



AcceleratedVision

# AI Filter

Create and train your own filters  
with unique AI-technology

SHARPEN  
HDR NEAT  
DENOISE  
FOCUS COLOR LUT  
ZOOM BLACK & WHITE  
EMOTION ANALOG DIVE  
PANORAMA AI Filter

# Guide to the special functions of the programmes

## AI Filter

**AI Filter** is a highly unusual and unique programme with many unique selling points that are not available on the market in this form.

**Artificial intelligence filters** (AI) are trained using neural networks that recognise certain patterns, colours, brightness levels, details or other characteristics that are supposed to make up a desired image look, learn from them (deep learning) and achieve the desired result in many training runs.

What makes this programme so unique, given that there are numerous programmes with AI support or AI generation?

The developer of this programme, Michael Piepgras, has succeeded in making the great complexity of neural networks accessible to 'normal' users in AI filters, with quick results.

In **AI Filter**, you don't rely on 'foreign' filters with image look suggestions or problem solutions, but become the "architect" yourself, creating your own filters and determining which 'neural network effects' should be trained so that they can then be used in this and all other Accelerated Vision programmes that offer the AI training area module for all desired motifs.

In this sense, **AI Filter** can be understood as 'preparation' for all other programmes.

The path to your individual filter or the desired result look is simple: you upload a motif as a 'before' training image, modify it according to your ideas, then upload it as an 'after' training image and initiate a number of training runs that you specify in order to get as close as possible to this modified result.

If you save this result as a filter, you can select it at any time in the database and use it for all similar types of motifs or problem solutions. You can also draw inspiration from pre-trained filters and apply them immediately.

Another unusual feature is that you can watch the programme while it is training, evaluate all intermediate results and, if necessary, start as many training runs (iterations) as you like until you are satisfied with the result.

If you only use this programme, the chapter 'Workflow with presets or ready-made filters from the database' describes how you can quickly achieve the desired result.

**Note:** Cross-programme functions and modules such as the RAW module, all other modules that can be displayed via the toolbar, and expert mode can be found in the corresponding guides.

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## 1. General information and tips for using AI Filter

The following comments and keywords are suggestions to help you achieve high-quality results as quickly as possible and avoid unwanted errors. Of course, deviations are possible, but knowledge of the interrelationships should help, e.g. to select the training preparation parameters or the appropriate number of training runs in a more targeted manner.

- **The quality of a trained AI filter depends largely on how good the before and after images are.** This has about a **90%** influence on the result, by far the most significant factor.
- **Even complex presets with all effects can be recreated in AI Filter**, used in all programmes, and can be further processed there if necessary and then retrained in **AI Filter**.
- You can try out different presets for an 'after image', train them one after the other and, if necessary, vary them as you wish in **expert mode**.
- Examples of filters or effects that can be trained for image looks or moods: **Detail enhancers, Colours, Brightness, Gradients, Vignetting**.
- Examples of filters or effects that can be trained for problem solving: sharpening, noise reduction.
- **Several problems** such as **Noise reduction, Sharpening, and Chromatic aberrations** in an 'after image' are **solved simultaneously** during training.
- All filters can be combined with each other.
- **Exception: Geometric changes such as horizontal compensation, distortions, bending and image cropping cannot be trained in this programme.** If such changes are desired, they must be made beforehand, e.g. in the RAW module or other programmes, and are then part of the 'before image'.
- **'Before and after images' must be aligned with pixel precision.** This is one of the few points that does not allow for any tolerance. If the two images do not match exactly, the 'after image' cannot be trained in a targeted manner, and the results will be rather random or arbitrary.
- 'Before and after images' can be edited in any programme using all filters or effects.
- **The 'before image' should contain as many different colours as possible**, because the neural network can only train elements that it recognises in the 'before image'. If, for example, the blue of the sky or another colour is missing from the 'before image', it will also be missing from the trained filter and thus from all imported images to which this filter is later applied.  
How this problem can also be solved for images with few colours is described in the chapter 'Parameters for optimal preparation of training, **additional functions**'.

- **Number of runs:** As a rule, **the higher the number of training runs, the better the result.** This is also crucial for colours, because subtle colour differences are only taken into account in the 'late phase' of training. First, the brightness levels are 'processed', then the structures and finally the colours, which is initially confusing when you follow the progress and notice that the colours are missing from the image.

- **Dependence on the complexity of the filter:** As a rule, **the more complex and complicated the filter is and the more different tasks it has to perform, the more runs the programme needs to achieve an optimal result.** This can amount to **several hundred training sessions.**

You cannot go wrong, as the result can never get worse with each increase in the number of passes, but at some point it will simply not get any better, which is also indicated by an **automatic security check.**

- **Save project:** If you save the project after training, the 'before image' and the trained 'after image' will also be saved and displayed again when you open the project later. One advantage of this is that you can increase the number of training runs at any time to further improve the accuracy or precision of the filter.

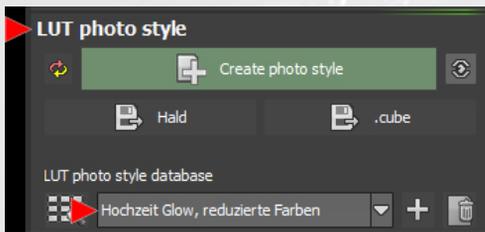
- **Possible workflow:**

- You upload an image with as many different colours as possible,
- then select the desired preset, e.g. **Structure Original** without effects
- transfer this current image processing as a 'training image before',
- select a preset that matches or comes close to your idea of the 'after image' and, if necessary, change the image look in expert mode.
- then upload it as an 'After' training image,
- select the parameter settings that you consider appropriate, start the AI training with the desired number of training runs to get as close as possible to the changed result.
- improve the result with further runs if necessary
- and save the filter in the database when you are satisfied with the result

The first image loaded may be a different one, e.g. the one to which the newly created filter is immediately applied. In this case, the 'before image' and the previously saved 'after image' are not **transferred**, but **loaded** or imported.

- **Advantages of AI filters over LUT styles:**

- AI filters can do incomparably more than LUT styles. The range of applicable effects is virtually unlimited, with the exception of geometric changes. Whether you want pure image look variations with exciting colour gradients, a light/dark vignette, structural changes such as influencing sharpness, detail enhancement/reduction, or problem solutions such as strong noise reduction and reduction of chromatic aberrations:
- **Everything is possible and everything can be combined!**



- **LUT styles can only reproduce brightness and colour changes with variations in hue, saturation and contrast.** However, these photo styles are unbeatably quick to create from any image file in the **LUT Styles** module and are ideal for achieving a consistent look in wedding photos, professional or creative image looks, for example. Like the **AI filters**, the **LUT styles** are transferred synchronously to all programmes in which these modules are used and can be used immediately after restarting the respective programme.



- **Advantages of AI filters over presets:**

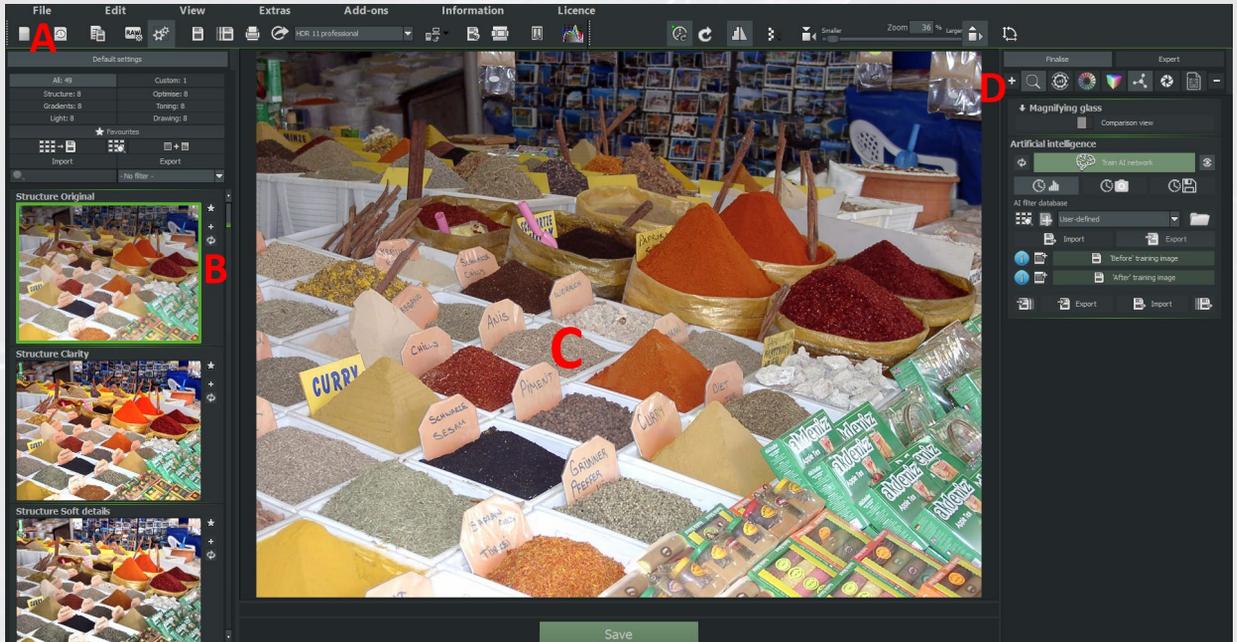
- **AI filters** also have clear advantages over **presets**, as in the example of **Micro-detail light** in the **HDR programme**, with an impressive result image thanks to the **tone mapping effect**: the **AI filters** are generated directly from the photo and can be expanded or varied as desired with additional effects, for example in expert mode. If necessary, various presets with the desired parameters can be calculated as AI filters and then trained with another preset to create a new filter. The desired 'assembly' of an 'after image' is also not limited to **AI Filter** or other programmes from **Accelerated Vision**. You can create the desired colour gradients or vignetting in Photoshop, use Topaz for sharpening, create AI-generated changes, etc., and then re-import the desired result image as an 'after image' into AI Filter and train it as a filter. Another advantage is cross-programme availability: While presets usually offer programme-specific categories and default settings as in the example, AI filters are immediately available in all programmes that offer the **AI filter area module** and can be applied to all desired image motifs.

## 2. Workspace with toolbar, 'Artificial Intelligence' module

If you own another **Accelerated Vision** programme, you do not need to change anything despite the exceptional options offered by **AI Filter**. The layout and use of the menus, tools and modules offered in the toolbar or RAW module are identical, require no adjustment and are described in detail in the General Functions guide.

Selected **presets** and the core of the programme, the **Artificial Intelligence module**, are described in the following chapters.

**Note:** The user interface is designed for 4K screens. On Full HD screens, you will need to scroll down slightly to see all modules and options.



The **AI Filter** workspace is divided into four main areas:

**A: Menu and toolbars.**

**B: Presets and the various preset categories.**

**C: Image area with the loaded image motif.**

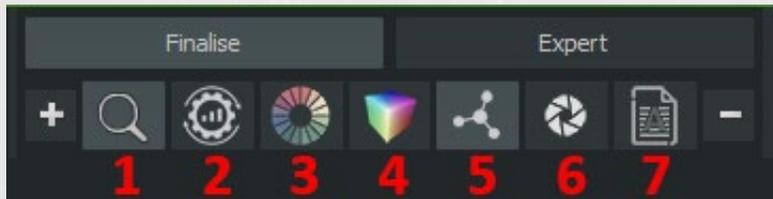


**D: Toolbar in Finalise mode with selectable modules** (see next page).

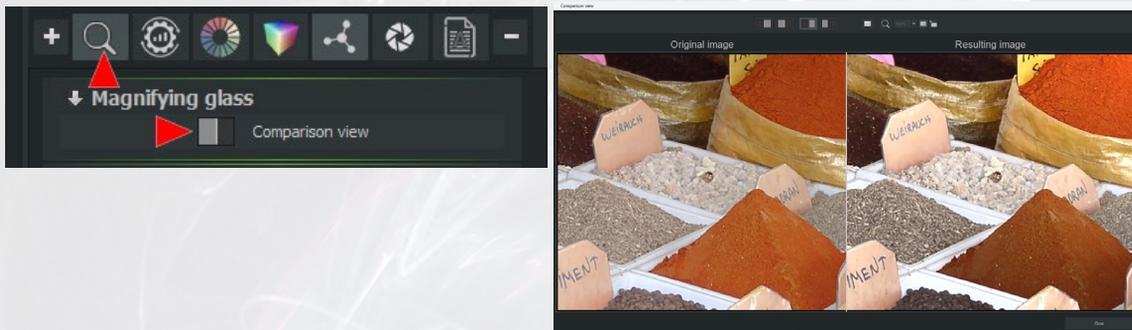
Clicking on the **plus** sign **displays** all modules, clicking on the **minus** sign **collapses** all modules.

By clicking on a desired module, in this example **Artificial Intelligence**, it is displayed, by clicking on it again, it is hidden again if necessary. This allows you to quickly configure the interface so that it is optimally tailored to your workflow. The currently set configuration is retained even after the programme is closed and restarted.

