



Privacy Keeper

Manual
version 0.25.9

**Automatic blurring of
faces and number plates
with your own Windows PC**

500.000 photos/day

Privacy Keeper 0.25.3 - Blur

Interface Languages Preferences Help

Blur Automatically

Project folder
F:\in\Demo3 Select Project

Output folder
F:\in\Demo3-blurred Select Output

Detector
Standard

Apply optional manual blumings:
-

Statistics

Processed: 248 / 873

Progress: 28.41 %

Faces blurred: 5

Number-plates blurred: 130

Time per photo: 0.17 s

ETA: 11:03:07 AM, 2018-06-25

Finishes in: 00:00:01:46

Performance: 508,000 photos/24h

Stop Review Open Output folder

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1. Main Features

1.1 The Law

A good starting point for an overview of the law can be found here:

[GDPR - General Data Protection Regulation](#)

[Wikipedia: Street View privacy concerns](#)

1.2 Blurring

- Blurring helps you to comply with privacy protection laws.
- Processing in your own office helps to comply with data protection laws.
- Processing in your own country helps to comply with export restrictions.

1.3 Performance

- Blurs 500.000 5MP photos in 24 hours.
- Detects approx. 94+ percent of faces.
- Detects approx. 96+ percent of number plates.

1.4 Extras

- Pre-trained Detector that works for many countries.
- Multi-Language: English, German, Russian.
- Optional: Training: Add Detectors made by yourself from your own data.
- Optional: Export trained Detectors to Privacy Keepers running on additional PCs for even faster processing.

2. Recommended Hardware

2.1 Testing

Any 64-bit Windows 10 PC will work.

Estimated performance: Slow.

2.2 Production

Recommended:

- 64-bit Windows 10 PC
- NVIDIA GTX 1080 graphics card with 8GB VRAM
- 16GB RAM
- 250GB SATA SSD for Windows
- 2TB HDD for the data

Estimated performance: App. 500.000 photos in 24 hours.

3. Download and Install

3.1 Privacy Keeper

Download and Install

<http://www.applied-streetview.com/privacy-keeper/>

3.2 This Manual

This Manual is available as a .pdf file in the **Help - Manual** menu.

And at:

<http://www.applied-streetview.com/privacy-keeper/>

3.3 Demo Data

To start with an existing project and markings click on **Help - Download - Demo Project** and **Help - Download - Demo Data**.

Unzip **Rtk2018-Bahnstrasse.zip**

Then go to **Process - Train - Mark** and click **Markings - Import**.

In **Select markings file** specify the path to **Rtk2018-Bahnstrasse-Markings.zip**.

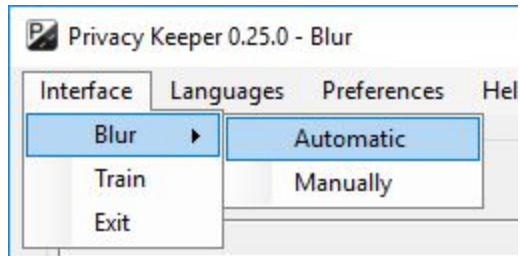
After the markings are imported go to **Markings - Open**,

for **Markings** select Rtk2018-Bahnstrasse-Markings

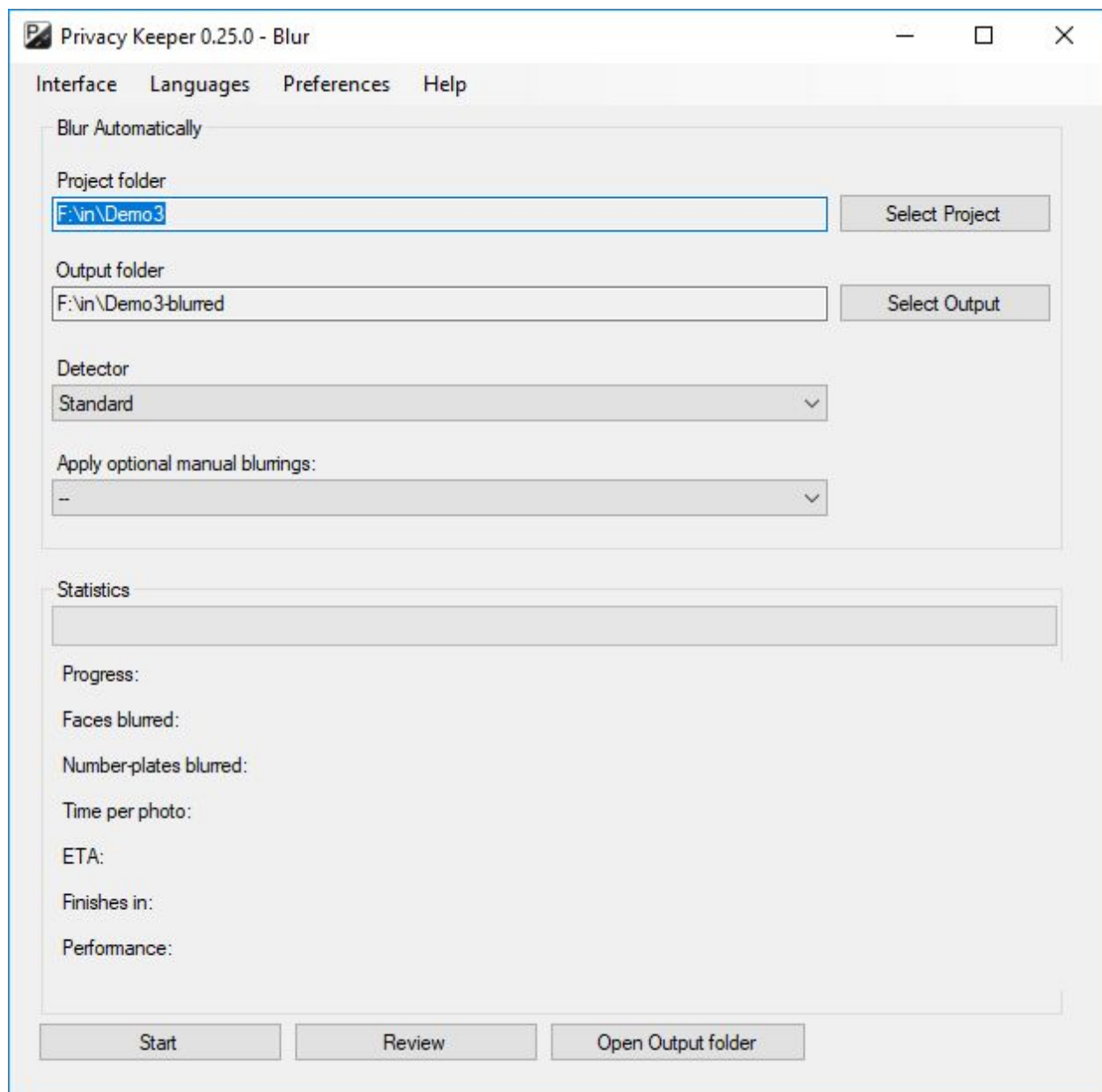
and for **Project Folder** select the unzipped folder of Rtk2018-Bahnstrasse.zip.

4. Blurring

4.1 Automatic blurring



Select a **Project folder**, an **Output folder** and a **Detector**.
Click **Start**.



Review

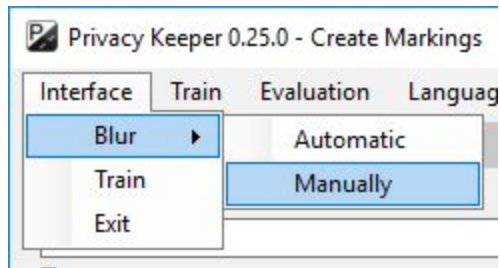
After **automatic blurring** has completed, click the **Review** button to check the result. Mark missed areas manually. Apply with the **Apply Manual blurring** button. In case you process again, use **Apply optional manual blurrings** for all your manual blurrings.

When done, process as usual with the [Creator](#) program.

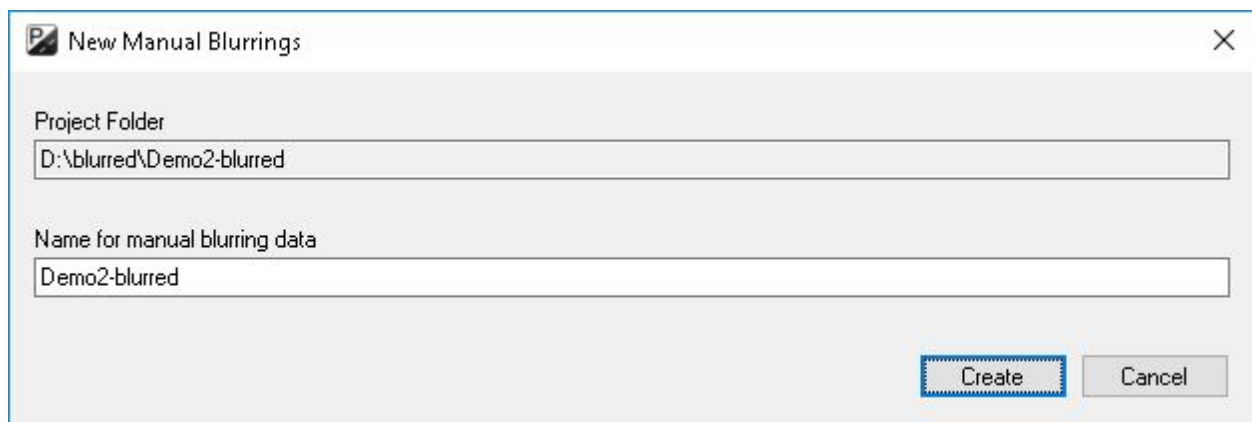
4.2 Manual blurring

Manual blurring can be used if automatic blurring failed to identify some of the heads or number plates. Another use case for Manual blurring is to blur something not covered by the detector at all.

After Automatic blurring is finished, go to **Interface - Blur - Manually**.



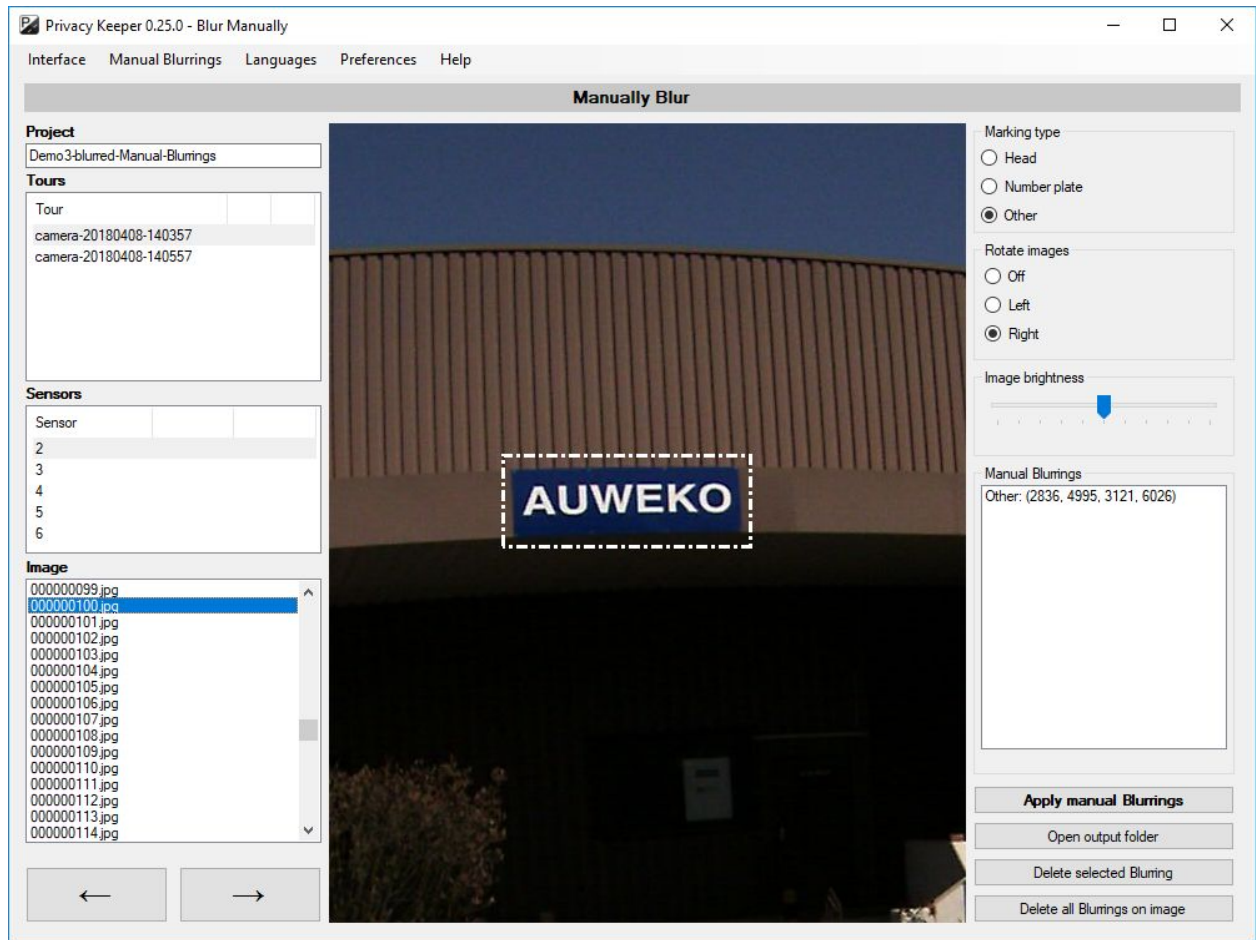
If this is the first time you are accessing Manual Blurrings for this project, you will be prompted to create them.



