

EyeDentity v1.3.7 User Guide

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1 Introduction

The software EyeDentity is a desktop application, which serves for automatic searching of digital image data for the purpose of localization, identification and verification of persons. The application processes images and videos in various formats, resolution and quality, it detects faces in them and applies advanced recognition functions.

This software enables above all:

- localize the faces in video files and photographs
- estimate age and gender of detected person
- identify faces from the input data with the faces in the internal person database
- search for the faces from the internal person database in the input data

The part of the software is a SQL database containing the images and identification data of the persons of interest. The software contains the user interface for data administration of the database. The user can add and remove the persons, edit identification data and notes, add and remove the attached pictures.

The analytical core of the system is based on the advanced recognition algorithms, which are created using the statistical methods of the automatic learning on large training sets. It is necessary to assess the quality of the detection and recognition features on the basis of the statistical evaluation of the larger number of samples.

This manual is written for the operating system Microsoft Windows 10, 64b, in English, in the default settings. Some of the described procedures and legends of the control elements of the operating system can differ for other operating systems.

2 Hardware requirements

2.1 Minimal requirements

- Processor: Intel® Core[™] i5, 2 cores (4 logical processors)
- RAM: 16 GB
- Hard disk: 256 GB (optional SSD)
- Operating system: Microsoft Windows 10, 64b

2.2 Recommended requirements

- Processor: Intel® Core[™] i7, 4 cores (8 logical processors)
- RAM: 16 GB
- Hard disk: 512 GB, SSD
- GPU (optional): NVIDIA® GeForce® GTX 1050 Ti, 4GB GDDR5
- Operating system: Microsoft Windows 10, 64b

2.3 Advanced requirements

- Processor: Intel® Core[™] i7, 6 cores (12 logical processors)
- RAM: 32 GB
- Hard disk: 1 TB, SSD
- GPU: NVIDIA GeForce GTX 1060, 6GB GGDR5
 - Optional: NVIDIA® GeForce® GTX 1080 Ti, 11GB GDDR5X
- Operating system: Microsoft Windows 10, 64b



3 Version history

EyeDentity 1.3.7

Released: 02/20/2025

List of major changes:

- Fixed descriptor recomputation for manual detections
- Updated Sentinel license protection system to the latest version (10.11)
- Updated PostgreSQL (15.11), fixed installation conditions

EyeDentity 1.3.6

Released: 03/25/2024

List of major changes:

- Fixed PostgreSQL backup and restore
- Added a link to the track's source photo / video file to the person detail dialog
- Updated Sentinel license protection system to the latest version (9.12)

EyeDentity 1.3.5

Released: 04/25/2023

List of major changes:

• Updated PostgreSQL to the latest version (15.2)

EyeDentity 1.3.4

Released: 01/17/2022

List of major changes:

- Supported more image formats
- Fixed application stability during new project processing

EyeDentity 1.3.3

Released: 12/20/2021

List of major changes:

• New version of the face detector: EyeFace SDK 4.6.0912

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EyeDentity 1.3.2

Released: 01/31/2019

List of major changes:

- Manual detection of tracks in source file
- Fixed video playback speed

EyeDentity 1.3.1

Released: 10/30/2018

List of major changes:

- New project file format (single h5 file)
- Conversion of old project format (XML file + extra folder) into new h5 file format
- Faster video file processing

EyeDentity 1.3.0

Released: 06/29/2018

List of major changes:

- Whole new algorithm for face recognition
 Binary model: CNN_FACE_IDENTITY_BGR_NONE_EXP35
 (need to perform descriptor recomputation)
- New version of the face detector: EyeFace SDK 4.5.0430
- Support for multi-user access to a database
- New options for the installation package
 - Selection of installation components
 - License server installation from the command line
- Added detailed import to a database log
- Support for GPU computation
- Improved import to database functionality

EyeDentity 1.2.1

Released: 01/19/2018

List of major changes:

- Manual detection for pictures, where detector fails
- Support for Microsoft SQL Server and Active Directory access

• Small modifications to the user interface

EyeDentity 1.2.0

Released: 01/29/2016

List of major changes:

- Whole new algorithm for face recognition (need to perform descriptor recomputation)
- Person import can be done using regular expressions
- New and more efficient communication with the database
- Small modifications in the user interface

EyeDentity 1.1.5

Released: 06/25/2015

List of major changes:

- New computational model for face recognition (need to perform descriptor recomputation)
- Small modifications in the user interface

EyeDentity 1.1.4

Released: 06/04/2015

List of major changes:

- New computational model for face recognition (need to perform descriptor recomputation)
- Projects structure updated (projects from previous application versions must be recreated)
- New projects require less storage space
- Small modifications in the user interface
- Better performance and higher stability

EyeDentity 1.1.3

Released: 04/16/2015

List of major changes:

• New computational model for face recognition (need to perform descriptor recomputation)



- Faster computation of face descriptor
- Backup and restore functionality in application
- Storing image data to database
- New version of PostgreSQL 9.4
- Small modifications in the user interface
- Better performance and higher stability

EyeDentity 1.1.2

Released: 11/14/2014

List of major changes:

- A possibility of manual import to database added
- Possibilities of adding of faces from a photograph directly in a person card
- A field Date taken in Track added
- Current file name in a project is displayed
- Cosmetic adjustments of a user interface
- Icons modified

EyeDentity 1.1.1

Released: 10/31/2014

List of major changes:

- A translation in English language added
- A possibility of switching languages added
- A field Province removed from a person card and from searching

EyeDentity 1.1.0

Released: 10/08/2014

This version brings a fundamental change in a form of a new algorithm for a computation and comparing of face descriptors. A success of comparing increases considerably at the cost of a higher demands of the descriptor computation. Projects created in the previous version of the application EyeDentity are not compatible with the version 1.1.0 and it is necessary to create them again. It is possible to use a database of persons and tracks from the previous version, but it is necessary to recompute the descriptors in the whole database.

List of major changes:

• New panel for matching of found tracks with the database of persons



- New algorithm for the computation of the face descriptors
- The possibility of the recomputing of the descriptors in the whole database
- Import of the persons and image data to the database from the CSV file
- Export of the persons from the database to the CSV file
- Use of a cached storage for a faster work with the database
- A field UID added to the person card
- A column with photographs added to the persons database
- Time of video is displayed in the whole application instead of a frame number
- Full-text searching in the persons database without diacritics
- New possibilities of the export of the matching results to PDF
- The project Picture Folder reads EXIF GPS for each file separately
- Minor bug fixes

EyeDentity 1.0.0

Released: 09/01/2014

• First release of the application



4 Installation and uninstallation

4.1 Installation of the application

If you have installed the previous version of the application EyeDentity, proceed in the same way as in the case of the first installation. Updating of all necessary files takes place during the installation. Data created in the previous version remain saved. Nevertheless, we strongly recommend performing their backup along with the backup of the database (see chapter 6.1).

Installation of the application starts using file **EyedentitySetup64.exe** in the installation package. The following window is displayed after the start, it informs about initiation of an installation process.



After pressing Install button, the installation of important libraries for running EyeDentity and PostgreSQL takes place, then the following window appears.



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Clicking the Next button, the License Agreement is displayed.

🛃 EyeDentity Setup	_		×			
End-User License Agreement						
Please read the following license agreement carefully						
LICENSE			^			
Eyedea Recognition s.r.o. (Eyedea) hereby gives you a non-exclusive license to use the software EyeDentity (the Software). For evaluation, the license is granted, and is time-limited.						
You may: - use the Software on any single computer; - use the Software on a second computer so long as the primary copy is the same person and more than one copy is not used si - copy the Software for archival purposes, provided any copy of the original Software's proprietary notices.	v user o multan ontains	f each eously; s all of	¥			
I accept the terms in the License Agreement						
Print Back Next		Can	cel			

After reading of the License Agreement and confirmation using the choice I accept the terms in the licence agreement it is possible to continue to the next step using the Next button.

🕼 EyeDentity Setup	_		×
Destination Folder			
Click Next to install to the default folder or click Change to choose and	other.		$\mathbf{\underline{\vee}}$
Install EyeDentity to:			
C:\Program Files\Eyedea Recognition\EyeDentity\			
Change			
Back Next		Car	ncel

In this window, it is possible to change the folder alternatively, where the program is installed, and using the Next button to continue to the penultimate page before installation itself.



🔀 EyeDentity Setup	– 🗆 X
Custom Setup	2
Select the way you want features to be installe	d. 🦉
Click the icons in the tree below to change the	way features will be installed.
Sentinel License Manager PostgreSQL EyeDentity	This feature requires 91MB on your hard drive.
Re <u>s</u> et Disk <u>U</u> sage	Back Next Cancel

Default installation contains all components that are needed for using the application. If only the installation of license server is required, select Sentinel License Server option only. If the PostgreSQL database is not needed or is already installed, feel free to select and install EyeDentity and Sentinel License Server only. The Next button confirms our selection and proceeds to the last page before the installation.

🚼 EyeDentity Setup			_		×
Ready to install EyeDentity					0
Click Install to begin the installation. Click installation settings. Click Cancel to exit th	Back to re ne wizard.	view or cha	nge any of y	our	
	Back	Ins	tall	Car	ncel

Now it is possible to start the installation itself using the Install button. This installation copies all necessary files and if required, it also installs the database PostgreSQL 15 and a driver of Sentinel hardware key.



援 EyeDentity Setup		_		Х
Installing EyeDentity				0
Please wait while the Setup Wizard installs	EyeDentity.			
Status:				
	Back	Next	Cance	I

The installation of the database server and the driver of the hardware key takes place automatically, but it can require confirming a report on finishing the installation.

Sentinel Run-time Environment Insta	×
Operation successfully completed	ł.
ОК	

The installer displays the following window after finishing the installation and it is possible to end the installer using the Finish button.



Now the application is installed and prepared for use.



Local setting of the system

For the correct function of the program, it is necessary to have correctly set the Language for the programs which do not support the Unicode in the Windows. In the English version of the Windows is in the default setting set English. To change this setting to your language, open Start Menu, search for and open Control panel \rightarrow Clock, Language, and Region \rightarrow Region and Language.

Olock, Language, and Region		-		\times
 Clock, Language, and Region ← → ~ ↑ ✓ Control Panel Control Panel Home System and Security Network and Internet Hardware and Sound Programs User Accounts Appearance and Personalization Clock, Language, and Region Ease of Access 	el > Clock, Language, and Region Date and Time Set the time and date Change the time zone Add clock Changuage Add a language Change input methods Region Change location Change date, time, or number formats	 Region Fomats Location Administrative Welcome screen and new user accounts Weike and copy your international settings to the welcome screen, system accounts and new user accounts. Copy settings Language for non-Unicode programs This setting (system locale) controls the language used when displaying text in programs that do not support Unicode. Current language for non-Unicode programs: English (United States) Change system locale. 	×	× 9
		OK Cancel Apr	ply	

In this dialog on the tab Administrative click the Change system locale button, which opens the following dialog.



Here set Current system locale to your preferred language.



4.2 Network license setting

4.2.1 License server installation

If an advanced user wants to install the license server only, the setup with command line parameters /passive LICENSESERVERONLY="yes" can be run. The only required input from the user is to confirm the report of the license server installation. Install the license server using command line:

EyedentitySetup64.exe /passive LICENSESERVERONLY="yes"

4.2.2 License server settings

After a successful Sentinel License Server installation, open the address <u>http://localhost:1947</u> in a web browser and check whether the license server is running. If the Sentinel Admin Control Center web application is displayed, the license server is running. License server can be configured to allow to connect clients to use available licenses (configured as a server) or it can connect to another license server (configured as a client).