## Selectable modules in the toolbar

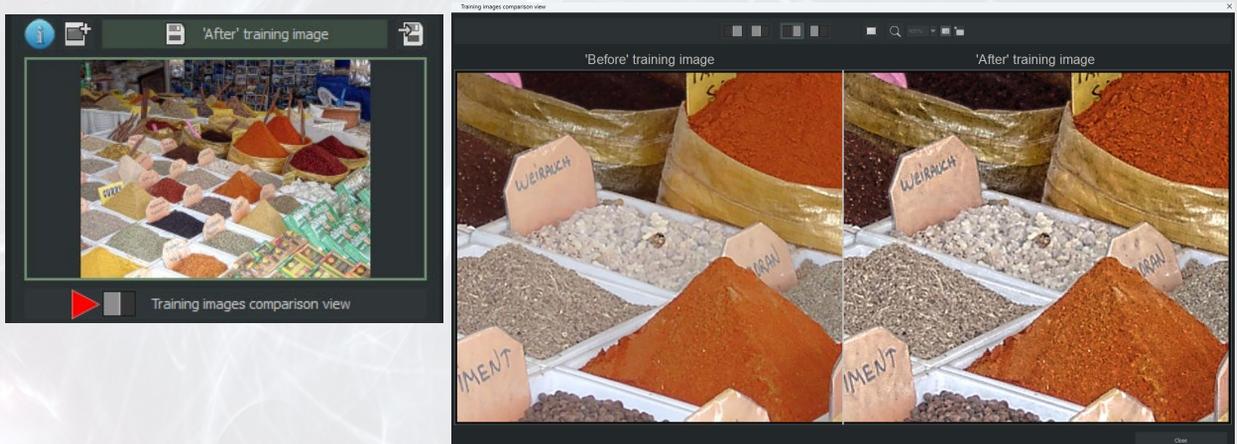


### 1. Magnifying glass/comparison view.



There are two comparison views in **AI Filter**:

- The 'normal' comparison view, which, as in all other programmes, is accessed by clicking on the magnifying glass icon in the toolbar and shows the comparison of the loaded original with the result image using a selected preset.



- If you have imported a 'before and after image', click on the Training Images Comparison View button below the 'after image' to see a comparison of the 'before image' with the image that you have modified, for example, by selecting a preset and applying additional effects, so that you want to train this look as a permanent filter. This comparison also makes it easier to check whether both images are identical.

### 2. Optimisation assistant.

### 3. Colour module

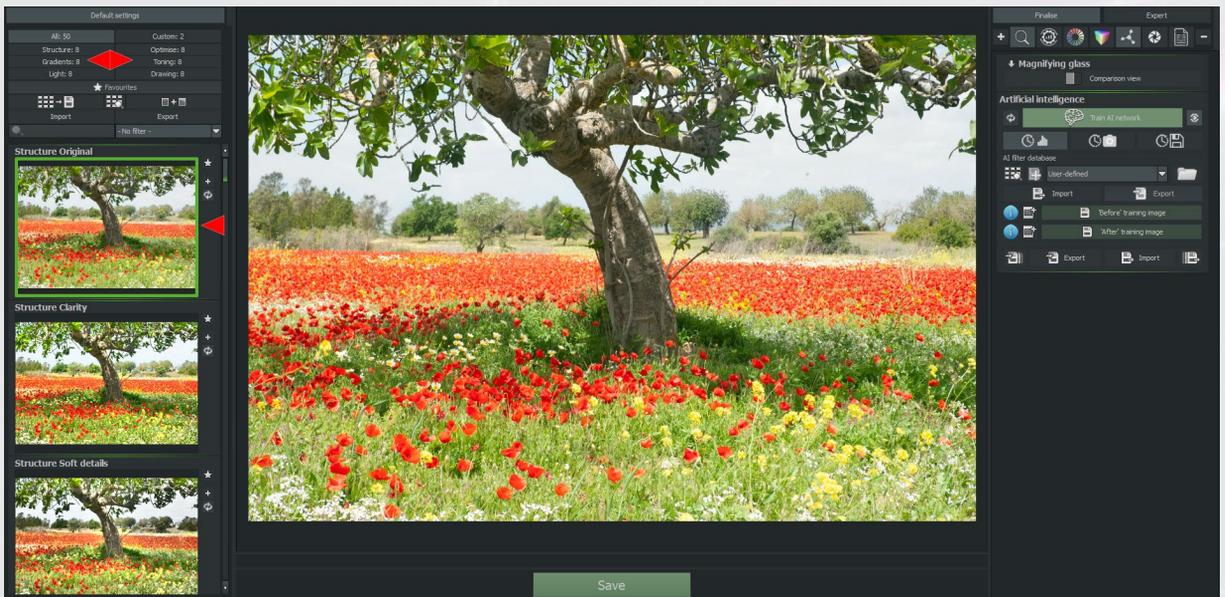
### 4. LUT module

### 5. AI filter area - the heart of the programme

### 6. Focus peaking analysis area

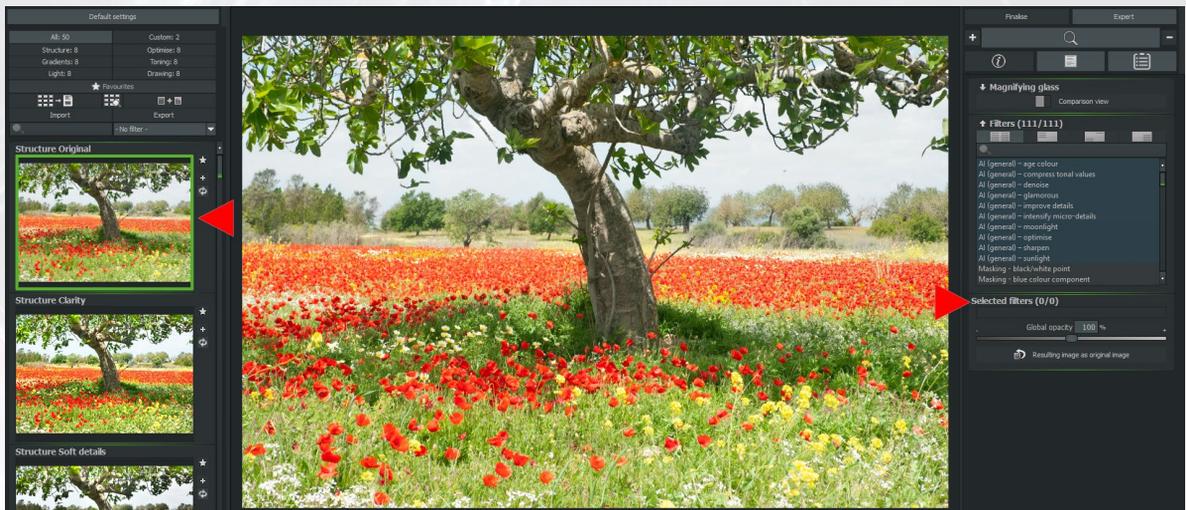
### 7. Watermark area

### 3. Presets



The **presets** in **AI Filter** are particularly important because they can be transferred or imported directly as **'before'** and **'after'** images.

Therefore, the image looks of the categories and the presets that can be selected within them are achieved exclusively with effects that can be trained in AI filters and can be directly applied as the desired image mood for a filter.

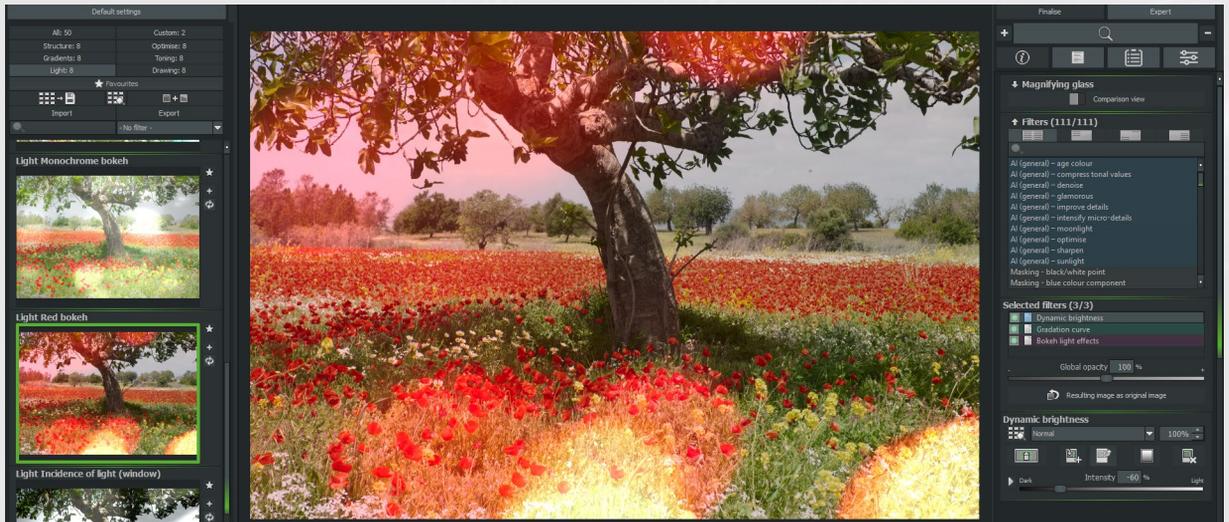


#### „Preset Structure Original - suitable as a 'before image'“

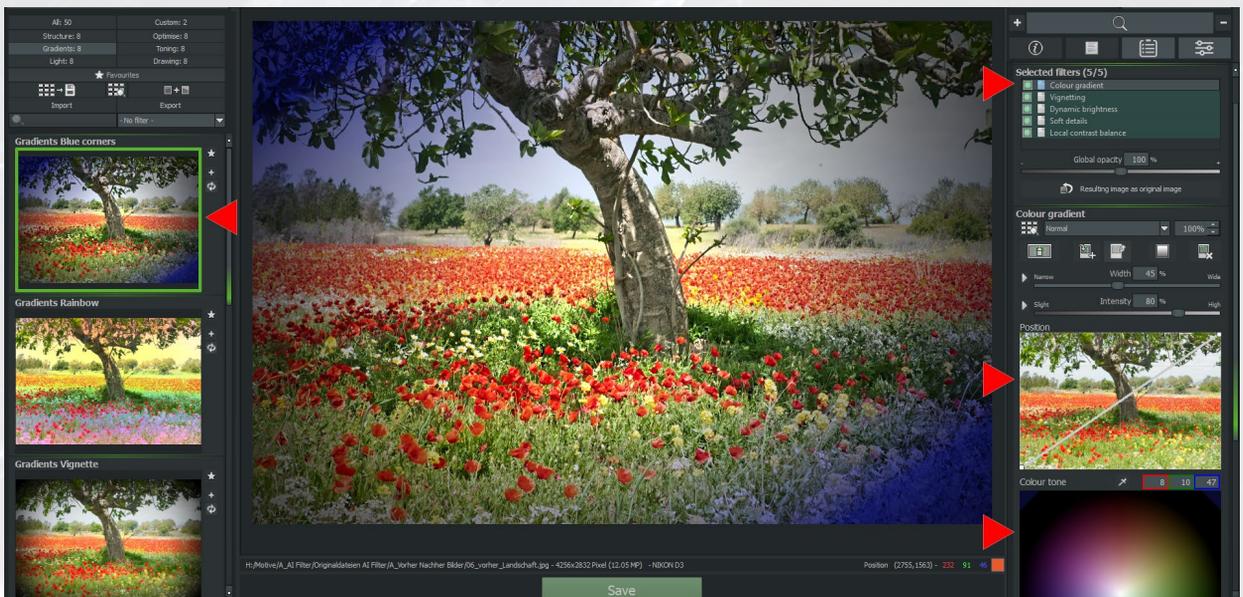
With the default preset **Structure Original**, you see the original image because it is an 'empty' preset without effects. After switching from Finalise to Expert mode, the list of selected effects is empty.

**Note:** The general handling of presets, 'reading' and changing presets in **expert mode**, and creating your own presets is described in detail in the **Presets guide**.

Select any preset and transfer it as the 'after image'.



Select any preset and transfer it as the 'after image' from the same or a different category, such as **Light Red bokeh** from the **Light** category in the example...

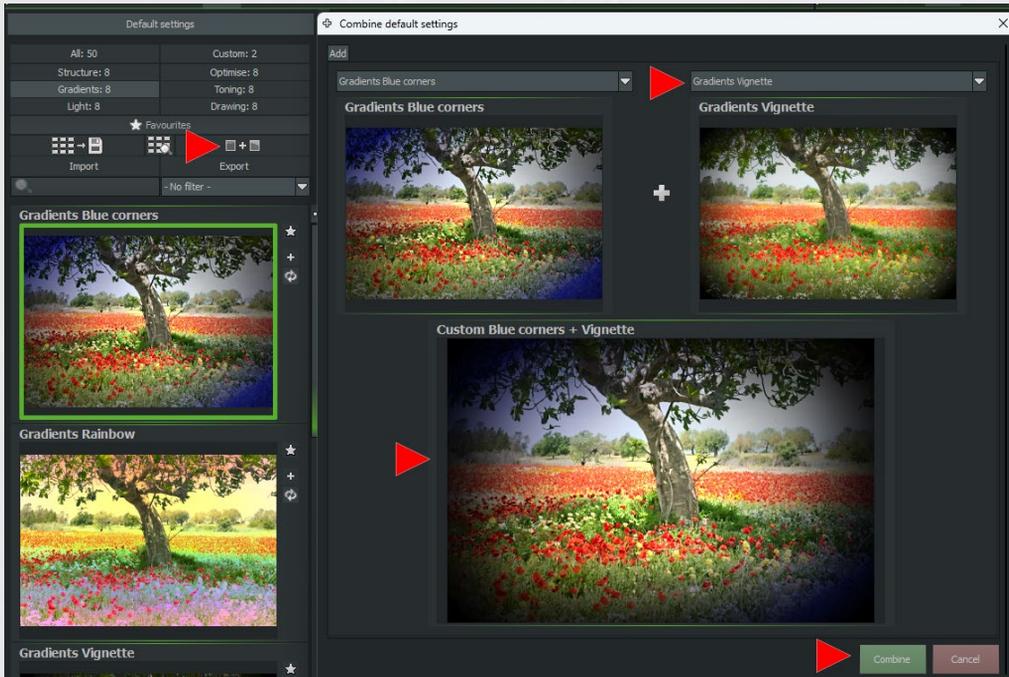


... or **Gradients Blue corners** from the **Gradients** category show you the image-defining effects in expert mode, which you can customise to your liking using the corresponding parameters so that the image look matches your ideas for a filter for other motifs as well.

You can then transfer this image as the 'after' image.