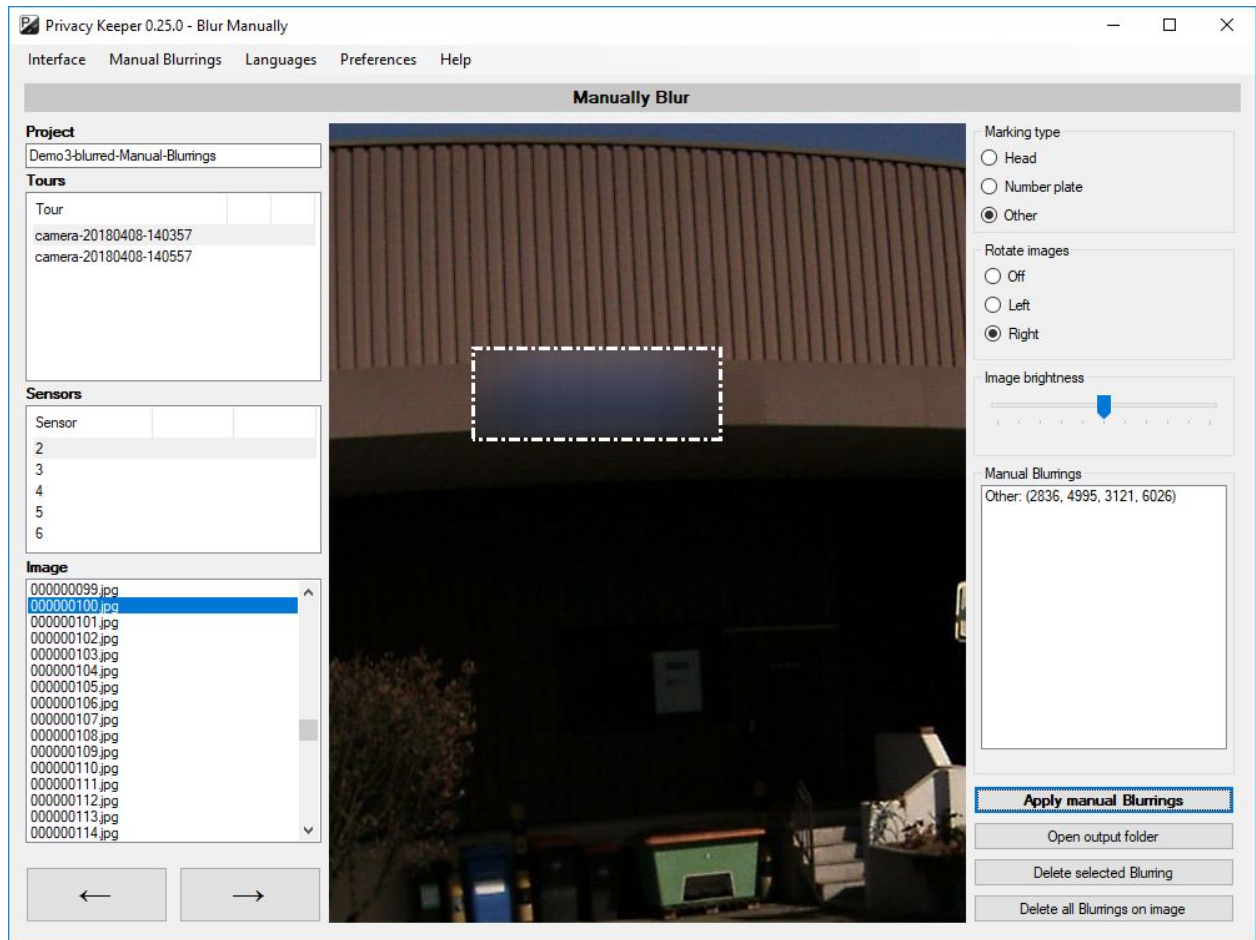
After opening/creating a new Manual Blurring project - **Manually Blur** page should be opened. The tour folders will be on the left side. Select a tour and a sensor on the left to start marking.

Select marking type based upon the object you are trying to blur: head, number-plate, other.

After identifying the area which needs blurring, mark it by clicking and dragging on the image.



When done marking the whole project, click on **Apply manual Blurrings**.



Open output folder

Open the project folder in Explorer.

Delete selected blurring

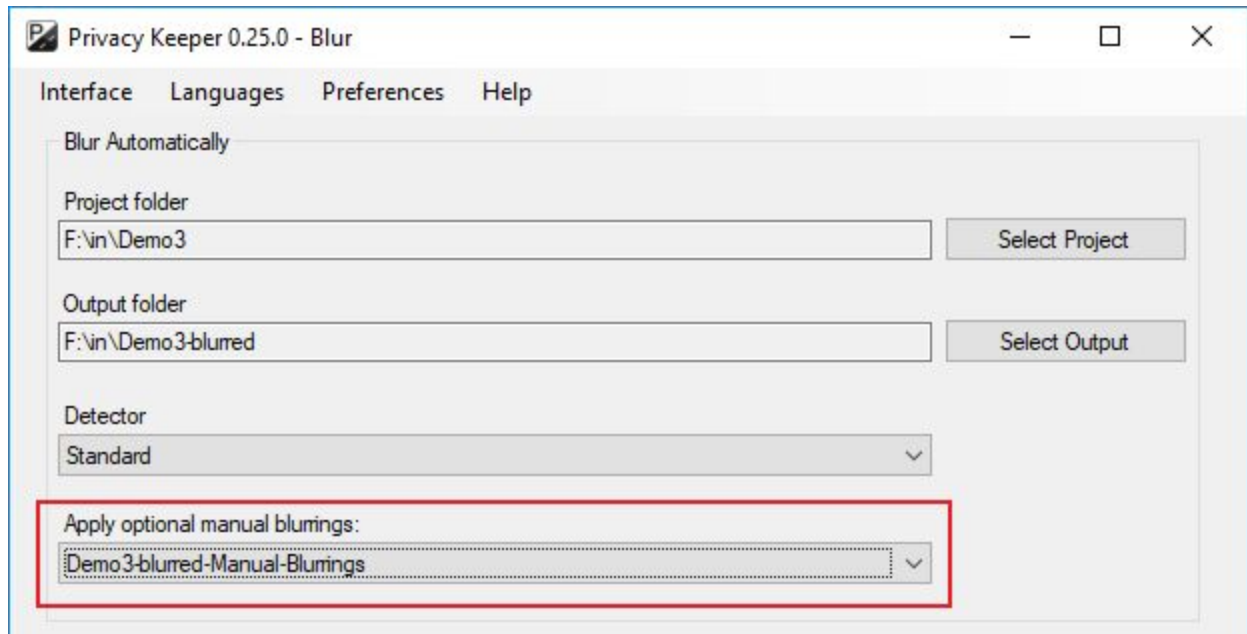
This will not undo already blurred areas, only delete a marking.

Delete all Blurrings on image

This will not undo already blurred areas, only delete all markings.

This workflow is helpful if you want to blur only a couple of areas, in case there are a lot of areas to blur it would be faster to mark all the images first, then go to **Interface - Blur - Automatic** and select previously created marking in the **Apply options manual blurrings** section.

This will blur automatically blur all number-plates and faces as well as all the manually marked areas.



5. Training

Training is optional.

You can train a new detector from your own images, **for example to teach it the faces and number plates from your country.**

TWO different Training data-sets will be needed to first train and then evaluate a new detector.

Each **Training data-set** has two parts:

- A **Project** folder containing the streetviews you recorded yourself.

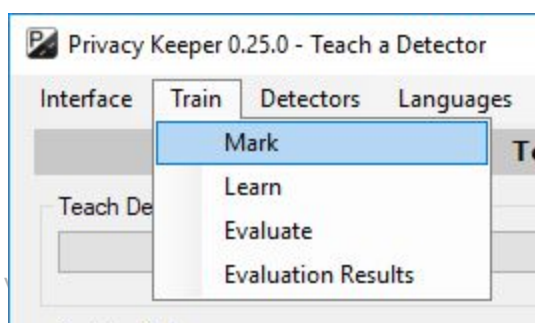
Project folder

Tour folder(s)

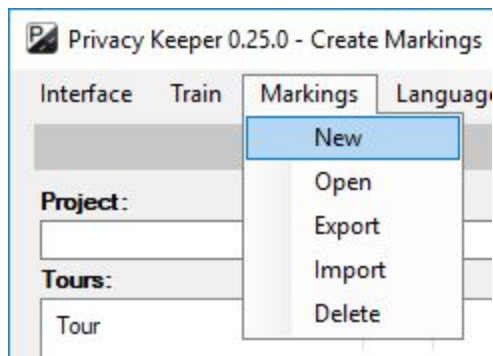
Camera folder(s) (1 to 7)

- A **Markings** folder containing heads and number-plates marked by yourself manually.

Create a new set of Markings

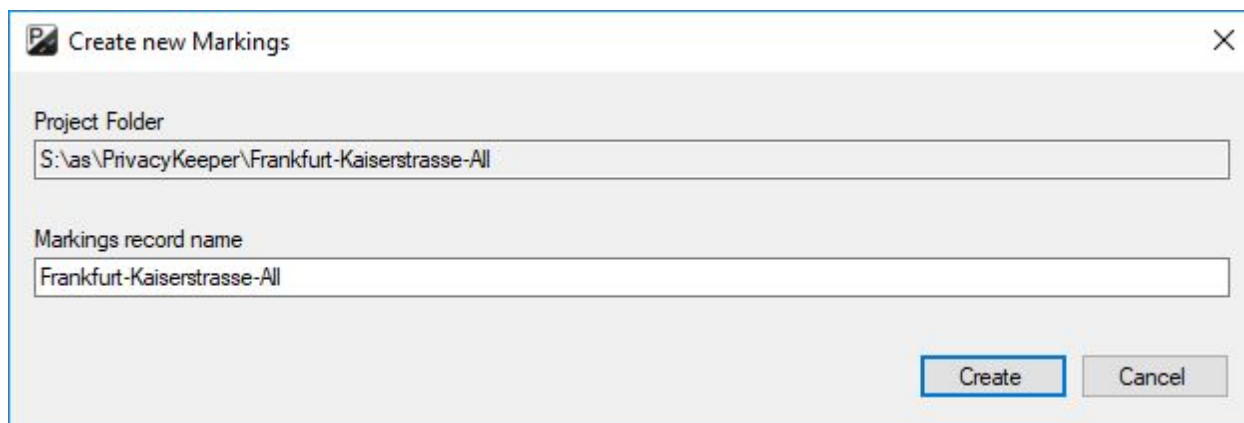


To create a new set of markings, select **Train - Mark** from the menu.