🖶 🖅 Thales Sentinel ACC	∺He × + ∽			-		×
\leftrightarrow) \circlearrowright	localhost:1947/_int_/ACC_help_index.html	□ ☆	5∕≡	1L	È	
Sentinel Admin	Control Center				0 F	ielp ^
	Admin Control Center Help					
Sentinel Keys	Welcome to the Admin Control Center. This application enables you to manage a Features, to control detachable licenses, to control sessions, and to diagnose pro	ccess to softwar blems.	re licenses	and		
Products	Note: You can select the language in which Admin Control Center is displayed fro > The Admin Control Center enables you to monitor the following:	om the bottom o	f the Optio	ns pane		
Features	 All the Sentinel protection keys that are currently available on the network and location The number of users currently logged in to a protection key, and the maxin 	server, including	g their ident users allow	iity, type ed to be	, I	
Sessions	simultaneously logged into that specific key • The Features to which each protection key allows access, and any restrict • The users who are currently logged into a specific protection key, including	ions that apply t g detailed login i	o the Featu nformation	re		
Update/Attach	Note: SL UserMode keys are only displayed for the local (Windows) machine. SL when the configuration parameter Do Not Load haspimv.exe is selected.	UserMode keys	are not di	splayed		
Access Log	 You can perform actions, such as: Detaching a license from the network and attaching it to your machine or a Cancelling a detachable license prematurely Installing an under to a license on a key that is wishle in Admin Control C 	i different recipie	ent machine	9		
Configuration	 You can implement and manage cloud licensing. 					
Diagnostics	 You can make basic configuration changes, including: Setting the display refresh time Configuring access permissions from a client machine to a remote server, 	and configuring	a server to	allow it	to	~

Server configuration

To set the license server as a license provider, plase open the address in your web browser <u>http://localhost:1947/_int_/config_from.html</u> and choose the option Allow Access from Remote Clients. This option allows other clients to connect to the network license key plugged in the server.





Client configuration

To set the license server as a client, open the address <u>http://localhost:1947/_int_/config_to.html</u> in a web browser and choose the Allow Access to Remote Licenses option. If the license provider is in another network than the computer, put the server's IP address into the field Remote License Search Parameters.

Basic Settings	Users	Access to	Remote License	Managers	Access from Remote Clients	Client Identities	Detachable Licenses	Network
	Domoto Li			Vaumau	avaariance a delay of a faw minu		a taka affaat	
Allow Access to	Remote Li	censes	\checkmark	You may	experience a delay of a few minu	les before your change	s take effect.	
Broadcast Sear	ch for Rem	ote Licenses						
Aggressive Sea	rch for Rem	note License	s 🗌					
Remote License	Search Pa	arameters						

4.3 First start of the application

It is necessary to fill login data to the database during the first start of the application. The dialog Database settings is displayed after the application starts.

🧕 Database settings	×
Database: O Microsoft SQL PostgreSQL	
Image: Server: O remote 127.0.0.1 Port: 5432	
Login: postgres Password:	
Database name: eyedentity	~
Reset Save Cancel	

Here can be set connection information to the database server and the **Database name**. In the standard installation filled-in can be used to connect to the default database. In case of problems, check on which port runs the database server (see paragraph 4.3.1). You can also find more information about Database settings in the chapter Settings 9.3.

4.3.1 Find database server port

In the case that was another version of the database PostgreSQL already installed on the computer before the installation of the application EyeDentity, the newly installed database server Postgres 15 probably runs on other port than is standard 5432. In this case it is necessary to find this port using the program pgAdmin 4. It can be started via the menu Start: Start Menu \rightarrow P \rightarrow PostgreSQL 15 \rightarrow pgAdmin 4.



In this window, after you connect to server (double click on it) and select the tab **Properties**, it is possible to find the database port, under the section **Connection**. The port 5434 is stated in the picture above.

4.4 Uninstallation

ΙE ÷ Щ T.

It is possible to uninstall the application EyeDentity via Settings (Start Menu \rightarrow Settings \rightarrow Apps). The PostgreSQL database (PostgreSQL 15) does not uninstall during uninstallation of the application, because it can be used also by other applications. If you still want to uninstall it, you can do it via the Settings (Start Menu \rightarrow Settings \rightarrow Apps).

← Settings					
🔅 Home	Apps & features				
Find a setting $\begin{subarray}{c} \end{subarray} \end{subarray} \end{subarray}$	Installing apps				
Apps	Choose where you can get apps from. Installing only Store helps protect your PC and keep it running smo	apps from the othly.			
E Apps & features	Allow apps from anywhere \sim				
I⊐ Default apps	Apps & features				
如 Offline maps Manage optional features					
Apps for websites Search, sort, and filter by drive. If you would like to uninstall o move an app, select it from the list.					
	Search this list \wp				
	Sort by: Install date $ \smallsetminus $ $$ Filter by: All drives $ \lor $				
	Eyedentity x64 Eyedea Recognition 1.2.1	1.93 GB 12/14/2017			
	Modify	Uninstall			
	Constitution and Constitution				
	and the second				
	11.1				
	C 100 100				
	C testil				
	PostgreSQL 9.6 PostgreSQL Global Development Group	472 MB 12/13/2017			
	20 m				
	and the local sectors of				



5 Application use cases

Two typical use cases of the application EyeDentity are described in this chapter. The goal of the first task is to find the selected persons from the internal database in the input data. In the second task the goal is to find the person from the input photograph in the internal persons database.

Of course, the possibility of application use is wider. Both mentioned examples serve primarily for a quick familiarization of the user with the basic functions of the application EyeDentity.

The tasks are demonstrated on the testing database of the persons **EyeDentity**, which is created and filled up with the testing data automatically at the first start of the application.

5.1 Example 1. Searching of persons in input video sequence and photographs

5.1.1 Task description

The user has a video record and the task is to verify if the selected person/persons from the internal persons database appears in the record. The procedure is same for the tasks, where it is necessary to use photos as an input source instead of video sequences.

5.1.2 Task solution

Step 1: Application start

The application starts using the icon EyeDentity, which is on the desktop or in the Windows Start Menu under the tabs $E \rightarrow$ Eyedea Recognition \rightarrow EyeDentity. The main application window is displayed after starting.



Step 2: Check database connection

In this demonstration we work with the testing database of the persons eyedentity, which was

created at the first start of the application, see chapter 4.3 . Verify, that the application is connected to the testing database eyedentity using the menu Settings \rightarrow Database settings. The window is displayed:

🧕 Database settings	×
Database: O Microsoft SQL O PostgreSQL	
Server: O remote 127.0.0.1	5432 🜩
Login: postgres Password:	
Database name: eyedentity	~
Reset	Cancel

If the Database name is correct, click the Cancel button and continue with the step 3: Create a new project and select input data. Otherwise create the new database (see chapter 9.3) and fill it up with the testing data.

Step 3: Create a new project and select input data

First of all, it is necessary to create a new project for each video sequence, image or image folder, which you want to analyse. We perform setting up of the new project using the main menu entry File \rightarrow New project.

🧕 I	EyeDentity	
File	View Settings Help	
	New project	Ctrl+N
	Open project	Ctrl+O
	Close project	Ctrl+W
	Manual face detection	Ctrl+M
	Recalculate descriptors	
	Import to database	Ctrl+I
	Export persons from database	Ctrl+E
	Backup database	
	Restore database	
	Exit	Ctrl+Q

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New project window is opened:

Source type:	File	Image folder	
Source:		Select	
Save project as:		Select	
Date taken:		GPS:	
4 🜩 10 🌩	2018 ≑	0 🗣 0 🗣 0.000 🗣 N	
12 🜩 : 51 🌩	: 59 🜩	0 🜩 0 🜩 0.000 🜩 E	

Select File as the Source type and press Select button in the Source section. In open dialog window select C:\Users\Public\Documents\EyeDentity\test-video.mp4 testing video sequence.

After the source selection, the remaining fields are prefilled from the source metadata – project file name and path, date and GPS coordinates and a note field. Press Select button in the Save project as section to change the name and path of new project file. For the remaining fields, we use default values.

🧕 New project		X
Source type:	• File	○ Image folder
Source:	C:/Users/Publ	lic/Documents/EyeDentity/test-video.mp4 Select
Save project as:	C:/Examples/I	EyeDentity/test-video.h5 Select
Date taken: 8 0 1 201 16 0 : 44 0 : 2 Note:	18 文	GPS: 0 ♥ 0 ♥ 0.000 ♥ N ♥ 0 ♥ 0 ♥ 0.000 ♥ E ♥
		Start processing

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Step 4: Processing of input data

By the processing of the input data is meant localization of the faces in the input data and the computation of their descriptors. The result is so called tracks. The track contains the detected face of the person with the appropriate descriptor. In the case of processing of the video sequences, one track can contain the time sequence of cut-outs of the faces, i.e. more time consequent cut-outs of the relevant face.

We start the processing of the input data using the **Start processing** button in the window **New project**. The **Processing panel**, which displays the progress of an analysis, is opened.



The application allows to process more projects (videos/photographs) simultaneously. The user simply sets up another new project and starts processing. The partial results of the processing can be displayed already during the analysis using the **Open** button.

Processing panel			-		×
test-video	100%	Open	Done	ОК	

In this example we are going to process only one video sequence, so we wait until processing is finished and press **Open** button to open the project in the main window.

Step 5: Display detected tracks

In the left part of the main window, frames around detected faces are rendered in the video. The tracks are drawn in the right part of the main window in the **Detected tracks** tab. Each track is described with the face cut-out, an integer identifier of the track, time of the first image in the sequence and estimation of gender and age of the detected face. The last entry in the square brackets is an identifier of the face – if there is a face on several tracks according to the program, all these tracks have the same identifier (e.g. Tracks 8 and 10).





Left-click the given track automatically plays the corresponding sequence of the video; selected face is marked with a green rectangle. Right-click the selected track unfolds the drop-down menu



with the following options:

Add to existing person	The track is added to the person selected from the database.
Add to new person	The track is added to the newly created person.
Find similar in this project	Sorts the project tracks with respect to similarity to the selected track.
Export images	Saves the track images (face cut-outs).
Match with database	Compares the track with the persons in database.

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Step 6: Matching the detected tracks with the person database

We perform the matching of the detected tracks with the person database using the tab Matching with database.

EyeDentity - test-video			- 🗆 ×
rite view Settings Help			
Project Matching with database Pers	on database		
Tracks	Track image	Person image	Persons
All tracks			Whole database
 Selected tracks 			O Database selection
💮 \cdots Remove all			🖞 Remove all
Track 1 (Projekt) ^ unknown age Gender: unknown Track 2 (Projekt) Age: 26 Gender: unknown age Gender: female (97%) Track 3 (Projekt) Gender: unknown Track 4 (Projekt) Gender: unknown Track 5 (Projekt) Gender: female (97%) Track 5 (Projekt) Gender: female (97%)			Jane Doe female, age: 24 Birth date: 05/05/1993 John Doe male, age: 40 Birth date: 09/02/1977 Jane Smith Female, age: 28 Birth date: 06/21/1989 Jane Roce Female, age: 37 Bohn date: 09/02/1977
Track 6 (Projekt) unknown age Gender: unknown	Show matched pair	Save PDF	
Track 7 (Projekt) age: 19 Gender: female (98%)			
Track 8 (Projekt) age: 50 Gender: male (99%)	c	>	
Sort tracks by score	Start matching		Sort persons by score

In the left part of the tab Matching with database is the List of tracks of the current project along with the Track filter, which is used for the selection of the facial sequences from the project, which we want to compare with the database.

