

Luxriot

Face Recognition

2.0

Administration

Guide

Monday, October 01, 2018

© Luxriot

Table of Contents

1.	Introduction	2
2.	Prerequisites	3-4
3.	Getting Started	5-9
4.	Configuration	10-19
5.	Connecting to the Video Management System	20-27
6.	Troubleshooting	28

1 Introduction

General

Luxriot FR (further referred to as FR) is a biometric face recognition application designed to work with Luxriot EVO video management software. Leading-edge technology assures optimal system performance and reliability with real time face detection, concurrent multiple face recognition and instant face matching in 1-to-1 and 1-to-many modes.

Key features:

- Efficient face recognition engine with low error rate
- Face liveness detection preventing cheating with a photo in front of camera
- Variety of supported IP cameras, encoders and analog CCTV devices
- Simultaneous multiple video stream processing
- No imposed limitation on the number of cameras
- User friendly interface for easy setup, monitoring and data retrieval
- Simple installation with ready-to-go database
- Possibility to use own database

Luxriot Face Recognition is perfectly suited for HR control systems as well as for security and enforcement applications.

This document will guide you through the process of product installation, configuration and usage, as well as provide basic troubleshooting procedures.

Licensing

Luxriot Face Recognition is available in two editions: Basic and Enterprise. Differences between these license versions are summarized in the table below.

Features	FR Basic Edition	FR Enterprise Edition
Max number of faces per 10s	5	500*
Max number of simultaneous video streams	2	10**
Max number of simultaneous faces per second per system	1	50**
Min face presence time	1 second*	0.1 second

*Server hardware must comply with recommendations

**Up to 200FPS per system, server hardware must comply with recommendations


2 Prerequisites

FR relies on the Luxriot EVO server and does not operate independently. All video streams are taken from the Luxriot EVO servers. Recognition results can be optionally sent back to Luxriot EVO as well. Supported Luxriot EVO editions are Luxriot EVO S and Luxriot EVO Global.

Supported OS

Microsoft Windows 64-bit versions only, no 32-bit (x86) version support.

Supported editions: Windows 7, Windows 8, Windows 8.1, Windows 10, Windows Server 2008, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016

 There is no support for virtual environment.

System Hardware Requirements

FR requires that .NET 4.5 framework is installed on the server.

The following recommended hardware specifications refer solely to the FR software; other modules like Luxriot EVO are NOT included into this estimation.

Edition	FR Basic		FR Enterprise	
Connected video streams	1	2	1-2	3-10
CPU	CPU Intel i3 2.8GHz+ (4 threads)	Intel i5 3.0GHz+ (4 threads)	Intel i7 3.2GHz+ (8 threads)	Intel i7 or Xeon* 3.2GHz+ (16 threads)
RAM	8GB		16GB	
Storage	~1GB** per 1000 recognition results			

*Single CPU systems are recommended

**Calculated for a FullHD stream. Exact size depends on actual video stream resolution.

Recommendations

Face recognition result precision greatly depends on the quality of input image quality; therefore, sufficient attention should be paid to the camera installation and preliminary work with FR configuration. Please consider the recommendations below and use them as a checklist when deploying an FR system.

Utmost attention is required at the subjects' enrolment stage. The input image is converted into a set of facial features, forming a template, which is saved into the database and used for identification and verification of people. Therefore, it is crucial to provide the highest possible **quality of the enrolment images**:

- Use clear, sharp images with distinct facial lines with no blurring effect and normal to high contrast range
- Use near-frontal, full face view with minimum rotation (less than 15°) in any direction
- Upload multiple images to cover slight differences of face views from different sides
- Neutral face expression during enrolment is strongly recommended: avoid frowned faces, closed eyes or eyes looking away from camera, raised eyebrows, broad smiles; however, slight changes in facial expression are recommended to "train" the engine
- For people wearing glasses, make sure to enrol both images – with and without glasses
- Same recommendations are applicable to people who are likely to have changes in appearance because of facial hair like beards and moustache, or due to seasonal variations – hats, makeup etc.
- Glasses with thick, heavy frames and sunglasses decrease recognition accuracy
- Person should occupy 50 to 100% of the screen height
- Minimum distance of 60 pixels between eyes is recommended, and 90 is advisable in order to obtain better recognition rate (note that this distance should be native and not obtained by stretching the image)
- Minimum stream resolution is VGA (640x480 pixels), and you need to make sure that it is also native resolution, not a scaled-up low quality image
- Avoid scenes where extraneous objects can distort the face, e.g. glass, rain, mirrors

If **light conditions** of the scene can be controlled:

- Direct frontal light or diffused lighting is recommended in order to have minimum shadowing within the face region, so that light is evenly distributed on each side of the face (both left to right and top to bottom) and face does not coalesce with background
- Make sure that light amount does not depend on the hour and other environmental factors
- Avoid additional illumination that can appear unpredictably, sunlight in the first place
- Use such light sources that will not produce bright shiny reflections and glares on glasses and skin

Camera choice:

- Use cameras of similar quality (or the same camera) for both enrolment and identification images
- If camera is set up to mirror the image, make sure that faces have the same orientation across all images because facial features' template is different for the mirrored and non-mirrored pictures of the same person