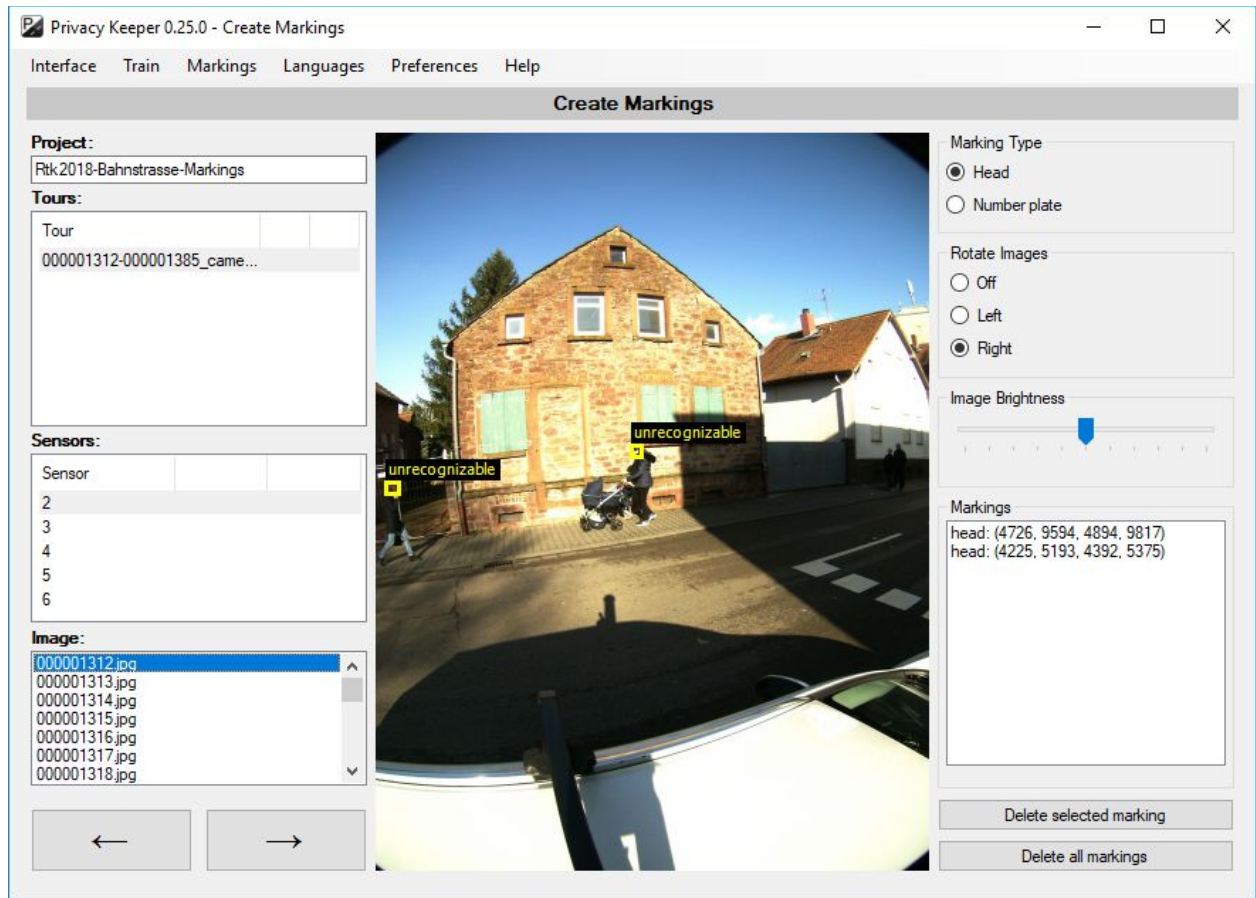
Then **Markings - New**.

You will be asked to choose the **project folder**.
A name for the new set of **markings** will be suggested.



By clicking **Create** the new set of markings will be created.
You will see the **Create Markings** window with the new markings name.
The tour folders will be on the left side.

Select a tour and a sensor on the left to start marking:



5.1 Mark heads

There are two major rules for marking heads:

I. Rule for heads and faces:

All heads and faces large enough must be marked.

No matter whether the person is recognizable or not. It does not matter if the person is viewed from the front, side, back, is wearing glasses, wearing a hat or if the face is blurry.

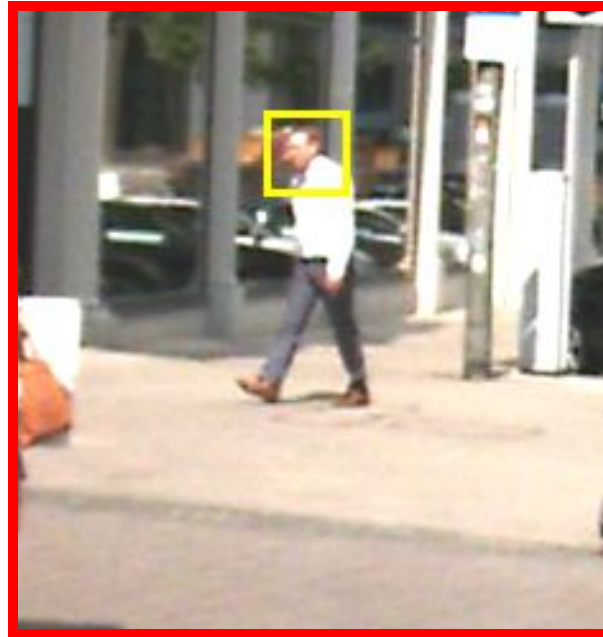
The minimum size of a marking in the Privacy Keeper software is shown by the thickness of the marking line:

If the **marking line is thick**, the head **meets the minimum size**. (see below image, left). Markings which meet the minimum size will be saved.

If the **marking line is thin**, the head **does not meet the minimum size** (see below image, right). Markings which do not meet the minimum size will be automatically cleared.



Please note: Don't extend the marking box on a small head until the minimum size is reached!



This is wrong, head should not be marked. It is too small.



This is right, all heads which meet the minimum size are marked.
Even they are not all recognizable.

II. Rule for heads and faces:

**If you have doubts about an image, don't mark heads and numberplates.
Clear existing heads and number plate markings.**

If there are many small heads or faces (some with unclear size), don't mark anything or clear all markings on that image (heads and number plates).

If you are unsure or if there are too many small heads on an image, the image should be ignored for training and evaluation.

This is done by simply skipping the image, so don't mark any heads or number plates. If there are already markings, delete all markings on that image.

IMPORTANT: If you want to ignore an image, delete all head **and** numberplate markings!



Difficult image with many small heads in the background, ignore the image.
Don't mark heads and number-plates

Examples for head markings:



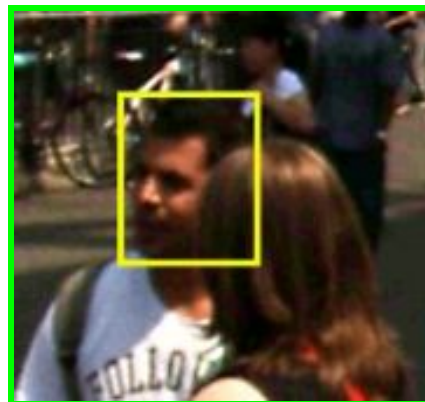
Must be marked



Must be marked



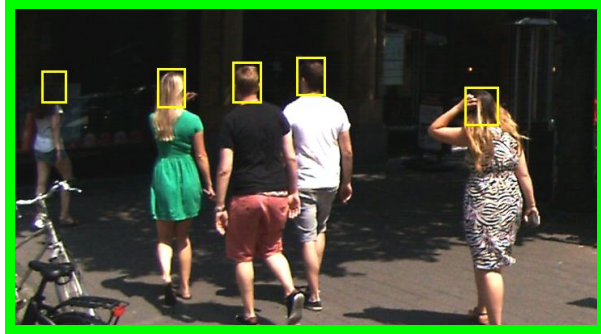
Must be marked



Partially hidden, must be marked



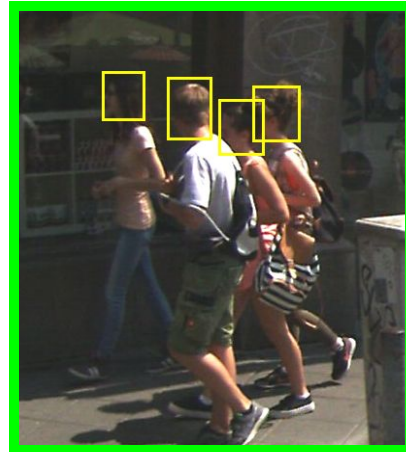
Partially hidden, must be marked



All must be marked,
and
labeled as **unrecognizable**



Skip ambiguous image.
Don't mark heads
AND
don't mark number plates



All four heads must be marked
and
labeled as **unrecognizable**



Mark heads which are large enough, don't mark small heads in the background



Many small heads, ignore
Don't mark heads.
For this also don't mark number plates. (Even when number plates are recognizable)



Mark number plates, don't mark small heads in the background

For more marking examples, please refer to Appendix A.

5.2 Mark number plates

There are two major rules for marking number plates, which follow the same structure as for the heads:

II. Rule for number plates:

All number plates of cars, trucks, motorcycles and scooters etc. must be marked if they meet the minimum marking size.

All number plates must be marked, no matter whether they are readable or not (truncated, viewed from angle, blurred).

The minimum size of a marking in the Privacy Keeper software is shown by the thickness of the marking line:

If the **marking line is thick**, the number plate **meets the minimum size**. (see below image, left). Markings which meet the minimum size will be saved.

If the **marking line is thin**, the number plate does **not meet the minimum size** (see below image, right). Markings which do not meet the minimum size will be automatically cleared.



Please note: Don't extend the marking box on a small number plate until the minimum size is reached!



This is wrong, number plate should not be marked (too small)



This is right, all number plates which meet the minimum size are marked (although they are not all readable)

II. *Rule for number plates:*

If you have doubts about an image, don't mark anything or clear all markings on that image (heads and number plates).

If there are many small number plates (some with unclear size), don't mark anything or clear all markings on that image (heads and number plates).

If you are unsure or if there are too many small number plates on an image, the image should be ignored for training and evaluation.

This is done by simply skipping the image, so don't mark any heads or number plates. If there are already some markings, delete all markings on that image.

IMPORTANT: If you want to ignore an image, delete all head *and* number plate markings!

Examples for number plate markings:



Must be marked



No markings,
too small



Must be marked



No markings,
too small



One must be marked, the other one is too small



All must be marked



One must be marked, the other one is too small



Viewed from angle, must be marked



Viewed from angle, must be marked



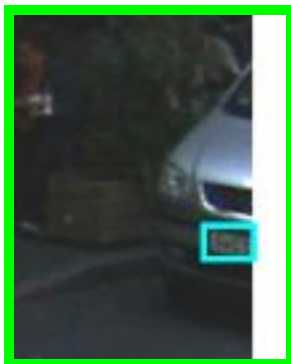
Must be marked.



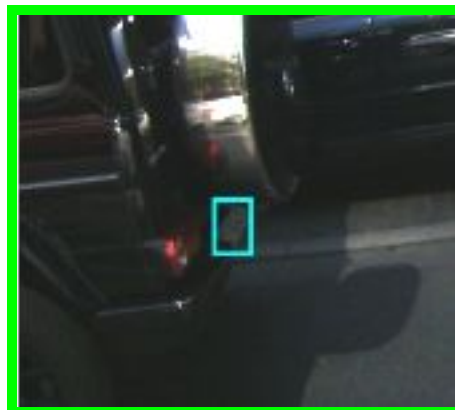
Must be marked.



Cut-off, must be marked



Cut-off, must be marked



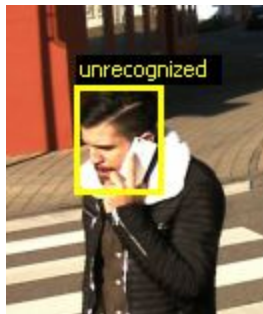
Partially hidden, must be marked

For more marking examples, please refer to Appendix A.

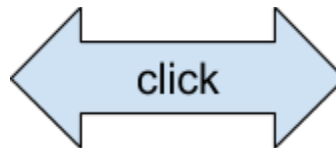
5.3 Label as recognizable

When creating a new marking, by default it is labeled as **unrecognizable**.

If the person or number plate is recognizable click the rectangle to make the label go away.



By default all markings are labeled **unrecognizable**.



But because the person is recognizable, click to make the label go away.



By default all markings are labeled **unrecognizable**.



