VideoXpert™ Integration: RecFaces

Id-Me Face Recognition Module

Integration Capabilities

Tags:

Analytics

Smart search

Improved data storage

PELCO

VideoXpert™

MULTIMODAL BIOMETRIC by REC FACES

Id-Me

- Enterprise Video Management System
- Open platform flexibility
- Ultimate Reliability
- Software & Hardware installations

- Multimodal Biometrical Platform
- Efficient face detection and identification
- Long-term information storage
- Convenient Smart Face Search

Safe and **Secure**
Convenient and **Reliable**

Features

- Human face detection in video streams. Creation and maintenance of a visitor database.
- Notification of visitor presence from a pre-defined visitor list.
- Notification of unauthorized visitor presence in a high security area.
- Fast database search ("smart search") of a suspect by their face image, with an option to extract the following attributes: video camera id, location id, time and date.
- Visitor identification via the mobile app.
- The possibility to create smart business solutions through integration into ERP/CRM systems via the use of open-source API.

The Id-Me Face Recognition Module is a software-hardware solution capable of face detection via video stream processing. Subsequently, it is also capable of face search through matching to a pre-defined database or a list. From the moment of detecting a face image of sufficient quality, the matching to a database is completed in under 1 second. The system supports visitor categorization into groups, such as "staff", "contractor", "wanted" etc., which allows the structuring of notifications. Each time a person is captured by the system, the following data record is stored in the system database: the captured person's face crop, the respective video frame this image has been cropped from, the person's biometric template, as well as the date, the time, and the camera id, along with some other attributes necessary to make database search and the search result filtering faster and more convenient. Hence, the system only needs a few seconds for accomplishing tasks a human operator would otherwise need minutes or even hours for. The face recognition system also has an open-source API, which simplifies the integration with external IT systems, the usage of recognition results for business intelligence purposes, and the creation of an integrated infrastructure aimed at improving business safety and efficiency.

Improved Data Storage Efficiency

For continuous 1080p H.264 video recording at 25 frames per second, 16 GB of storage space per each video surveillance channel per day would normally be required.

Each database record of the Id-Me Face Recognition System, containing the captured person's cropped face image, the respective full video frame, and the biometric template, requires only c. 120-150 kB. Hence, when using the Id-Me Face Recognition System, the same 16 GB of HDD space would suffice for recording data on c. 140,000 captured visitors, which equals 280 days of system operation at 500 visitors per day.

In a typical video surveillance system, the video archive would normally be overwritten with new footage every month. In contrast, the Id-Me Face Recognition System data is stored in an indexed database, which may be available after as long as a year or more.

Fast Search of Wanted Persons

Manual search of a person in footage generated by 10 video cameras during just one day could take several man-hours. This task is especially difficult when a person is unfamiliar to the security officer.

The smart biometry-based search function provided by the Id-Me Face Recognition System requires just an image of the person to succeed. In only a few seconds, the system will perform a database search and identify all locations where the person was captured by the system within a specified time frame. Modern biometric systems detect persons with a much higher efficiency than human operators, especially when a person is unfamiliar to the operator. The security surveillance data processing speed may be a matter of life or death. Improved search efficiency of wanted persons greatly increases the overall efficiency of a security system.

Immediate Notification of Operators

Security operator's level of concentration may decline through the work shift, which may become the critical point of failure in safety, security or incident prevention.

The Face Recognition System generates automatic notifications (alarms) as soon as either an unauthorized / unknown person (i.e. not in white list), or a person present in a black list, is detected. Notifications can be displayed at the security operator's desk, on remote mobile devices, or both.

This ensures the security operator is fully aware of the presence of an unauthorized person in a security area in a swift and timely manner.

Business Analytics

In addition to increasing security systems performance, biometric identification systems can be effective for solving business-related problems, while the open-source API available for the Id-Me Face Recognition System also makes it easy to integrate with external IT systems (e.g. ERP and CRM).