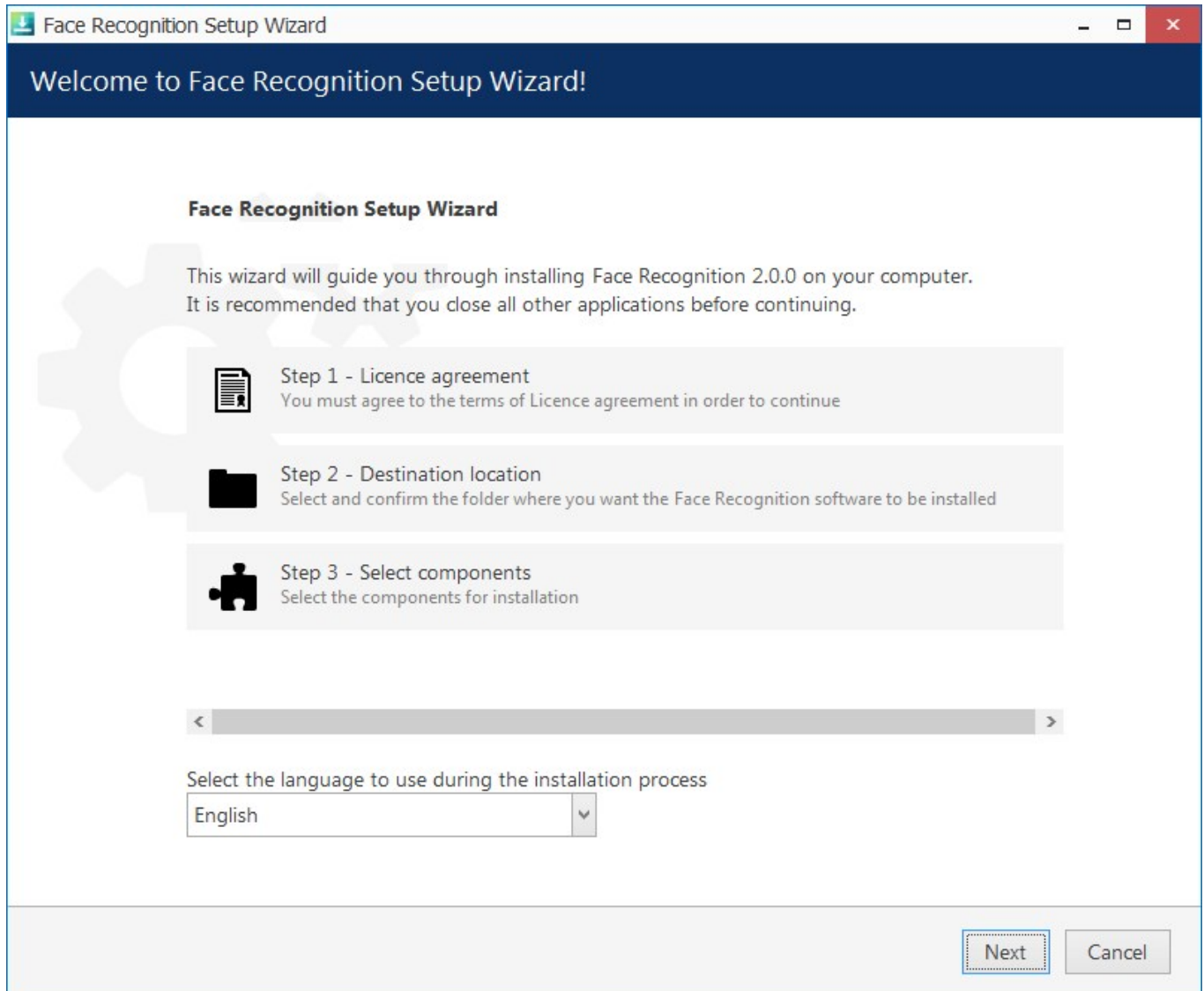
When **deploying** the system:

- Train operators to check if the person is facing camera the right way

3 Getting Started

Product Installation

Run Luxriot FR installation package and go through the steps to set it up on your system. You will be offered to choose the installation language and the target directory.



Run the Face Recognition installation wizard

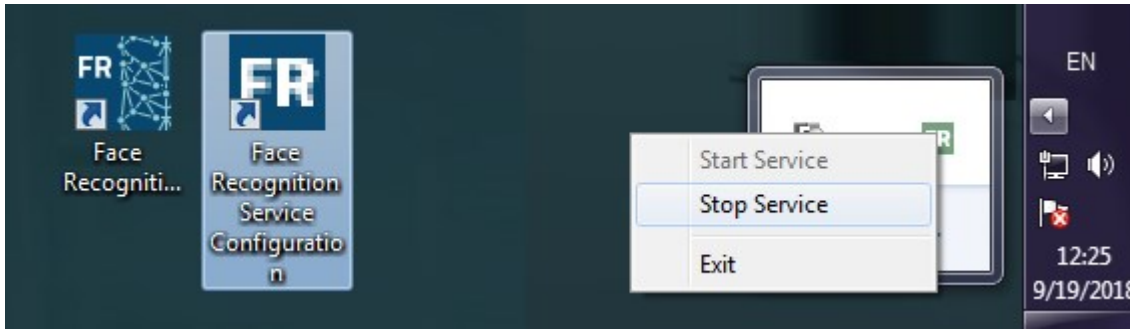
When the installation is complete, you will see a summary page: if everything has gone smoothly, the steps in the summary will be marked green. If something goes wrong during the installation, make sure the host OS meets the [system requirements](#). Click *Finish* to close the wizard.

As a result, Luxriot Face Recognition will appear in the list of Windows services. Immediately after the setup is complete, the FR service will be started automatically and you will be able to run FR as described below.

First Run

Start the FR service shell by launching the *Face Recognition Service Tray Tool* **shortcut** from your Desktop. FR icon will then appear in your system tray, allowing you to **start and stop** the service simply by right-clicking the tray icon and choosing the corresponding option.

The Face Recognition server itself has no graphics user interface, running silently as a Windows service, but has a Web based management console, easy to access and to use.



FR shortcuts and tray tool

Having installed and launched the FR service, you can access its control centre either by clicking the *Face Recognition Service Configuration* icon or your Desktop, or by typing in the address manually in the Web browser using the following **default parameters**:

Address: localhost or local IP address

Port: 8081

Username: admin

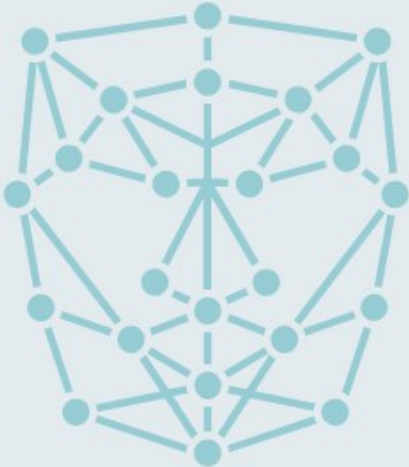
Password: admin

You will be able to change these settings later via Service Settings.

For the parameters above, console access link will look like *http://localhost:8081*.

License Activation

When you open the FR Web management console for the first time, you will be asked to activate your license key in order to proceed. Later, if the system already has a license installed, you will see your current license edition; in case of the Basic License, you will also have an option to upgrade to Enterprise.



Face Recognition

Activation

☒ **Online**
Select this option if you have License Key and this server has permanent Internet connection.

☐ **Offline**
Select this option if you have a License Key and this server has no Internet connection.

[Get trial license key](#)

Activate

FR license activation options

When navigated away from the Web Management console main page, you will still see your license information and a link to the license manager in bottom left corner of the page.

The following options are available:

Online activation: choose this option to activate your license on the current computer. This mode is suitable if the computer in use has Internet access and will be the one operating as the face recognition server.

Offline activation: if your face recognition server has no Internet access, follow the procedure described below in order to activate your license.

Trial license: request a demo license key to unlock all features of the Luxriot Face Recognition software for a limited time period of one month. You can choose between Basic and Enterprise license editions.



Note that Luxriot Face Recognition license is bound to the server hardware set, therefore hardware changes may cause license activation failure.

Online Activation

If permanent Internet connection is foreseen for your FR server, choose this activation method. Simply enter your FR license key and click *Activate*: the form will automatically connect to the activation server and get back to you with a confirmation.