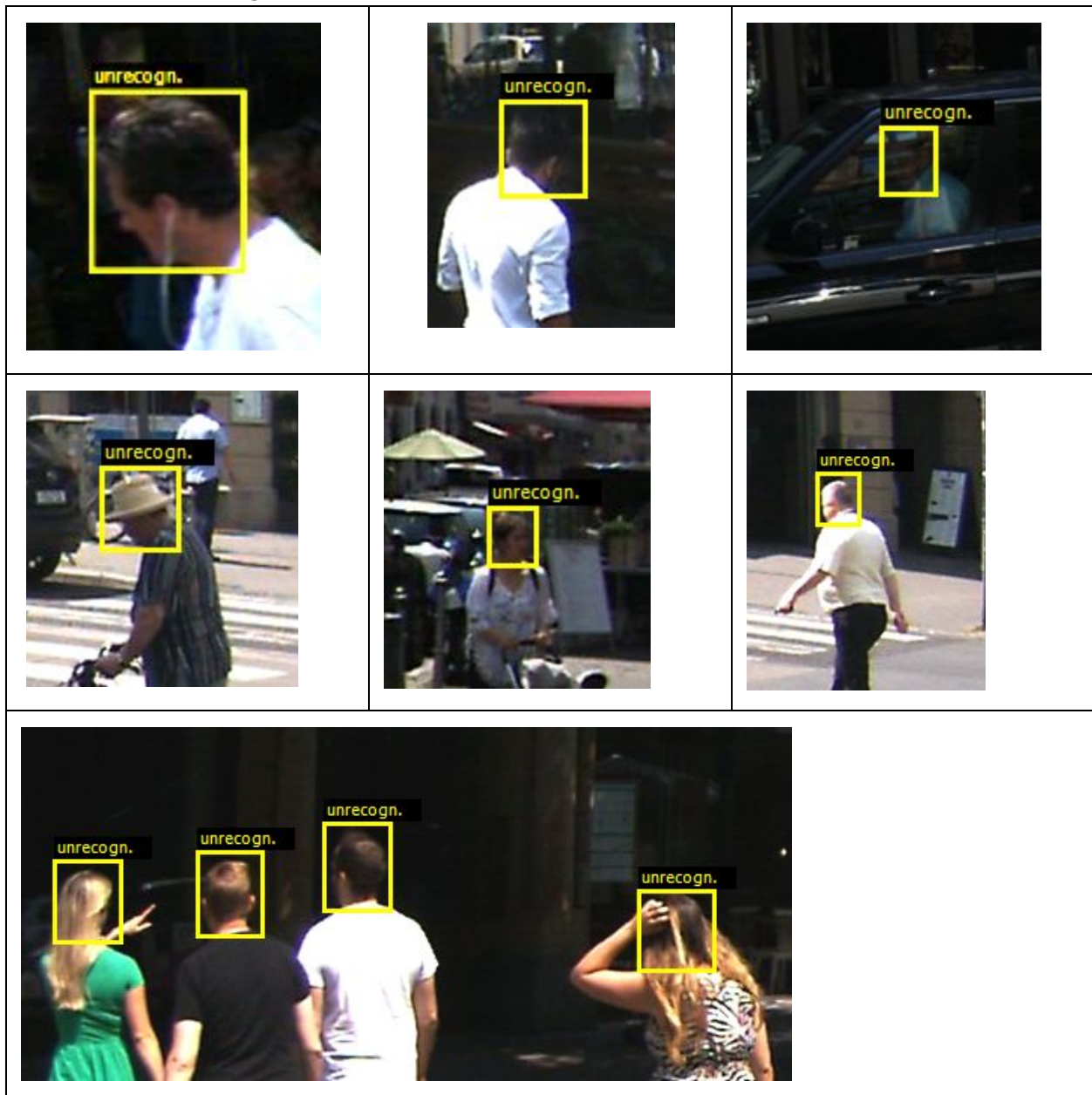
But because the number plate is recognizable, click to make the label go away.

Rules for the **unrecognizable** label:

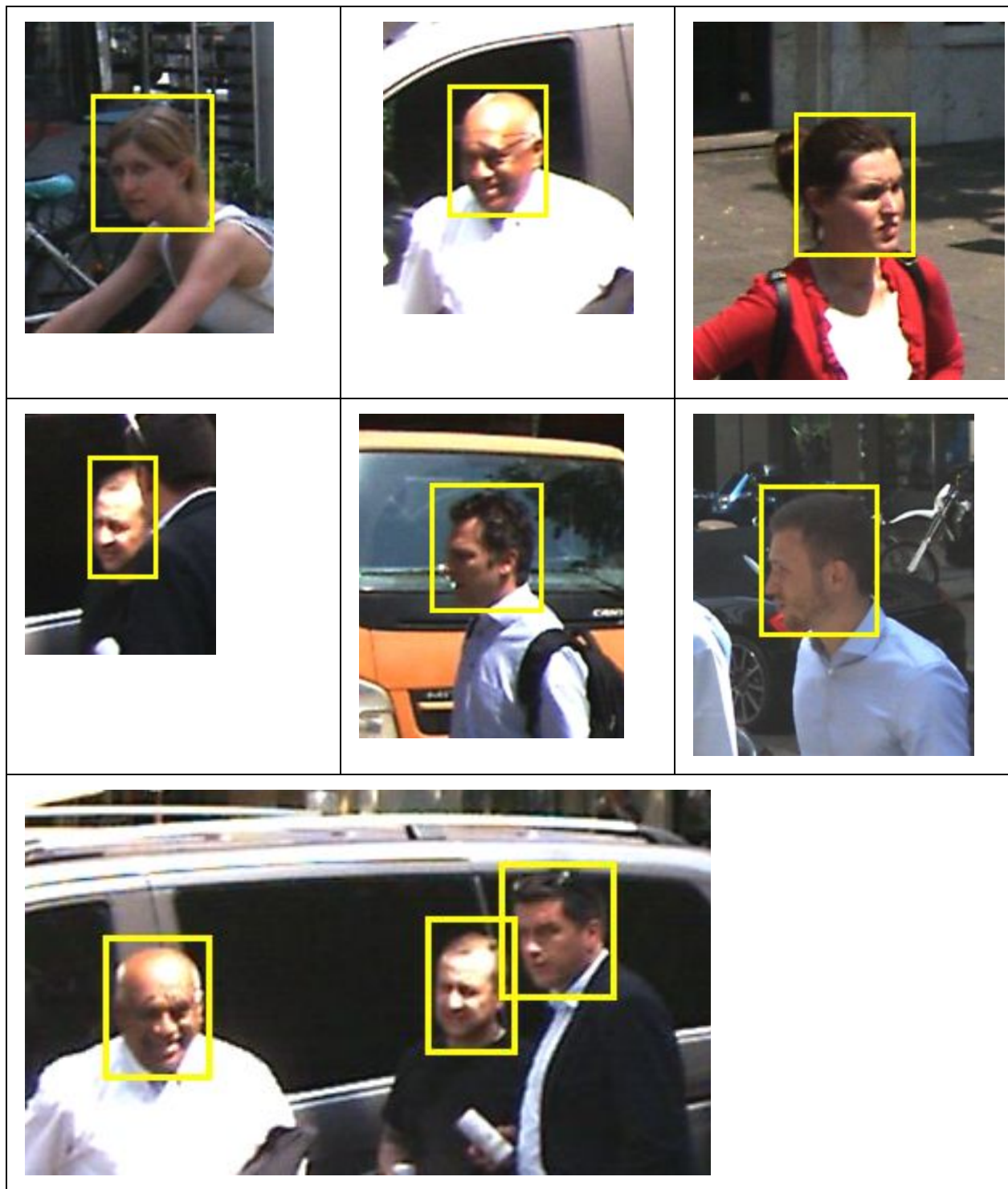
Heads: A recognizable head is one viewed from front or side and large and clear enough for the person to be identifiable. For example, if compared to another photo of the person.

Number plates: A recognizable number plate is readable and at least half visible.

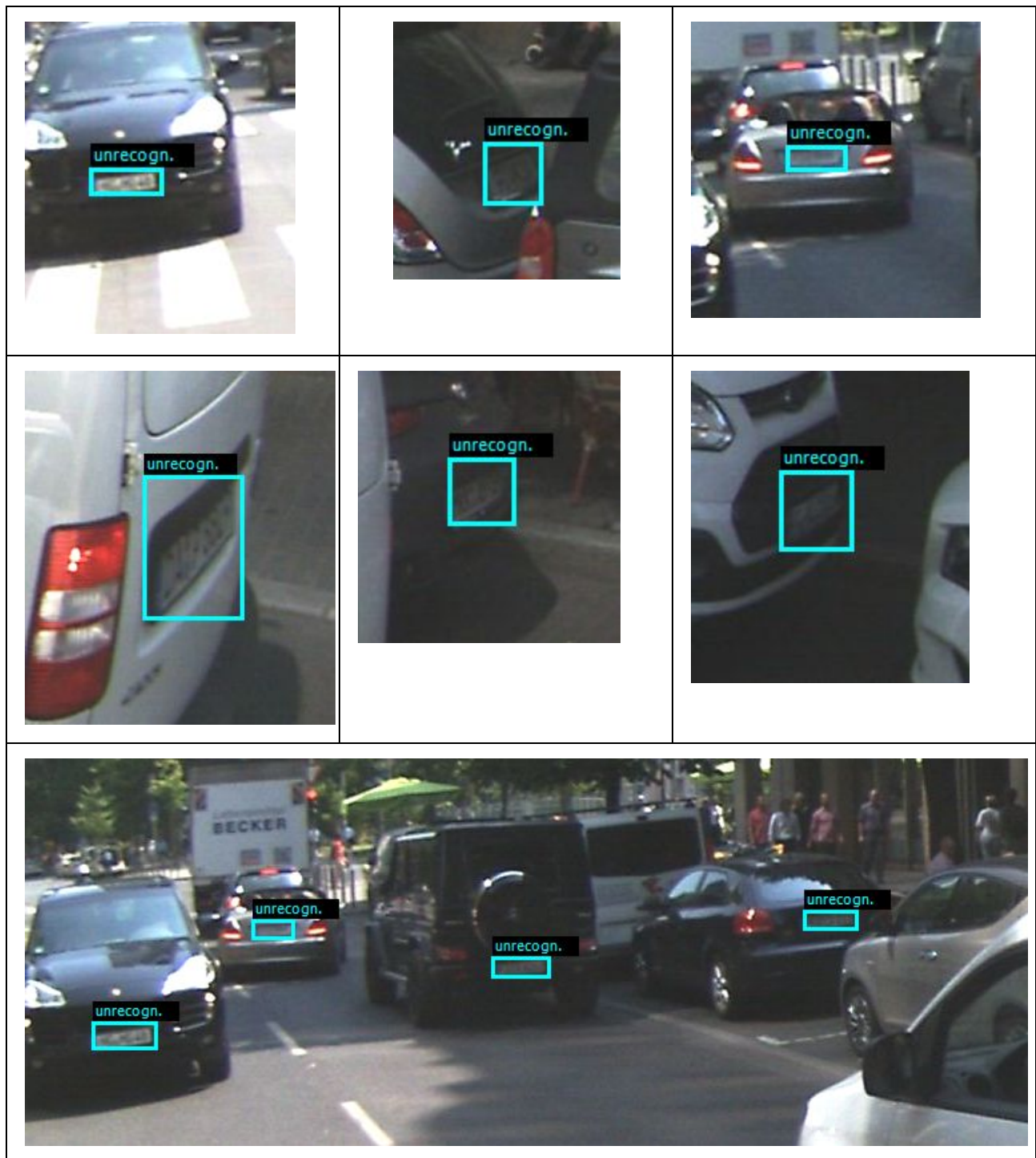
Examples for **unrecognizable** heads:



Examples for **recognizable** heads:



Examples for **unrecognizable** number plates:



Examples for **recognizable** number plates:



5.4 Right marking box size

Always mark with properly sized marking boxes.

Too small marking boxes as well as too large marking boxes compared to the object must be avoided.

Marking box size examples:





BAD (too large)



GOOD



BAD (too small)



GOOD



BAD (too large)



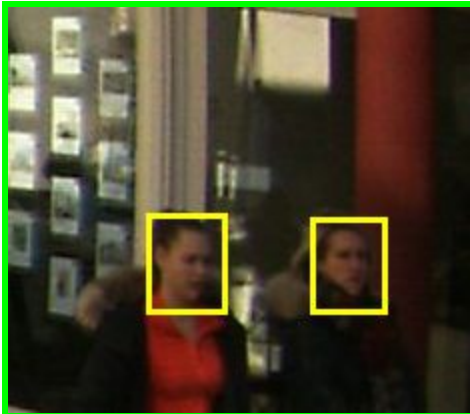
GOOD



BAD (too small)



GOOD



GOOD, slightly larger boxes are allowed if the face is at the limit of minimum allowed size.



BAD
Blue box is too large



GOOD



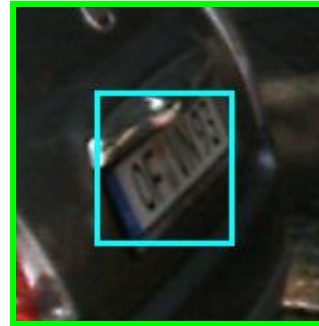
BAD (too small)



GOOD



BAD (too large)



GOOD



BAD (too small)



GOOD



BAD (too large)



GOOD



BAD (too large)



GOOD

5.5 Always skip

Faces and number plates on billboards, posters etc. as well as faces of mannequins in shops should **not** be marked.



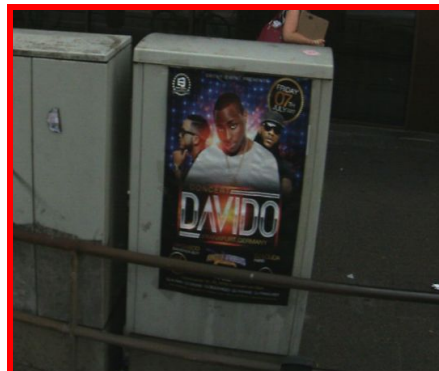
No marking



No marking



No marking



No marking



No marking

5.6 How to mark

Use the [Keyboard shortcuts](#) for the settings and the mouse to draw the markings.

Please print the page with the [Keyboard shortcuts](#)!

Working sequence:

- 1) Click **“h” for a head** and **“n” for a number plate**.
You can switch several times between **h** and **n** while working on an image.
- 2) Draw the marking boxes with your mouse.
The markings will be saved automatically.

Heads must be marked **yellow**.

Number plates **blue**.