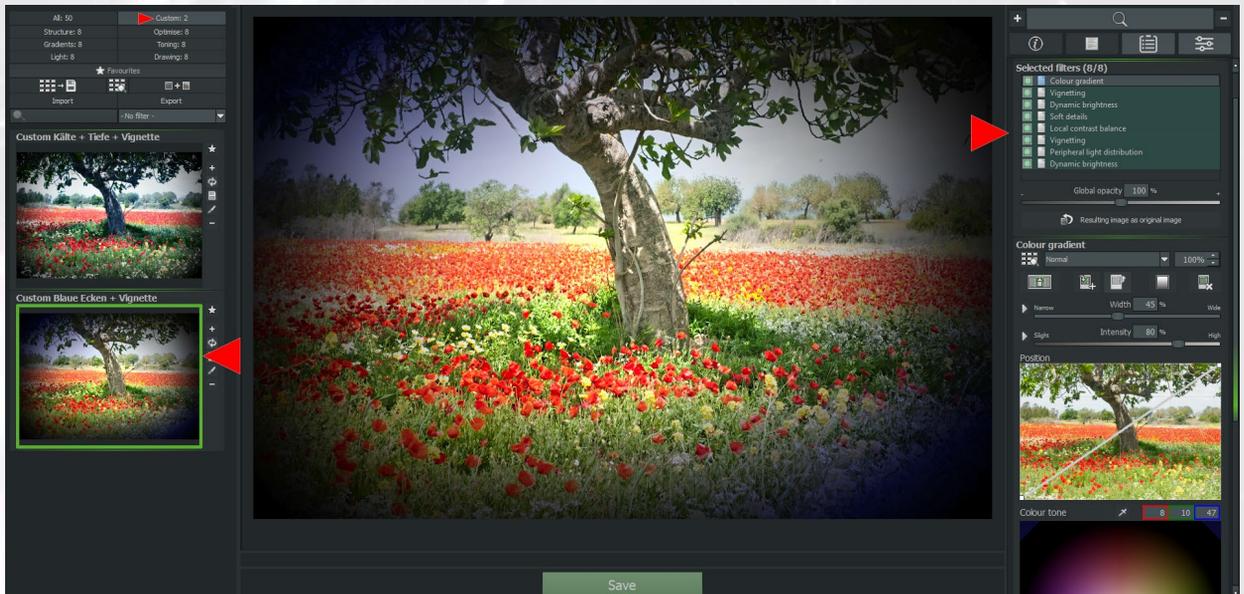
**Note:** As described in the first chapter, you can of course also make changes to the 'after' image in any other programme of your choice. Selecting a preset or combining several presets is particularly quick and easy to do.

## Combining presets



Combining two or, if necessary, several presets results in appealing, surprising or unusual image looks, which can then be used immediately as trained filters in all programmes.

Clicking on the **button** opens the **Default settings-window**, where you will see the previously selected preset on the left, which you can combine with any other preset on the right, in this example **Gradients Vignette**.



Clicking on **Combine** saves this preset at the bottom of the **Custom** category, and the view of the selected effects shows the image-defining filters/effects with all parameters again.

If necessary, this 'new' preset can be combined with another one.

These two examples show how quickly desired image moods can be created with one or more presets and trained as filters.

## 4. Workflow with presets or filters from the database

If you want to use **AI Filter** to quickly achieve a finished image using presets, filters from the database, or a combination of both, you can do so in just a few steps:

**Step 1: Load the desired image motif.**

**Step 2: Select a preset, filter from the database, or combination.**

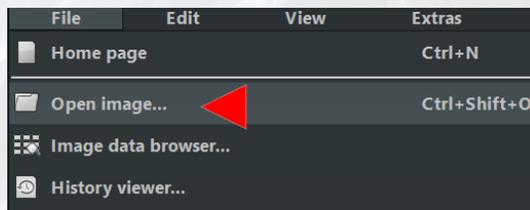
**Step 3: Crop the resulting image if necessary and/or add a caption.**

**Step 4: Save or print, select one of the scaling suggestions if necessary – done!**

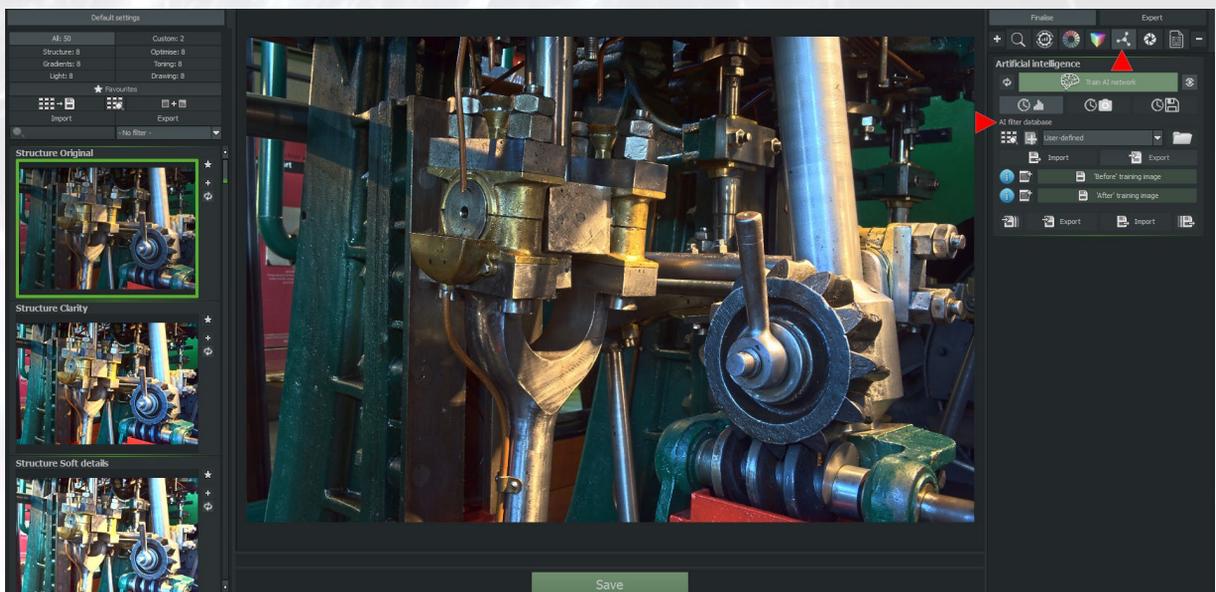
**Note:** How to select a desired image look using a preset was described in the previous chapter. Therefore, the examples listed here refer to the use of **filters from the database** and their **combination with presets**.

The individual steps of this workflow, from loading an image to saving or printing, are described in the guides for other programmes in the **Flash Workflow** chapter or in the **General Programme Functions guide**.

### Step 1: Load image



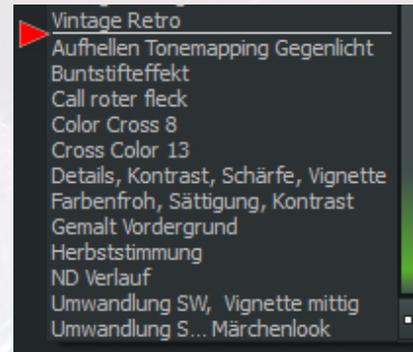
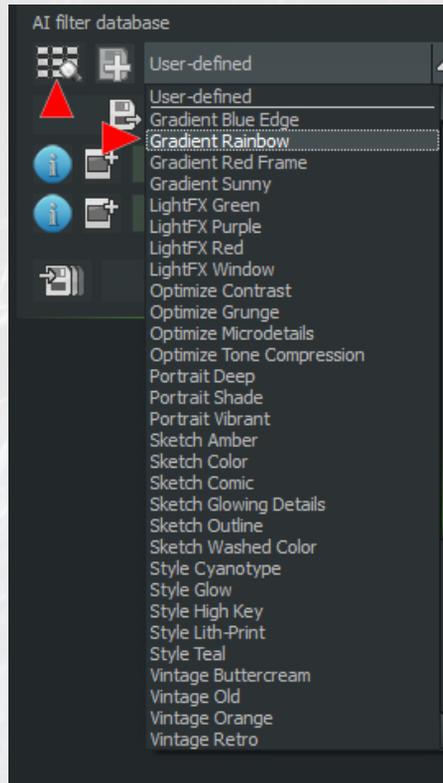
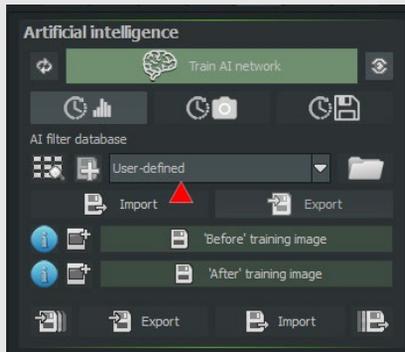
By clicking on **File/Open image ...**



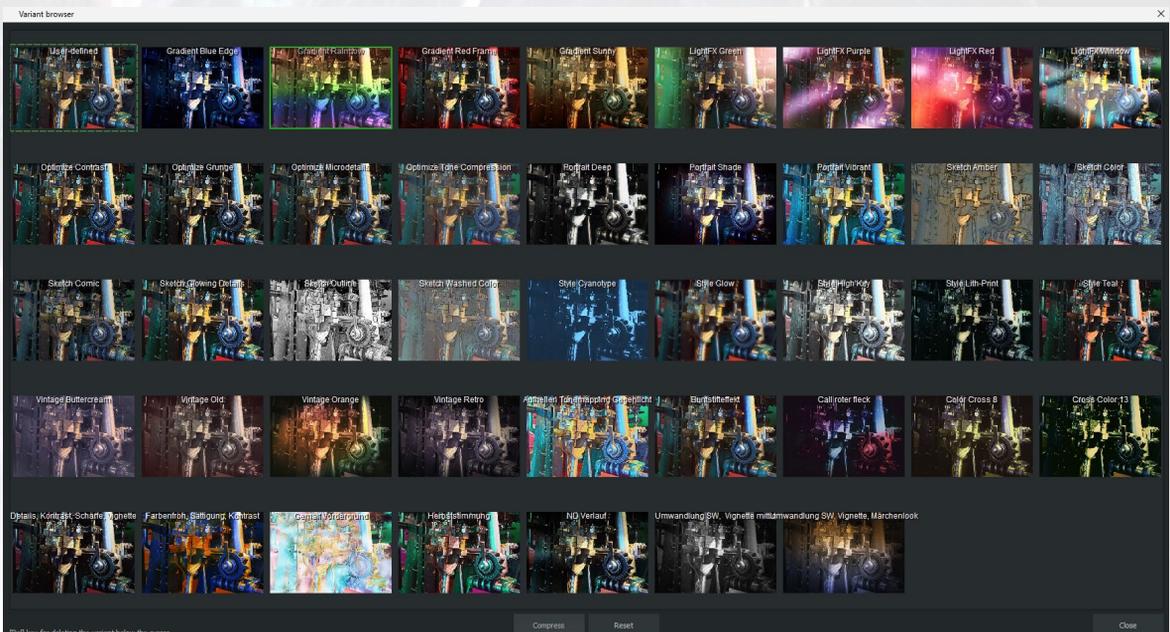
... import the desired image motif.

Clicking on the **AI filter area** button in the toolbar opens the **Artificial Intelligence module** with the **AI filter database**.

## Step 2: Selecting a filter from the database



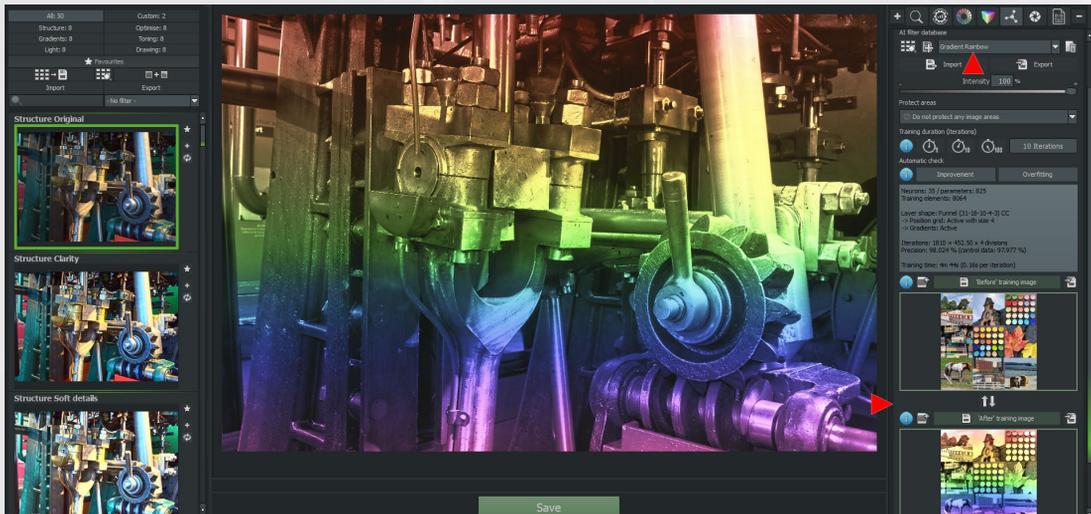
Clicking on the **User-defined button** or the small arrow to the right of it displays the list of predefined filters (centre graphic). The self-trained filters are listed below.



### Alternative display: Variant browser

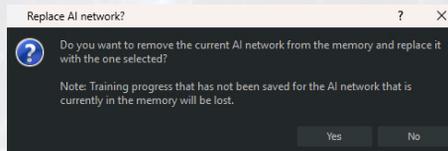
Clicking on the browser icon displays the **Variant browser** with all available filters and provides a quick overview of the effect of a filter. Double-clicking on a desired thumbnail immediately applies it to the loaded image.