Offline Activation

If your FR server is located in an isolated environment with no Internet connection, you can use another computer with Internet access to activate your FR server license.

First, enter the FR license key that you have purchased from Luxriot or an authorized reseller, and then hit the *Download ID File* button. Note that the system will not generate any files for empty or incorrect license keys.

The screenshot shows a web interface for 'Offline Activation'. At the top, there is a link '< Manage License' and the title 'Offline Activation'. The interface is divided into three steps:
Step 1. Licence key: This section contains a text input field with the placeholder 'Enter licence key:' and 'enter your license key here', and a 'Download ID File' button.
Step 2. ID file: This section contains the instruction 'Send ID file to support to receive the activation file.'
Step 3. Activation file: This section contains the label 'Upload Activation File', a 'Browse' button, and the text 'No file selected.'.
At the bottom of the form, there are two buttons: 'Activate' and 'Cancel'.

Offline activation

Next, copy the ID file to the computer with Internet access and send it to the Luxriot representative or support@luxriot.com. Luxriot will process your license activation and will provide you with another file to confirm license registration process.

Having received the activation file, click *Browse* and upload it, then hit the *Activate* button to complete the activation process.

Trial License

For the Basic Edition license, simply hit the *Activate* button. A 30-day evaluation license will be automatically generated and applied to the current system, and you will be redirected to the Luxriot Face Recognition start page. License edition limitations are described in the corresponding [chapter of this document](#).

[< Manage License](#)

Trial Access Activation

Edition

☐ Basic License Trial Edition

☒ Enterprise License Trial Edition

Trial Request and Key

Trial Request ID:

271570E618F00101

Input Trial Key:

Activate

Cancel

Trial license request

If you wish to obtain an Enterprise Edition license for testing, select the *Enterprise License Trial Edition* option. Here, copy your Trial Request ID and contact Luxriot representative or support@luxriot.com. We will provide you with the trial FR key. Once you have received it, enter your Enterprise Trial key into *Trial Access Activation* form and click *Activate*.

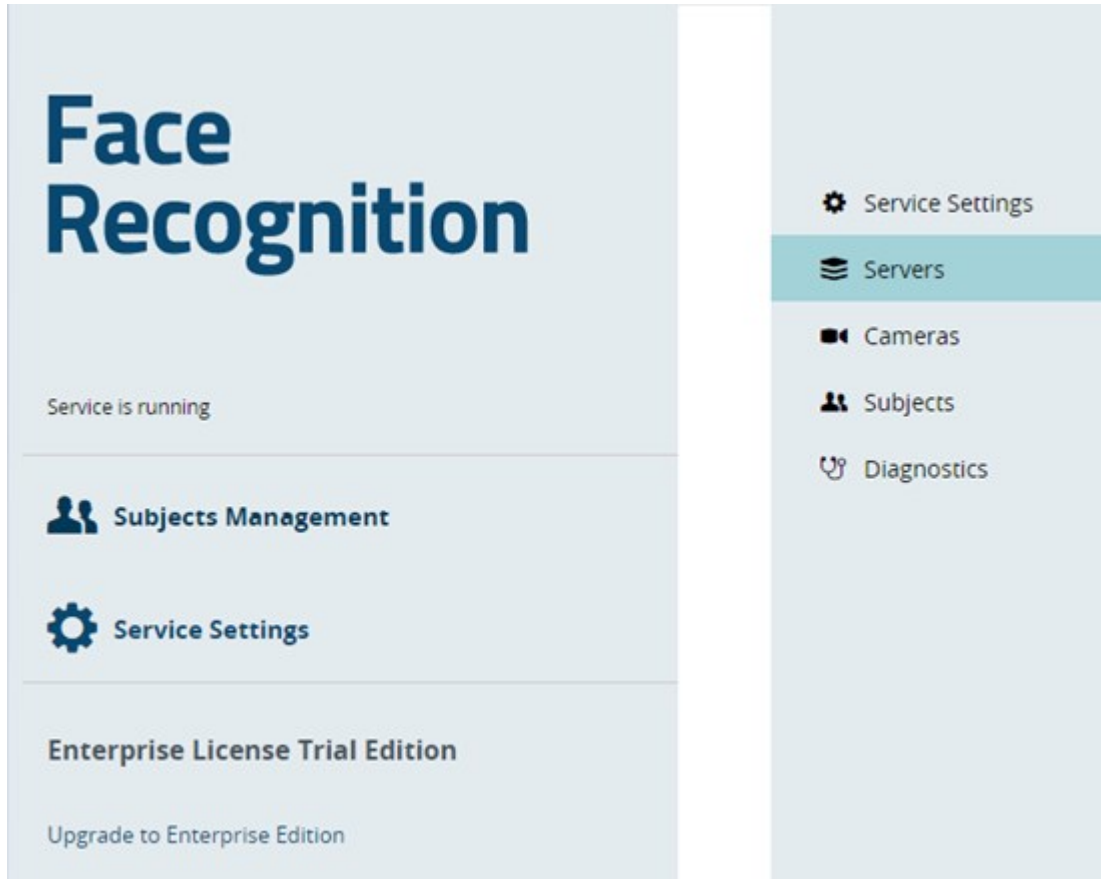


Trial licenses require permanent Internet connection in order to operate.

4 Configuration

Service Management

Service homepage offers quick access links to the service settings and subjects' database management. Subjects are also accessible from within *Service Settings*; once you are done with the server/camera setup, you do not have to browse the settings but rather use the quick access link to open the subjects' gallery.



FR main menu

Service homepage summary also shows information about the registered license and offers an opportunity to upgrade the license (if applicable).

Service Settings

You can change connection settings and administrator user account details here. Initial parameter values are listed below, with default password being admin. Note that these values will also be used if server configuration is corrupt or has been deleted.

Service Settings

HTTP Interface Settings

HTTP Username:

admin

HTTP Password:

.....

HTTP Port:

8081

Language:

English (United States) ▼

Database Settings

ODBC Connection String:

DSN=Face Recognition Database

Frame Archive Settings

Frame Archive Location:

Frame Archive Quota (%):

50

Apply Changes

FR service settings

A single **user** profile is available, but you can pick any username and password you like, considering that it is allowed to use uppercase and lowercase Latin characters A-Z and a-z, and digits 0-9. No special characters are permitted.

By default, FR uses its own **database** file. Do not change the ODBC connection string unless you wish to use your own database and you know exactly what you are doing.

Pre-defined **directory** for the **frame archive** is

C:\ProgramData\Luxriot\Luxriot Face Recognition\Frame Archive,

and the default **storage limitation** is 50% of the total disk size. This means, a maximum total of 50% of disk is allowed to be full. If your disk is already 60% full even without FR archive, and you set quota to 50%, no frames will be saved.