**Yellow box color
for heads**



**Blue box color
for number plates**

Navigate images

Use the **‘a’** and **‘s’** keys (or the **left-/right-arrow** keys) to navigate forward and backward through the images. The markings will be saved automatically.

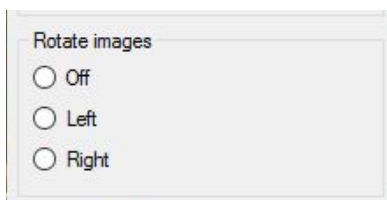
Use the **mouse wheel** or the **‘+’** and **‘-’** keys to zoom in and out of the image.

Use the **space key** to navigate to the next image if there is nothing to mark.

Image orientation

The images are automatically rotated to the proper orientation, so you should not need to change the orientation manually.

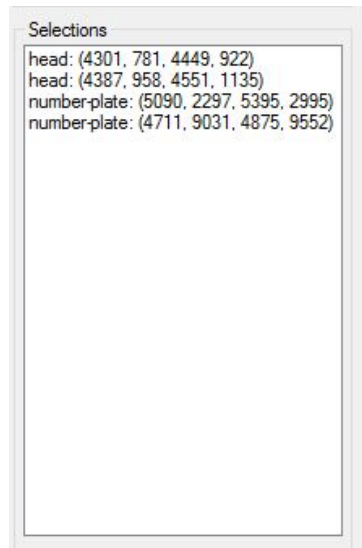
During marking, the image orientation has an influence on the quality of the blurring. Mark images only in the correct, upright orientation.



Manually rotate images upright if needed.



You can change the image display brightness with the slide control on the right. The image brightness setting is just for your better view and has no impact on the resulting blurring quality.



On the right side, you can also see the list of all markings in the current image.

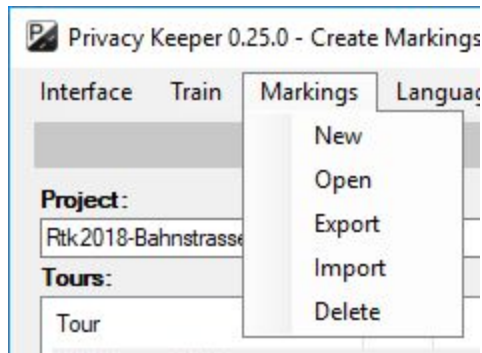
By pressing the keyboard keys **u** or **DEL** the last marking added to the current image will be deleted. You can also do this with the button **Undo last selection** in the bottom right-hand corner.

By pressing the keyboard key **i** all markings added to the current image will be deleted. The same can be done with the button **Clear all selections** in the bottom right-hand corner.

A) Import/Export Markings

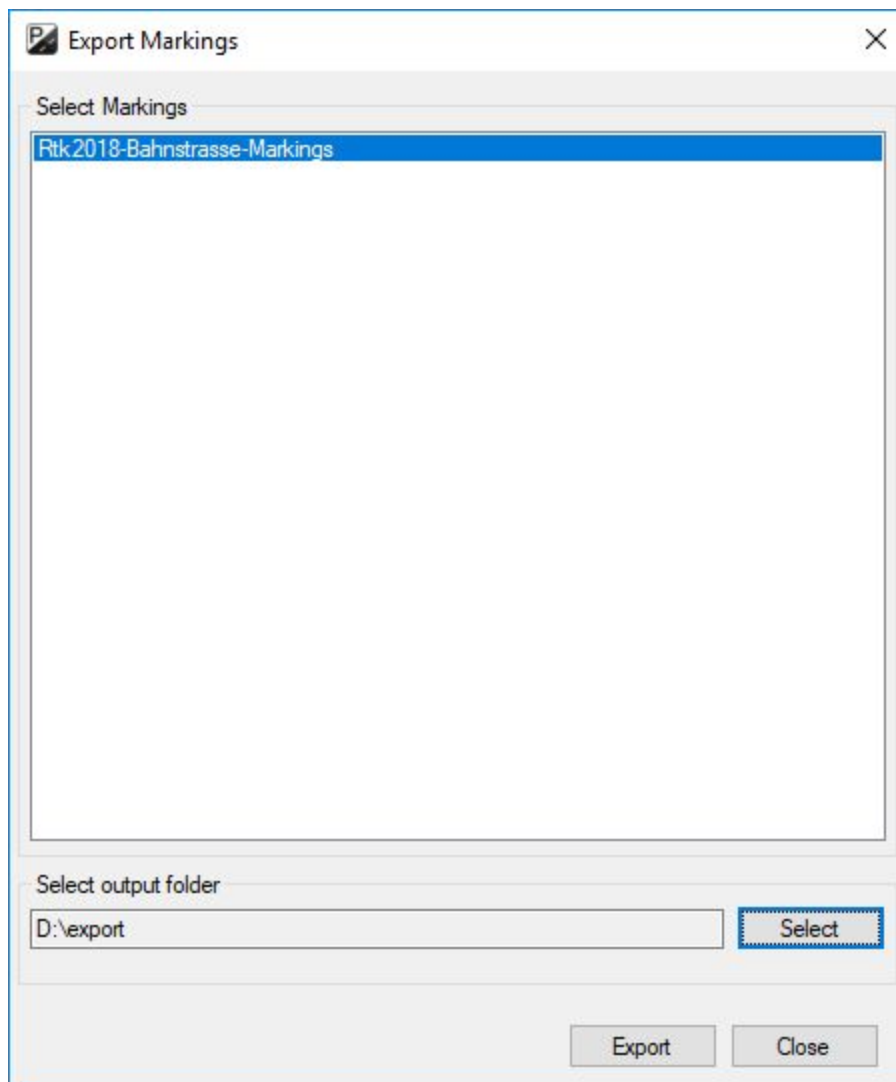
When importing/exporting Markings, only the marking data (without the image data) will be imported/exported. The corresponding project folder containing the image data must be handled separately. After migrating the exported set of markings and the project folder to a different PC, you will have to assign the new location of the project folder to the markings using the **Edit** button in the **Load Training Data** window.

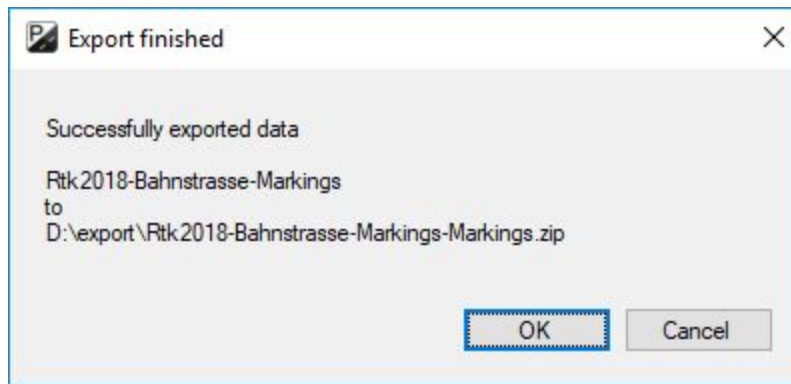
For exporting/importing sets of markings, select **Markings - Export** or **Markings - Import**:



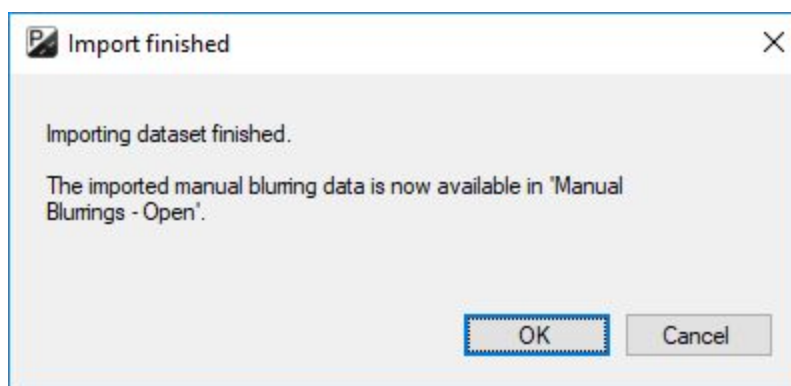
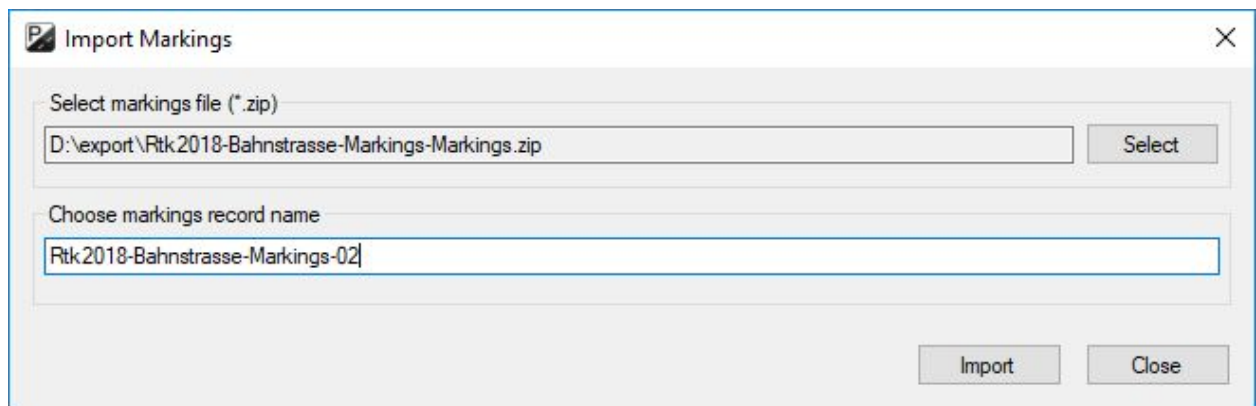
Exporting:

Select the set of markings to be exported, select an output folder and click **Export**.
A *.zip file will be created in the output directory:

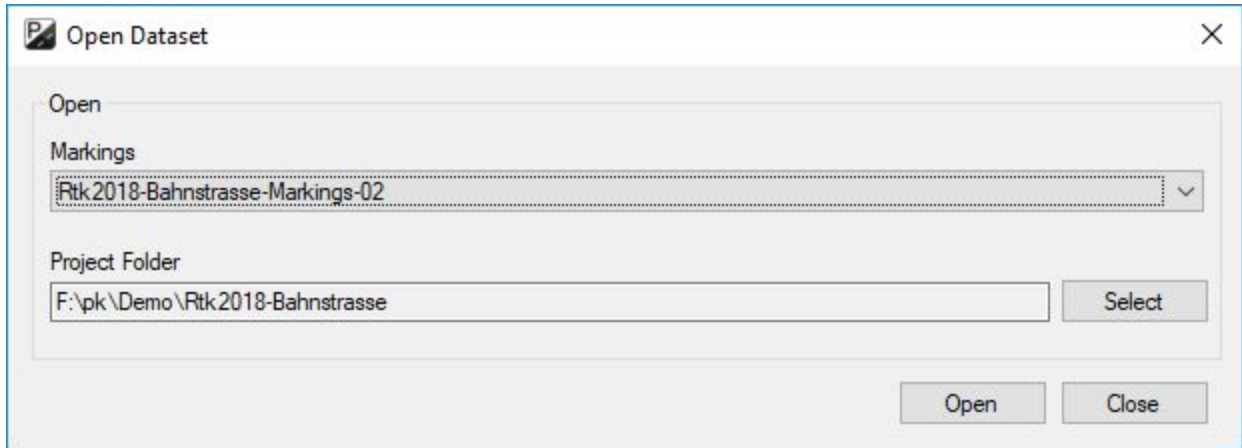




For importing a set of markings, select a *.zip file and and click **Import**:

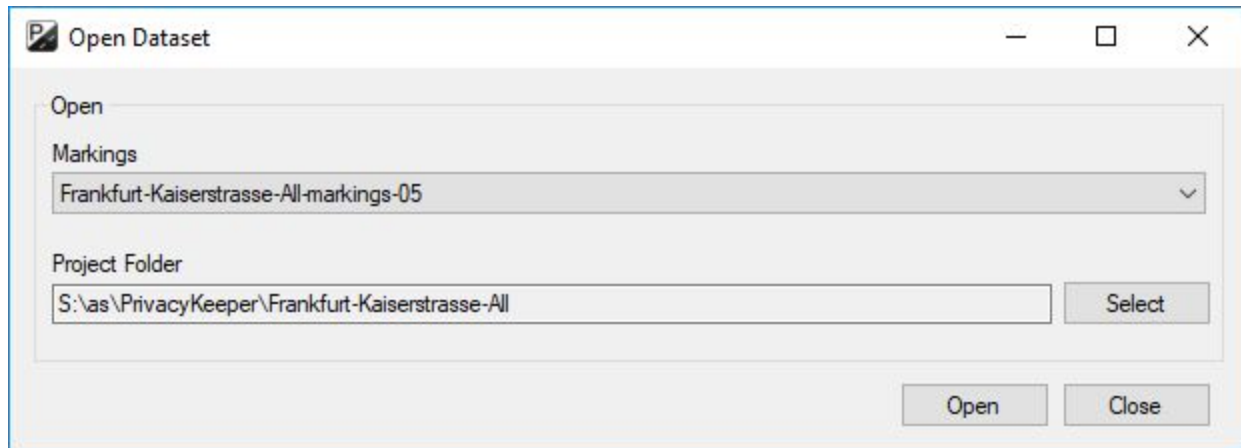


After importing the markings, check the path of the project folder associated to the markings. Open the **Markings - Open** window, select the newly imported markings and click **Edit**:



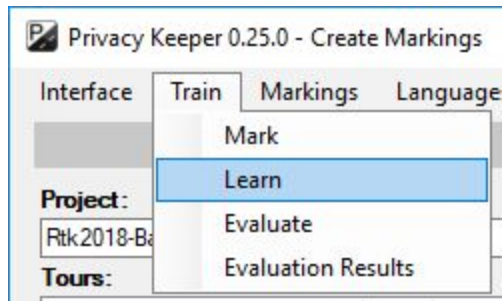
B) Open Markings

To open an existing set of markings, select the option **Markings - Open** from the drop-down menu on the main window:



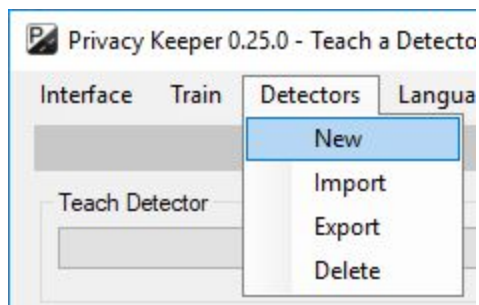
Select one of the existing markings sets and load it. You can now continue marking more heads and number plates.