## Example 1: Selecting the Gradient Rainbow filter



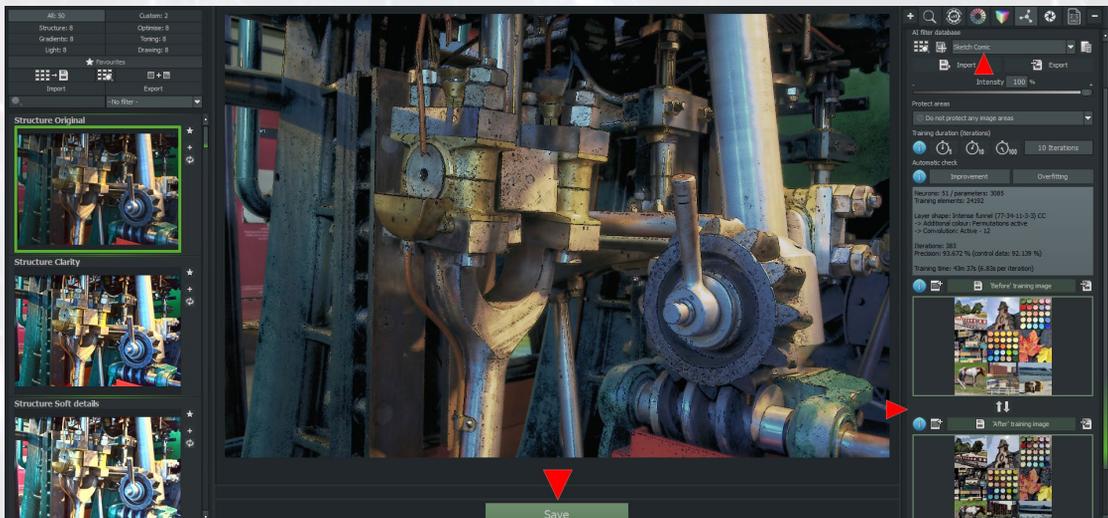
Simply click on the desired filter in the list, in this example **Gradient Rainbow**, or double-click on the thumbnail in the browser, and the filter will be applied to the loaded image immediately.

Below, you can see the image file used to train the filter as a 'before' and 'after' image. The information window displayed above lists the corresponding parameters and settings.



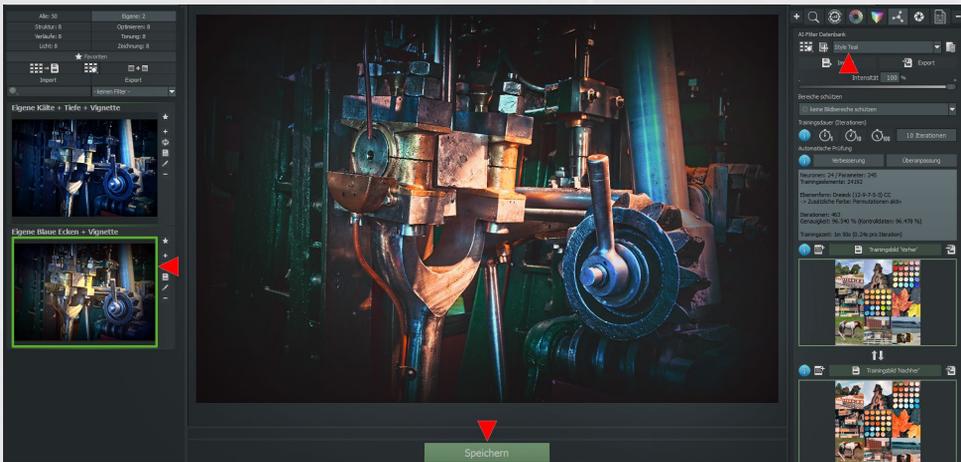
## Example 2: Selecting a different filter Sketch Comic

If you select a different filter, in this example Sketch Comic, the information window will appear with a warning that any unsaved training progress will be lost. Since you have not trained anything here, you can confirm the warning with **Yes, ...**



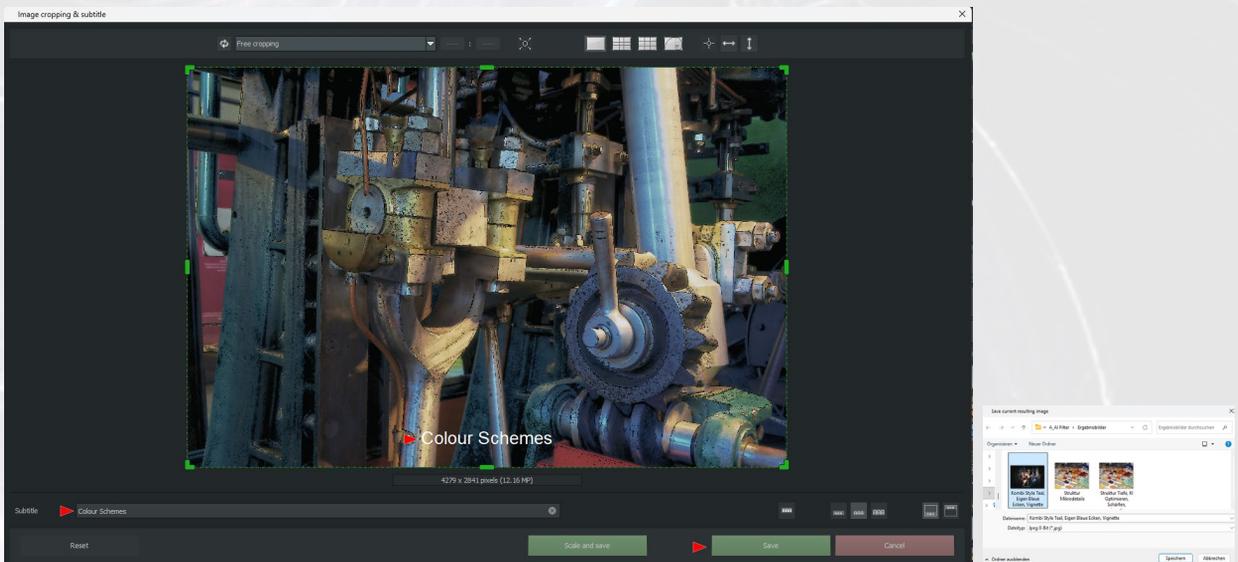
... and you will immediately see the edited 'before and after' image and the final image with the comic look.

### Example 3: Combination of Filter **Style Teal** with a **self-created preset**



You can combine all filters, in the example **Style Teal**, with a preset of your choice. Here, the 'own' preset from the last chapter Presets has been selected and transforms the industrial motif into an exciting play of colours.

### Step 3: Crop the resulting image if necessary and/or add a caption.



Clicking on the large green Save button takes you to the Image Cropping & Captions window. Here, you can crop the image using the 8 green handles and/or add a caption if required.

### Step 4: Save or print, select one of the scaling suggestions if necessary – done!

By clicking on the green **Save button** again, the result image can be saved in a folder of your choice, preferably with a descriptive name such as **Kombi Style Teal, Eigen Blaue Ecken, Vignette** (graphic on the right).

**This combination can be imported as an 'after image' and trained as a new filter.**

## 5. AI Filter Module 'Artificial Intelligence' - Overview

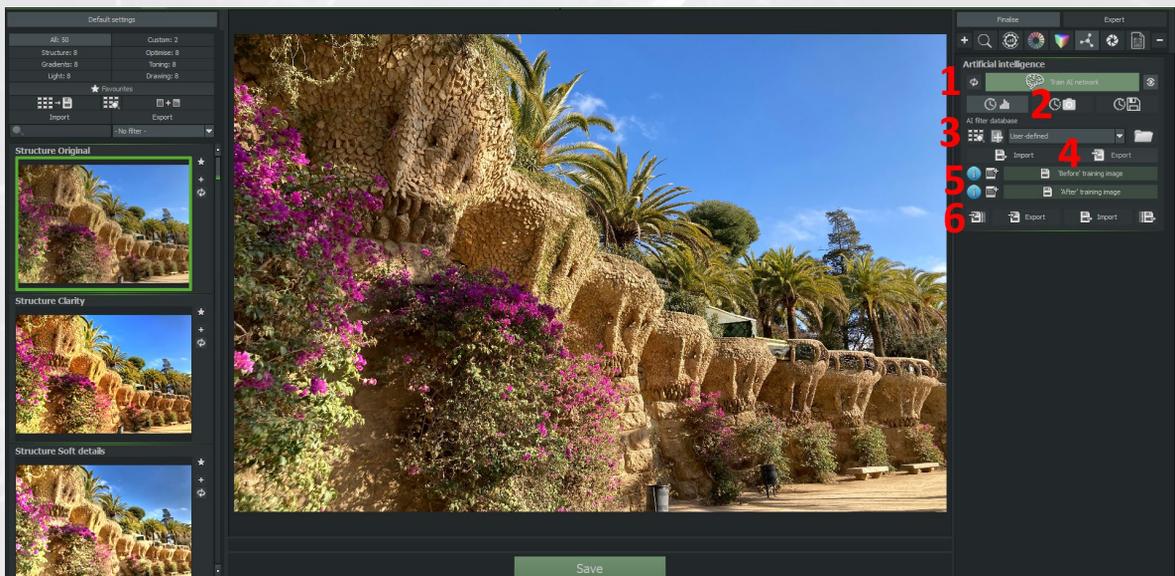
The 'heart' of **AI Filter**, the **Artificial Intelligence** module, offers various options for **using** ready-made or self-trained filters or **training** filters with a wide variety of image looks or problem solutions.

You saw examples of how to **use** the filters in the previous chapter.

The following chapters focus on the **active** role, including:

- Loading the 'Before' image.
- Processing of this image as requested, the mood of which is to serve as an 'after image'.
- Loading the 'After' image.
- Determining the appropriate parameters for training.
- Train the AI network.

The following overview is intended to provide a quick guide.



Once you have loaded an image motif, you will always see the module without the 'Before and after images' and the preparatory training parameters.

Exception: If you load a previously saved project, the corresponding 'before and after images' will also be displayed immediately.

- 1. Train AI network:** Clicking this large green button starts training with the set values.
- 2. Various functions** for displaying the current training data or saving it automatically.
- 3. AI filter database** with the option of selecting pre-built or self-trained **filters** from a list or the variant browser, or adding a **trained network to the database**.
- 4. Import/export function** for trained networks.
- 5. Training pictures 'Before' and 'After'.**
- 6. Quick export/import and export/import functions** for the **current filter settings**.

## Artificial intelligence module with training images showing 'Before' and 'After' results

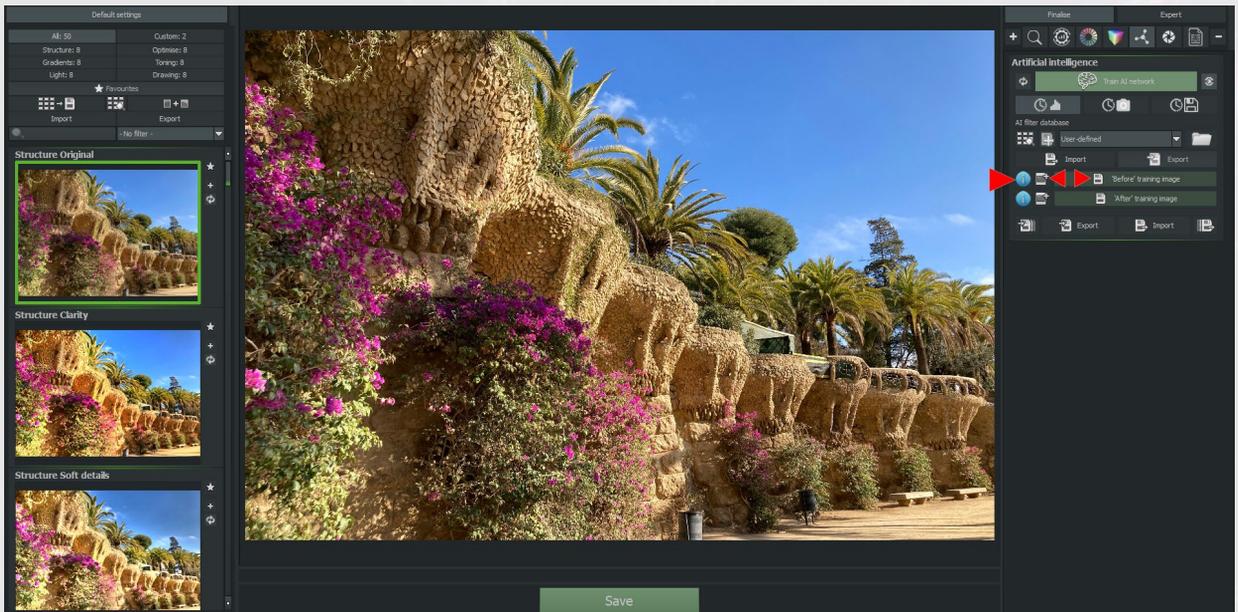


Once you have transferred or imported a 'Before' and 'After' image, the corresponding thumbnails and all parameters and settings for preparing and performing the training will be displayed.

