

# Tevian Face Detection

## User Manual

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### Functionality

The module detects faces in a specified region of interest. Detected faces can be stored on an SD card for subsequent visualization in a browser or saving to a local computer. Faces can also be sent to a remote server using specified REST API.

### Licensing

To run the module in a normal mode it need to be licensed. For licensing go to the following Axis webpage <http://www.axis.com/global/en/products/camera-applications/license-key-registration>. Enter a license code acquired from Tevian and a camera serial number. The serial number can be found in About menu of camera setup page. Axis system generates an activation key which should be uploaded in Setup / Applications / Tevian Face Detection / License. This menu is available after uploading the module (see below).

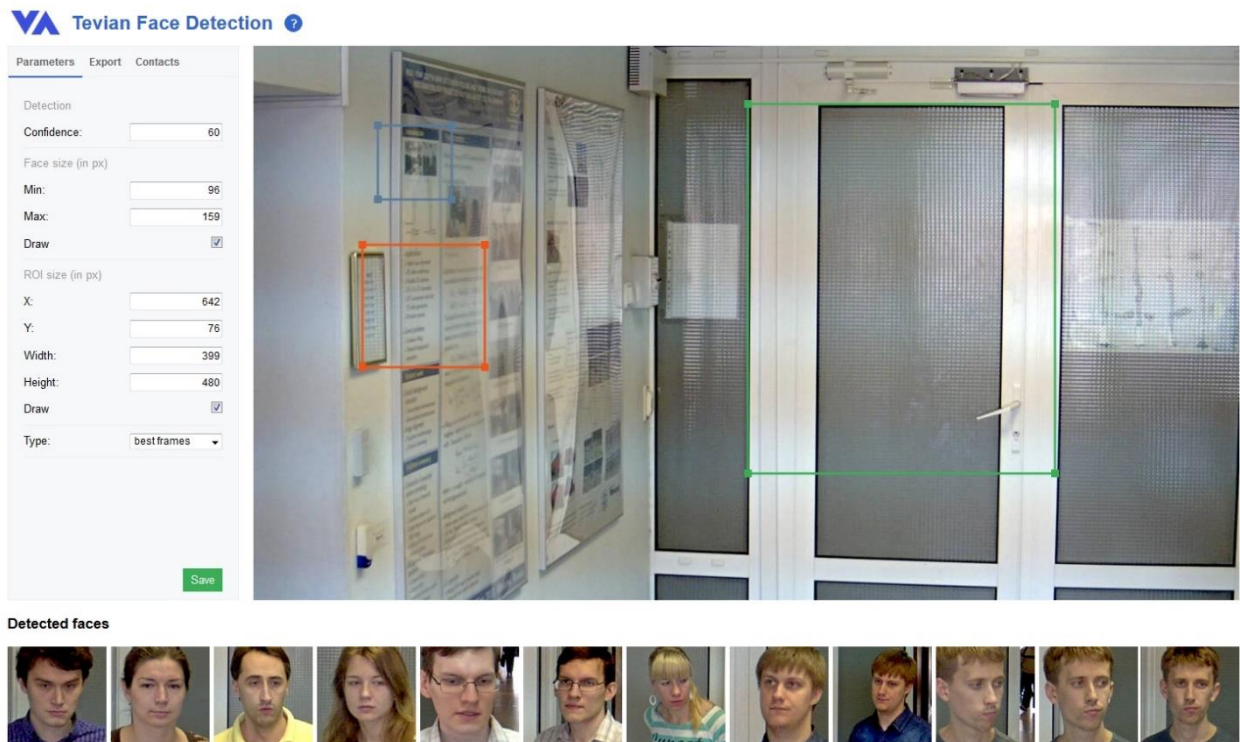
### Work with the module

Configuration process step-by-step:

- Mount a camera. The more frontal people faces are seen, the better. The minimal face size should be at least 96 pixels for a video resolution of 1920x1080 pixels (for different video resolution the minimal face size changes accordingly, i.e. 1280x720 leads to the minimal size of  $1280/1920 * 96 = 64$  pixels).
- Configure the camera. The image sharpness is of the most importance. Video resolution does not matter much as far as face size is bigger than minimal.
- Configure DNS to send faces to a remote server (*System Options / Network / TCP / Advanced*).
- Upload the module to the camera. Use *Applications* menu, *Choose file* button and *Upload Package* button.
- Upload the activation key in Tevian Face Detection / License. Use *Choose File* and *Install* buttons for that. Check that License column in the application list indicates "Valid".