6. Learn

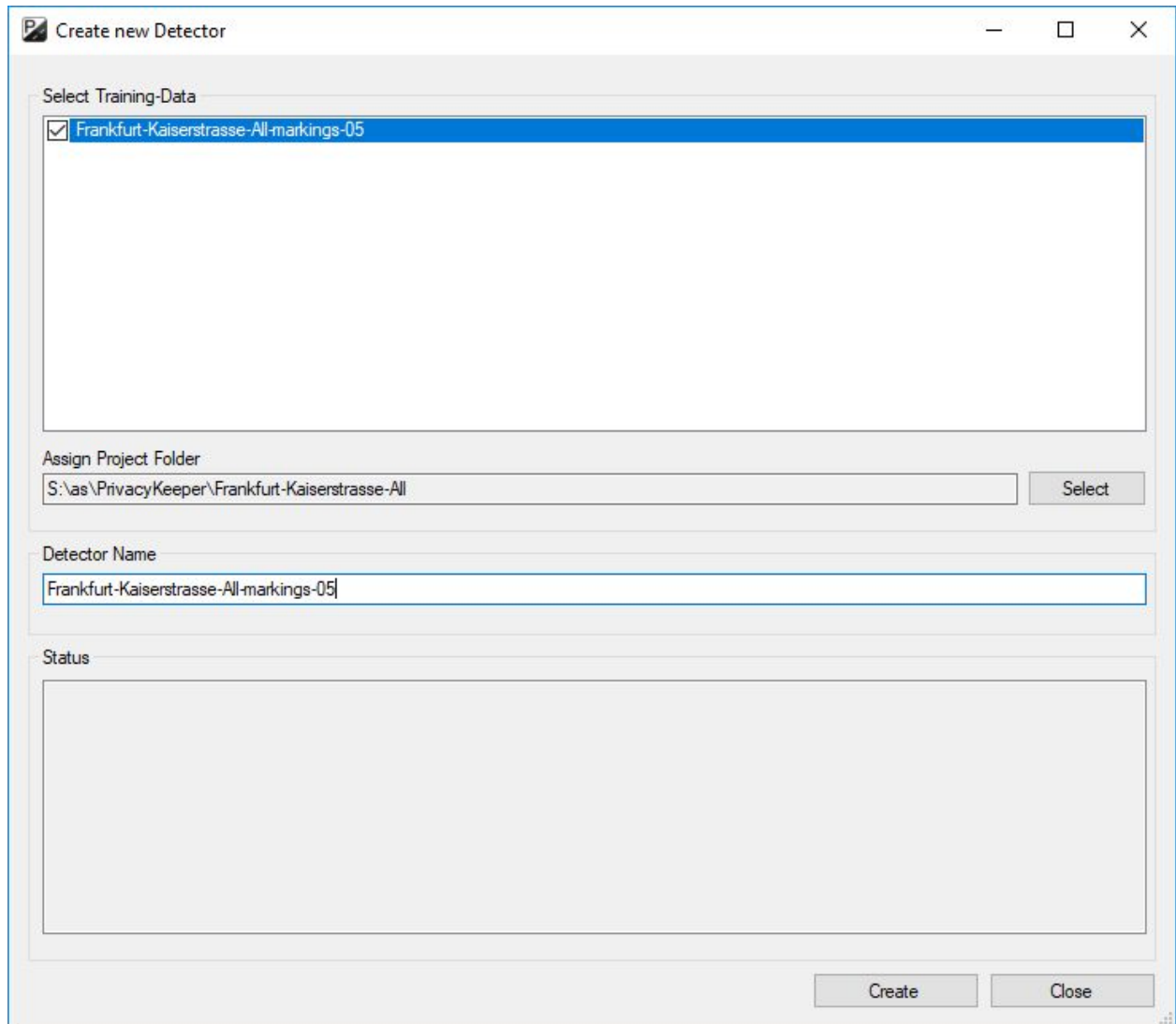


6.1 Create a new detector

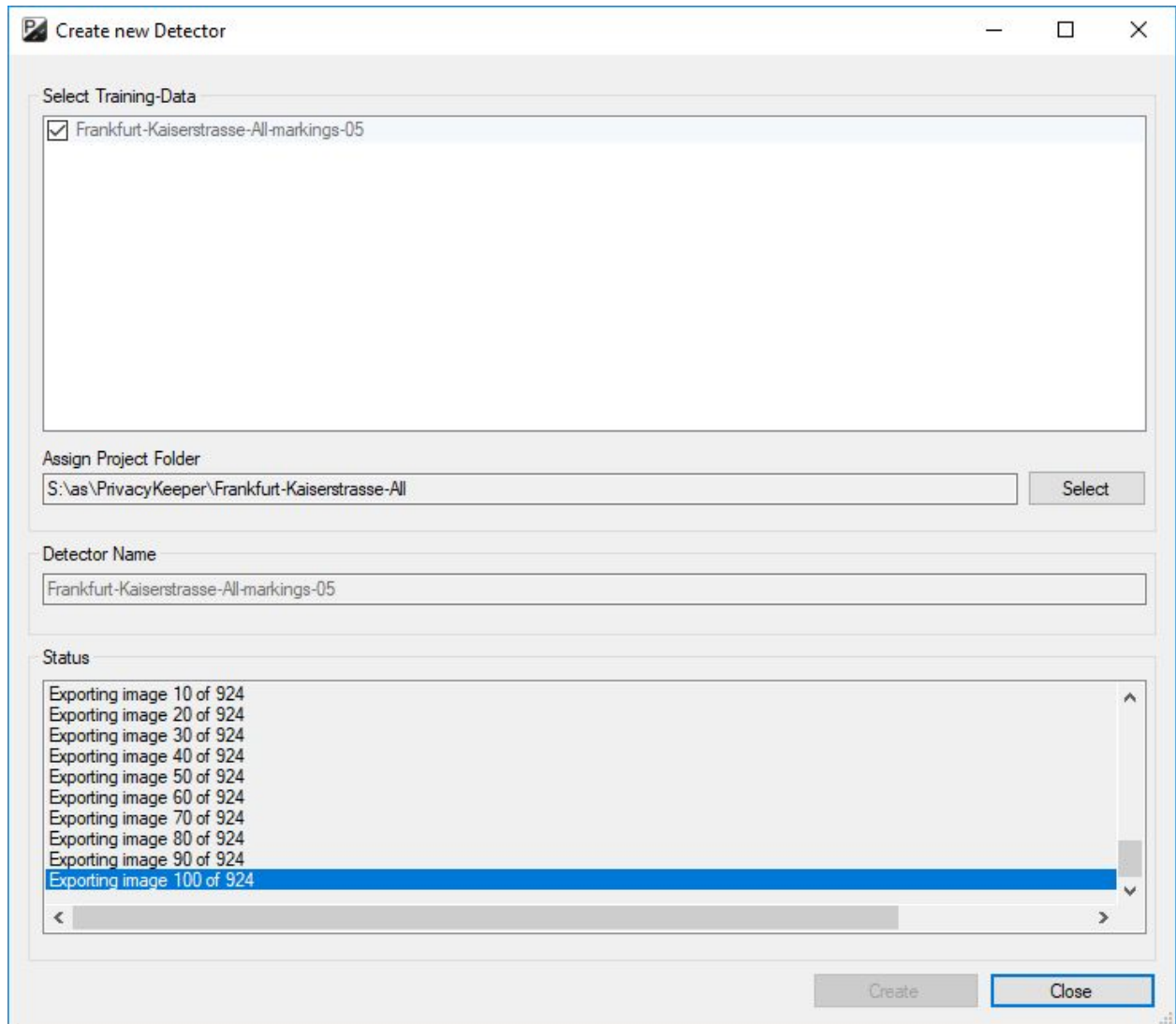
For creating a new detector from an existing training dataset, select **Detectors - New** from the menu:



In the pop-up window, select one or more training datasets to be used to train the detector:



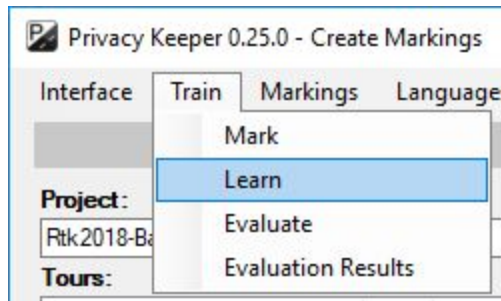
Select a name for the new detector and press the **Create** button. The window will close and the **Train Detector** window will be shown with the newly created detector.



When the process is finished, a popup will be displayed.
The new detector is now ready to be trained.

6.2 Train a detector

For training a new detector, or for continuing the training of an existing detector, open the Window **Train - Learn**.

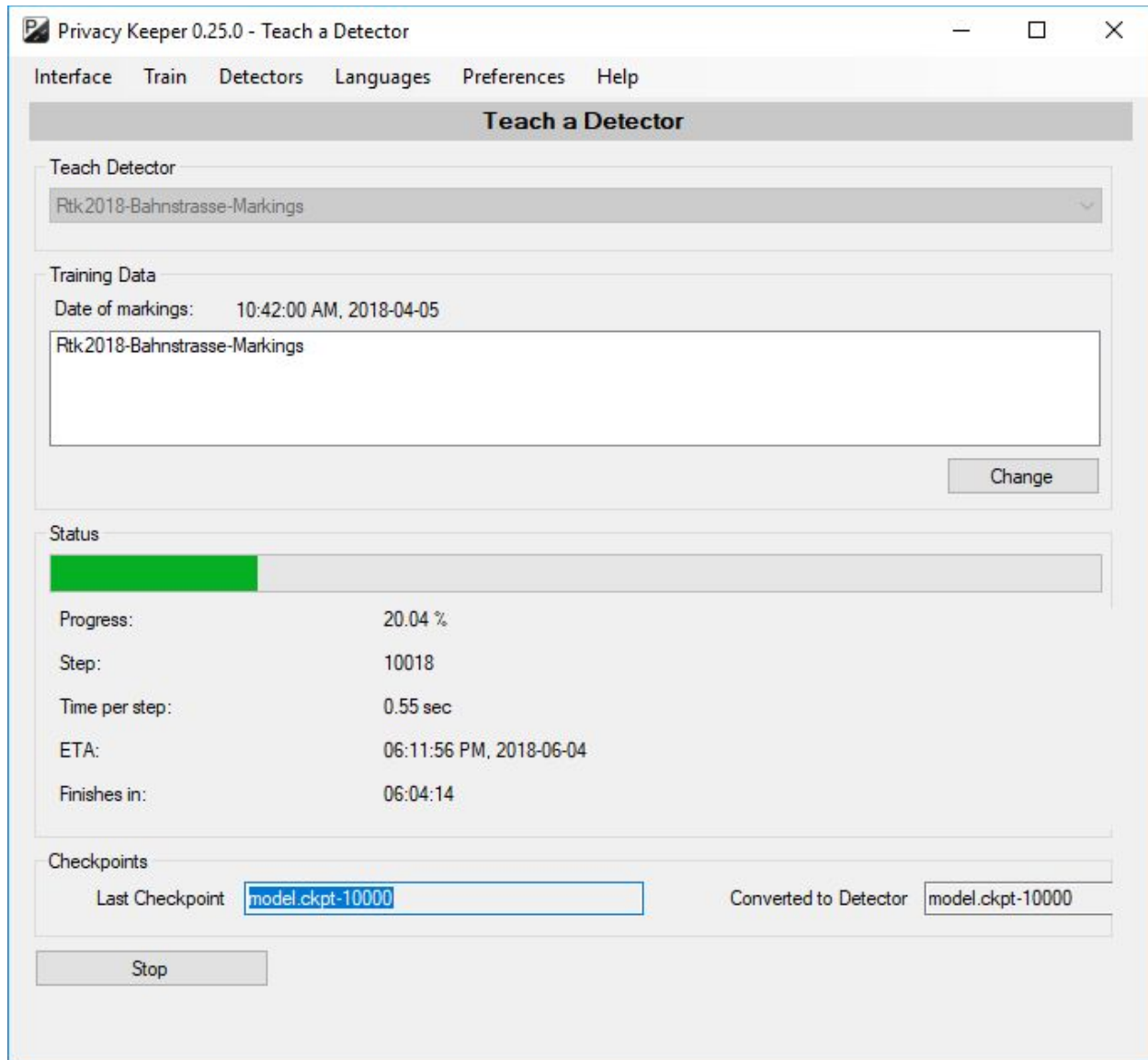


In the **Teach a detector** window you will see a list of available detectors (**Teach Detector**) and below it a list of available training data (**Training Data**).