In the right part of the tab Matching with database is the List of persons from the database along with the Person filter, which is used to the selection of the persons of interest, which we want to search in the given sequence, i.e. with which we want to compare the found tracks.

We start the matching using the **Start matching** button after selecting the desired tracks from the project and persons of interest from the database.



The results of the matching are displayed in the middle part of the tab Matching with database. The selected pair of faces is displayed, on the left is the track image, on the right is the image from the person database.





At the bottom of the List of persons we can select, whether we want to sort the persons by computed similarity score, or alphabetically. Selecting the sorting by the score, the persons with the highest score will be on the first positions in the List of persons.



Down in the middle is the List of results of the currently selected person from the List of persons. Each result is displayed as a thumbnail of the cut-out from the matched track along with the achieved similarity score that is below the icon. The results are displayed from the highest score achieved.



We move through the List of persons by pressing a key up or down or by using the left mouse button, the corresponding results of matching are displayed with each selection of the person in the List of results.

We move through the List of results by pressing a key left arrow and right arrow or by using the left mouse button, the matched pair of the faces is displayed with each selection of the result.

We can switch between the columns List of tracks and List of persons using the key combination Ctrl + left arrow, which switches to the List of tracks, and Ctrl + right arrow, which switches to the List of persons.

Right-click the selected result unfolds the drop-down menu



with the following options:

Show in project	The selected track from the List of results is displayed and played in the tab Project .
Add to person	The selected track from the List of results is added to the person selected in the List of persons.

Images of the currently selected matched pair can be hidden by deselecting Show matched pair. This layout is useful in the case the large number of the results is found. (For the following image, we temporarily decreased Min. matching score level for which the results are shown. This settings is described in chapter 9.4.)



5.2 Example 2. Search the internal person database

5.2.1 Task description

The operator has the photograph or the video sequence with an unknown person and needs to find the similar person in the internal person database. Specifically, he needs to sort the persons in the database based on the similarity with the person on the input photograph or in the video sequence.

5.2.2 Task solution

Step 1: Application start

The application starts using the icon EyeDentity, which is on the desktop or in the Windows Start Menu \rightarrow Eyedea Recognition \rightarrow EyeDentity. The main application window is displayed.

EyeDentity				-	
e View Settings Help					
Project Matching with database Person database					
		Detected tracks			
		Found: 0. Displayed: 0			
		, and all adjusted a			
					- 1
[-214.0,-220.0]					
Image settings	44 bb B				
made accords		Min hadd leastly E	Ferredu		andar
Filename:		Pint o dox lengel: 5 V	Search	n G	enuer

Step 2: Check database connection

In this demonstration we work with the testing database of the persons eyedentity, which was created at the first start of the application (see chapter 4.3). Verify, that the application is connected to the testing database eyedentity using the menu Settings \rightarrow Database settings. The window is displayed:

🧕 Database settings	×
Database: O Microsoft SQL PostgreSQL	
local Server: O remote 127.0.0.1	2 🗘
Login: postgres Password:	
Database name: eyedentity	~
Reset Save Cance	el

If the Database name is correct, click the Cancel button and continue with the step 3: Create a new project and select input data. Otherwise create the new database (see chapter 9.3) and fill it up with the testing data.



Step 3: Create a new project and select input data

First of all, it is necessary to create a new project. We perform setting up of the new project using a command in the main menu File \rightarrow New project. The window New project is opened.

Source type:	File		🔿 Im	age folder			
Source:						Select	
Save project as:						Select	
Date taken:		[GPS:				
4 🔹 10 🔹 2	2018 ≑		0 🌻	0 🜩	0.000 🗘	N	T
12 🔹 : 51 🌲 :	: 59 🜲		0 🔹	0 🌲	0.000 🗘	E	
lote:							

Then select the input image in the line Source using the Select button. We use the testing image file C:\Users\Public\Documents\EyeDentity\test-image.png in this example.

🧕 New project	;	×
Source type:	File O Image folder	
Source:	C:/Users/Public/Documents/EyeDentity/test-image.png Select	1
Save project as:	C:/Examples/EyeDentity/test-image.h5 Select	
Date taken: 22 • 12 • 201 11 • : 22 • : 4	GPS: 0	•
Note:		
	Start processing	_

Press Select button in the Save project as section to change the name and path of new project file. For the remaining fields, we use default values and press Start processing button.

Step 4: Processing of input data

By the processing of the input data is meant the automatic localization of the faces in the input image and the computation of the face descriptor. The result is called track. The track contains



the cut-out of the person with the appropriate descriptor. (In the case of processing the video sequences, one track can contain the time sequence of cut-outs of the face, i.e. more time consequent cut-outs of the relevant face, with the descriptors.)

We start the processing of the input data using the **Start processing** button in the window **New project**. The **Processing panel**, which displays the progress of the project analysis, is opened.



The application allows to process more projects simultaneously. The user simply sets up another new project and starts processing. The partial results of the processing can be displayed already during the analysis using the Open button.

Step 5: Display a detected track

In the left part of the main window, there is the analysed image with a frame around the detected face. The track is drawn in the right part of the main window in the **Detected tracks** tab. In this case, there is only one detected face, but in general more of them can be detected. Each track is described with the face cut-out, an integer identifier of the track, index of the image in sequence (useful when an image folder is analyzed) and estimation of gender and age of the detected face. The last entry in the square brackets is an identifier of the face.



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Add to existing person	The track is added to the person selected from the database.
Add to new person	The track is added to the newly created person.
Find similar in this project	Sorts the project tracks with respect to similarity to the selected track.
Export images	Saves the track images (face cut-outs).
Match with database	Compares the track with the persons in database.

Right-click the selected track unfolds the drop-down menu with the following options:

Step 6: Matching the detected track with the person database

We perform the matching of the detected track with the person database using the tab Matching with database.

In the left part of the tab Matching with database is the List of tracks of the current project along with the Track filter, which is used for the selection of the face sequences from the project, which we want to compare with the database.

In the right part of the tab Matching with database is the List of persons from the database along with the Person filter, which is used for the selection of the persons of interest, which we want to search in the given sequence, i.e. with which we want to compare with the found tracks.

We perform the matching using the **Start matching** button.



The results of the matching are displayed in the middle part of the tab Matching with database. The selected pair of faces is displayed, on the left is the track image, on the right is the image from the person database.





At the bottom of the List of tracks we can select, whether we want to sort the tracks by computed similarity score, or by the order in the project. Selecting sorting by the score, the tracks with the highest score will be on the first positions in the List of tracks.



Down in the middle is the List of results for the currently selected track from the List of tracks. Each result is displayed as a thumbnail of the photograph of the matched person along with the achieved similarity score that is below the icon. The results are displayed from the highest score achieved. (Min. matching score level is set to default value 0.70 so only one result is shown. This settings is described in chapter 9.4.)



We move through the List of tracks by pressing the key up and down or using the left mouse button, the corresponding results of matching are displayed with each selection of the track in the List of results.

We move through the List of results by pressing the key left arrow and right arrow or using the left mouse button, the matched pair of the faces is displayed with each selection of the result.

We can switch between columns List of tracks and List of persons using the key combination Ctrl + left arrow, which switches to the List of tracks, and Ctrl + right arrow, which switches to the List of persons.

Right-click the selected result unfolds the drop-down menu



with the following options:

Show person	It displays the window with the card of the persons from the database.
Add track to this person	The selected track from the List of tracks is added to the matched person from the List of results.



6 Backup and restore the person database

The application uses the SQL database for storing the person database. Since EyeDentity version 1.1.3 it is possible to back up the data of PostgreSQL database directly from the application. If you need to restore the backup done in previous versions of the application, please refer the guide relevant to the used version.

The application creates backups in one file, where the whole person database, face descriptors and all image data are stored. Using this file, it is possible to transfer the EyeDentity between different users and computers.

6.1 Database backup

Backup of the application EyeDentity database is done using the menu File \rightarrow Backup database. Then the window is opened where the user can select the destination to store the backup. After confirmation the backup itself is started. This process can take several minutes according to the size of the database. When the backup is finished, dialog with the information about the backup process is displayed.

6.2 Database Restore

Restore of the application EyeDentity database is done using the menu File \rightarrow Restore database. Then the window is opened where the user can select the source file to restore. The user is asked whether he wants to restore the data to the current database, create new one or select another database. WARNING – when restoring to the current database, all contained data will be deleted. When restore to the new database is selected, the user must input the name of the database to create. After confirmation the restore itself is started. This process can take several minutes according to the size of the database. When the restore is finished, dialog with the information about the restore process is displayed.

-	cyebennity	
File	View Settings Help	
2	New project	Ctrl+N
	Open project	Ctrl+0
	Close project	Ctrl+W
	Manual face detection	Ctrl+M
	Recalculate descriptors	
	Import to database	Ctrl+I
	Export persons from database	Ctrl+E
	Backup database	
	Restore database	
	Exit	Ctrl+Q

🧕 EyeDentity

File	View Settings H	lelp	
2	New project		Ctrl+N
	Open project		Ctrl+O
	Close project		Ctrl+W
	Manual face detection	n	Ctrl+M
	Recalculate descripto	rs	
	Import to database		Ctrl+I
	Export persons from o	latabase	Ctrl+E
	Backup database		
	Restore database		
	Exit		Ctrl+Q

Database restore will fail, if there is more users connected to the database, therefore it is necessary to make sure, that all users are disconnected before the restore.

🧕 Name of database to restore to	?	×
Please fill the name of the database to rest Could be existing or new database.	tore the o	lata to.
OK	Can	icel



7 Import and export of persons

The application EyeDentity allows from version 1.1.0 to perform the import of the persons along with the image data that belongs to them. Simultaneously, it is also possible to export the list of the persons, who are in the database.

This functionality does not replace backup and restore the database and created data. This serves only for more comfortable filling of the person database or alternatively for creating the list of persons, which can be processed in another application.

7.1 Import to database

The function Import to database is designed for the bulk processing of the image data, which belongs to the individual persons. Import can be done in three ways which are described in detail in the following chapters: Manual import, CSV import and Regexp import.

EyeDentity File View Settings Help		🧕 Import to database
New project Open project Close project Manual face detection Recalculate descriptors	Ctrl+N Ctrl+O Ctrl+W Ctrl+M	Select type of import: Manual import Requires to fill in the person data manually CSV import Requires person data defined in CSV file
Import to database Export persons from database Backup database Restore database	Ctrl+I Ctrl+E	Regexp import <i>Reads person info from filename using regexp</i>
Exit	Ctrl+Q	Cancel

7.1.1 Manual import

The function Manual import enables a creation of a list of persons and relevant data for import to a database directly in the application. Each record of the list represents one person. All fields contained in the person database can be set for each person.

In the first step either an image or an image folder of each imported person must be selected. For that purpose there are Add person image file, Add person folder and Add person subfolders buttons that open the corresponding Open dialog window. The selected image or folder is added to the list of imported persons.