- Big Data: one step ahead of the competition. Collecting and structuring customer data in retail and banking in order to improve communications and the quality of service.
- Upsale and effective communication. Improved interaction between the staff and the customers through notifying the staff about the customers shopping preferences (available from the CRM).
- Business process automation. Customers can be identified at the point of entering an electronic queue, at which point their information can be sent to and processed in CRM with the possibility of notifying a senior member of staff about the arrival of a VIP-customer.
- Simplified attendance recording. Staff arrival and departure times can be automatically recorded through integration of the Id-Me Face Recognition System with external IT systems. Staff will be able to interact with customers in a targeted manner, enhanced by the information about the frequency of visits, purchase history, and the results of prior communications and interactions, which are recorded in the CRM system.

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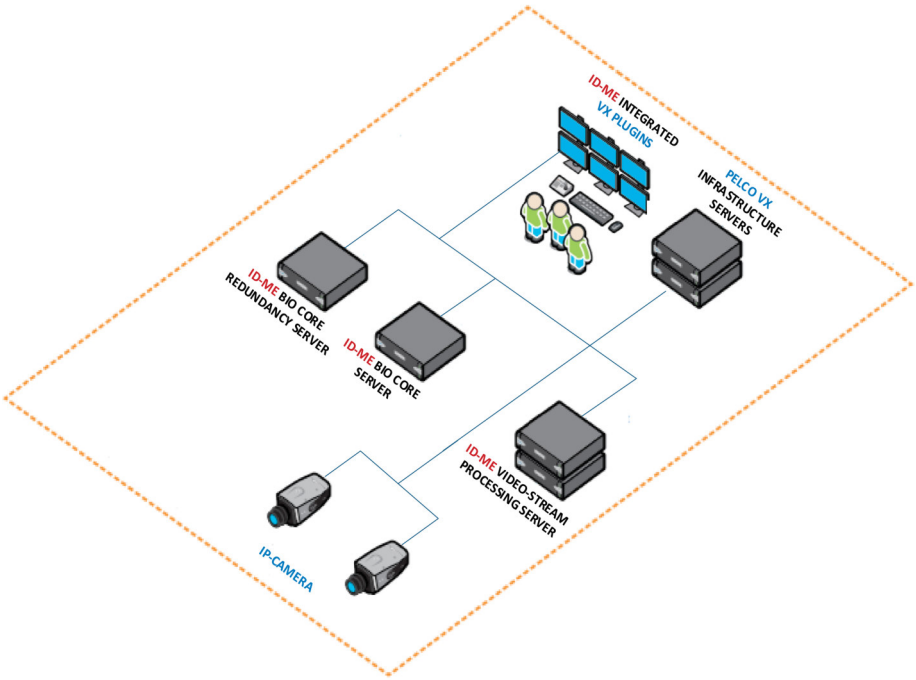
System architecture of solution



Architecture of the biometric Id-Me module within the Pelco VX.

Types of Id-Me solutions for Pelco VX

Type	Description	Typical use
Light Id-Me for VX	The system fully supports **Id-Me Light Bio Core & Video Stream Processing Server** on one server, processing the single FULL HD video stream of up to 25 fps. The limitation on the reference photo database for this solution is 10,000 photos.	Small systems in which identification of the face image on one camera is required. If necessary, several territory distributed Id-Me Light Bio Core & Video Stream Processing Servers can be installed in sync with the reference photo database.
Professional Id-Me for VX	The system consists of: - Central server used for identification, data and configuration storage - **Id-Me Professional Bio Core Server.** - Backup server (optional) **Professional Bio Core Redundancy Server.** - Servers processing up to 2 video streams in FULL HD, up to 25 fps - **Professional Video Stream Processing Server**. The limitation on the reference image database for this solution is 100,000 photos per **Professional Bio Core Server**. Limit on the number of **Professional Video Stream Processing Servers** that can be connected to one **Professional Bio Core Server** is 10 servers.	Territorially-distributed mid-level systems, in which simultaneous identification is required from a large number of video cameras with a limited reference photo database. If necessary, several **Professional Bio Core Servers** can be installed in sync with the reference image database and the required number of **Professional Video Stream Processing Servers** to process the required number of video streams.
Enterprise Id-Me for VX	The **Enterprise Id-Me for VX** class equipment is based on specialized high-performance **DELL** servers. **This ensures cost-optimization of server hardware in large installations**. Calculation of cost for the server hardware and licensing in **Enterprise Id-Me for VX systems is available on request from Pelco by Schneider Electric.** Reference photo database limit for this solution is **customized on request**. The number of simultaneously connected video cameras is unlimited.	Corporate-class territorially-distributed systems where simultaneous identification is required on a large number of video cameras, without restrictions on the size of the reference image database.