**Above the 'Before' training image**, all buttons and settings for the **training process** are arranged, with the exception of the database. **Below the 'After' training image**, all parameters and settings for **preparing for training** are arranged:

- 7. Training duration (iterations) in seconds, which can also be set manually.**
- 8. Division of iterations, resulting in an increased learning rate and acceleration of the process.**
- 9. Automatic improvement check**, which checks each training run for **improvement**, and **overfitting**, which stops training if the programme considers that no further improvements can be achieved.
- 10. Training image 'Before'**, which can be, for example, the original with the **Structure preset Original (no image look-changing effects)**.
- 11. Training image 'After'** with **exactly the same image dimensions** as the "Before" image, which is modified or manipulated as desired to serve as a 'template' for a permanent filter to be trained.
- 12. Parameters for training preparation in order to achieve the best possible results.**
- 13. Export-/Import-functions**

## 6. Select and transfer/import the 'Before' training image

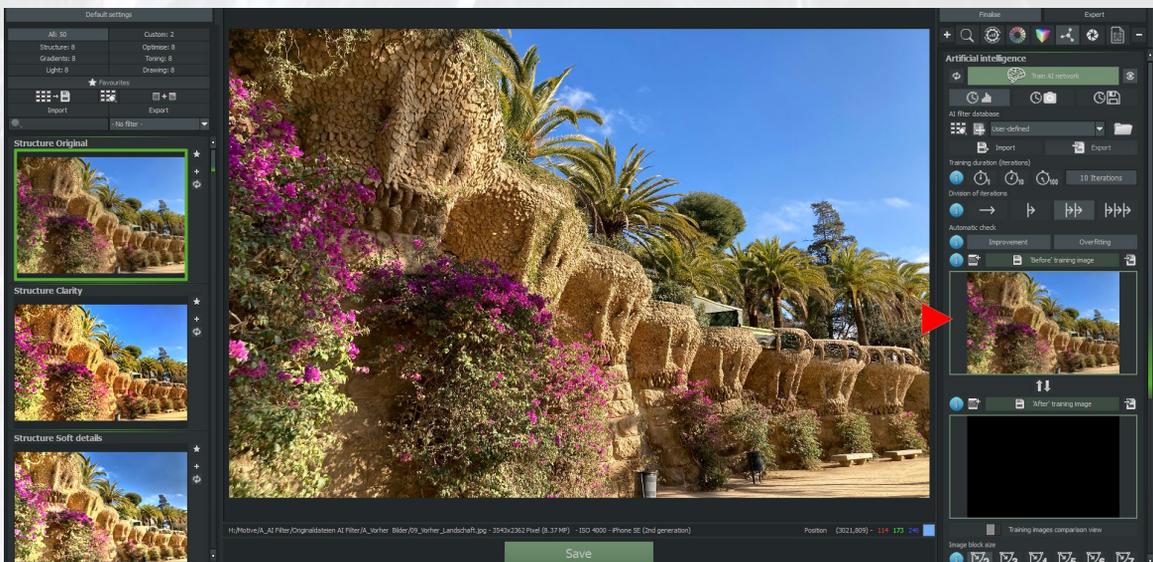


There are two ways to load the 'Before' training image:

- **Transfer the loaded image** using the currently selected preset, in the example **Structure Original** or
- **Loading** an image from a folder.

### Transferring the imported image

By clicking on the button next to the blue info button ...

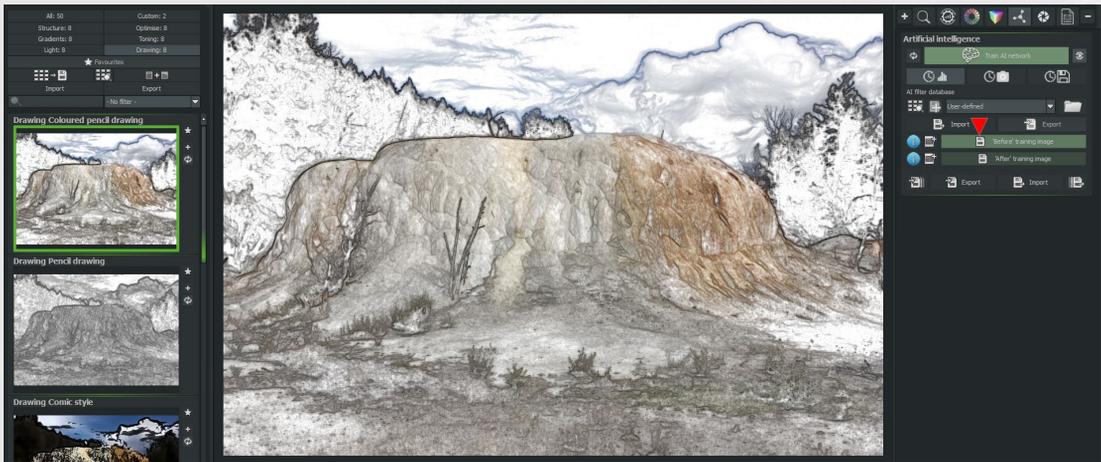


... the current image editing is immediately transferred as a 'Before' training image.

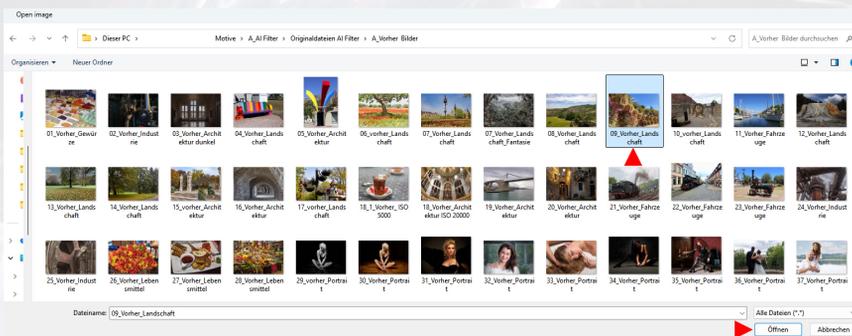
**Note:** As described in the introductory chapter, the choice and quality of the 'before image' is crucial.

**The 'before image' should contain as many different colours as possible,** because the neural network can only train elements that it recognises in the 'before image'.

# Import from a folder



By clicking on the **Training Image Before** button ...



... select the desired image motif from a folder. **Double-click** on the image or click on **Open** ...



... it is immediately loaded as a 'before image' as during **transfer**, and the corresponding thumbnail is displayed.

**Notes:** When loading from a folder, the **original is always imported** as you saved it. It does not matter which image you previously loaded into **AI Filter** and changed the image look with a preset of your choice, as in the graphic above with the **Coloured pencil drawing** from the Drawing category.

**Image format:** You can choose **any image format** for the 'before image', whether **square, portrait or landscape**.

# Saving and loading an image from the database

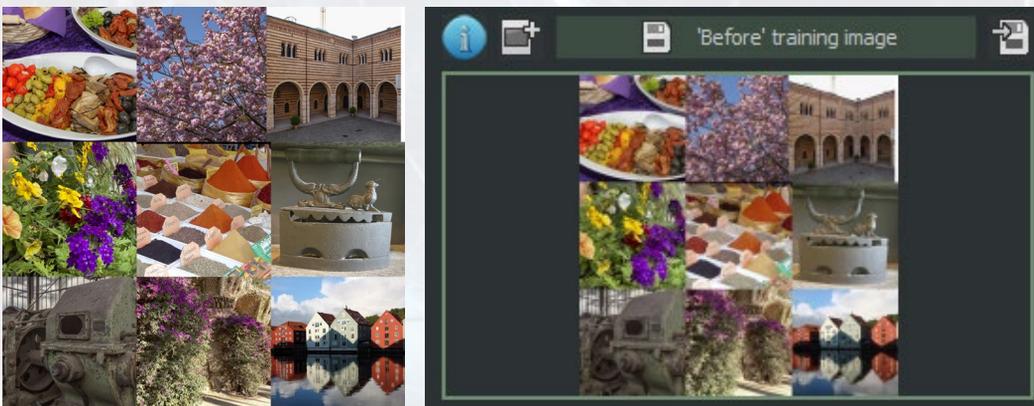


If you do not have a suitable 'before image' of your own available, you can use the training image with which the pre-built filters were trained and which ideally meets all the requirements for a "good" 'before image':

- Select any filter from the database, in this example Light FX Window. The corresponding 'before and after' images are displayed.
- By clicking on the button with the save icon next to the 'Before' image ...



... save the image as an 8-bit TIF file (default setting), for example and can later reload it as a 'before image' at any time for any imported image motif and any selected preset.



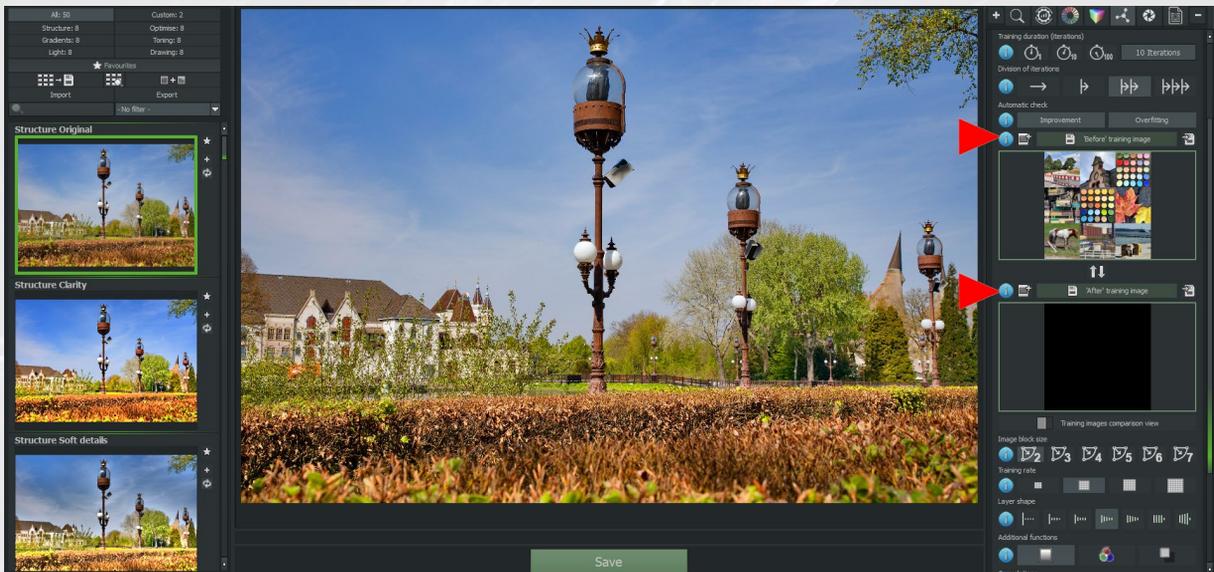
**Note:** The appeal of this programme lies, of course, in training with your own images, as shown in the graphic on the left. There are nine image excerpts that have been assembled into a collage similar to the training image in the programme and saved as a "before image".

## Information window

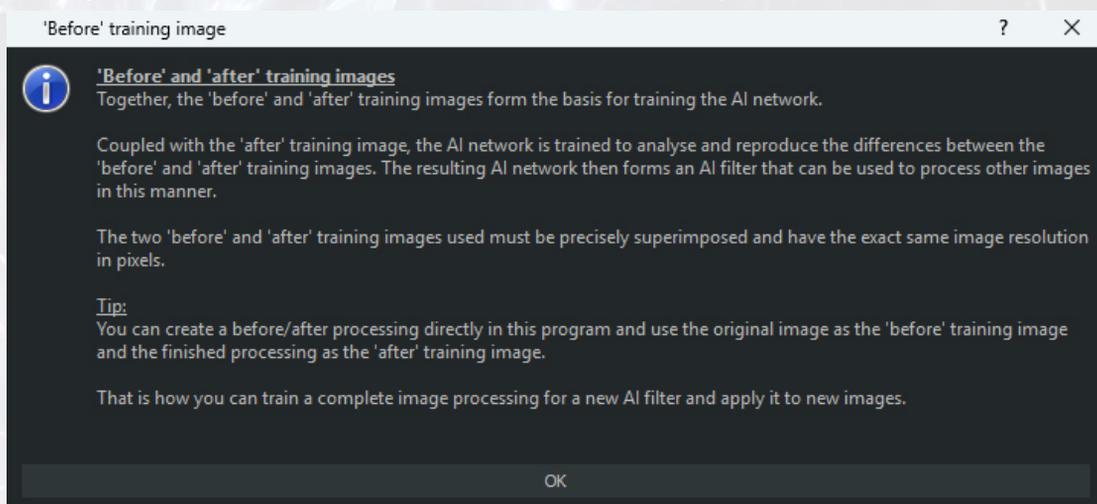
In all **Accelerated Vision** programmes, interactive buttons provide useful information about what lies behind the buttons and what they can do. This also applies to all modules.

**AI Filter** is so different from all other programmes with many new functions that, in addition, most functions and parameters have an information window that provides valuable tips and suggestions related to the selected function or parameter.

### Example: 'Before and after images'



By clicking on the blue button with the information symbol ...



... the information window for the 'before and after' training images opens with lots of helpful explanations and tips.

**Recommendation:** Before selecting a function or making any changes, e.g. to the parameters that deviate from the default settings, it is advisable to open the corresponding information window.

## 7. Edit the “after” image according to desired criteria

The goal of the Artificial Intelligence module is to **create your own filters using a neural network**, which are generated directly from the “before and after images” in order to save them as permanent filters and apply them to other image motifs in this or other **Accelerated Vision programmes**.

The basis for this is the “before image,” which is modified and manipulated according to your individual ideas to create the “after image” in such a way that, after all changes have been made, it can be imported as the “after image” and then trained as a filter in comparison to the “before image.”

Except for the two restrictions

- **Exact, pixel-perfect matching** of the “before and after” images,
- **No geometric changes,**

You can let your imagination run wild and use as many effects as you need to give the “after” training image the **look you want**, apply solutions such as **noise reduction or sharpening**, or a combination of both: **anything is possible!**

If you are using an existing preset or have some experience in making specific changes to an original, load the saved image with the “result look” as the “after image,” rely on the default settings or change them as needed, and start the training.

The following examples provide some suggestions for creating the “after” image:

- **Select a preset** from the categories offered.
- **Combination** of two or more presets.
- Modifying an original in the **RAW module**.
- Changing a preset in **expert mode**.
- Use **other Accelerated Vision programmes** because almost every filter from every program can be replicated.
- Use programs from other providers such as **Photoshop**.