Storage quota mechanism does not know about any other quotas applied to the same disk: e.g., if Luxriot EVO is set to use the same storage location and it fills up the storage so that FR quota is exceeded, no frames will be recorded as well. For instance, if your disk is currently 20% full and you set quota to 50%, FR will use a maximum of 30% of disk space.

Server Setup

To start actually using the recognition engine, it is necessary to connect to a Luxriot EVO server that contains cameras pre-configured for FR, and then add desired cameras to FR. If you have not set up your Luxriot Luxriot EVO server yet, proceed with its setup and get back when you are ready. Video management server configuration instructions can be found in the corresponding supporting documentation.


Choose a Luxriot EVO server to connect to and enter its connection details.

The screenshot shows a web interface for adding a server. At the top, there is a breadcrumb '< Servers' and a title 'Add Server'. Below this, the form is divided into two sections: 'Server Settings' and 'VMS Notification Settings'. In the 'Server Settings' section, there are four input fields: 'Server:' with the value 'localhost', 'Port:' with the value '60554', 'User:' with the value 'admin', and 'Password:' which is empty. In the 'VMS Notification Settings' section, there is a 'Title:' field with the value 'Face Recognition Service', a checkbox labeled 'Use custom identifier' which is checked, and an 'Identifier:' field which is empty. At the bottom of the form is a blue button labeled 'Add Server'.

Add Luxriot EVO server into FR configuration

Server: Luxriot EVO server IP address or hostname. If you are connecting to a Luxriot EVO Global system, make sure to use the address of the central management server. Direct connections to Luxriot EVO Recording Server will not work.

Port: Luxriot EVO server port for HTTP connections (default is 8080). When connecting to a remote server, make sure this port is allowed on all intermediate routers and firewalls.

 You might have noticed: earlier, Luxriot VMS servers used port 60554 for FR connections. Luxriot EVO generation servers use HTTP port because FR connects to them via HTTP API. Port 60554 is no longer used by FR.

User and password: Luxriot EVO server user account to connect with. Depending on the connection type, user must have corresponding privileges (connect via HTTP and manage external services) and must be allowed to receive video from FR camera. For full description on the Luxriot EVO security setup, please refer to the corresponding user manual.


Title: the name that will appear in Luxriot EVO as the external event source.

ID: unique FR server identifier. ID is assigned automatically, so you do not need to enter anything in this field.

Once you have entered all the details, click *Add Server*. Connection with the Luxriot EVO server will be established automatically: if the target server is online and reachable, you will see the status saying *connected*. If the Luxriot EVO server is offline, FR will endeavour to connect every few seconds until it reaches the server. Open the

Diagnostics section to see the details on the unsuccessful connection attempts.

Servers

SERVER ▾	PORT	USER	STATUS	
127.0.0.1		admin	Connected	Edit 

Add Server

Luxriot EVO server in the connected server list in FR


You can add one or more Luxriot EVO servers to a single Face Recognition server.

To **edit or delete** an existing server, simply move your mouse over the server name and corresponding controls will appear on the right side.

Camera Setup

Server setup only establishes a connection between FR and the Luxriot EVO server on the service level. In order to start recognizing people, you now need to choose **video streams** and define **recognition parameters** for each one. It is strongly advisable that you read and follow [recommendations regarding camera positioning](#), which are available within this document.

Cameras

CAMERA NAME ▾	SERVER	USER	FR STATUS	
FR emu	127.0.0.1	admin	Stopped	
Hikvision FR	127.0.0.1	admin	Enabled	Test 

Add Camera

FR camera list

To begin the **new camera** setup, click the *Add Camera* button below the camera list. To **edit** any of the existing cameras' settings, as well as **disable/enable** face recognition for specific device, simply click *Edit* for the desired camera – this is similar to editing server settings.

Select a server from the list of your connected servers and then select one of the cameras. Note that camera must be enabled in Luxriot EVO Console and the server must be connected to FR (server status must be *Connected*).

[< Cameras](#)

Add Camera

Target Camera

Server:

127.0.0.1

Select

Camera:

Hikvision FR

Select

Add new FR camera

Face Detection Engine Settings

The settings below affect the process of face recognition, that is, the identification of human faces based on the set of specific features. For all settings, recommended values are provided based on two conceptually different typical scenarios:

#1 “Quick harvesting”: on the fly detection in crowded regions and large flows of people, certain amount of false recognition acceptable.

#2 “Double check”: authorization or identity verification of a single person, high demands for accuracy.

By default, **recognition is enabled** for the camera being added, so that face detection engine can start working at once right after the camera appears in the list. However, you can uncheck this option if you wish to start recognition manually later.

Face Detection Engine

☒ Recognition Enabled

Image Quality Requirements:

3

Matching Similarity:

Very Accurate

Face Deviation Angle:

15

Minimum Interocular Distance (pixels):

90

Face detection settings

Image Quality Requirements: is used when searching for faces in the image. Images with lower quality will not be considered. Scenario #1 allows lower quality level, while #2 requires bigger value of this parameter.

Matching Similarity: this parameter should be set according to the desired false acceptance rate. The higher probability of false rejection is required, the higher threshold should be set: increased similarity level in recommended for scenario #2.

Face Deviation Angle: max angle deviation from frontal view, in degrees; max value is 45° in one direction. This

parameter implies both horizontal and vertical angles.

Minimum Ocular Distance: defines minimal distance between eyes in pixels, must be in range [60..10000]. Faces with smaller distance between eyes will be ignored. Minimum recommended value is 90 pixels.

Face Matching Settings

Turn ON **detection of unknown persons** if you want to save every single recognized face. With this setting OFF, only persons matching one of your subjects will be available in the search, and other recognition results will be ignored. If you know that no unknown persons should be there – e.g., when FR is used as an additional security check in the scenario #2 – it may be advisable to disable this option in order to eliminate cases when a subject present in the database is detected as unknown because of unusual facial expression or rapid head movement.

Face Matching Settings

☒ Detect Unknown Persons

☒ Save Recognized Unknown Persons in Frame Archive

Unknown Person Identification Delay (milliseconds):

1500

Face Absence Timeout (seconds):

10

Settings for face matching

You can choose to **save recognitions of every face**, including those yet unknown – in case these are detected – and use these images to enhance your subjects' database later on; or, stick to saving pictures of known persons only. In the latter case, you will still have events of unknown persons' detection but there will be no pictures saved in the FR frame archive.

Unknown Person Identification Delay: time in milliseconds for the engine to try finding a match for the recognition result in the known persons' database. Delay should be consistent with the time period during which the person stays in the recognition area and adjusted for each individual scene. For the scenario #1 above, a lower value is better as it allows more faces to be handled, especially in case of high speed people flows. For #2, longer delay may be considered for improved face matching accuracy. Also, note that the recognition event will be only triggered after the delay.

