changing illumination and angle.



The cooperative behavior of subjects has no crucial influence on the efficiency of the face recognition video analytics module. In particular the recognition process is less dependent on the angle between the camera and the person's face.

SecurOS FaceX runs on the SecurOS video management platform, which provides the interoperability with other subsystems, for example ACS. Several SecurOS FaceX systems consolidated under one SecurOS platform command & control center, can support working with multiple watchlists.

The module allows you to automate various operations related to monitoring and enrollment, control and access restriction, as well as statistical analysis. SecurOS FaceX provides the necessary level of security at sites where person enrollment and identification are required, including multifactor authentication systems.

ADVANTAGES OF TECHNOLOGY

- **Unlimited database size**
Create an unlimited amount of watchlists and people in them
- **Convolutional neural network based algorithms**
High percentage of correct recognitions, including those taken under conditions of changing illumination, expression, resolution, distance or aging. The video server CPU performs all neural network processes without the need of special GPU cards
- **Multifactor authentication**
Special mode to manage access control systems (ACS) for both single-factor and multifactor authentication
- **Anti-spoofing**
Special feature to check for face liveness, and to ensure that printed photos or images from mobile devices (phone, tablet) will not be recognized
- **Expanded field of business applications**
Total set of instruments to integrate with 3rd party software that provides business processes support (ERP, SCADA, PSIM, etc.)
- **Tailored Solutions**
Expanded functionality and customized solutions to uniquely address your organization's needs

Applications



Entrances of stations, airports, sport venues



Passport control zones



Industrial enterprises



Business centers



Retail applications



Restricted areas



Entertainment and hospitality industry

KEY FUNCTIONS

- Automatically detect and recognize faces in real-time and display the results in the SecurOS FaceX GUI (graphical user interface).
- Collect information on all detected faces as well as recognition data such as camera, date, time, watchlist, and links to the video clips in the video archive.
- Retrospective people search by photo (search in database of previously detected people and search in watchlists).
- Easily manage watchlists, including the add-one-person-to-multiple-watchlists option.
- Batch import of photos into watchlists while automatically checking for duplicates on existing photos and person's full name.
- Log changes to watchlists.
- Inform the operator (at workstation monitor), or send notifications (by e-mail, SMS, etc.) if a particular person of interest is in the detection field of view.
- Ensure the interoperability with ACS in order to perform multifactor authentication.
- Anti-spoofing feature to check for face liveness, and to ensure that printed photos or images from mobile devices (phone, tablet) will not be recognized. This feature does not require the use of 3D cameras.
- Transfer data to 3rd-party systems as needed.

SecurOS FaceX advantages

Automatically detects every person's face in the camera detection zone.

High recognition quality in a wide range of external conditions (camera angle, changing and insufficient illumination, heavy rain and snow).

Lack of critical dependency from cooperative behavior of people (the recognition process is less sensitive to the angle between the camera and the person's face).

Retrospective photo search is carried out simultaneously both by protocol and by watchlists.

Compares up to 20 detected people per second per CPU core – against watchlists' records.

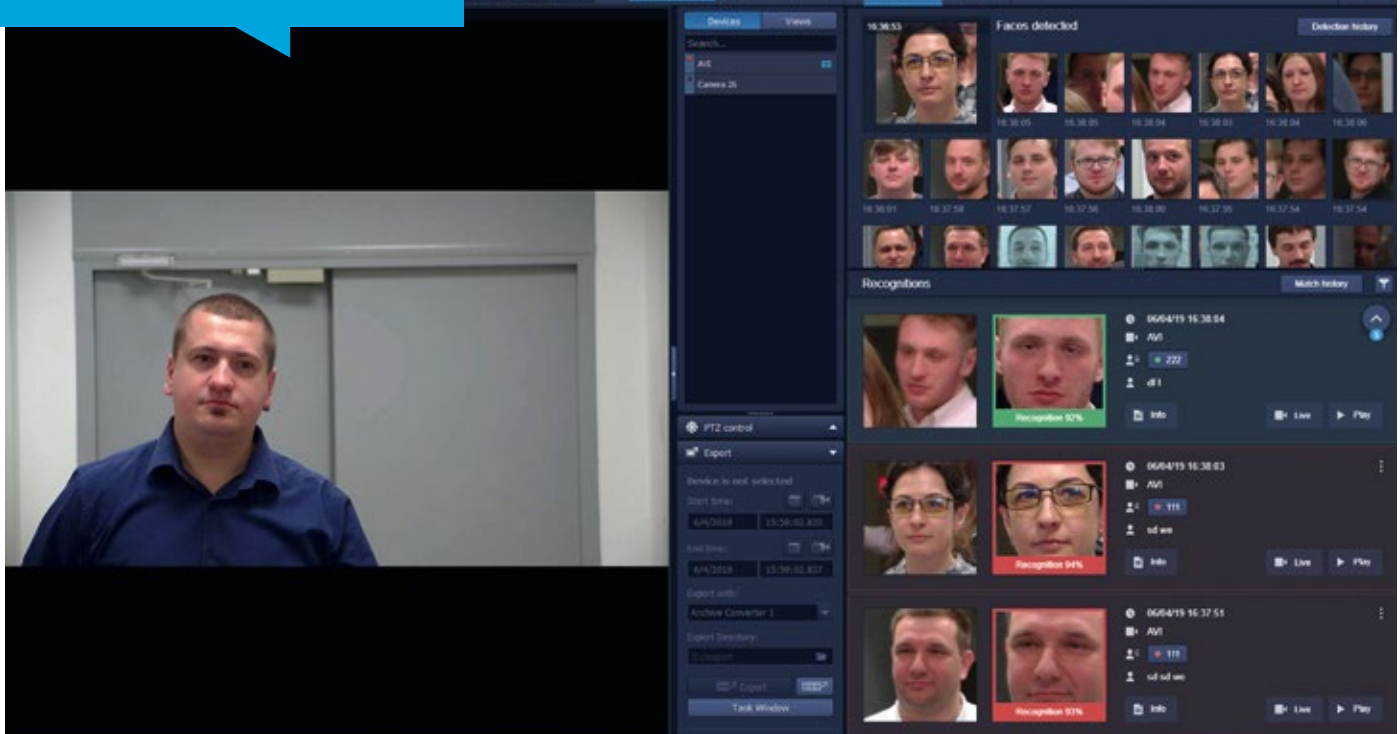
Unlimited number of watchlists and people per watchlist.