Add person image file

A person is added with one image attached. A face found in this image will be added to the database along with the person.

Add person folder

A person is added along with all images found in the selected folder (and all its subfolders). A person and all detected faces will be added to the database.

Add person subfolders

After selecting the folder all its subfolders are added to the list, where each represents one person.







The person can be removed from the list using the **Remove person item** button. Personal information can be filled by pressing **Edit person info** button.

🧕 Edit person info 🛛 🕹 🗙
Folder: C:/Users/Public/Documents/EyeDentity/images/Eva_Foe_1.png
UID:
Name: Surname:
Gender: unknown Personal No.: /
Born: 1 ♀ 1 ♀ 1990 ♀ Age: 0 ♀ ☑ Unknown
Place: ID card:
Nationality: unknown
Address:
Height: 0 🗧 cm Wanted: unknown 🔻
Body: unknown 🔻 Hair color: unknown 👻
Hair shape: unknown 🔻 Eye color: unknown 👻
Note:
OK Cancel

Edited persons are marked with a green tick in the list. Confirm the selection by pressing OK button in Manual import dialog window to start the image data processing.

Manual import			×
🖶 Add person image file	🖶 Add person folder	4 Add person subfolders	- Remove person item
 - C:/Users/Public/Do 	uments/EyeDentity/image	es/Eva_Foe_1.png	
C./ USES/ FUDIC/ DOCUMEN	s/ Lycoenius/ Images/ Eva_	, UC	
	Edit p	person info	

If any of the imported person's data has not been edited, a warning appears; otherwise you are requested to confirm the import.



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Click Yes to process image data and add persons and found tracks to the database. If a face has not been detected on a picture, the Manual detection window appears. Such a situation is described in chapter 8.6.2.

7.1.2 CSV import

The import processes a CSV (comma-separated values) input file containing information about one or more persons. The file must meet the general requirements described below:

- 1. All fields belonging to each single person are placed on a single line.
- 2. Each line must contain requested number of fields.
- 3. If a text field contains a comma or a new line character (allowed e.g. in address field), its content must be put in quotation marks "" (from the import point of view, such a field is still considered as single-line). In other cases, a field may or may not be enclosed with quotation marks "". **Warning**: always use "" to quote a CSV field, not "" or "."
- 4. If there is a need to enter a quotation mark " or a backslash \ in a text field, it has to be escaped with the \ character. In that case for example the string "*text*" will be written as \langle "*text*\" and *C*:*Examples**EyeDentity* will be written as *C*:*Examples**EyeDentity*.
- 5. Initial and trailing spaces in fields are ignored.
- 6. If the text field is to be blank, you can either enter an empty quotation mark or omit the value (in this case, two commas follow in sequence; in the case of the last field, the line ends with the last comma separator).

The order of CSV fields: Folder, Name, Surname, UID, Age, Gender, Birth date, Birth place, Personal No., ID card number, Nationality, Address, Wanted, Height, Body, Hair color, Hair shape, Eye color, Note

Field	Representation, comment
Folder	Text string indicating the path to image data. If we do not want to import
	image data, leave this field blank
Name	Text string
Surname	Text string
UID	Text string
Age	Integer $0 - 200$
Gender	Character: 'm' - male, 'f' - female, 'u' or blank - unknown
Dinth data	Text string in the format <i>dd.MM.yyyy</i>
Dirin dale	(dd: 01-31, MM: 01-12, yyyy: year) e.g.: 01.12.1980
Birth place	Text string
Personal No.	Text string in the format xxxxx/xxxx where x stands for a digit (0-6 digits

In addition to the general requirements, there are specific filed formats:

	followed by '/' character followed by 0-4 digits). Also may be blank
ID card number	Text string
Nationality	One of the values, which is found in the EyeDentity in the field <i>Nationality</i> .
Address	Text string, possibly multiline
Wanted	Integer $0 - 3$: <i>1</i> - wanted, <i>2</i> - missing, other - unassigned
Height	Integer $0 - 250$
Body	One of the following values: <i>unknown, anorexic, skinny, thin, slim, medium, fat, obese</i>
Hair color	One of the following values: <i>unknown, white, black, brown, dark brown, highlights, dyed, bleached, blonde, red, gray</i>
Hair shape	One of the following values: unknown, straight, curly, wavy, bald
Eye color	One of the following values: unknown, black, brown, blue, green
Note	Text string, possibly multiline

Example:

We want to import the following data:

Person 1								
Folder with image	Folder with image data: C:\data\images\ivakopecka\							
Name:	Iva	Personal no.:						
Surname:	Kopecká	Nationality:	Finland					
UID:	e46as1d	Wanted:	unassigned					
Birth place:	Helsinki	Age:	23					
ID card number:	F2PO245IX2	Height:	168 cm					
Address:	Nádražní 62	Body:	thin					
	Bruntál	Hair color:	brownblack					
	792 01	Hair shape:	curly					
Note:		Eye color:	green					
Gender:	female							
Birth date:	5 th February 1991							

Person 2							
Folder with image data: E:\Users\Jan Novák\Images\udatny							
Name:	Michal	Gender:	male				
Surname:	Udatný	Birth date:	21.6.1972				
UID:	u64r	Personal no.:	722106/0377				
Birth place:	Rokycany	Nationality:	Czech Republic				
ID card number:	129442893797	Wanted:	unassigned				
Address:	Masarykova 29	Age:	42				
	Kladno	Height:	178 cm				
	272 01	Body:	slim				
Note:	The missing man left his place of residence	Hair color:	brown				
	in Kladno and he has not made any contact	Hair shape:	straight				
	until now. The description of the clothes	Eye color:	unknown				
	that he wore last is not known.	-					



The content of the CSV file for import is the following:

```
"C:\\data\\images\\ivakopecka\\","Iva","Kopecká","e46as1d",23,f,05.02.1991,"Helsinki",,
"F2PO245IX2","Finland","Nádražní 62
Bruntál
792 01",0,168,"thin","brownblack","curly","green",""
"E:\\Users\\Jan Novák\\Obrázky\\udatny", "Michal", "Udatný", "u64r", 42, "m", "21.06.1972",
"Rokycany", "722106/0377", "129442893797", "Czech Republic", "Masarykova 29
Kladno
272 01", 0, 178, "slim", "brown", "straight", "unknown", "The missing man left his place of residence in
Kladno and he has not made any contact until now. The description of the clothes that he wore last is not known."
```

If provided CSV file is not correct, the application informs user with a dialog window containing a detailed list of errors. All necessary information is included - a brief description of the error and the line number in the CSV file where the error occured. Also if it's possible, the entry contains the value which caused the error.

🧕 Invalid CSV file	Х
The CSV file is not valid!	
Following errors occured:	
'23.5' is not an integer between 0 and 200. Line: 1, column: 5 (Age).	^
'55.02.1991' is not a date (supported format dd.MM.yyyy, or empty). Line: 2, column: 7 (Birth date).	
'9156205/0006' is not valid (supported format dddddd/dddd, or empty). Line: 3, column: 9 (Personal No.).	
'x' is not a valid gender (character m, f, or u). Line: 5, column: 6 (Gender).	
CSV item no. 6 contains 18 columns, but 19 columns are required. Line: 6	*
ОК	

7.1.3 Regexp import

The prerequisite for using this function is the fact that all person data which we need to decode is contained in the image filenames or in the paths to these files. It is also important that all data which we want to decode is contained in the filenames and file paths with respect to one specific rule. Regular expression is used for describing this rule during the import. If one or more filenames or paths do not satisfy the rule the decoding of these entries is skipped.

Fill in	the regex y: ☑ name	p to deco	o de the filenan ame 🗌 gender	nes: 🤊 r 🗌 o	6n_%s_%g_%D_%M_%Y_%a	?▼	# parent folders include: 0 🔹
. Click	to see the	preview	Previev	v			Source folder: C:/Users/Public/Documents/EyeDentity/images
Name	Surname	Gender	Date of birth	UID		Filename	^
1	Dee	famala	05 05 1002		Jane_Doe_f_05_05_1993_0		
Jane	DOE	Temale	03.03.1995		Jane_Doe_f_05_05_1993_1		
Jane	Roe	female	17.01.1986		Jane_Roe_f_17_01_1986_0		
Jane	Smith	female	21.06.1989		Jane_Smith_f_21_06_1989_0		
John	Doe	male	02.09.1977		John_Doe_m_02_09_1977_0		
John	Smith	male	04.08.1980		John_Smith_M_04_08_1980_0		

The regular expression is a text string built from predefined elements which are representing specific person data fields. The elements which can be used in regular expressions are following:

Regular expression	Meaning	Description
%a	Anything	Substitutes any character or the sequence of characters.
%n	Name	Name of the person containing letters or numbers.
%s	Surname	Surname of the person containing letters or numbers.
%g	Gender	Gender of the person defined by character f/F for female and m/M for male.
%d	Day of birth	Day of birth of the person defined by number without leading zero (1 - 31).
%D	Day of birth	Day of birth of the person defined by number with leading zero (01 - 31).
%m	Month of birth	Month of birth of the person defined by number without leading zero (1 - 12).
%M	Month of birth	Month of birth of the person defined by number with leading zero (01 - 12).
%y	Year of birth	Year of birth of the person defined by two-digit number (00 - 99).
%Y	Year of birth	Year of birth of the person defined by four-digit number (0000 - 9999).
%u	UID	Substitutes any character or the sequence of characters.

Example:

We have following filename list:

persons/wanted/Jan_Novák-25_01_89_M.jpg persons/wanted/Petra_Bosá-05_11_81_f.png persons/wanted /Zdeněk_Čermák-12_06_64_m.bmp persons/missing/Jiří_Zelený-10_11_42_M.png persons/missing/Žaneta_Udatná-18_02_01_F.jpg persons/other/Lenka-Rychlá-12_1_1969_ž.jpg persons/other/Šárka_Dobrá-07_09_75_f.jpg

Result for expression %a/%n_%s-%D_%M_%y_%g:

Name	Surname	Gender	Date of birth
Jan	Novák	male	1/25/1989
Petra	Bosá	female	11/5/1981
Zdeněk	Čermák	male	6/12/1964
Jiří	Zelený	male	11/10/1942
Žaneta	Udatná	female	2/18/2001
Šárka	Dobrá	female	9/7/1975

Decoding data for Lenka Rychlá's photo failed because its name does not correspond to the regular expression format even in several places: separating the name and surname with a hyphen instead of the underscore, January is written as "1" instead of the desired "01" form, the year is a four-digit, and the gender is written with unsupported "ž".



If there are multiple pictures for a single person, the user can easily group them. There are seven checkboxes that can be used to group photos together. The grouping is done in the cases when all the values from selected groups are identical. Example: In the previous picture two photos were assigned to Jane Doe, because parsed name and surname values were identical.

In the case when the user wants to edit the value, which was automatically parsed from the file name, it is possible by double-clicking the cell.

7.2 Export persons from database

The function **Export persons from database** is intended for creating the list of persons and their data from the database of the application EyeDentity, which is intended for further processing in other applications, alternatively for further re-import into the application EyeDentity. However, the function does not allow to export the image data from the database, it cannot be interchanged with backup of the database and data (see chapter 6).