Face Absence Timeout: minimum time period in seconds to wait until a face triggers a recognition event again. Set higher parameter value if you do not want a face to be reported as recognized repeatedly when it is likely that the person will stay in the area for some time.

When finished with camera setup, click *Add Camera* to save and return to the camera list. You can get back to these settings any time you want simply by clicking Edit button. Correspondingly, the recycle bin icon will delete camera from the list with all existing settings: an attempt to add the same camera again will not restore its previous parameter set.

Camera Test

Aside from showing the real-time recognition status for every camera (**Disabled/Enabled**), the camera list offers one more useful feature: test recognition with current camera parameters. This can be used to check actual recognition if you do not receive any events in Luxriot EVO Monitor.

Using **Test**, you will see if:

- Recognition actually works for your camera and settings
- Recognized persons are added to the database

FR test

[Edit Camera Settings](#)

SUBJECT NAME ▾	FIRST MATCH TIME	LAST MATCH TIME	PRESENCE	BEST MATCH TIME	BEST MATCH SCORE	STATUS
James	4/7/2015 12:55:05 PM	4/7/2015 12:55:18 PM	13237	4/7/2015 12:55:05 PM	339	In Database
Unknown person #2131	4/7/2015 12:55:13 PM	4/7/2015 12:55:13 PM	0	4/7/2015 12:55:13 PM	0	
Philip	4/7/2015 12:55:24 PM	4/7/2015 12:55:30 PM	6001	4/7/2015 12:55:24 PM	2758	In Database

Done

Results of the camera test

The recognitions of subjects, which have an **"in database"** status, will be sent to the server as recognition events.

Subject Management

You can create your own database which will be used for comparison and identification of detected persons.

Once you have entered the initial set of subjects, and FR has been deployed and operating for some time, it is possible to get back to the subjects management to update their face galleries. In such a way, recognition engine is trained to identify the person more precisely and easily, and also allows you to keep up with the changes in the persons' appearance.



Important note: Please consider the [Recommendations section of this document](#) to develop best techniques for adding subject pictures. Requirements for the picture quality here are very strict: this is necessary to obtain high recognition rate during the system operation.

Each entry has the following attributes:

Subject Name: usually, person's title/name/surname or other ID used to distinguish him/her from others, and also to enable subject database search.

[< Subjects](#)

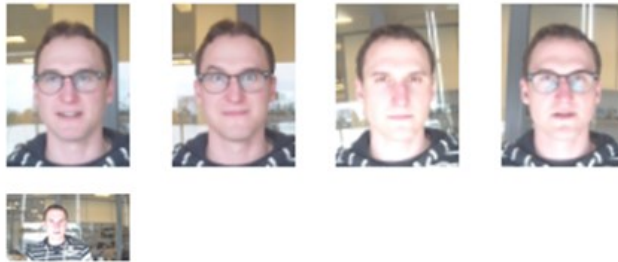
Edit Steven

Subject Details

Name:

Steven

Face Gallery

[Browse](#)

Tag

[Manage Tags](#)[Apply Changes](#)*Edit subject*







Face Gallery: set of photographs that a bit different from each other so that the recognition engine can detect the person from various angles and with slightly different appearance/facial expression. Browse for and add multiple pictures, then hit *Apply*: application will automatically crop the picture so that it only contains the face.

Tag: subject's attribute based on the access level, can further be used for white/black lists. Select one of the previously created tags from the drop-down list or click *Manage Tags* to add/change existing ones. Select one of the suggested colors for the tag or pick your own one, and click *Add* to create a new tag. Create classification to suit your project specialty. Tags will appear in the Luxriot EVO Monitor application to facilitate investigation.

Subjects (4)

Search

☒ Show face gallery

SUBJECT NAME ▾	FACE GALLERY	TAG
Shakespear		
Steven		
Patrick		

Add Subject

Rows per page: 50 ▾ < 1 of 1 >

Image Title

Diagnostics

The diagnostics page provides you with important server events like: information about FR service start, license check, server and camera connection. In the example here, FR service has successfully started, connected to its database and validated the license, but Luxriot EVO server on localhost is not running so connection could not be made.

You are kindly requested to provide information from this page when applying for technical support.

Alerts (7)

Search

Q

DATE/TIME ▾	TARGET	ALERT	PROPERTY
3/31/2015 10:08:24 AM	Database	Information	ODBC data source connected
3/31/2015 10:08:25 AM	RecognitionEngine	Information	face recognition engine component licenses obtained
3/31/2015 10:08:25 AM	Service	Information	connecting to admin@localhost:60554
3/31/2015 10:08:28 AM	Service	Information	server admin@localhost:60554 disconnected (8007274D)
3/31/2015 10:08:32 AM	Service	Information	server admin@localhost:60554 disconnected (8007274D)
3/31/2015 10:08:34 AM	Service	Information	service started
3/31/2015 10:08:35 AM	Service	Information	server admin@localhost:60554 disconnected (8007274D)

Rows per page:

50 ▾

<

1 of 1

>

FR diagnostics

5 Connecting to the Video Management System

FR runs recognition on video streams received from Luxriot EVO servers. Recognition results are then saved in FR database. However, it is also possible to send recognition events back to Luxriot EVO. In such a way, investigation can be made possible on Luxriot EVO Monitor side. If FR is configured in Luxriot EVO as an **external service**, the following functionality becomes available in Luxriot EVO:

- real time recognition results paired with the live video stream in Luxriot EVO Monitor
- recognition history investigation in Luxriot EVO Monitor (with playback, if recording is enabled for the target channel)
- recognition events available for automated scenarios in the Event & Action management of Luxriot EVO Console

This chapter describes the external service configuration from the point of view of Luxriot EVO. Configuration is made via Luxriot EVO Console locally or remotely. For details on the Luxriot EVO Console application, please refer to the full Luxriot EVO administration guide, which is supplied together with Luxriot EVO.

Add FR as an External Service

In Luxriot EVO Console, go to the *Configuration* section and choose *External Services* from the left-hand-side menu. On the upper panel, press the + *New external service group* button; in the dialog box, enter a group name and click *OK* to save. The newly created group will appear in the item list. The **group is necessary for permission management**, as the FR service itself appears automatically and does not have any settings for user permissions.

If you have already configured this Luxriot EVO server in FR, the corresponding entry will appear in the list of external services automatically. Double-click the FR service in the list and assign it to the group.