The path to the appropriate “after” training image is always the same:

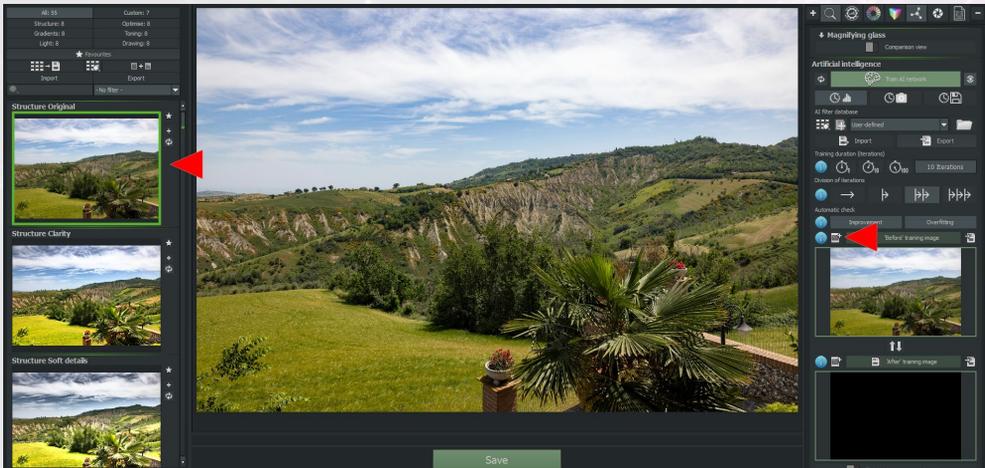
- **Objective for the filter training**, e.g., changing the exposure of the colors, the contrast, adding a vignette, a gradient, etc.
- Decision on whether and how this objective can be implemented in **AI filters** or other programs.
- Modify the original according to your desired specifications.
- Saving the result image.

**Note:** All examples listed in this chapter are prepared, trained and stored in the database in the following chapters using the parameters.

## Example 1: Selecting a preset from the available categories

This is the easiest way.

**Objective for filter training:** A vignette that darkens the edges of the image on all sides, thereby highlighting the main subject and brightening it slightly.



You upload the desired image motif.

If you want to train the filter immediately after saving the "After" training image, transfer it as a **"Before training image"** by clicking on the button. This also applies to all other examples.



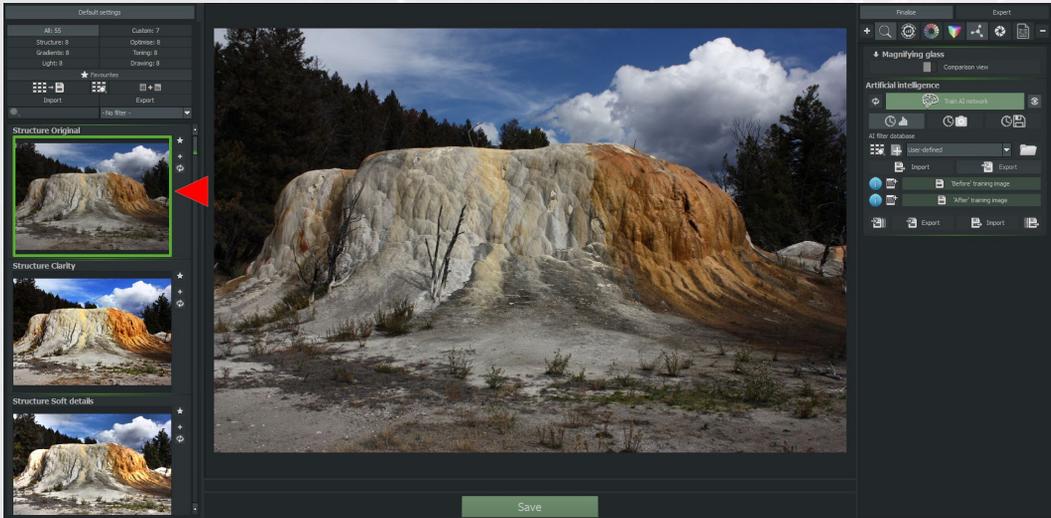
In the second step, check whether there is a preset in the categories that meets your requirements, in the example **Gradient Vignette**, and save this image look as the result image - done!

Switch to **expert mode** to see the effects associated with the presets, which can be adjusted to your individual taste using the parameters and/or supplemented with additional effects from the list of all available effects.

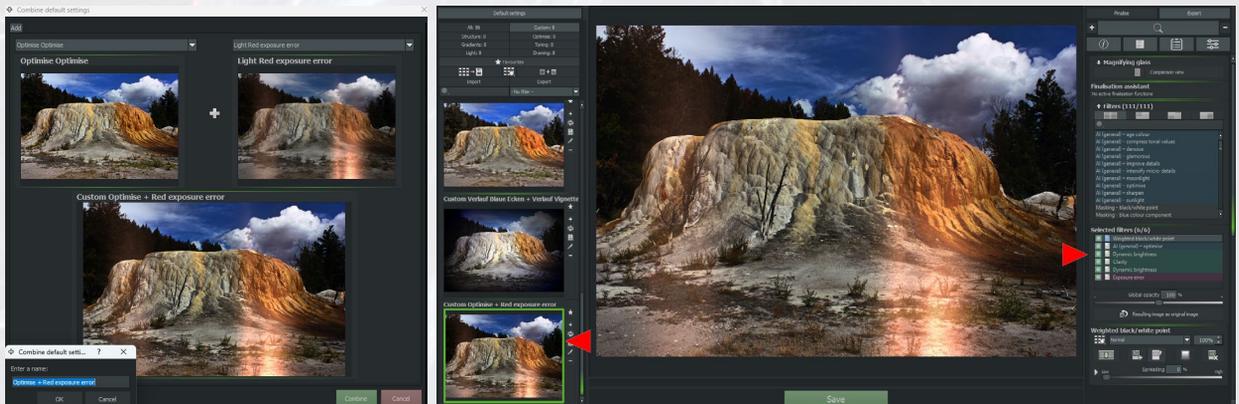
If you want to train the look of this result image as a filter right away, click the button to transfer it as a **training image "After"** and you can train this filter. This also applies to all other examples.

## Example 2: Combination of two or more presets

**Objective of the filter training:** Sharpness, contrast, and color should be optimized, clarity in the details should be more visible, and an added exposure error should give the image a distinctive mood.



You upload the desired image motif.



In the second step, check whether there is a preset in the categories that meets your requirements, or a **combination of two presets, for example, Optimize from the Optimize category and Exposure Error Red from the Light category**, and save this image look as the result image.

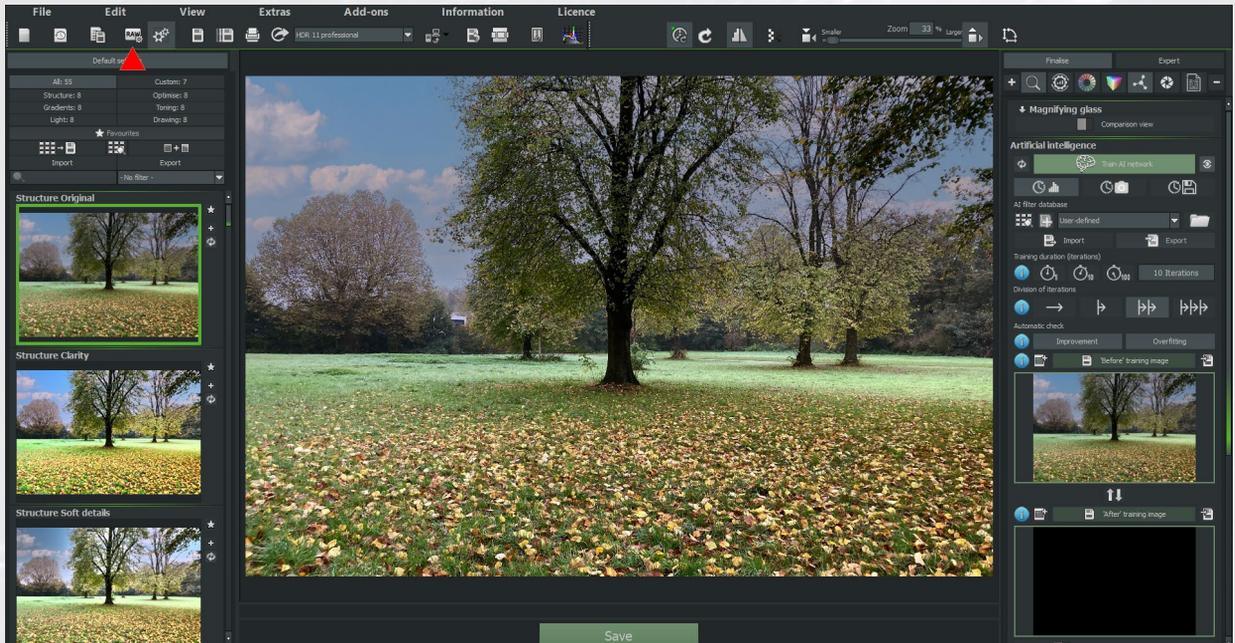
Switch to **expert mode** to see the effects associated with the presets, which can be adjusted to your individual taste using the parameters and/or supplemented with additional effects from the list of all available effects.

If you want to train the look of this result image as a filter immediately, click on the button to transfer it as a **training image "After"** and you can train this filter. This filter with the effects could also be trained immediately with the default settings.

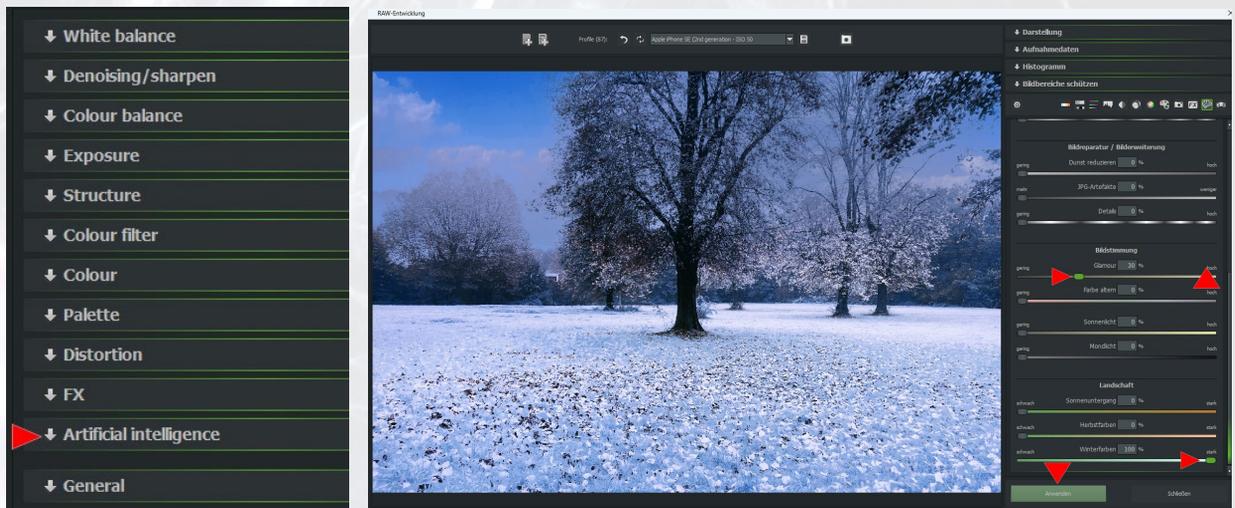
### Example 3: Modifying an original in the **RAW module**

**Objective for the filter training:** The image look of an imported “suitable” motif should be transformed into a **winter landscape** with a slight **glamour look**.

**Note:** The RAW module with all offers and options is described in detail in the **RAW Module Guide**.

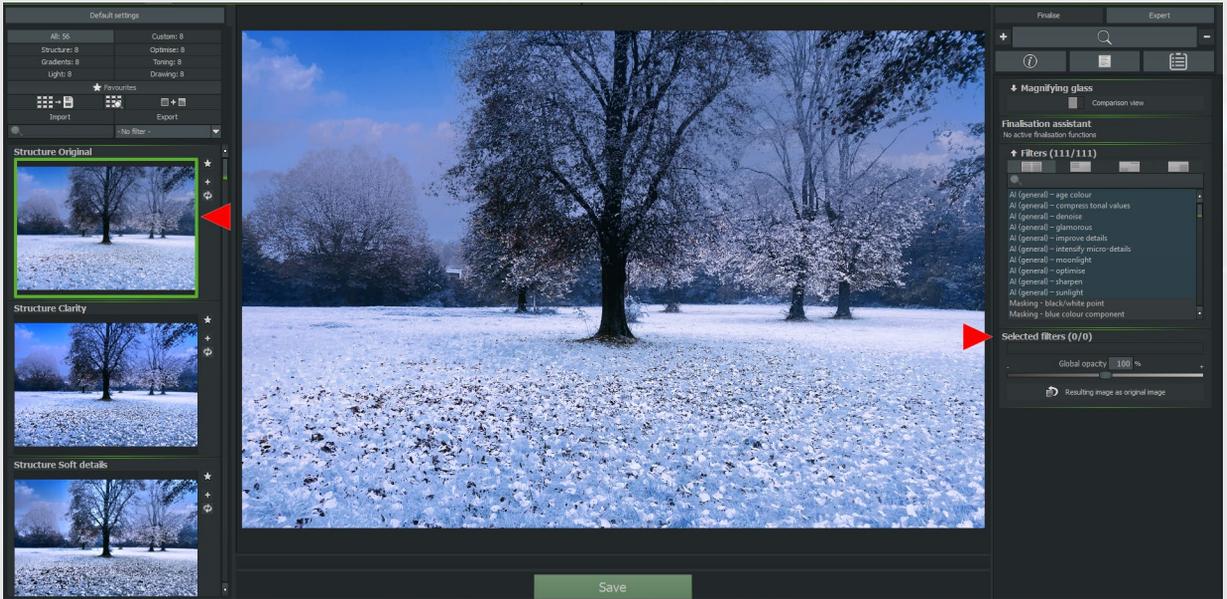


You upload the desired image, load it as a “before” training image if necessary, and switch to **RAW development** by clicking on the button...