Training

If you start the Training of a new detector, the training will start at the beginning.
Press the **Start** button to start or continue the training.

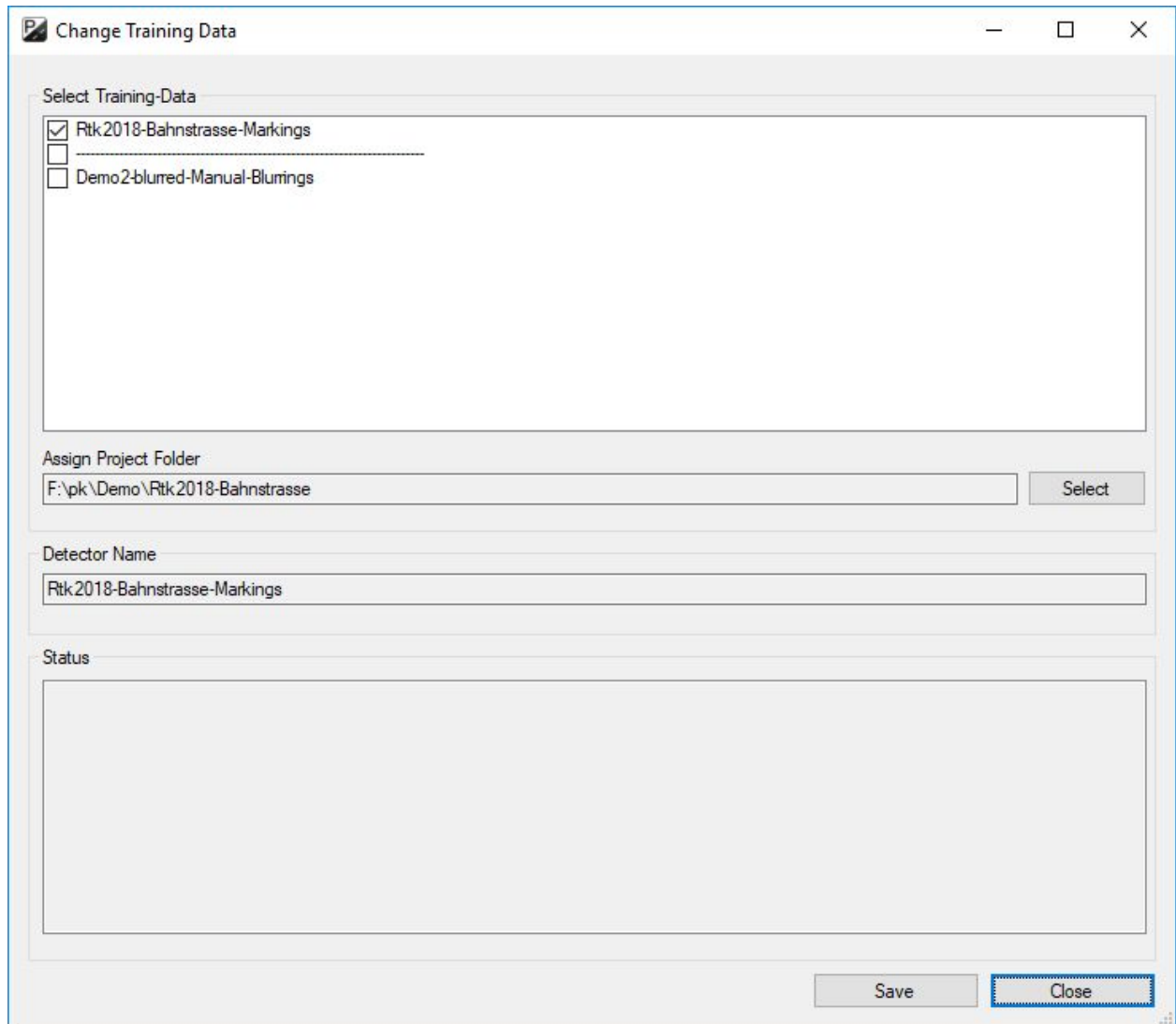
If you start the training of a detector which already has been partly trained, the training will be continued where it was left off.



Let the training process run until it reaches 100%.

After the process is finished it's a good idea to [7. Evaluate the Detector](#).

To change the Training-Data click on the **Change** button.



----- separates your markings (top part of the list) from your blurrings (bottom part of the list).

Select a new Training-Data set then click **Save**.

6.3 Import/Export a detector

Detectors can be created on one PC and copied to other PCs.
Use import/Export to set up this [Multi-PC workflow](#).

6.4 Multi-PC processing

After you have created your own Detector:

- Master PC: Open Privacy Keeper
- Detectors - Export
- Exit Privacy Keeper

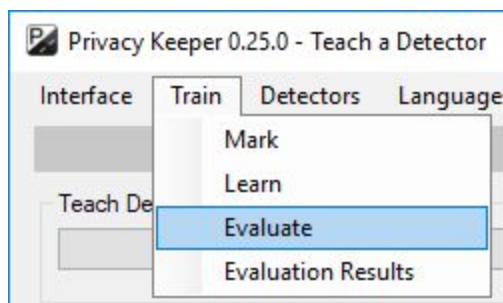
- Slave PC(s): Open Privacy Keeper
- Detectors - Import
- Follow the [Blurring workflow](#). Pick a project and the Detector you have just imported.
- Exit Privacy Keeper

7. Evaluate a Detector

To evaluate a detector, you will need a **second, different**, Training Project with different images and different manual markings.

Otherwise you will be testing your detector on the same data it learned from and the results will be unrealistic.

After the training process has finished, start the evaluation process:



Click **Start**. The evaluation process should begin.

Privacy Keeper 0.25.0 - Evaluate a Detector

Interface Train Evaluation Languages Preferences Help

Evaluate a Detector

Evaluate Detector

Detector:
Rtk2018-Bahnstrasse-Markings

Data for Evaluation

Markings:
Rtk2018-Bahnstrasse-Markings

Project Folder
F:\pk\Demo\Rtk2018-Bahnstrasse Select

Statistics

Progress:

Detection rate recognizable heads: Detection rate recognizable number-plates:

Detection rate all heads: Detection rate all number-plates:

Additional head detections: Additional number-plate detections:

Start

The following evaluation metrics are calculated based on the existing marking boxes and the detection boxes generated by the detector:

Detection rate recognizable heads:	Percentage of <i>recognizable</i> heads that were detected correctly.
Detection rate recognizable number-plates:	Percentage of <i>recognizable</i> number-plates that were detected correctly.
Detection rate all heads:	Percentage of <i>all marked</i> heads that were detected correctly.
Detection rate all number-plates:	Percentage of <i>all marked</i> number-plates that were detected correctly.

Additional head detections:

Number of heads or other objects that were detected in addition to the marked heads.
(This can be heads smaller than the minimal marking size or objects that were detected as heads falsely.)

Additional number-plate detections:

Number of number-plates or other objects that were detected in addition to the marked number-plates.
(This can be number-plates smaller than the minimal marking size or objects that were detected as number-plates falsely.)

Please note:

Only images with **at least one existing marking box** are used for the above calculation.
Images with no markings are ignored for the evaluation metrics calculation.

The values are calculated in the following way:

True positive detection

The detection box intersects with a marking box.

Detection rate recognizable heads =

(number of **true positive detections** of recognizable heads) / (total number of recognizable head **markings**)

Detection rate recognizable number plates=

(number of **true positive detections** of recognizable number plates) / (total number of recognizable number plate **markings**)

Detection rate all heads =

(number of **true positive detections** of all heads) / (total number of all head **markings**)

Detection rate all number plates=

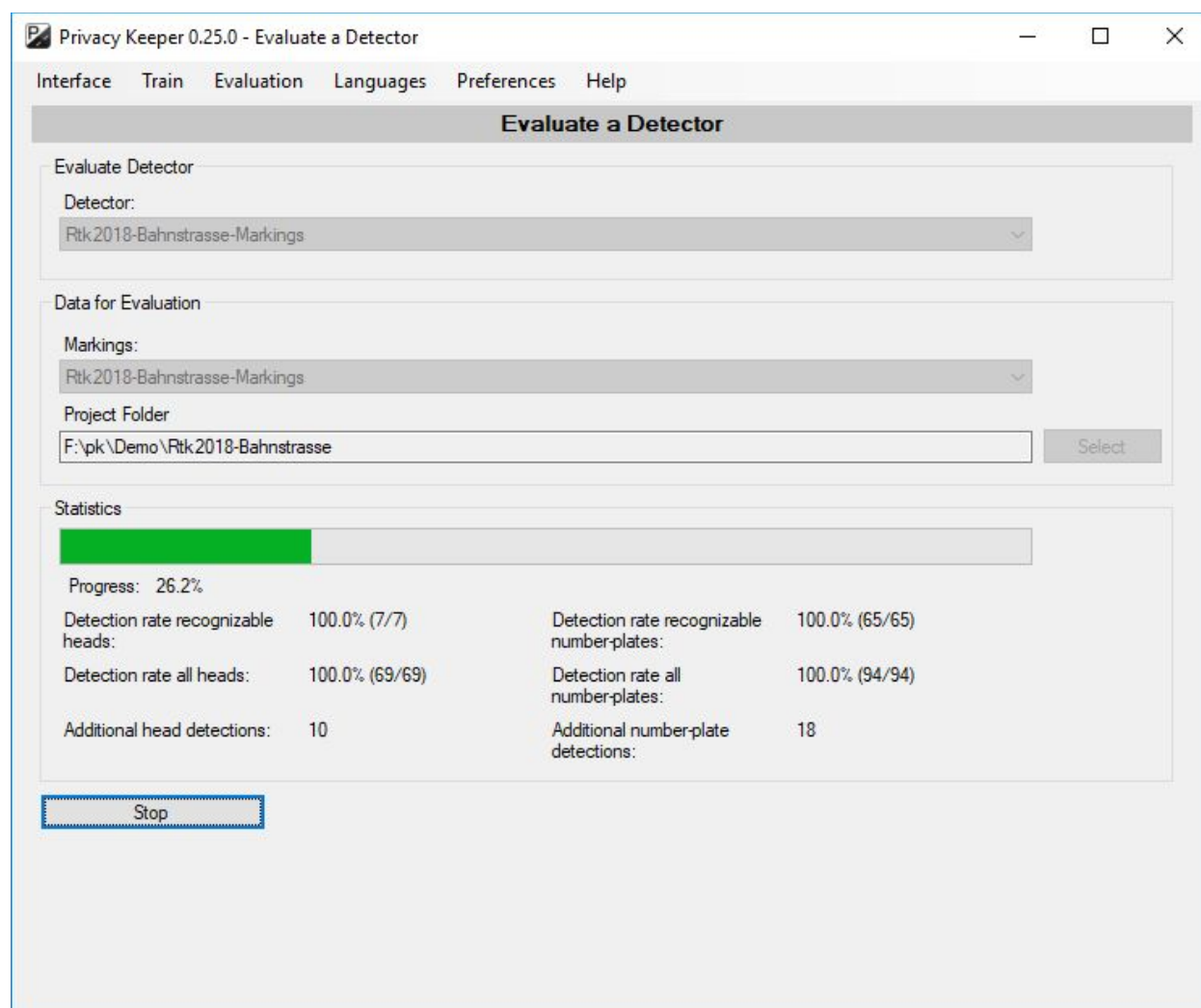
(number of **true positive detections** of all number plates) / (total number of all number plate **markings**)

Detection rate additional heads =

(number of **true positive detections** of additional heads) / (total number of additional head **markings**)