The data of all persons in the database is saved to the CSV file after export, which is similar to the file for import from the chapter 7.1.2. The only difference is that the exported file contains the value *UID* instead of the value *Folder*.

cycochildy						
View Settings Help						
New project	Ctrl+N					
Open project	Ctrl+O					
Close project	Ctrl+W					
Manual face detection	Ctrl+M					
Recalculate descriptors						
Import to database	Ctrl+I					
Export persons from database	Ctrl+E					
Backup database						
Restore database						
Exit	Ctrl+Q					
	View Settings Help New project Open project Close project Manual face detection Recalculate descriptors Import to database Export persons from database Backup database Restore database Exit					

CueDentity

The exported values will be on the line in this order: UID, Name, Surname, UID, Age, Gender, Birth date, Birth place, Personal No., ID card number, Nationality, Address, Wanted, Height, Body, Hair color, Hair shape, Eye color, Note

Example:

If we export the following data:

Person 1						
Name:	Iva	Personal no.:				
Surname:	Kopecká	Nationality:	Finland			
UID:	e46as1d	Wanted:	unassigned			
Birth place:	Helsinki	Age:	23			
ID card number:	F2PO245IX2	Height:	168 cm			
Address:	Nádražní 62	Body:	thin			
	Bruntál	Hair color:	brownblack			
	792 01	Hair shape:	curly			
Note:		Eye color:	green			
Gender:	female					
Birth date:	5 th februar 1991					

The content of the exported CSV file is the following:

"e46as1d","Iva","Kopecká","e46as1d",23,f,05.02.1991,"Helsinki",/,"F2PO245IX2","Finland","Nádražní 62 Bruntál 792 01",0,168,"thin","brownblack","curly","green",""



8 Description of main features

8.1 Project

Analysis of input files in the EyeDentity application takes place through projects. The project file stores information about the location of the source file (video or photos) and faces detected by the application (referred to as tracks). The most time-consuming operation takes place only when the project is created, so opening an existing project is relatively fast.

Since EyeDentity version 1.3.2, the application allows manual detection of tracks – faces in the input file that have not been detected. This functionality is described in chapter 8.6.1.

8.1.1 Creating the new project

To process the digital image data with the application use the command File \rightarrow New project in the main menu. It is possible to process bitmap images of the type JPG, PNG, BMP, TIFF and GIF and the video files AVI, MPG, MP4 and MOV. The program supports all video codecs of the standard <u>ffmpeg</u>, i.e. the most of the known codecs¹.

🧕 New project		;
Source type:	File	○ Image folder
Source:		Select
Save project as:		Select
Date taken:	18 🗘	GPS:
12 🗘 : 51 🗘 :	59 ≑	
	_	

¹ In the case that it is necessary to process the video, which codec the program does not support, it is necessary to reencode the video before processing.



In this dialog box, it is possible to choose whether to process a single file (image or video) or an image folder (which folder may contain additional subfolders) using the **Source type** switch. Click **Select** button to select a specific file/folder.

Once the source is selected, the Save project as field is automatically filled in. You can change the name of the project in h5 format as well as its path by clicking on the corresponding Select button. The project file name should not contain non-ASCII characters. It is also possible to enter the Date of acquisition, the GPS coordinates where the record was made, and possibly a text Note.

🧕 New project						×
Source type:	File		🔿 Image fo	older		
Source:	C:/Users/Pub	lic/Documents/Eyel	Dentity/test-	video.mp4	Select	
Save project as:	C:/Examples/	EyeDentity/test-vi	deo.h5		Select	
Date taken: 8 • 1 • 201 16 • : 44 • : 2 Note:	8	GPS:		 ♥ ● 0.1 	000 \$ N 000 \$ E	•
		Start processir	ng			

Press the Start processing button to start the processing of data. The window Processing panel is opened, there you can see the progress of the task processing and there it is possible to end processing using the Cancel button.

🧕 Processing panel			-		×
test-image	100%	Open	Done	OK	
test-video	100%	Open	Done	ОК	
error-file	0%	Open	Error	ОК	

It is possible to load the results of processing into the application using the Open button, even if the project is not completely processed. In this case, it will show all findings up to now. After the processing completion is the project in the Processing panel highlighted in green.



In the case of the error the project is marked red. The project is removed from the list in the Processing panel using the OK button.

The project processing runs in the background. During processing it is possible to work normally with the application and also to create the new projects. The application can process up to 4 projects at once. Other projects are queued and are processed after the completion of the previous ones.

For displaying the video or image in the left part of the main window it is necessary that the input video or image is always available in the original location, for this reason it is suited to copy the data before processing in the folder, where the project will be saved.

The processing time depends on the length and the resolution of the input video or the number and the size of the input photographs, the total number of the faces included and the performance of the computer. The most time-consuming operation, which runs during processing, is the computation of the face descriptor. It takes on an ordinary PC several hundreds of milliseconds per face on CPU and units or tens of milliseconds per face on GPU (processing time depends on available computation power).

8.1.2 Open project

Processed projects can be opened either after completion of the processing from the Processing panel or using the item File \rightarrow Open project in the main menu of the program. New projects (from version 1.3.1) have the extension h5, but it is possible to open older XML project files as well – in that case the old project will be automatically transformed and saved in the new h5 format.

8.1.3 Recalculation of descriptors

By choosing File \rightarrow Recalculate descriptors, the input file will be processed from scratch, including track detection and descriptor computation (in fact, it corresponds to the creation of a new project with the same name and based on the same source). This option is particularly useful if the user cancels the processing of a new project but wants to complete it in the future. Recalculating descriptors also removes all manually detected tracks.



8.2 Work with found tracks

After opening the processed project from Processing panel or via File \rightarrow Open project is in the left part of the main window of the application displayed the view of the video/image with the marked detections of the faces and in the right part is the list of all detected tracks with the faces.



When clicking the detected track is this track displayed in the left part of the window in the context of the entire image, or in the context of the video, from which the track comes from. The individual tracks detected in the video can be also be viewed by clicking the colored bar in the control under the video view, that shows, where are the tracks detected in the input video. When you place the cursor on the location with the detected track, the image of the detected track is displayed.

[1167.9,174.9]		
Image settings 🔊 Save image	00:00:11/	• • •
Filename: C:\Users\Public\Document	ts\EyeDentity\	

The video can also be seeked using the slider under the video and using the buttons serving to move to the previous and the next picture of the video.

In the case that one image is processed, these controls are not displayed. If the image folder is processed, only the slider is displayed to move between the images and the buttons to move to the next or previous image.

Bounding box around the detected faces can be turned on or off using the item View \rightarrow Show all detections in the main menu in the preview of the video/image. Similarly, you can set highlighting of the active detection, (the detection that is selected in the right part of the window in the panel Detected tracks) in the main menu under the item View \rightarrow Show active detection.



For each detected track is displayed information to the track below the image of the track. The first line indicates the number of tracks, the second line shows the time when the track in the video begins. On the third line is written the gender of the person recognized by the detector (M for male, F for female and U if the detector is not able to estimate the gender) age of the person estimated by the detector and the number of the identity in square brackets. It can be the same on more tracks, if the detector determines that it is probably the same person.



Tracks that **can be matched with the database** and for which advanced recognition functions can be applied are **marked with a blue triangle** in the lower left corner (these tracks usually contain one or **more frontal faces** of the given person or were detected manually).

8.2.1 Filtering of found tracks according to the length

In the case of the video processing the program automatically combines the detections of one face in the consecutive video frames into the tracks, which can then be filtered by the minimal number of the frames in the track using the field Min. track length on the card Detected tracks at the bottom left.

8.2.2 Sorting of found tracks by gender, age and identity

The detected tracks can be sorted using the field **Search** at the bottom right. It can be sorted by the recognized gender of the person, the recognized age and the identity. The search function sorts the detected tracks so that at the beginning are the tracks corresponding to the entered search, and then follow all other tracks. Sorting is started by pressing the key **Enter** in the search field.

Sorting of found tracks by gender

When searching the detected tracks by the gender enter the letter M in the field Search, if you want to find the tracks, where the detector determines the gender male. Enter the letter F, if you want to display females. Enter the letter U, if you want to display the tracks, where is a small confidence of the gender classification.

Search in the detected tracks by age

When searching by the age enter the desired age (e.g. 25) in the field Search. The detected tracks are then sorted according to the difference of searched age from the age recognized by the detector. For example, if you enter to search the age 25, at first will be the tracks with the estimated age 25, then the tracks with the age 24 and 26, then the tracks with the age 23 and 27 and so on.

Search in detected tracks by identity number

During the detection of the tracks in the data are the found tracks mutually compared. If the detector determines that the identical person is on more tracks, all tracks have the same identity number. It is possible to search in the detected tracks by this number to determine whether more tracks belong to one person. When searching by the identity number the tracks of the given identity are displayed first and then the other tracks.



Eyedea Recognition, s.r.o.

8.2.3 Adding a track to an existing person

Using the command Add to existing person, it is possible to add the selected track to the person, which already exists in the database. Using the keys Ctrl and Shift it is possible to add more tracks to one person at a time. The dialog box of the person selection opens after selecting the menu entry, where it is possible to select the desired person, to which the tracks are added.

 Add to existing person

 Add to new person

 Add to new person

 Find similar in this project

 Export images

 Match with database

9 File	EyeDent View	tity - t Set	test-vide	:o Help										_		×
Pr	oject	Mate	ching with	n database	Pers	on datal	oase									
F	Search:															
	Fulltext:					Gende	r: not er	itered	•	ID card:						
	ID:					Wante	d: not en	itered	•	Nationality:	not entered		-	🧕 Search		
	UID:					Age:	from) 🗧 to	0 ≑	Personal No.:			/			
	Name:					Born:	0 . 6 cm [+/- 0	years	Body: no	t entered 🔻	Eye color: not er	tered 🔻	😂 Reset		
	Surriame					neight	. Irom [, 🛋 cu		tentereu 🔹	nair snape: not er	illereu 🔹			
F	hoto	ID	Name	Surname	UID	Age	Gender	Birth date	Birth place	Personal No.	ID card number	Nationality		Address		
	8		Jane	Doe	0	24	female	05/05/1993	Bangor	930505/0001	201711031993	United Kingdom	63 Hexham Ro	ad Wick BN17 4	GQ	
		2	John	Doe	4	40	male	02/09/1977	Norwich	770902/1955	20171103	United Kingdom	78 Lammas Str	eet Newcastle u	pon Thyne	e Cl
	3	}	Jane	Roe	1	31	female	17/01/1986	Leicester	861701/0005	201711031986	United Kingdom	86 Roman Rd I	eicester LE1 3DI)	
		ţ	Jane	Smith	2	28	female	21/06/1989	Eyeton	892106/0001	201711031989	United Kingdom	73 Whitby Roa	d Denio LL53 2Y	J	
		5	John	Smith	3	37	male	04/08/1980	Suffolk	800311/0001	201711031980	United Kingdom	88 Stone St Cra	anberry ST21 5G	N	
4																>
Di	splayed	5 of 5	persons										Open	🕂 Add	- Delete	2

In this dialog you can filter and sort the list of the persons in the same way as in the **Person** database (see chapter 8.5). Double-click to open the window with the details of the selected person. Click the OK button to add the selected track to the selected identity and confirm that the track is added to the selected person.

🧕 Add	Track to person X
?	Do you really want to add the track to selected person?
	Yes No

It is possible to cancel the addition using the No button.

Track previews that have been added to any person from the connected database are marked with a green tick in the lower right corner.