Configuration > External services

admin

Search

Configuration

Networks

Servers

External services

Failover clusters

Configuration

Events & Actions

Monitoring

Audit

+ New external service group

Edit

1 selected

TITLE	GROUP
Face Recognition Service	FR

Recently added, 0

Recently updated, 1

External service groups, 1

External services, 1

FR with its corresponding external service group

From now on, FR configured as an external service will become available in the *Event & Action Configurator*, and the recognition results will also become available for investigation in the Luxriot EVO Monitor application.

Configure Events

Luxriot EVO software has a powerful and flexible built-in tool for creating automated scenarios. With facial recognition events, you can automatically open doors and gates for your staff, or, on the contrary, inform the security guys about suspicious people in the premises. This is achieved by creating rules - combinations of events and desired target actions. Additionally, special rule modifiers are available, such as action delay and rule schedules.

To access the rule management in Luxriot EVO, open your Luxriot EVO Console and select the *Events & Actions*

section in the bottom left corner.

Create FR Events

Click *Events* in the left-and-side menu to switch to the event management. Click the + *New event* button on the top panel and fill in the settings in the dialog box:

- **Event type:** external service
- **Title:** anything you want to name the event
- **Source:** FR video channel
- **Service group:** FR service group you have created earlier
- **Target event:** select a [tag from FR tags](#) to trigger the event

Event Staff at Main Entrance*

Event

Details

Event type

External service

Select event type from list of possible event types

Title

Staff at Main Entrance

Event name

Source

Hikvision FR

Event source

Change...

Service group

FR

Service group

Change...

Target event

Staff

Target event

OK Cancel

New event based on FR recognition

The event type you need to select is *Scheduled event*. The rest of the events represent other Luxriot EVO functionality; you will find a detailed description of these in the Luxriot EVO administration guide.

Tag created earlier in FR Web interface will appear here in the tag list. In addition to your defined tags, there are two extra groups: known and unknown. **Known** means that the recognition result matched any existing tag. **Unknown** means that the recognized face did not match any of the defined tags.

Create Desired Actions

Created events can trigger any actions, which are available in the *Event & Action Configurator*. Luxriot EVO supports all kinds of alerts - email, push notifications, pop-ups in the Luxriot EVO Monitor application, - as well as interactions with internal and third-party components.

Some actions already exist by default: for example, live video pop-up. Other types of actions need to be created with specified parameters. To add new types of actions, select the *Actions* section from the left-hand-side menu and click the + *New action* button on the upper panel.

Here are several action types useful for FR.

Open Doors

A frequent use case for facial recognition is automatic **opening and closing of doors** or gates. Typically, the door

is wired to the relay output of a camera (or a DI/DO module). The digital output can be then controlled in several ways:

- for cameras, where DO is supported*, use the *Control digital output* action type
- use *Send HTTP request* action type for triggering DO of any device that supports HTTP/CGI commands, even if not supported in Luxriot EVO
- the *Run program* action allows you to build more complex scenarios using shell scripting (e.g., for multiple triggers)

*For supported camera functionality, see <http://www.luxriot.com/support/supported-cameras/>. Also, DO is typically supported for ONVIF Profile S conformant devices.

The screenshot shows a software window titled "Action DoorOpen". It has a sidebar on the left with two tabs: "Action" and "Details". The "Details" tab is selected. The main area is titled "Details" and contains the following fields:

- Action type:** A dropdown menu showing "Control digital output". Below it is the text "Select action type from list of available action types".
- Title:** A text input field containing "DoorOpen". Below it is the text "Action name".
- Target:** A dropdown menu showing "Hikvision FR" with a "Change..." button to its right. Below it is the text "Action target".
- Digital output:** A dropdown menu showing "DO1". Below it is the text "Digital output".
- Digital output mode:** A dropdown menu showing "Activate". Below it is the text "Digital output mode".

At the bottom left of the details area is a "Reload" button. At the bottom right of the window are "OK" and "Cancel" buttons.

Automatically open the door using camera digital output

For each action you create, fill in the details according to the available options in the dialog box. For DO triggering, these are:

- **Action type:** control digital output
- **Title:** user-defined action name to be used in rules
- **Target:** select a channel that will accept the relay output trigger command*
- **Digital output:** DO interface (multiple may be available)
- **Digital output mode:** choose if the target DO should be activated or deactivated

*In order to use the relay outputs of the target channel, you must first enable them in the channel settings.

Send Live Recognition Results to Luxriot EVO Monitor

One more useful action is the ability to **send the recognition results to the client application**. For this, the *Send event to client* action type is used. This action can also send text and sound notifications to the Luxriot EVO Monitor application, and push notifications to the Luxriot EVO Mobile app. Here, we will only consider the example with sending a text notification with details from FR.



Note that FR real-time recognition results **automatically appear with live video of FR channel** in the live view and you do not need to configure any rules for this. Use the rules for sending the text notifications elsewhere.

- **Action type:** send event to client
- **Title:** your desired action name
- **Message:** any text you want plus text macros to pass information from FR
 - {EVENT_SOURCE_TITLE} - if the base event will be FR recognition, this macro will produce the channel name
 - {ADDITION_INFORMATION} - FR recognition result
- **Checkboxes:** select the ones you want
 - *Display event in alerts:* the text message will appear in the *Alerts* section of Luxriot EVO Monitor
 - *Display a warning message box:* the notification will **pop up** and stay on top
 - *Display event in notification panel:* message will be displayed in the **notification area of the target channel** (channel is defined at the rule creation step). Select this option if you wish to see the recognition results with the **live video** of a channel that is different from the source channel
 - *Display event in mobile application:* this will send an alert to Luxriot EVO Mobile
 - *Play audio notification:* mark this option if you want the recognition event to arrive with **sound**. Here, you can choose the audio notification number, and the actual sound is defined on the Luxriot EVO Monitor application side.
- **Send event to specific user or user group:** limit the recipients of the target notification; leave [none] if you wish to send the notification to all connected client applications

➔ Action MSG to client - alerts

Action

Details

Details

Action type

Send event to client

Select action type from list of available action types

Title

MSG to client - alerts

Action name

Message

Recognized from {EVENT_SOURCE_TITLE} {ADDITION_INFORMATION}

Message

☒ Display event in alerts

Message will be shown in alerts on client.