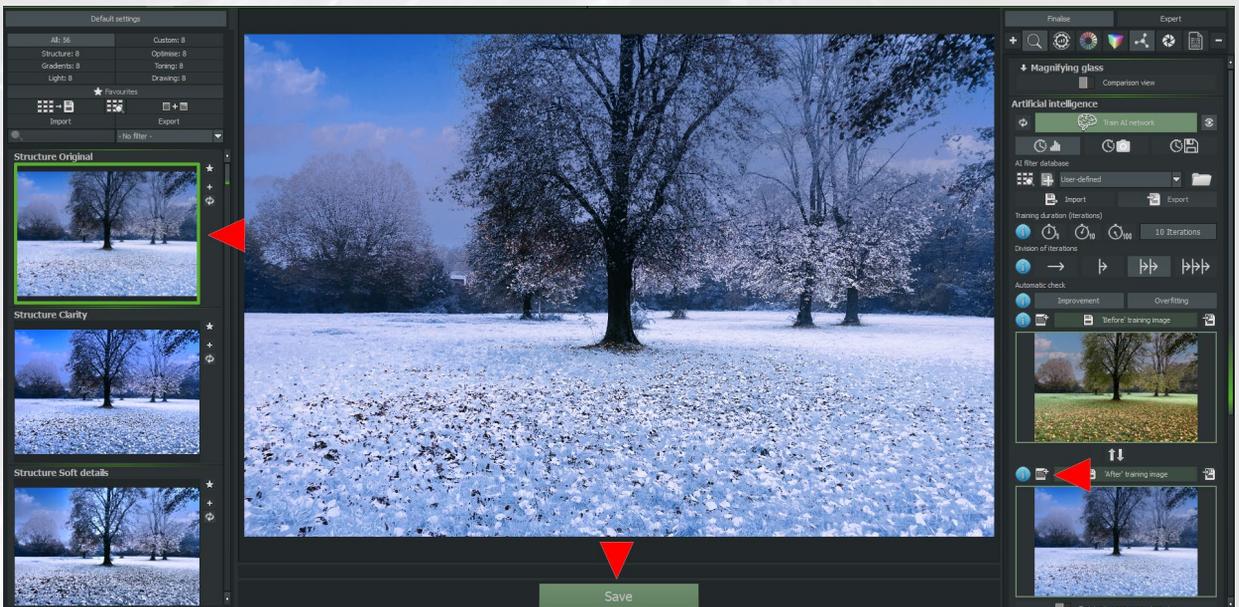


... to the RAW module. Here, select the desired area, in the example **Artificial Intelligence** (graphic on the left), and drag the **Winter Colours** and **Glamour** sliders to the desired position. Click **Apply** to return to post-processing.

## New original



**Structure Original** is now the 'new' original image, which can also be recognised by the fact that there are no selected effects for this preset.



**Save the result image or transfer it as an 'After' training image:** Unlike in the two previous cases, this 'new' original can be saved as a result image to be imported as an "After" training image at a later time, or you can **transfer** it immediately as an 'After' image and start the training, which also works very well with the default settings in this case.

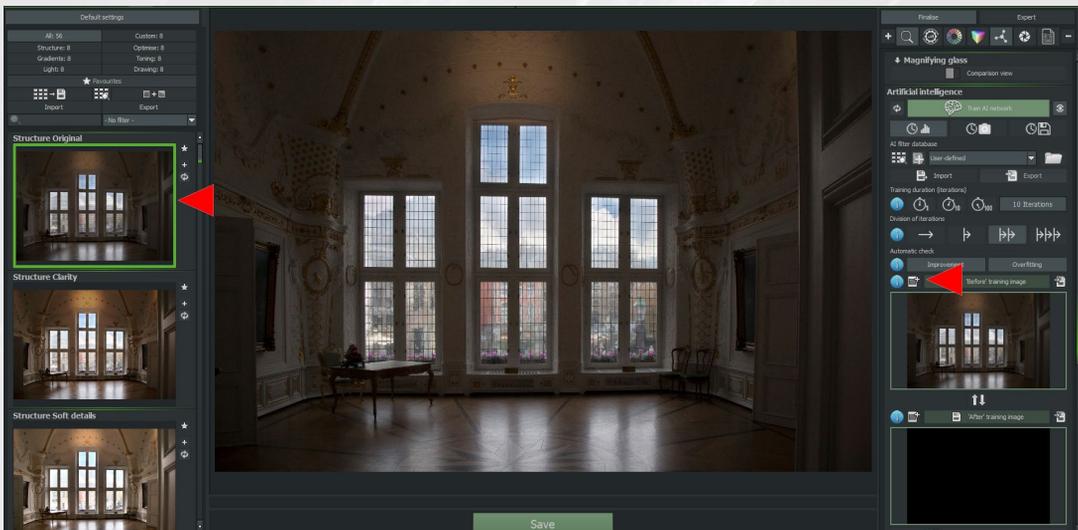
**Note:** Of course, this 'winter look' can also be varied as desired with any preset and/or additional effects and trained as a filter.

## Example 4: Changing a preset in expert mode

### Objective of filter training: problem solving.

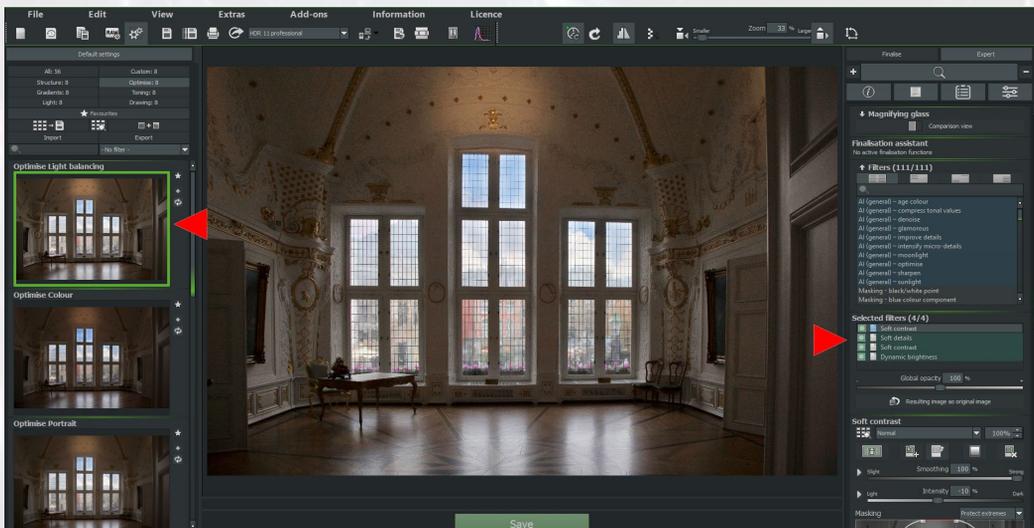
When taking photographs inside a building or in a street canyon, for example, even the best cameras cannot solve the problem that either the room or the street canyon is underexposed and the sky is correctly exposed, or vice versa, the interior of the building or the street canyon is correctly exposed, but the sky is overexposed and 'frayed' in the highlights.

The solution to the problem therefore consists primarily of brightening the dark areas and leaving the light areas largely untouched. The filter to be trained solves this task by selecting a **preset with corrections and adding further effects in expert mode**.



After switching to **expert mode**, you can load all the desired effects into the 'empty' **Structure Original** preset and optimise the image effect using the parameters.

You will often reach your goal faster if you select a preset that comes close to the desired 'basic idea' before making the change ...

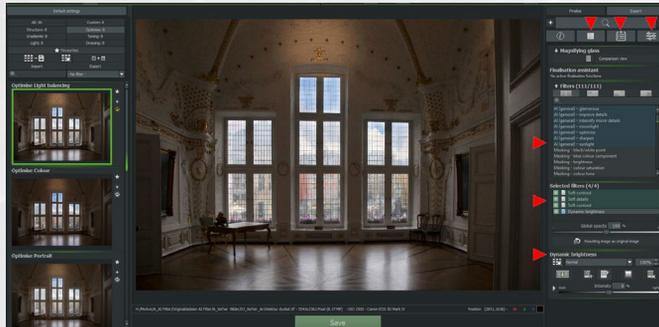


... as in the example, the **Optimise Light Balancing** preset from the Optimise category.

## Changing the preset and selecting additional effects

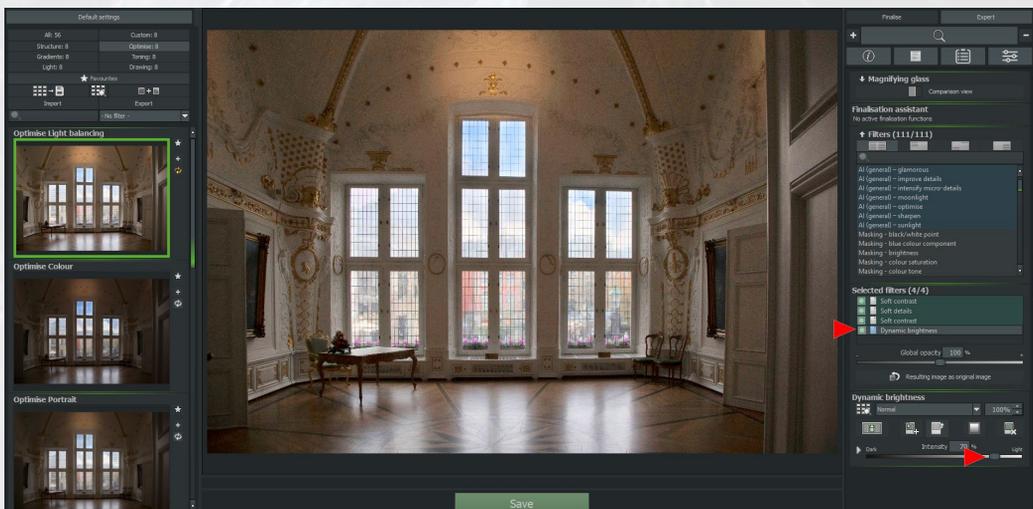
The filters/effects in expert mode are tailored to AI filters and can therefore be selected and trained as required without exception.

**Note:** Expert mode, with all selection and setting options, is described in detail in the **Expert Guide**.



By clicking on the **3 buttons in the toolbar**, you can

- all **available** effects,
- the list of all **selected** filters and
- the **parameter range** of the selected filters/effects is displayed.



After switching to **Expert mode**, the list of **selected effects** shows all effects that determine the image look of the active preset, in this example **Optimise Light Balancing**.

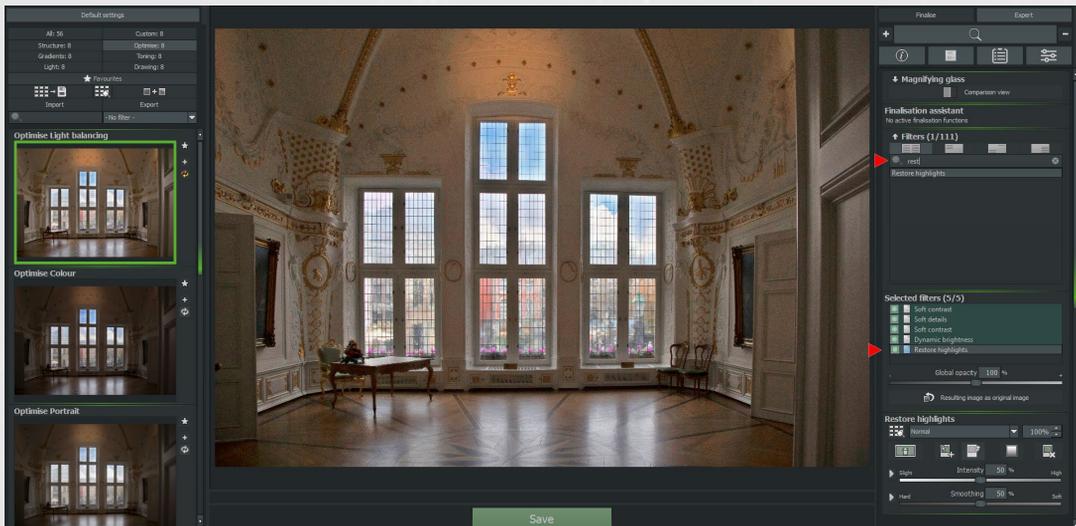
In the image, the foreground should be further brightened in the first step: Clicking on an effect activates it and displays the corresponding parameters below it, for **Dynamic Brightness**, there is only one.

Drag the slider to the right until the desired brightness is achieved. **Dynamic** causes dark areas of the image to be brightened more than light areas such as the background with the sky.

The choice and application of additional effects depends on how you wish to further optimise the mood of the image.

In the example image, the **sky could appear a little clearer**, the **image noise**, which was intensified by brightening, could be **reduced**, and **sharpness, contrast and colour could be optimised**.