8.2.4 Adding a track to a new person

The found track can also be added to the newly created person. In this case the dialog for filling in the data for the new person is opened.

🧕 New person		× 🧕	New person	×
Info Tracks		Inf	fo Tracks	
	ID: UID:	(0))	🖶 Add photo
	Name:			
	Surname:			
	Personal No.: /	Gender: unknown 🔻		
	Born: 1 ‡ 1 ‡ 1990 ‡ Age:	0 🗘 🗹 Unknown <		>
	Place:	Tra	rack 0	
		Ge	Sender: female (99%)	
ID card:	Wantedi	Ag	kge: age: 32	
Nationality: unknown	▼ Usishtr	0 th cm	ime: 00:00:17.544 - 00:00:20.088	
	negrit.	So So	iource: <u>7 - test-video</u>	
Address:	Body: un	Da Da	ate 8 \$.1 \$.2018 \$	
	Hair color: un	known		
	Hair shape: un	known •	0 ÷ 0 ÷ 0.000 ÷ E •	
	Eye color: un	known	ote:	
Note:	Track's notes:		07.811	
				000
				000
				Nes Nes Nes Y
		Save Close		Save Close

8.2.5 Finding similar tracks in project tracks

It is possible to search the similar tracks in the detected tracks in the given project based on the visual similarity of the faces. For this purpose serves the item Find similar in this project in the context menu (see the image on page 8-48). It is possible to search for the similar tracks only in the tracks that contain the frontal views, these tracks are marked with a blue triangle on the bottom left. Only the frontal faces are displayed in the search results.

8.2.6 Export images

This option allows to save the cut-outs of all images of the selected track (the cut-outs with the faces, not original images) on the disk to the specified folder. The images are saved in a PNG format.





8.3 Working with the image

The following chapters describe how to work with the image displayed on the player.

8.3.1 Brightness and contrast adjustment of an image

Brightness and contrast of the displayed view can be adjusted in case of need by pressing the **Image settings** button at the bottom left.

Image settings		
Brightness: Contrast:		Reset
	OK Cancel	

The program remembers this setting also for the projects opened afterwards and also after closing the program. The **Reset** button serves for setting the default values.

8.3.2 Measurement in an image

When moving the cursor over the preview of the video/photograph on the left under the picture are the current coordinates of the cursor in the image. When clicking on the image a mark is added in this place and clicking the second point in the image the distance between these points in pixels is displayed below the image on the right. The third click deletes the measurement.



[70.6,413.6]

Distance: 726.4 px

8.3.3 Saving an image with detections

The current frame of the video or the image displayed in the left part of the window can be saved using the **Save image** button. The image will be saved as it is currently displayed, including the image settings and the displayed detections. The image can be saved in one of the formats PNG, JPG, BMP. The saving is recommended in the format PNG.



8.3.4 Keeping the aspect ratio / window customization

The size of the displayed photo or video is automatically adjusted to the size of the application window. By default, the aspect ratio is kept. Right-clicking on the player area and selecting the Fit to window option from the context menu fills the entire area of the player. Switch back to the original state by selecting the Keep aspect ratio option.

8.3.5 Zoom

You can zoom in or out the photo or paused video on the player by turning the mouse wheel while holding down the Ctrl key.

8.4 Matching of faces

The panel Matching with database is used for setting, to start the matching and to view the results afterwards. The panel is divided into four areas. On the left is the column with the List of tracks, on the right is the List of persons, at the bottom in the middle is the List of results and on top in the middle is the Pair of faces, that is currently selected. Matching is started using the Start matching button, the results are displayed afterwards. Deleting of the found results can be done using the Clear results button.



8.4.1 List of tracks

The left part of the panel Matching with database contains the List of tracks, that were found in the current project. The list is used both for the display of the found tracks and setting of the matching parameter, and viewing the results that belong to the individual tracks.



Tracks All tracks Selected tracks Selected tracks Remove all Track 2 (Projekt) age: 26 Gender: female (96%) Track 12 (Projekt) age: 32 Gender: male (99%) Track 7 (Projekt) Sort tracks by score The switch All tracks determines that all found tracks in the project will be included in the matching. On the contrary, the selection Selected tracks allows to include in matching only the subset of the found tracks in the matching. This speeds up the matching itself and also increases the clarity in viewing of the results.

The individual tracks in the list can be sorted in descending order according to the achieved score in the matching by enabling the switch **Sort tracks by score**. In the opposite case are the tracks sorted by the order in the project.

Right-click the selected track unfolds the drop-down menu



with the following options:

Show in project The selected track is marked and played in the list of faces in the tab Project.

8.4.2 List of persons

The right part of the panel Matching with database contains the List of persons, which are in the database. The list is used both for displaying the persons and setting the matching parameters, and viewing the results that belong to the individual persons.

The switch Whole database determines that all persons from the database will be included to the matching. On the contrary, the selection Database selection allows to include only the subset of the persons for the matching. This speeds up the matching itself and simultaneously increases the clarity in viewing the results.

The individual persons in the list can be sorted in descending order according to the achieved score in the matching by enabling Persons
Whole database
Database selection
Database selection

Database selection

Database selection

Database selection

Persons
Pers

Sort persons by score

the switch Sort persons by score. In the opposite case are the persons sorted alphabetically.

Right-click the selected person in the List of persons unfolds the drop-down menu

John	i Doe
male,	age: 40
Birth	Show person
Jane	e Smith
femal	e, age: 28

with the following option:

Show person	It displays the window with the card of the person from the database.
-------------	---

8.4.3 List of results

The panel Matching with database contains at the bottom in the middle the List of results. Here are shown the found results for the currently selected track/person sorted in descending order by the achieved score. The displayed results change based on the currently selected track/person.



In the case of the selection of the track from the List of tracks are the persons in descending order sorted by the achieved score with the selected track displayed in the List of results. Selecting the person from the List of persons the tracks are displayed in descending order sorted by the score with the selected person in the List of results.

8.4.4 Browsing the results

The results of the matching can be browsed both using a mouse and using a keyboard. When using the mouse is the selection from the List of tracks, the List of persons and the List of results done by left-clicking. The right-click allows to display the context menus.

In comparison with the mouse, using the keyboard enables faster browsing of the results, but it does not have the context menus for the individual elements. Browsing the List of tracks and the List of persons is possible using the keys up and down. Switching between the List of tracks and the List of persons is possible using the keyboard shortcuts Ctrl+left that activates the List of tracks, and Ctrl+right that activates the List of persons. The active list is marked with a blue frame. Browsing the results in the List of results is possible using the keys left arrow and right arrow.

8.4.5 A pair of faces

The panel Matching with database contains on top in the middle the pair of the currently selected faces. Here are shown the cut-outs of the found and matched faces. The displayed pair of faces changes when selecting the result in the List of results. On the left is the image from the matched track, on the right is the image of the matched person from the database.





Save PDF

The pair of faces can be displayed/hidden using the selection Show matched pair. The List of results extends, and more space for the result thumbnails is created.

🛢 EyeDen	tity - test-video			- 🗆 ×
ile View	Settings Help			
Project	Matching with database	Person database		
Tracks	•	Show matched pair	Save PDF	Persons
	دلط تعمل: دلط تعمل: Track 2 (Projekt) (Projekt) Track 2 (Projekt) (Projekt) (Projekt) (Projekt) (Projekt) (Projekt) Track 3 (Projekt) (Pro	0.84 0.71		 (i) Olde database (i) Database selection (ii) Ennore all (iii) Ennore all (iiii) Ennore all (iiii) Ennore all ennore all
	age: 52 Gender: male (99%)	v	>	
Sort	tracks by score	Start matching Clear results	3655 pairs matched	Sort persons by score

8.4.6 Saving results to PDF

Uložit PDF The results obtained from the matching can be saved to a file in PDF format. There are three saving options as a choice, which vary according to the results, which are included in the file. It is possible to save Currently selected pair in matching results, First 50 results in currently selected track/person and Results with highest score in first 50 tracks.

Save PDF	Х
Select data to save to PDF:	
 Currently selected pair in matching results 	
O First 50 results in currently selected track/person	
○ Results with highest score in first 50 tracks	
OK Cancel	

Currently selected pair in matching results

When selecting this option, the currently selected pair of matching is saved in the file. This can be determined by selecting the appropriate track/person from the List of tracks/List of persons and subsequent selection of the result from the List of results.



10/8/2018 12:32:01

First 50 results in currently selected track/person

The mentioned selection allows to save the first 50 results sorted by the score. The group of the results, from which it is selected, is determined by the active track/person from the List of tracks / List of persons.

Results with highest score in first 50 tracks

With this option are always saved the first best results from the first 50 tracks sorted in descending order by the highest achieved score in the PDF file.

8.5 Person database

It is possible to create and manage the person database in the program, that can contain up to several thousands of records. It is possible to search easily in this database, or to filter it by the individual fields.

D: Wanted: Instendered Nationality: Instendered Image: frame		👻 🧕 Search						not er	Genue				с	
UID: Age: from 0 0 0 0 0 Personal No. I / <</th <th></th> <th></th> <th></th> <th>not entered</th> <th>Nationality:</th> <th>•</th> <th>ntered</th> <th>ed: not er</th> <th>Wante</th> <th></th> <th></th> <th></th> <th></th> <th>D:</th>				not entered	Nationality:	•	ntered	ed: not er	Wante					D:
Name: Born: 0 2 +/- 0 2 years Body: Instended V Spic color: Ind entered V Suname: Height: from 0 1 0 <th></th> <th>/</th> <th></th> <th></th> <th>Personal No.:</th> <th>0 ≑</th> <th>0 ≑ to</th> <th>from</th> <th>Age:</th> <th></th> <th></th> <th></th> <th></th> <th>JID:</th>		/			Personal No.:	0 ≑	0 ≑ to	from	Age:					JID:
Sumame: Image: Top (and the second seco		itered 🔹 😂 Reset	Eye color: not en	t entered 🔹	Body: no	years	+/- 0	0	Born:	_			Ļ	lame:
Ib Name Summer UID Age Gender Bitth place Personal No. ID Card number Nationality Address 1 Jane Doe 0 24 female 05/05/1993 Bangor 930505/0001 201711031993 United Kingdom 63 Hesham Road Wick BN17 2 John Doe 4 40 male 02/09/1977 Norwich 770902/1955 20171103 United Kingdom 78 Lammas Street Nevocstlt		itered 👻	Hair shape: not en	t entered 🔹	Hair color: no	0 🖃 cm) 🖃 to [t: from	Height				ne:	Surnan
1 Jane Doe 0 24 female 05/05/1993 Bangor 930505/0001 201711031993 United Kingdom 63 Hesham Road Wick BN17 2 John Doe 4 40 male 02/09/1977 Norwich 710902/1955 20171103 United Kingdom 78 Lammas Street Newcestle	ess	Address	Nationality	ID card number	Personal No.	Birth place	Birth date	Gender	Age	UID	Surname	Name	ID	hoto
2 John Doe 4 40 male 02/09/1977 Norwich 770902/1955 20171103 United Kingdom 78 Lammas Street Newcastle	7 4GQ	63 Hexham Road Wick BN174	United Kingdom	201711031993	930505/0001	Bangor	05/05/1993	female	24	0	Doe	Jane	1	8
	le upon Thyne	78 Lammas Street Newcastle	United Kingdom	20171103	770902/1955	Norwich	02/09/1977	male	40	4	Doe	John	2	S.
3 Jane Roe 1 31 female 17/01/1986 Leicester 861701/0005 201711031986 United Kingdom 86 Roman Rd Leicester LE 1	3DD	86 Roman Rd Leicester LE1 3D	United Kingdom	201711031986	861701/0005	Leicester	17/01/1986	female	31	1	Roe	Jane	3	3
4 Jane Smith 2 28 female 21/06/1989 Eyeton 892106/0001 201711031989 United Kingdom 73 Whitby Road Denio LL53	3 2YJ	73 Whitby Road Denio LL53 2	United Kingdom	201711031989	892106/0001	Eyeton	21/06/1989	female	28	2	Smith	Jane	4	3
	5GW	88 Stone St Cranberry ST21 50	United Kingdom	201711031980	800311/0001	Suffolk	04/08/1980	male	37	3	Smith	John	5	
5 John Smith 3 37 male 04/08/1980 Suffolk 800311/0001 201711031980 United Kingdom as stone st Cranberry S1215														

It is possible to sort the database records by clicking the header of the appropriate column. At the first click the records are sorted in ascending order, at the second click in descending order and then is the direction of sorting switched over and over.