OK Cancel

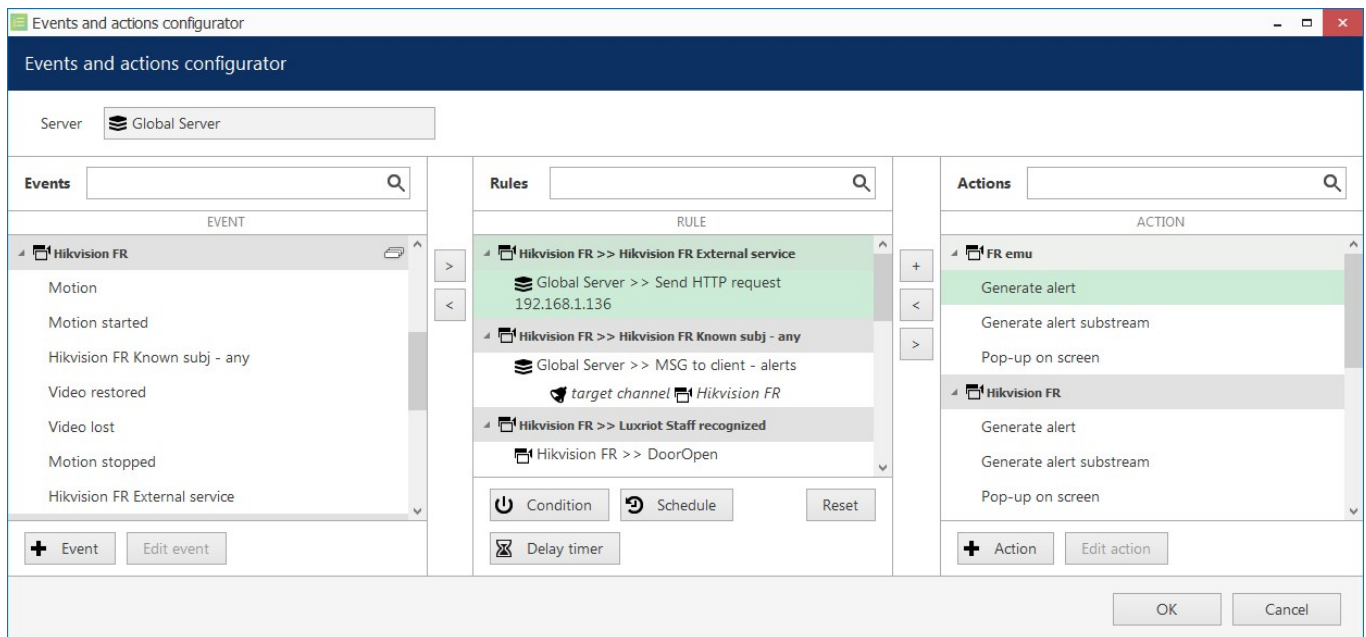
Send recognition results to the Luxriot EVO Monitor application

For other actions, you may be asked to provide additional details. When all the requires actions are ready, you can proceed with the rule creation.

Manage Rules

Switch to the *Rules* section. Here, you can combine your events and actions to build automated scenarios.

If you are using a Luxriot EVO Global system, first choose the server where you wish to add the rules. Then click the *Open configurator* button on the top panel to access the rule management.



Event & Action Configurator

To combine events, actions and additional controls into rules, simply follow this scheme:

- find your desired **event** in the *Events* list - use search filter on the top panel, if required
- use the < and > arrows or double-click events to add/remove them to/from the *Rules* list
- click free space of the target rule in the *Rules* list (use CTRL or Shift to select multiple ones) - the selected rows will then become highlighted green
- find your desired **action** in the *Actions* list - use search filter on top, if required
- use the < and > arrows or double-click actions to add/remove them to/from the *Rules* list, and the + button to add more than one action for a single event
- select desired actions and add auxiliary controls by clicking buttons on the bottom panel (see description below for details)



Useful tips:

- double-click an source to add **all** its events to the rule map
- to **add** an action to an existing rule, use the + button instead of the < button: the original event will be duplicated and new action will be added to the copy
- use the + button between *Rules* and *Actions* lists to add **multiple actions** of the same type to the selected rule(s)
- to clear the *Rules* list, select all rules using Shift or CTRL+A, then press < button on the left to remove all events

The rule header displays the event source and event itself; below, related actions are listed, each with its own set of special controls. Actions of the same type are listed under the same rule header; for all other cases, the events are duplicated, resulting in a separate rule. One condition, one schedule and one delay timer can be attached to **each action**.

Once the rule map has been created, click the *OK* button in the bottom right corner to **save and exit**.

Rule Modifiers

There are three rule modifiers available in the central column of the *Event & Action Configurator*: **schedules, delay timers and conditions**. Additionally, other elements may appear in this section: for example, if the target action requires a channel to be defined, a corresponding option will appear. A good example of this is the action described above - *Send event to client* - you need to define the channel for the recognitions to appear with.

You can read more about these elements in the Luxriot EVO administration guide.

Live Results

Once FR has been added as an external service in Luxriot EVO Console, **real-time recognition results will be shown in the live view section**, in the notification area of the target channel. This will happen **automatically**. If you wish to send other notifications (e.g., show recognition results in the notification area of another channel), use rules as described above.



FR live recognition results

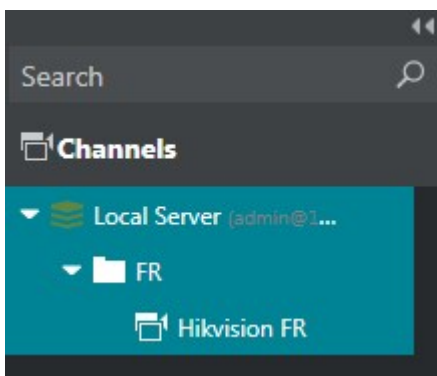
Investigation

For every external service type, a corresponding tab appears on the topmost panel of Luxriot EVO Monitor. For the face recognition, the tab will be named FR. Here, you can search for the past recognition results. If the target FR channel has recording enabled, you will also be able to play back the moments in time when the recognized face was detected.