The captured face similarity threshold can be configured specifically for each watchlist.

Built-in automation mechanisms to program specific system responses for detected recognition events or watchlist search.

Interoperability with security systems, access control systems and specialized third-party software.

GRAPHICAL USER INTERFACE



SecurOS FaceX GUI includes the following functionalities:

- Detection and recognition results displayed in a user-friendly thumbnail view
- The ability to simultaneously view a detected face in both real-time and from previously detected faces in archive mode
- Manage enrollment via watchlists (create a watchlist, add/delete a person profile, edit a person profile, add additional photos of person to an existing profile)
- Batch photo import into watchlist(s). Check will be performed for duplicates images used, and user will be able to manage duplicates (if duplicates found - add a photo to an existing entry / replace a photo / or create a new entry)
- Easily view corresponding video archive by clicking on a photo of a detected or recognized face
- Search by photo (with the ability to set a threshold for the degree of similarity) and search in watchlists by name
- Provide retrospective search with filtering by similarity, time, camera name

SPECIFICATION

Recognition quality:

- ISO / IEC 19794-5 standard visa compliant photographs
- Social network photographs (and mug shots)
- Face recognition by video stream
- 99.5% True Positive Rate @ 0.1% False Match Rate
- 97.8% True Positive Rate @ 0.1% False Match Rate
- up to 98% True Positive Rate @ 0.1% False Match Rate (if camera installation procedure and reference photo quality meet the technical requirements)

Number of people on the watchlist	unlimited
Number of watchlists	unlimited
Biometric template size	approx. 2Kb
Biometric template extraction speed	4 templates per second per 1 physical CPU core
Face recognition speed against 100k faces in watchlist	up to 20 faces per second per 1 physical CPU core
Number of faces detected simultaneously in one frame	Limited by processor performance only
Data transfer protocol	TCP/IP
Search by picture, parameters	date, time the person appeared in camera FoV, camera name, recognition threshold

- | | |
|-------------------------------------|---|
| Recognition event data of watchlist | <ul style="list-style-type: none">• camera name• date & time of best-frame• captured face image (best-frame)• watchlist• link to person profile• link to a video archive• anti-spoofing alarm (if feature is enabled) |
|-------------------------------------|---|

SecurOS FaceX provides ample opportunity for design and development of multi-component vertical solutions:

- to control and manage the person access to industrial enterprises, critical infrastructure, and sensitive facilities
- to automate person authentication process in sport venues, hospitality and entertainment sites
- to perform person search in law enforcement databases including detecting missing persons or criminals (forensic search)
- to minimize the human factor influence in verification of the conformity of person and photo

FACE RECOGNITION CAMERA SELECTION & INSTALLATION RECOMMENDATIONS

Camera	IP, FullHD resolution is recommended
Frames per second: • for ACS installations (people slow down or stop) • for areas with continuous people movement	• 12 • 25
Lens focal length: • for recognition at 5 feet (1.5 meter) distance • for recognition at longer distances	• 0.11 – 0.31 inch (2.9 – 8 mm) • 0.2 – 2.0 inch (5 – 50 mm)
Optimal camera position	Provides face detection in front view
Best-frame resolution quality requirements: • recommended distance between eyes • minimum distance between eyes	• 60 pixels • 40 pixels
The best-frame quality requirements	The face should be clear (not blurred) without any digital alterations. The face should not be too dark or too light.
Angles of tilt and rotation of the camera with respect to the detected face: • recommended • maximum allowed	• up to 15° vertical and horizontal • ≤ 30° horizontal, ≤ 20° vertical

WATCHLIST ENROLLMENT – IMAGE QUALITY RECOMMENDATIONS

- The recommended head size in the frame is about 70% horizontally.
- The distance between the eyes should be at least 60 pixels (or the width of the face should be no less than 160 pixels).
- Optimal angle (view) is a front view. The maximum allowed face deviation from the optical center should be 15° vertically and horizontally.
- Photos to be of normal sharpness, brightness, contrast, hue and saturation. For black and white images, the face area is 64 shades of gray at least.
- Images color subsampling should be no higher than 4:4:2 (4:2:0, 4:2:2 and lower).
- Any post-processing (format converters, by utilities of photo compression or photo editors are not recommended).
- Images of person with closed eyes, opened mouth, with facial expressions, which distort natural face view, hair / headgear / shadows covering part of the face, wearing bright unusual (creative) makeup are not recommended for face recognition purposes.
- Optimal image quality is achieved by following the requirements of the ICAO standard.



SECUROS
FACEX

SecurOS FaceX available for:

- SecurOS Premium
- SecurOS Enterprise



Please note:

The introduction of a face recognition system requires a pre-installation walk-through for each control point.



Technical Support

The calculation of individual configurations and the selection of hardware for the best system performance are recommended to be performed with the help of the ISS Corporation Pte. Ltd. pre-sales team.



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