- Press *Start* button to actually start the module.
- Open the module settings page via *Applications / FaceDetection / Advanced Settings*.
- Configure region of interest, minimal and maximal face size, detection confidence and type. See **Parameters description** for details. To check the performance use the last detected faces at the bottom of the settings page. If detector performs badly try **Tips for improving the detection quality**.
- Use the export tab to configure storing of the detected faces on a camera SD card. Check the *Save to SD Card* checkbox and set memory size for a face archive.
- Use the export tab to configure sending of the detected faces to a remote server. Check the *Exported enabled* checkbox, and set server address and a session token. Ask a remote server operator for details.
- To see the saved face images use an SD card directly or the Export tab. For the latter set a time range by its start and finish time. Use the *Export* button to save faces to a local computer as a zip archive. Use the *View* button to see the faces in a separate window.
- When a new track is generated (new detection in case of no tracking mode), the module sends a *TevianFaceDetection* event. You may set an action for this event in Events menu of the camera setup.

## Module web interface



**Figure 1. Module web-interface**

Figure 1 shows the module web interface. The left panel consists of the three tabs – parameters, export (to an SD card or a remote server) and contacts.

The right part is a live video stream. If *Draw* checkboxes are on, the rectangles are shown, which correspond to the region of interest, the minimal and maximal face sizes.

The bottom part shows the last detected faces.

Figure 2 shows the interface of *View faces* window, which appears after the *View* button of the *Export* tab is pushed.