FR tab in Luxriot EVO Monitor

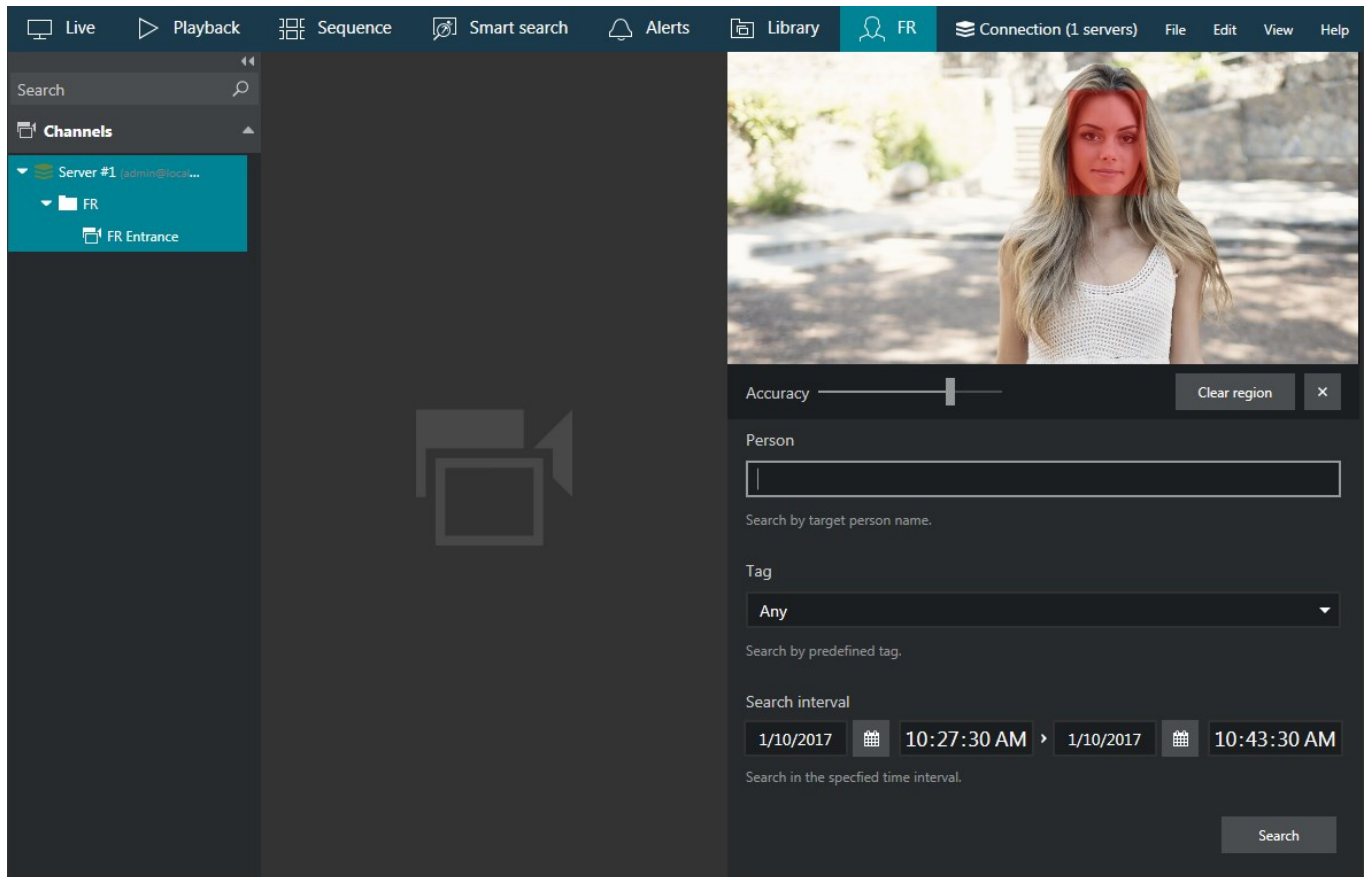
In order to start searching for the recognition results, you need to specify the target channels first. To do this, click the + (plus) next to the channel, service group or server name in the *Resources* pane on the left; you can add multiple channels from different external service groups. Use the - (minus) next to the channel, group or server name to deselect and exclude it from the search. Selected items will be marked blue.



FR channel selected in the Resources pane

Next, enter your search parameters in the search field on the right. The following search adjustments are available:

- upload a **photo** and draw a region to contain a face to search for
- specify search accuracy (higher accuracy is recommended for better results)
- enter the person's **name or a part of the name** if you know it is present in the FR database
- use **tags** to refine the search: tags are available only when **all channels** have been selected for search



Investigation of the face recognition results

Specify the **target date and time range**: the date can be either entered manually from the keyboard or selected using the calendar control; the time can be also either entered manually or adjusted using your mouse wheel after clicking the digits and holding your mouse cursor over the time element.

After that, click the *Search* button to view the **results**. Please note that, depending on the selected time range and number of channels, the search may take some time; the results will be listed in the bottom-right-hand area after they have been found. Do not press the *Search* button repeatedly: this will re-initiate the search process.

Double-click any specific search result and it will be opened in the central viewing area in the instant playback mode, the recognition moment (plus some seconds before and after) being looped. This will only be available if the target FR channel has recording enabled.

The **instant playback** here has some standard Luxriot EVO Monitor controls and also an option to switch to the regular playback mode.

- Use the semi-transparent *Play* viewport overlay control in the centre of the picture to play faster, slower or pause the playback: simply drag the arrow to the left/right/centre position
- Timestamp in the upper-right-hand corner of the picture shows server time
- The small *Play* icon in the bottom-right-hand corner will take you to the *Playback* mode
- The *Clock* overlay control allows you to go to any particular moment in time in the same playback window
- The *Flag* icon will open the *Add new bookmark* dialog box, allowing you to add a bookmark to this specific moment
- Pressing the *Camera* icon will export a snapshot
- Pressing the *Video clip* icon will automatically export the piece of video, which is currently being played
- The timeline contains the recognition related time interval but you can also adjust the boundaries by

clicking and dragging the arrows on the left and right sides of the timeline (minimal interval is ten seconds)

You can switch to other tabs while investigating and you can return to the exact place where you left off by switching back to the FR tab, provided that you do not close the Luxriot EVO Monitor application. If you do, all your search results will be discarded.

Found data can be saved into a **CSV** file (comma-separated values) that can be later parsed or opened with MS Excel-like applications. To do this, simply click the *Export CSV...* button below the search result list and specify your desired file name and path.

6 Troubleshooting

Q: During installation, setup shows errors or takes forever to finish.

A: Abort installation and reboot your server computer, then try again. If the issue persists, contact Luxriot support at support@luxriot.com, providing exact error messages and/or snapshots.

Q: I have activated my license key but no faces are detected from cameras.

A: Check bottom left corner of the Web console for activation errors: click *Retry* to attempt to fix the error; then, check the *Diagnostics* page for details. If the error cannot be corrected automatically, contact Luxriot support.

Q: I have trouble uploading pictures in *Subjects Management*, engine says *No faces detected*.

A: Please refer to the [Recommendations](#) section of this document and go through all steps carefully, making sure that pictures' quality is suitable. Engine requirements for sharp facial lines and no inclination are strict. Use a graphics editor to make sure that distance between eyes (in pixels) satisfies the required minimum (60px minimum, 90px recommended minimum).

Q: I set archive quota to <percentage> but no frames are saved.

A: Check your disk space. Defined quota refers to total disk space, not just space used by the Face Recognition software: for example, if your disk is already 60% full even without FR archive, and you set quota to 50%, no frames will be saved.

Q: Server status shows *Disconnected* in the servers list.

A: Make sure your video management server is running and reachable and has incoming HTTP remote connections enabled. If you are able to connect via telnet <VMS IP/hostname><VMS HTTP port>, FR will successfully connect as well. Then double check server settings in the FR, making sure you are using correct HTTP port.

If you have been unable to determine the reason of disconnect, open the *Diagnostics* section to see the details on connection attempts, and provide these to the support team when reporting the problem.