8.5.1 Search in the person database

The search field for all items in the database are permanently displayed at the top of the perons database table. Between search terms in the individual fields is a logical conjunction "and", it means that all conditions must be valid together. For example, if we enter into the search the Name Jan and the Surname Novák, after the press of the Search button are found all persons, who are named Jan Novák, but not e.g. Jiří Novák or Jan Svoboda.

Zero in the fields Age, Born and Height indicates that the search by this field is turned off.

In the text fields it is possible to search by entering the initial letters, e.g. when entering the name "Vladi" the program finds the persons named Vladimír, Vladislav, Vladislava, …. But this works only for the initial letters, it is not possible e.g. to enter to the field name "mír" and to expect that the program finds the persons named Vladimír, Jaromír, and similar.

The field Fulltext is used to search in all text fields at once. These are the fields Name, Surname,



UID, ID card number, Address, Birth place, Personal No., Note and Notes in the tracks.

8.5.2 Adding a new person to the database

A new person can be added to the database using the Add button directly on the Person database tab. After pressing this button, a blank card of the person is displayed.

On this card, it is possible to fill in all the required information and to add it to the database using the Save button. The person's picture can be uploaded by pressing the Add photo... button on the Tracks tab (for details see chapter 8.5.4).

An alternative way to add a new person to a database is to create a new project with photos of the person concerned. Then select Add to new person from the detected track context menu (for more details see chapter 8.2.4).

rito Traos					
6	ID: Name: [Sumane: [Personal No.: [D: Gender:	unknown
J	Born: Place:	10 10	1990 🗘	Age: 0 0	Unknow
ID card:		•	Wanted: Height: Body: Hair color: Hair shape: Eye color:	unknown 0 🐑 a unknown unknown unknown unknown	•
Note:		Track's n	otes:		

8.5.3 Removing a person from the database

🧕 Delet	e Person X
	Do you really want to delete current person? 4 - John Smith
	Yes No

To remove a person from the database user can use the **Delete** button at the bottom right of the window that will remove the selected person. Using the keys **Ctrl** and **Shift** can be selected and deleted more persons at once. A confirmation dialog is displayed before removing. The person is removed from the database and cannot be restored in any way after the confirmation.

8.5.4 Editing a person

Editing a person saved in the database can be done by opening the window with details of the person and either double-click the given person or by using the **Open** button.

Click the **Edit** button to make available editing in all fields. Information about the person can be edited in the tab **Info**. The assigned tracks and images can be modified in the tab **Tracks**.

Jane Doe (1)			×	🧕 Jane	Doe (1)	
fo Tradis				Info	Tracks	
	ID:	1	UID: 0	Jane Doe	(1)	
21 224	Name:	Jane				
	Sumarre:	Doe		N R		
3 3 6	Personal No.:	930505 / 0001	Gender: female *			
15	Born:	5 0 5 0 1993 0	Age: 24 C Unknown	1		
	Place:	Banpor		Track 1		
				Gender	: female (99%)	Images:
	-			Age:	age: 24	
D card: 201711031993		Wanted:	wanted ~	File:	C:/Users/Public/Pictures/IdenSty/mages Users Doe F 05 05 1993 0.ono	
lationality: United Kingdom		* Height:	165 ¢ cm	Time:	-	1
Address: 63 Hexham Road Wick BN 17 4GD		Body:	sim 👻	Source	1 - ImportD8 2018-04-05 03-18-13-998	
		Hair color	black v	Date	18 🔄 9 🔹 2017 🗢	
		Hair shap	e: straight 🕆	taken:	12 0 20 0	
		Eye color	brown 👻	GPS:	0 2 0 2 0.000 N *	
(ata)		Transfer materia			0 🔄 0 🔄 0.000 🗢 E 💌	
AD IE1		Track s hotes.		Note:		
			Edit Close			Save

To find the face in one photograph and then add a track to the displayed person the button Add photo... can be used. If the face will be detected in the photograph, it will be immediately loaded among the tracks of the person. To save this track to the database, it is necessary to save the whole person using the button Save.



Selecting a track from the list displays all relevant images and also the information obtained from the face detector and the source project at the same time. It is possible to save a note and GPS coordinates to each track.

Track 1		
Gender:	female (99%)	Images:
Age:	age: 24	
File:	<u>C:\Users\Public\Pictures\Identity\images</u> \Jane Doe f 05 05 1993 0.png	
Time:	-	1
Source:	1-ImportDB 2018-04-05 03-18-13.498	
Date taken:	18 ‡ .9 ‡ .2017 ‡ 12 ‡ :10 ‡ :20 ‡	
GPS:	0 💠 0 💠 0.000 🗘 N 🔻	
	0 💠 0 💠 0.000 🗘 E 🔻	
Note:		
		×

Clicking on the linked source opens a window with detailed information about the source itself (which can be either a project, or an import). It includes the type, name, source file name, date of taking, date of insertion and editable note.

The brightness and contrast of the image can be changed by double-clicking on individual track images. This setting is saved when the **Save** button is pressed, and the image will be displayed on the **Tracks** tab with adjusted brightness and contrast.

9 Source 1 - ImportDB_2018-04-05_03-18-13.498	×
ID: 1	Type: Video
Name: ImportDB_2018-04-05_03-18-13.498	
File: csv-import-test.csv	
Date taken: 5.4.2018 03:18:13	Date created: 5.4.2018 03:18:13
Note:	
Import to database at 04/05/2018 03:18:13.498 5 persons imported. 5 images processed.	
	Save Close



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On the **Tracks** tab, you can also delete the selected track by pressing the **Delete** key or by selecting **Delete** from the context menu by right-clicking the track image.

Similarly, you can delete

selected images from the track using the right-click contextual menu or by pressing the **Delete** key. Any image from the track can also be set as the preview of the person using **Set as photo of person** in the context menu.



8.6 Manual detection

If our face detector could not find a face on the image, it is possible in some cases to add significant points on the face manually. Once entered, the person can be identified automatically as if added by the detector itself.

The Manual detection window can be displayed in order to add a project track, it will also be automatically displayed when detection fails when importing to a database or adding an image while creating / editing a person in the database. All three cases are discussed in more detail below.

8.6.1 Track detection

If the application does not detect a face in the input file when creating a project, it can be marked manually using the File \rightarrow Manual face detection option.



The user is asked to enter these seven points in the dialog window: Right canthus of person's right eye, left canthus of person's right eye, right canthus of person's left eye, left canthus of person's left eye, person's nose tip, right corner of person's mouth and left corner of person's mouth. The selected points are highlighted with a red dot. In the lower right corner of the picture there is a small blue face with a red mark indicating the point to be labeled.

For more precise selection, you can zoom in with the mouse wheel while holding the Ctrl key. It is recommended to mark the points very carefully as it affects the quality of the subsequently calculated face descriptor.



After selecting the last point, the face is marked with a red square and you can press the Save button to compute the descriptor and save the track. Note that in the case of a video, a manually detected track always has a length of one image, so it is necessary to change the Min. track length to 1 to show that track on the Detected tracks tab.





8.6.2 Importing to database

After the import is done, information message will appear on the screen, in the upper area there will be information summarizing how many tracks and persons were added to the database, in the lower area, there will be list of errors. User can double click on any of those, that say "no detection".



After that the Manual detection window with selected image appears. The user is asked to mark seven points in the same way as for the track detection. When the Save button is pressed, the previous window is displayed again with the green background for the resolved image.

🧕 Import finished	?	×
Import to database was successful. 85 persons a 84 tracks were imported.		
Encountered errors: "no detection".		
Person ID: 885 (Joshua Smith) Image: C:/Users/ /Pictures/f/Joshua_Smith_1.jpg Error: no detection		
Double dick on "no detection" to resolve.	C	Ж

8.6.3 Adding a photo while creating/updating a user

In this case only window for manual detection will be displayed, the process of marking facial features is exactly same as described in 8.6.2.



9 Program settings

9.1 Language change

The application EyeDentity allows switching the display language from the version 1.1.1. This can be done in the main menu in the Settings \rightarrow Language. Currently, the application supports Czech and English language. After selecting the relevant language, application will be restarted with the selected localization.



9.2 Computing device change

Since version 1.3.0 it is possible to change the computing device. The processor (CPU) or one of supported graphics cards (GPU) can be selected. The user can change the computing device through menu Settings \rightarrow Computing device. Graphics cards supporting CUDA® 8.0 and higher can be used. For a successful change to GPU it is necessary to have a valid license for the GPU computation. If a valid license is not available or if there's any other issue, the application will roll back to the CPU computation.

🧕 EyeDenti	ty
File View	Settings Help
Project	Language
	Database settings
	Computation device CPU
	GPU 0 GeForce GTX 960
	Max. matching results 50.00 Remore GEForce GTX 960 Memory: 4096
	Min. matching score 0.50 Free memory: 3406 Cuda driver: 9.1

9.3 Database settings

The dialog Database settings allows to set the database location and other options. The item Database determines which type of SQL server will user connect to - for the right settings please contact your Database Administrator.

🧕 Database settings 🛛 🗙
Database: O Microsoft SOL PostgreSOL
● local Server: ○ remote 127.0.0.1 Port: 5432 €
Login: postgres Password:
Database name: eyedentity
Reset Save Cancel



The item **Server** determines where the database is located. In the default setting it is local (installed on the same computer as the application). The item **Port** determines using what port it is possible to access the database. In the default setting is PostgreSQL installed on the port 5432. The field **Database name** determines, to which database the program will connect. If the entered name of the database does not exist, its creating is offered subsequently. The database name can contain only small letters, digits and underscore character.



Insertion of test data for the first test of the application functions is offered after the database creation.



Using the database name, it is possible to have more different databases of the persons on one computer and to switch between them by changing the database name.

After editing it is necessary to save the changes using the **Save** button, or alternatively it is possible to close the dialog without saving of the performed changes using the **Cancel** button. **Reset** button allows resetting the default values. With that the application will work, if these values were not changed after installation.

9.4 Matching settings

The item Max. matching results determines, how many results at most will be shown in the tab Matching with database after pressing the button Start Matching. The item Min. matching score determines the lowest possible score for the result to show.