Description of the hardware Light Id-Me for VX

Title	Description	Purpose
IP-Camera	Network camera managed by the Pelco VideoXpert.	Forming a video stream for processing on Light Bio Core & Single Video Stream Processing Server.
Light Bio Core & Single Video Stream Processing Server	The server performs identification function, sends notifications to Pelco VX, stores identification results. The reference base of photo-images is up to 10,000. One video stream from an IP camera is processed in FULL HD format with up to 25 fps.	Biometric identification: matching procedure, data storage, system configuration, VX integration services. Single video channel: face detection, quality control, biometric template creation, sending data for matching procedure, face detection and metadata storage.
Pelco VX Infrastructure Servers	Pelco VX Management, storage server infrastructure.	Operation and data storage of the CCTV system.
Integrated VX Plugins	Biometric-system integrated VX plugins: - Notifications (blacklists, whitelists etc.); - Detected face archive; - Smart face database search; - Biometric check and identification services.	Biometric graphical user interfaces.

Description of Professional Id-Me for VX technical tools

Title	Description	Purpose
IP-Camera	Network camera managed by the Pelco VideoXpert.	Forming a video stream for processing on the Professional Video Stream Processing Server.
Professional Video Stream Processing Server	A server that processes up to **two Full HD video streams with a frequency of up to 25 fps** per channel. The server also performs the functions of data storage: detected person, date, time, camera ID, contextual frame, biometric template.	Face detection, quality control, biometric template creation, sending data to Bio Core Server for matching procedure and metadata storage.
Professional Bio Core Server	The server performs identification functions, sends notifications to Pelco VX, stores identification results. The reference base of photo-images is up to **100,000.** **Simultaneous work with up to 10 Video Stream Processing Servers.**	Biometric identification: matching procedure, data storage, system configuration, VX integration services.
Professional Bio Core Redundancy Server	Second Bio Core Redundancy Server for mission-critical facilities.	Redundancy Server.
Pelco VX Infrastructure Servers	Pelco VX Management, storage servers infrastructure.	CCVT-system management and data storage infrastructure.
Integrated VX Plugins	Biometric-system integrated VX plugins: - Notifications (black, white, etc. lists); - Detected faces archive; - Smart face archive search; - Biometric verification & identification services.	Biometric graphical user interfaces.