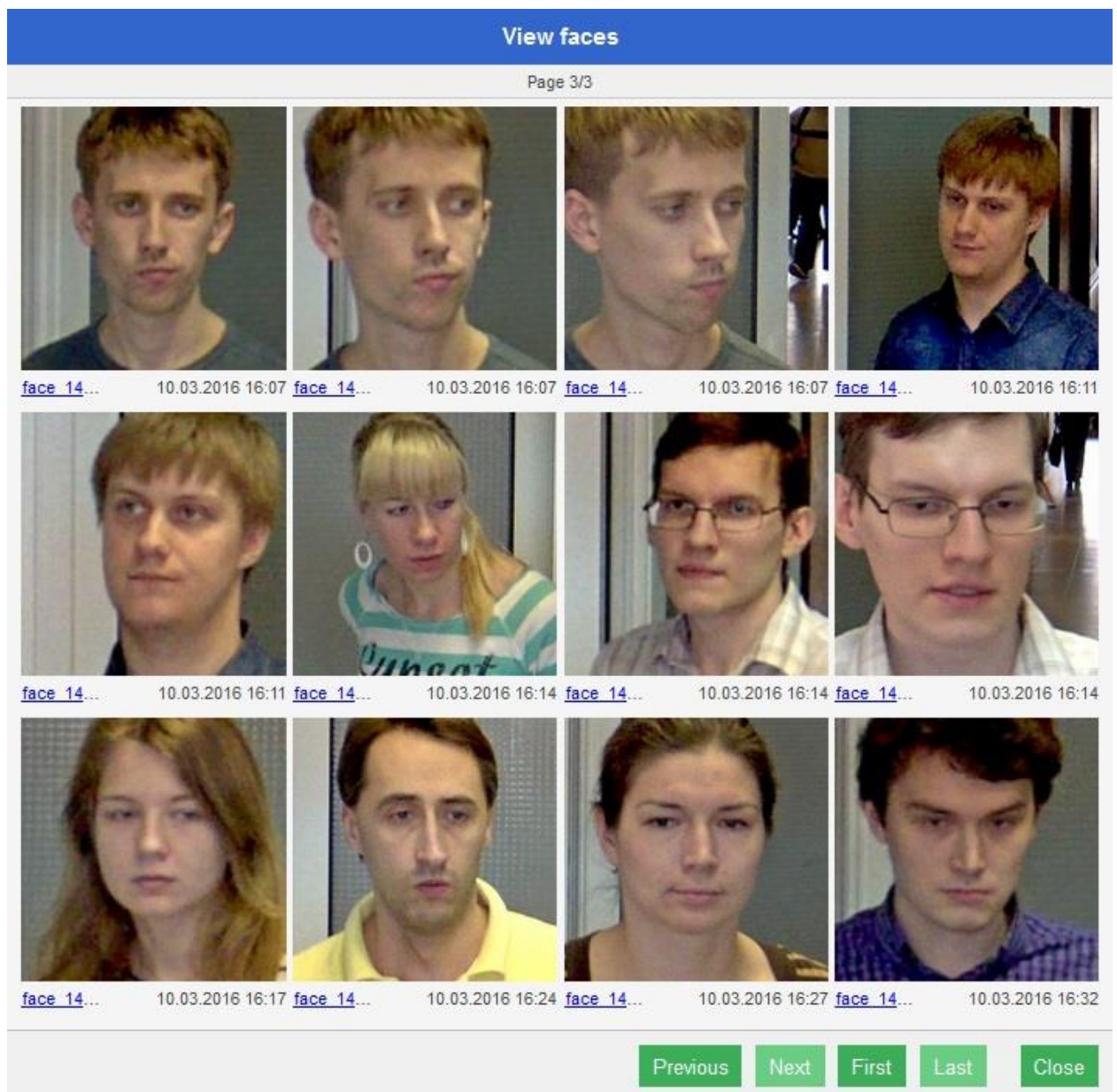


Figure 2. View faces window interface

## Parameters description

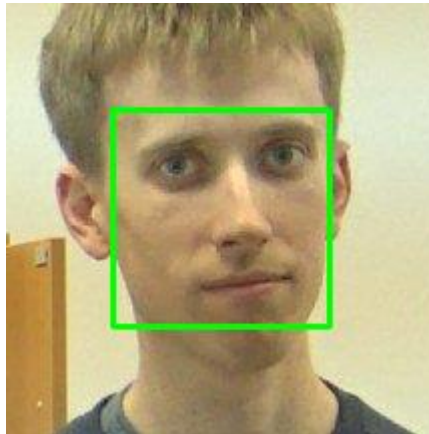
All parameters are divided into two parts

1. Algorithm parameters (*Parameters tab*)
2. Export parameters (*Export tab*)

Parameters tab includes the following:

1. *Detection confidence* – adjusts precision level of detection algorithm in range of 0 to 100. The lower the precision, the more faces would be detected, but false detection rate would also increase.
2. *Min Face size* – minimal face size in pixels (width equals height). The minimal possible value depends on the video resolution. Figure 3 shows how a face border is defined.

3. *Max Face size* – maximal face size in pixels (width equals height). This value should be less than the video resolution. Figure 3 shows how a face border is defined.



**Figure 3. Face borders according to the detector**

4. *Draw (Face size)* – if checked, then minimal and maximal face sizes can be set in an interactive manner by resizing the rectangles over the live video stream. The red rectangle corresponds to a maximal size, while the blue one corresponds to a minimal size. The location of the rectangles is of no importance, only their sizes matter.
5. *X, Y, Width, Height (ROI Size)* – set the region of interest for face detection. Only faces inside this region could be detected. The smaller this region is, the fewer false detections would be and the faster the detector would work. The latter may have a positive influence on the total quality.
6. *Draw (ROI Size)* – if checked, the ROI could be set in an interactive manner by resizing the green rectangle over the live video stream.
7. *Type* – this parameter sets which detected faces would be saved (or send). Available options:
  1. *detections* – all detected faces are saved without any additional information;
  2. *detections with id* – tracking is performed, and every face is saved with its track number;
  3. *best frames* – tracking is performed, and only one face per track is saved.

Export tab includes the following:

1. *Export to SD Card* – if checked then detected faces are saved to a camera SD card. This option is not available if camera does not contain an SD card.
2. *Max capacity* – maximal size (in megabytes) for face image archive on an SD card. If the archive exceeds this size, then new images are saved upon old ones. This option is enabled if *Export to SD Card* is checked.
3. *Archive* – allows saving faces from an archive on a camera SD card to a local computer or view them in a separate window. Only faces from the specified time range are considered. This time range is set by *From* and *To* parameters. The *View* button opens a new window with detected faces. Every face has a download link, a timestamp and a date. The *Export* button downloads a zip-archive of the detected faces from the specified time range to a local computer. The number of faces in an archive cannot exceed 4096 (otherwise only 4096 first faces would be put to the archive).
4. *Export enabled* – if checked then every face is send to a specified remote server.
5. *API availability* – OK in case sending to a remote server is available. Possible problems include unavailability of a network and not configured camera DNS.

6. *URL* – remote server address.
7. *Token* – a remote session identifier.

## **Tips for improving the detection quality**

- Set ROI as small as possible.
- Increase minimal face size as much as possible.
- Close camera web interface.

These actions may help to eliminate false detections and increase processing speed. The latter leads to a large number of processed frames, which may help to find more faces.