10 Technical details

10.1 Possible harddrive writes

Application **Eyedentity** during its run sometimes needs to write to the computer's harddrive, because in some cases it can be handy to know during which operation and where the program writes, we provide you with this short summary.

The program continually maintains information about its settings so it can be used again after it is restarted. Therefore there is a configuration file in C:\Users\\$USER\AppData\Local\EyeDentity folder where \$USER indicates the name of the logged-in user in Windows. Internal temporary files of EyeDentity can also be found in this folder.

The location where the project file will be saved in the h5 format is chosen by the user when the project is created. Optional is also the location of all exported data, whether images, export / backup of database or PDF file with comparison results.

EyeDentity does not write into any other location apart from those mentioned above and the person's database.

10.2 How to create person Microsoft SQL Server database

This guide is for Microsoft SQL Server Administrator,, because the specific privileges are needed to create the new database. After creation of database with desired name, it is neccesary to execute two C:\Program Files\Eyedea SOL files from the folder DB in installation path Recognition\Eyedentity, create_tables_microsoft.sql names of those files are and insert_values.sql, please execute them in this order.

The execution can be done using the Microsoft SQL Server Management Studio 17, after the connection to the database, open the file named create_tables_microsoft.sql, you can open the files with keyboard shortcut Ctrl+O, and then press F5 or Execute button, same steps should be used to execute the second file.

10.3 How to update person Microsoft SQL Server database

This guide is for Microsoft SQL Server Administrator. If the person database has been created for EyeDentity version 1.2.1, it is necessary to update it to support the version 1.3.0. In the installation folder (e.g. C:\Program Files\Eyedea Recognition\Eyedentity) in the subfolder db/, a file update_1.2.1_to_1.3.0_microsoft.sql can be found. This file must be loaded into the database, in the way it is described in the Chapter 10.2.



10.4 How to move PostgreSQL database data

This guide describes, how to move PostgreSQL data, that are used by EyeDenity, into a new location in the file system.

Before you continue, we strongly suggest to backup your database (see chapter 6.1)

- 1) First of all start the Task Manager and open the Services tab. In the list of services find PostgreSQL database service, it's usually named *postgresql-x64-<VER>*, where *<VER>* denotes a version number of the database server. There can be several database servers installed, which can be distinguished by their version. Each version has its own data directory, so the user has to find and select the correct data folder to move.
- 2) Before we can continue we have to stop the selected service *postgresql-x64-<VER>*: right click the service and select the action **Stop**.

Processes Performance Ap	pp history	Startup Users Details Services			
Name	PID	Description	Status	Group	
🖓 postgresql-x64-15	3784	postgresql-x64-15 - PostgreSQL Server 15	Running	0	
		and an an an an an an an an an	Name and Address of the Owner o	Ston	
	-		Territory.	Restart	
	-	Name Concession and South Advances Name Concession - March South Advances		Open Services Search online Go to details	
		Valet op Kalender Salet Valet og Valet og Salet Valet og Valet og Salet Valet og Valet og Salet og Salet og Valet og Salet og Sa			

3) After the service was successfully stopped, start the program regedit (Start \rightarrow search regedit \rightarrow press Enter). The Register Editor window appears. In the upper part of the window is the address input line, insert the following address (you can also use the tree structure in left part of the window):

 $Computer HKEY_LOCAL_MACHINE SYSTEM CurrentControlSet Services postgresql-x64-<VER>. Replace the string <VER> with the correct version number of PostgreSQL database.$

4) In the right part of the window choose the value ImagePath and double-click it with left mouse button. A dialog appears where the chosen value can be editted. The path to database data is located in the string after parameter -D surrounded by quotation marks. Change the original address (usually *C:\Program Files\PostgreSQL\<VER>\data*, *<VER>* is the version number) to a new location (for example: *D:\PostgreSQL\15\Data*).



Registry Editor			- 🗆 X
File Edit View Favorites Help Computer\HKEY LOCAL MACHINE\SYS	TEM\CurrentControlSet\Ser	vices\postaresal-x64-15	5
postgresql-x64-15	Name (Default) DependOnService Description DisplayName ErrorControl ImagePath DiplectName Start Type	Type REG_SZ REG_MULTI_SZ REG_SZ REG_DWORD REG_EXPAND_SZ REG_SZ REG_DWORD REG_DWORD	Data (value not set) RPCSS Provides relational database storage. postgresql-x64-15 - PostgreSQL Server 15 0x00000001(1) "C:\Program Files\PostgreSQL\15\bin\pg_ctl.exe" r NT AUTHORITY\NetworkService 0x00000002 (2) 0x00000010 (16)
	Edit String Value name: ImagePath Value data: Iti.exe" runser	vice -N "postgresqlx64-1	X 5" -D "D\\PostgreSQL\15\deta" -w OK Cancel

- 5) Confirm the new location by clicking the OK button and close the **Register Editor**. Open the **File Explorer** and find the original location, where the data is still located (as mentioned before, it is usually *C:\Program Files\PostgreSQL\<VER>\data*, *<VER>* is the version number).
- 6) There select all directories and files and move them into the new location (the one chosen in the steps above, for example: D:|PostgreSQL|15|Data).
- 7) When the copying is done, run the Task Manager again and open the Services tab. Find the service *postgresql-x64-<VER>* again, the one which was previously stopped, right-click it and select action Start. After the service successfully starts, the database server is ready to use.

2 12 2	2.220			
Processes Performance	App history	Startup Users Details Services		
Name	PID	Description	Status	Group
ostgresql-x64-15		postgresql-x64-15 - PostgreSQL Server 15	Stopped	Start
				Stop
<u>i</u>			Sector Sector	Restart
<u>Q</u>		Free Second and Soll about	Transmitt .	Onen Senvices
9		The second se	The support	Search online
		Production and Products		Go to details
ġ,				-
ġ,		And States and the Second	(magazite)	terrolder contra
ġ,		Manuals Income Name Income Strength	(Incase of Control of	10000
ġ,		Receipt Income Connection (Manager	(Annual of the second s	10010
<u>Q.</u>		Reality, and Records, Science,	The second se	10000
9		Name of Congress	The second se	
		The second second	and the second second	and the second s
				and the second se
		And the second sec		

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11 Known issues

11.1 PostgreSQL failes to run

After Windows 10 Fall Creators Update (KB4041994) installation, the czech localization in Windows 10 was renamed from Česká Republika / Czech Republic to Česko / Czechia. Because the PostgreSQL refers to the old localization name, the database server fails to run after this update. For this case, here is a workaround.

- 1) Download and install the Locale Builder 2.0 application from Microsoft web page (https://www.microsoft.com/en-us/download/details.aspx?id=41158).
- 2) Run Locale Builder (Start menu \rightarrow find Locale Builder \rightarrow press Enter).
- 3) Initial screen is displayed. Select Create a custom locale from an existing locale option and from the Based on field select Czech (Czechia) [cs-CZ].

Click Next.

Locale Builder		>
ile Edit Build	Tools Help	
Create a custom	locale from an existing locale	Preview of cs-CZ Name:
Based on:	Czech (Czechia) [cs-CZ]	 čeština (Česko)
	* Custom locale	Dates:
New locale name:	cs-CZ	07.05.2018 pondělí 7. května 2018 Gregorian Calendar (Localized)
) Open a custom k	ocale from an LDML file	Time: 1:23:45
DML File:	Brov	Numbers:
		12 345 678,90 -12 345 678,90
		Currency:
		12 345 678,90 Kč -12 345 678,90 Kč
		Next

4) In the English names region set Display name field to *Czech (Czech Republic)* and Region name field to *Czech Republic*. In Native names region set Display name field to *čeština (Česká republika)* and Region name field to *Česká republika*.

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The resulting setting should look the same as the picture below.

ile <u>E</u> dit <u>B</u> uild <u>T</u> ools	<u>H</u> elp		
Locale formats	Names for your	ocale, your locale's region, and your locale's language	
<u>N</u> ames	Locale Names ISO	Other Standards	
N <u>u</u> mbers	Locale and parent lo	ocale name	
Currency	New locale name:	cs-CZ	
jime	Parent locale	Czech [cs]	~
<u>M</u> onth names			
<u>D</u> ay names	Specific locale:	Czech (Czechia) [cs-C2]	~
D <u>a</u> tes	English names		
le <u>x</u> t	Display name:	Czech (Czech Republic)	
L <u>o</u> cale signature	Region name:	Czech Republic	
Help	Language name:	Czech	
Names for your locale, your locale's region, and your locale's language.	Native names Display name: Region name: Language name <u>:</u>	Čeština (Česká republika Česká republika čeština	

5) From the main application menu select Build \rightarrow Build Locale Installer. Installer dialog box appears. Save the installer to the selected location.

e Edit	Build Tools	Help			
Locale form	Build Loca	le you	r locale, your locale's region, and your locale's language		
Names	Build Loca	le Installer	O Other Standards		
Numbers	Build Zip B	latch File	it locale name		
Currency	irrency New locale		e cs-CZ		
lime		Parent locale	Czech [cc]	~	
Month names		Casalita la salar	Credu (Credu) (n. 67)		
2ay names		Specific locale:	Czech (Czechia) [cs-CZ]	~	
Dates English nam		English names			
Te <u>x</u> t Disr		Display name:	name: Czech (Czech Republic)		
L <u>o</u> cale signature		Region name: Czech Republic			
lelp		Language name: Czech			
Names for y	our locale,				
our locale's	s region, and	Native names			
our locale :	anguage.	Di <u>s</u> play name:	čeština (Česká republika)		
		Region name:	Region name: Česká republika		
		Language name: Čeština			

6) The installer is created and saved to the selected location.

Now you can close the Locale Builder application.

Locale formats	Names for your	locale, your locale's region, and y	our locale's language	
<u>N</u> ames	Locale Names ISO	Other Standards		
Numbers	Locale and parent le	ocale name		
Currency	New locale name:	cs-CZ		
Iime	Parent locale:	Czech [cs]		~
Month names	Specific locale:	Czech (Czechia) [cs-C7]		~
Day names				0.36
D <u>a</u> tes	Engli Locale Builde	er - Build Complete		
Te <u>x</u> t	Disg			
L <u>o</u> cale signature	Reg Build comp	leted successfully.		
Help	Lan	OK		
Names for your locale, your locale's region, and	Native names			
your locale's language.	Display name:	čeština (Česká republika)		
	Region name:	Česká republika		
	Language name <u>:</u>	čeština		

- 7) Run and install the installer created in the previous steps. After the installation is finished, run Task Manager and open the Services tab. From the list find the PostgreSQL database service (its name is *postgresql-x64-<VER>* where *<VER>* stands for version number of the database server).
- 8) Right-click the PostgreSQL database service and from context menu select Start. Once the service is restarted, the database server is ready for use.

11.2 Corrupted layout on high DPI displays

If you use EyeDentity version 1.3.0 (or older), and in Windows Display settings other value than 100% is set for Change the size of text, apps and other items (which is common especially for high resolution / DPI displays), the application layout may be corrupted:



In that case we recommend the following workaround. Open the Start menu and find and run Edit environment variables for your account. In the User variables section, click New..., fill in both fields as follows and confirm OK.

Variable name: QT_AUTO_SCREEN_SCALE_FACTOR Variable value: 1

In order for the settings to take effect, you must log out and in again to Windows.

Beginning with EyeDentity version 1.3.1, this environment variable is automatically set during installation, so serious problems with the application display should no longer occur.



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