Recommended equipment and parameters of Light and Professional servers

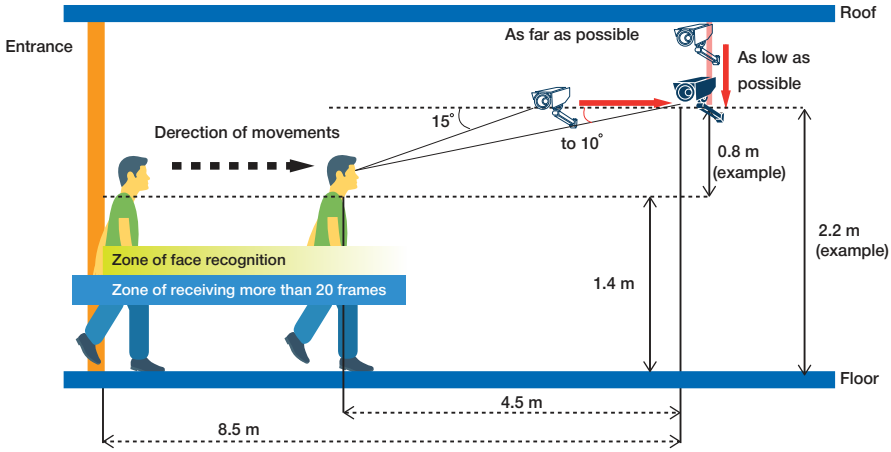
Title	Description	Comments
Recommended IP-Camera		
IXE22 or higher	Sarix Enhanced SureVision3 Full HD camera	A different camera may be used to obtain a video stream, as long as it meets the requirements of Table "Recommendations on operating conditions of the system".
YV3.3x15SR or higher	**Fujinon Lens System 15-50 mm., F1.5**	A different lens may be used to obtain a video stream, as long as it meets the requirements of Table "Recommendations on operating conditions of the system".
Light Bio Core & Single Video Stream Processing Server parameters - up to 10 000 enrolled faces in DB - up to 1 FULL HD Channel processing		
Dell OptiPlex 7050 micro	i7-7700T(2.9 MHz, 8M, QC), 32GB (2x16GB) 2400MHz DDR4, 3Y NBD	or higher
HDD 1	System disc: SSD Intel Original SATA III 480Gb 540s Series M.2	or higher
HDD 2	History storage disc: SSD SATAIII 1024Gb, 2,5”	or higher
Operation system	Windows 10 Professional	or higher
Professional Video Stream Processing Server: - 2 FullHD cameras connected - processing up to 25fps per channel		
Dell OptiPlex 7050 micro	i7-7700T(2.9 MHz, 8M, QC), 8GB (2x4GB) 2400MHz DDR4, 3Y NBD	or higher
HDD 1	System disc: SSD Intel Original SATA III 480Gb 540s Series M.2	or higher
HDD 2	History storage disc: SSD SATAIII 1024Gb, 2,5”	or higher
Operation system	Windows 10 Professional	or higher
Professional Bio Core Server: - up to 100 000 enrolled faces in DB - up to 10 Professional Video Stream Processing Server connected		
Dell OptiPlex 7050 micro	i7-7700T(2.9 MHz, 8M, QC), 32GB (2x16GB) 2400MHz DDR4, 3Y NBD	or higher
HDD 1	System disc: SSD Intel Original SATA III 480Gb 540s Series M.2	or higher
HDD 2	History storage disc: SSD SATAIII 1024Gb, 2,5”	or higher
Operation system	Windows 10 Professional	or higher
Professional Bio Core Redundancy Server		
Dell OptiPlex 7050 micro	i7-7700T(2.9 MHz, 8M, QC), 32GB (2x16GB) 2400MHz DDR4, 3Y NBD	or higher
HDD 1	System disc: SSD Intel Original SATA III 480Gb 540s Series M.2	or higher
HDD 2	History storage disc: SSD SATAIII 1024Gb, 2,5”	or higher
Operation system	Windows 10 Professional	or higher

Recommended operating conditions

Recommendations on operating conditions of the system.