Detection rate additional number plates=

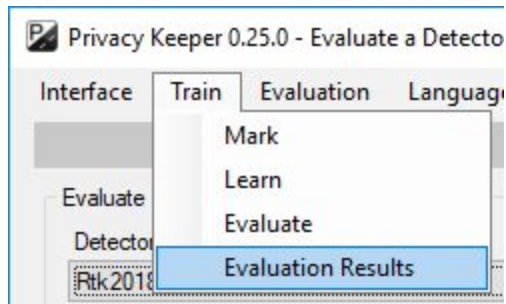
(number of **true positive detections** of additional number plates) / (total number of additional number plate **markings**)



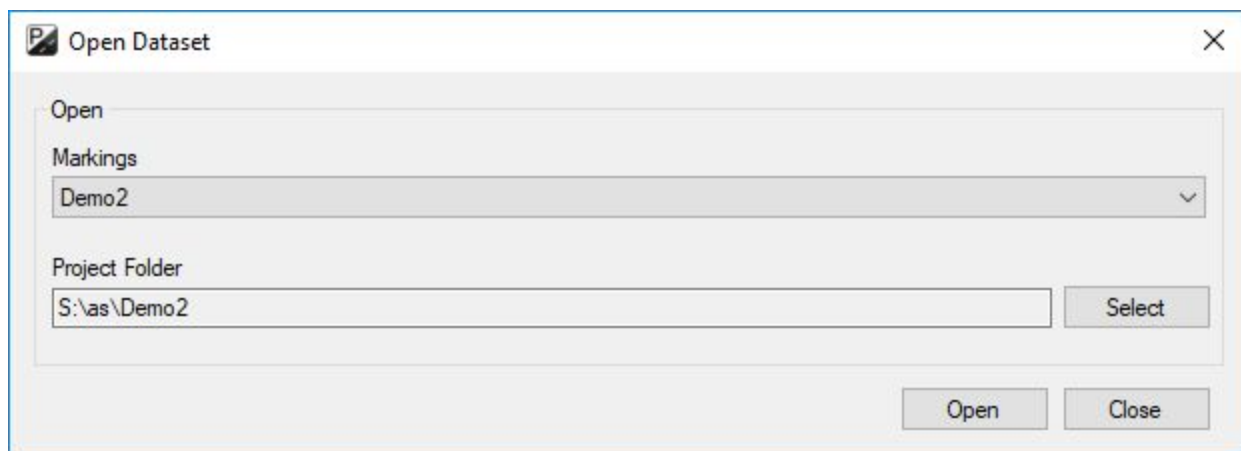
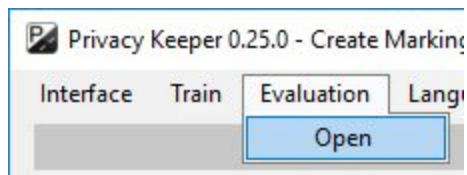
The accuracy of a Detector can be evaluated by comparing it to markings created manually.

8. Evaluation Results

After evaluation is complete, you should check the quality of the new Detector.
Go to **Train - Evaluation Results**.

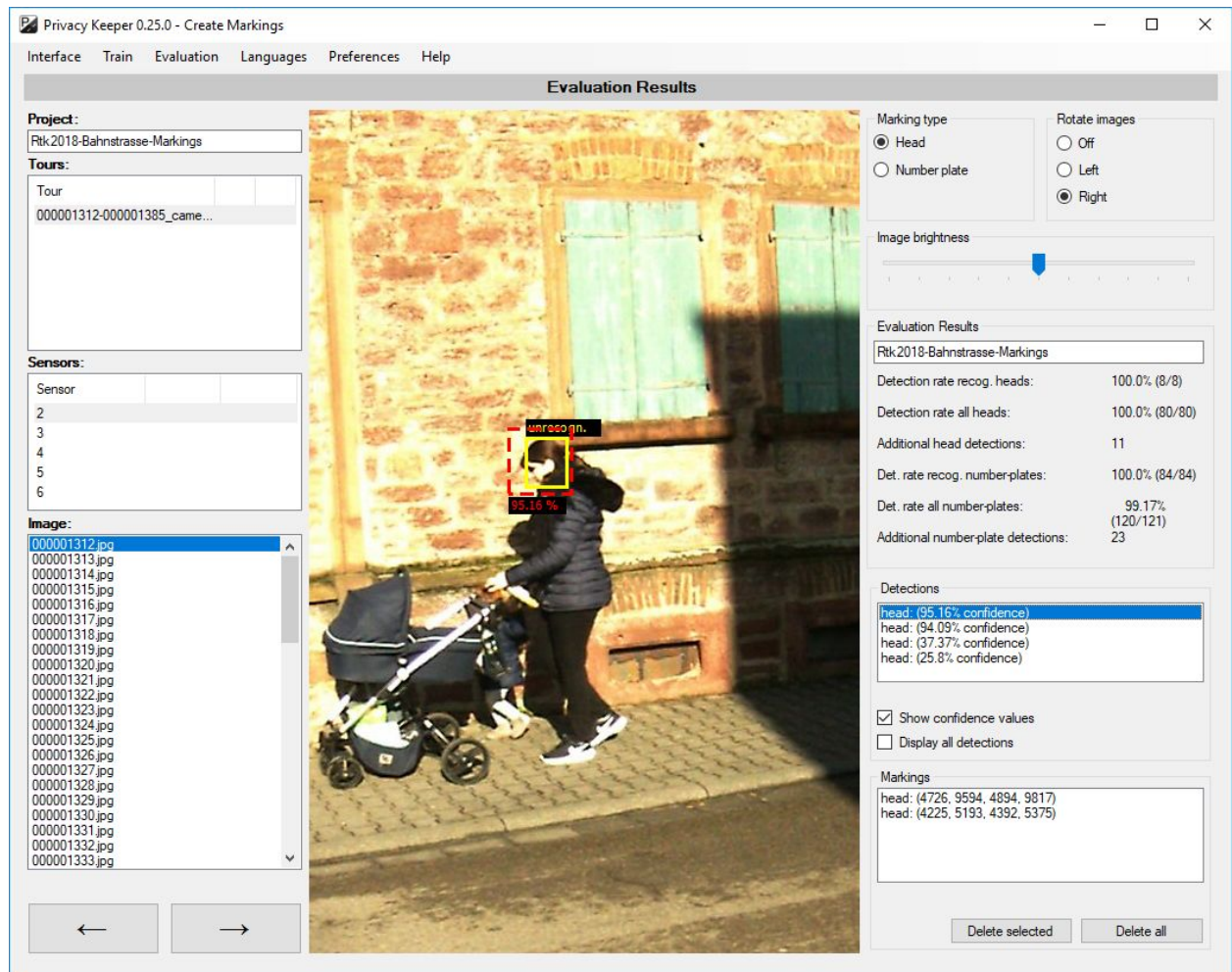


Then **Evaluation - Open** for the results of a set of markings.



Continuous line - Markings created by the user
Dashed line - Detections by the detector

Click **Open** to display the evaluation result.



On the right-hand panels you can click through every **detection** or **marking** using the lists.

Evaluation results

Detection rate heads

Detection rate number plates

False discovery rate heads

False discovery rate number plates

For a detailed description of the values see [7. Evaluate a Detector](#).

9. Settings

Blurring style automatic

Blur - Blur the detected heads or number-plates

Green - Draw a green rectangle around the detected heads or number-plates

Blurring style manual

Blur - Blur the detected heads or number-plates

Green - Draw a green rectangle around the detected heads or number-plates

Copy mode

Create a copy of the whole project and blur it - The whole project, blurred or not.

Create copies for blurred photos only - Copy only blurred images.

Batch size

This is the number of blurring processes to run in parallel. Privacy Keeper will determine the best value for your hardware for maximum performance.

In case blurring fails, try setting this value to 1.

Minimum Confidence for Face (%)

Minimum Confidence for Number plates (%)

Every detection comes with a **confidence** value, that indicates how 'sure' the detector is about the marking.

The minimum confidence value lets you set a minimum limit for this confidence.

If a detection has a confidence value lower than the set minimum, the detection will be ignored for blurring and for evaluation.

A low value for 'minimum confidence' will result in more detection boxes, a high value for 'minimum confidence' will result in fewer detection boxes.

The 'minimum confidence' can be set independently for heads and for number plates.

The default setting is 20%.

Number of training steps

You can set the number of training steps which will be run to train a detector.

You can choose between 10000, 25000, 50000, 75000 and 100000 steps.

A low number of training steps will result in a shorter training time.

The quality of the detector increases with more training steps.

The default setting is 50000 steps.

10. Maintenance

From time to time you should back-up your data for safe-keeping:

- Markings
- Detectors

11. Reference

11.1 Keyboard Shortcuts

Please print this page!

Key	Function
a	Previous image
s, space	Next image
+	Zoom in
-	Zoom out
Mouse wheel	Zoom in/out
b	Brighter
d	Darker
h	Head
n	Number plate
o	Other marking
u, Del	Delete last markings
i	Delete all markings for this image
1	Rotation off (default)
2	Rotate clockwise
3	Rotate counter-clockwise

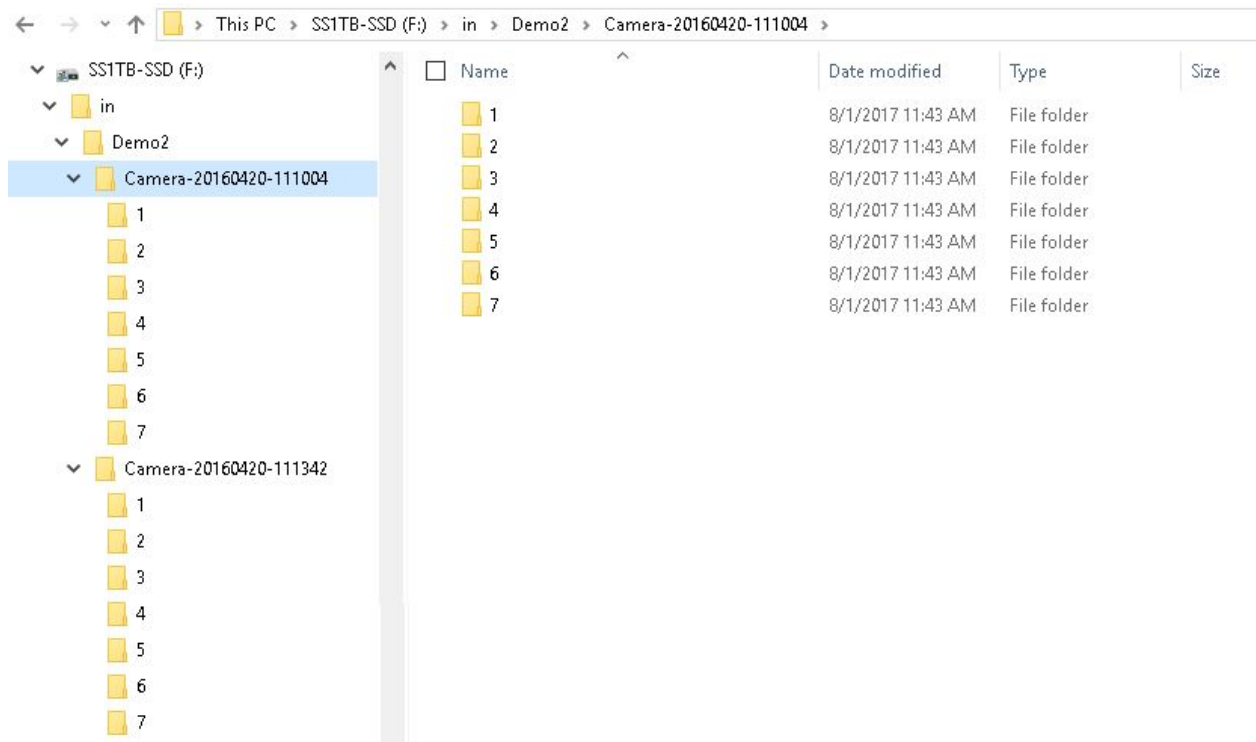
11.2 Project folder structure

Project folder **Demo2** with 2 tour folders, each with 7 subfolders:

Project folder

Tour folder(s)

Camera folder(s) ("1" to "7")



12. Support

Please update first.

Support is provided for the newest Privacy Keeper version only.
Maybe your problem has already been solved?

Check

Privacy Keeper -> Help -> Check for update

or

<http://www.applied-streetview.com/privacy-keeper/>

for new releases.

Contact

Support is available in English language.

Helpdesk: support.applied-streetview.com

E-Mail: support@applied-streetview.com

Skype ID: applied-streetview

Phone: +49 6103 - 372 7494

13. Consulting

We are available for hire for consulting.

Please contact:

E-Mail: jan.martin@applied-streetview.com

Skype ID: applied-streetview

Phone: +49 6103 - 372 7494