Parameter	Value	Comments
Camera resolution	**1080p (1920x1080)**	*or higher*
Video stream frame-rate	15 fps	*or higher*
Wide dynamic range	Preferable	
Lens, focal length	**f= 15-50, Megapixel, Auto Iris**	*or higher*
Focus of the camera	The camera should be well focused so that the face is sharp, of high contrast, clearly visible and discernible by naked eye.	
Illumination	Uniform and constant light level should be provided indoors. For optimal face recognition indirect lighting should be such that those objects had a uniform illumination without shadows or glare. **The recommended light intensity should be about 300 Lux (a minimum of 150 Lux and a maximum of 600 Lux).**	
Face posture for enrollment and identification	Recommended **head yaw for enrollment** (Y, Figure 1) is ±7 degrees from frontal position. Recommended **head yaw for identification** (Y, Figure 1) is ±15 degrees from frontal position. Recommended **head roll for enrollment** (R, Figure 1**)** is ±7 degrees from frontal position. Recommended **head roll for identification** (R, Figure 1) is ±15 degrees from frontal position. Recommended **head t for enrollment** (P, Figure 1) is ±7 degrees from frontal position. Recommended **head pitch for identification** (P, Figure 1) is ±10 degrees from frontal position.	
Inter-eye-distance	Recommended **inter-eye-distance for enrollment is 120 pix. or more.** Recommended **inter-eye-distance for identification is 80 pix. or more.**	
Camera movement	Video camera should be firmly fixed on the ceiling with a special bracket to minimize blur caused by camera movement.	
Camera location	The recommended location of the camera: the object looks and moves forward in the direction of the camera, the object moves along the line of sight of the camera.	
Optimal camera installation height	**Optimal camera installation height above the floor is between 1.5 and 2.2 m**. It is desirable to start identifying individuals located further than 8.0-8.5 m.	
Optimal field of view	Preferable camera field of view width is 2 m wider than the distance of the straightened hand.	
Eye-glasses	Clear eye-glasses are available.	

Recommendations for video camera placement.



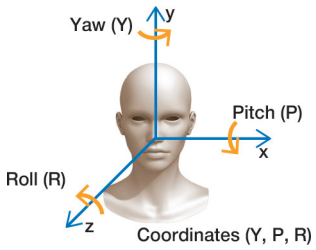


Figure 1. Yaw, Pitch, Roll angles

Data Storage in Id-Me Light and Id-Me Professional

The Id-Me for VX has a data storage function, which aids in swift investigation of security incidents. This function makes it possible to find a person by his/her face image, and to determine when and where this person was captured by the system within a specified time frame - using either the video footage archive (when not yet overwritten by the VX system), or the database records of the Id-Me system. The system uses the following servers: Light Bio Core & Single Video Stream Processing Server, Professional Video Stream Processing Server, Professional Bio Core Server and Professional Bio Core Redundancy Server for storing the following data: the captured person's cropped face image, the respective full video frame, both in either JPEG or PNG format,, and the biometric template, requires only c. 120-150 kB. It is also possible to store the captured person's cropped face image and the biometric template that requires only c. 50 kB. A data record, which is added every time a person is captured by the system, is from c. 50 to 150 kB in size and depends on configured data-model in database.

When using the Light Bio Core & Single Video Stream Processing Server, Professional Video Stream Processing Server, Professional Bio Core Server and the Professional Bio Core Redundancy Server, the HDD1 will be used as the system drive only. If the HDD2 is then used for storage of the Id-Me database, and if it has 1024 Gb of storage space available, it will be sufficient for storing over 8 million records in extended data-model (respective full video frame, cropped face image, biometric template, metadata) or over 19 million records in standard data-model (cropped face image, biometric template, metadata) each covering a single event when a person was captured by the system, and each instantly available for running security incidents investigations or for utilizing business intelligence-related functions - all on the same server. Thus, knowing the visitor throughput at the focal location, the archive timespan which can be covered by the Id-Me system can be readily estimated.

When the data is received from two video cameras simultaneously using the Professional Video Stream Processing Server, each camera will generate an individual database record, both of which should be accounted for in estimating the archive timespan.

When using Professional Id-Me for VX, we recommend recording operational data onto the Video Stream Processing Servers, while data records related to high-priority individuals (e.g. blacklisted individuals, VIPs, or unauthorized persons moving to/from security areas outside normal working hours etc.) should be stored on the Professional Bio Core Server. This approach ensures higher longevity of high-priority data.

For the Light Id-Me for VX system, the operational data is recorded onto the HHD2 of the Light Bio Core & Single Video Stream Processing Server.

About RecFaces

The company's product is a Id-Me multimodal biometric identification platform that allows using the built-in identification algorithms to receive, store and process various biometric features of each person, such as face image, three-dimensional face image, vein pattern, etc.

Contact the sales representative in your area today, or visit id-xpert.com to learn more.