## Choosing the right effects

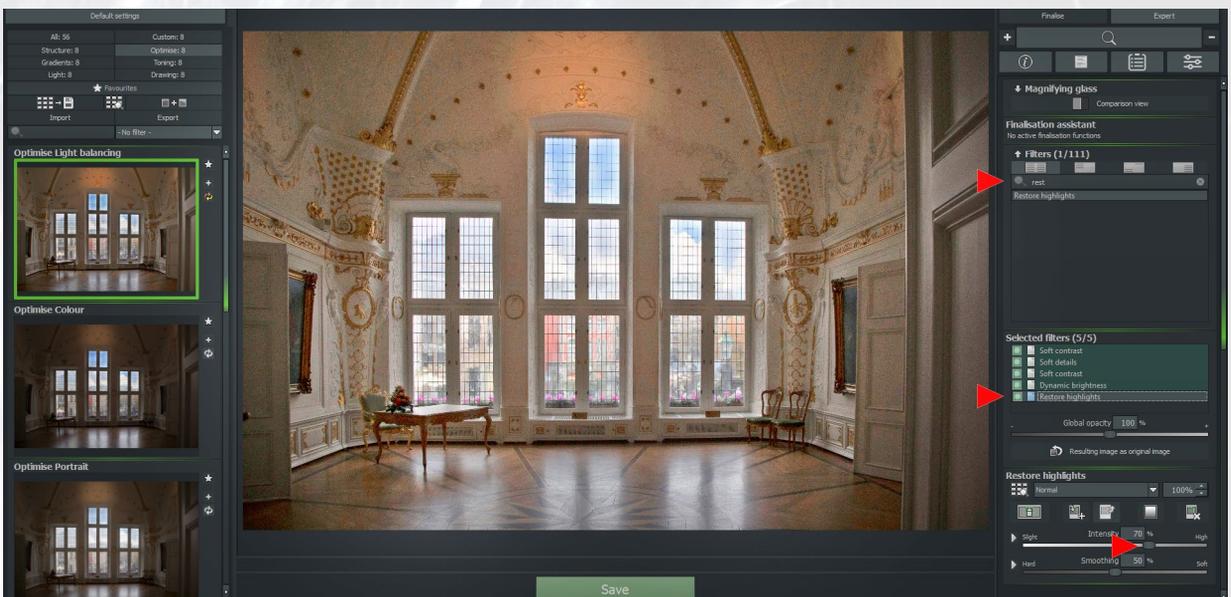


Scroll through the list of all effects to get inspiration for your selection, because when you hover over an effect with the mouse, information about the effect achieved with this filter is displayed interactively.

If you know the filter or enter the first few letters in the search field, e.g. “Exp”, all effects containing the term “**Exposure**” will be displayed below.

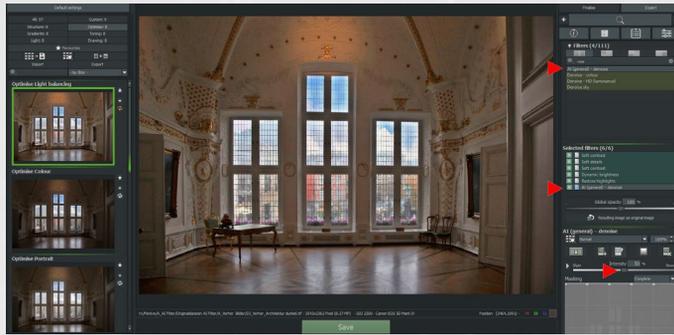
In the example, the initial letters ‘rest’ are sufficient to display the **Restore Highlights** effect, which improves the detail in the highlights. Alternatively, the Reduce **Haze + Fog** effect would produce a similar result.

**Double-clicking** on the effect immediately places it at the bottom of the selected effects, activates it and displays the corresponding parameters.



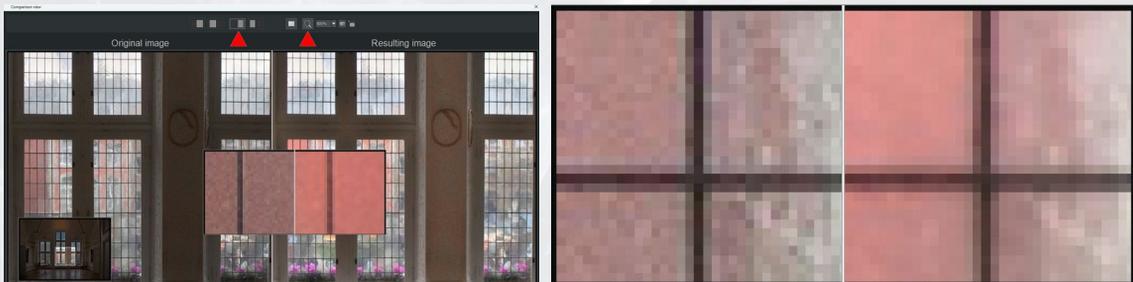
Drag the **Strength slider** all the way to the right until all the details in the background behind the windows are clearly visible without any ‘haze’. Since this effect also darkens the image slightly, you may need to adjust the dynamic brightness a little.

## Choosing the right effects

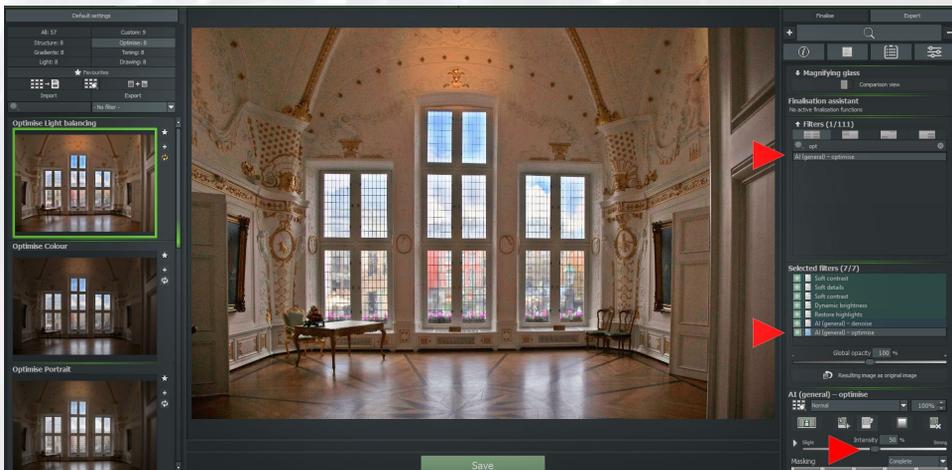


Proceed in the same way when selecting all other filters: If you enter the initial letters 'Raus' for noise, all filters with the term noise reduction will be listed, from which you can select **AI noise reduction**.

Drag the **Intensity** slider all the way to the right until the result is so good that the noise is significantly reduced but the details are well preserved, a task that the AI-powered slider handles very well even at full intensity.



You can easily check the result in the comparison view by activating the same image section in the **original** and the **result image** and selecting a high magnification by clicking on the **magnifying glass** icon.

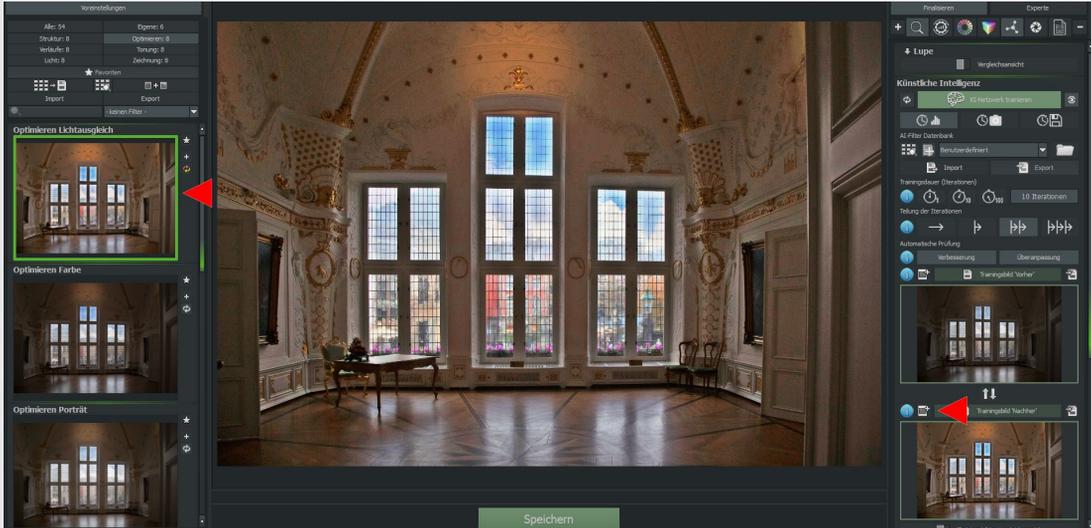


The final task of optimising contrast, colours and sharpness is performed by the Effect **AI (General) - Optimise** effect.

Double-clicking inserts it again at the bottom of the list of selected effects. The default **intensity setting of 50%** was used in the example.

By clicking on **Finalise**, you will return to the **Finalise mode**.

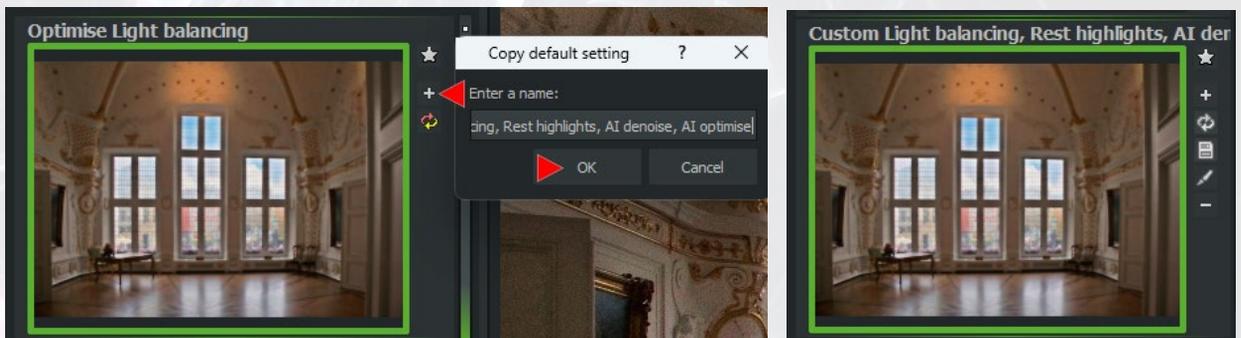
## Save image and/or transfer as 'After' training image



The image can now be saved as usual so that it can be loaded later as an 'after' training image, or you can transfer it directly as an 'after image' after saving.

## Save project, save new 'own' preset.

If you want to review all the settings you have made or correct something at a later date, it is a good idea to save the result as a project. When you load it later, all the selected effects and all the parameter settings you have made will be retained.



The colourful arrows around the edge indicate that the original preset **Optimise Light balancing** has been changed

If you never want to use the modified preset again, click on the arrows to reset everything to the default settings.

If this new preset can also be used as a starting point for further manipulations, click on the **+ sign**, give it a descriptive name and save it by clicking **OK** in the **Custom** Presets category at the bottom (see graphic on the right).

This example illustrates the incredibly diverse possibilities for quickly, intuitively or specifically changing a training image 'before' in a desired direction.

**Note:** The default settings are not sufficient for training this AI network. See the chapter on **parameters for optimal training preparation** for suggestions on suitable parameters.

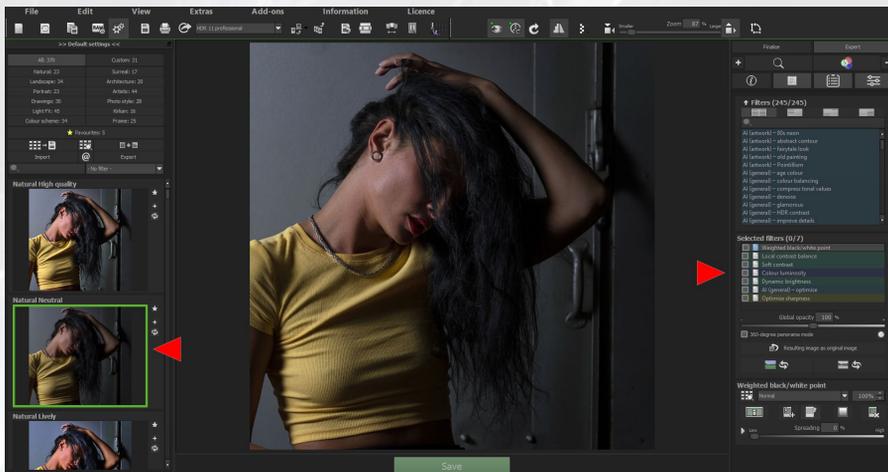
## Example 5: Using other Accelerated Vision programmes

If you own one or more other programmes from **Accelerated Vision**, you can also create and save the 'after' training images in **HDR, DENOISE, SHARPEN, Color or Black 6 White**, for example, because with the exception of filters/effects with geometric changes, all effects from every programme can be reproduced.

The following examples of **Color** and **HDR** show selected possibilities:

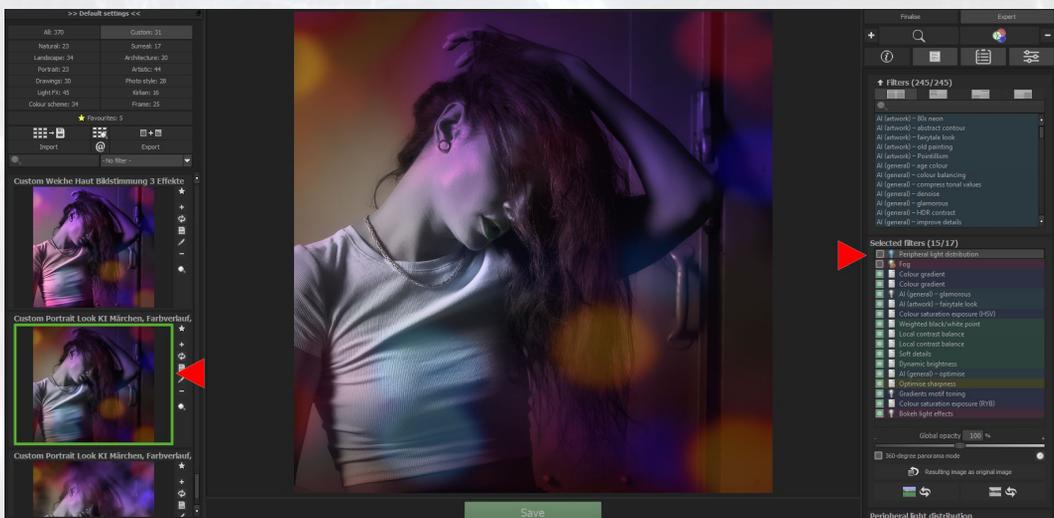
### Color

**Objective:** The image look should create a special colour mood, especially for portraits, colour or black and white, including many lighting effects, colour gradients, glamour and a 'fairytale look'.



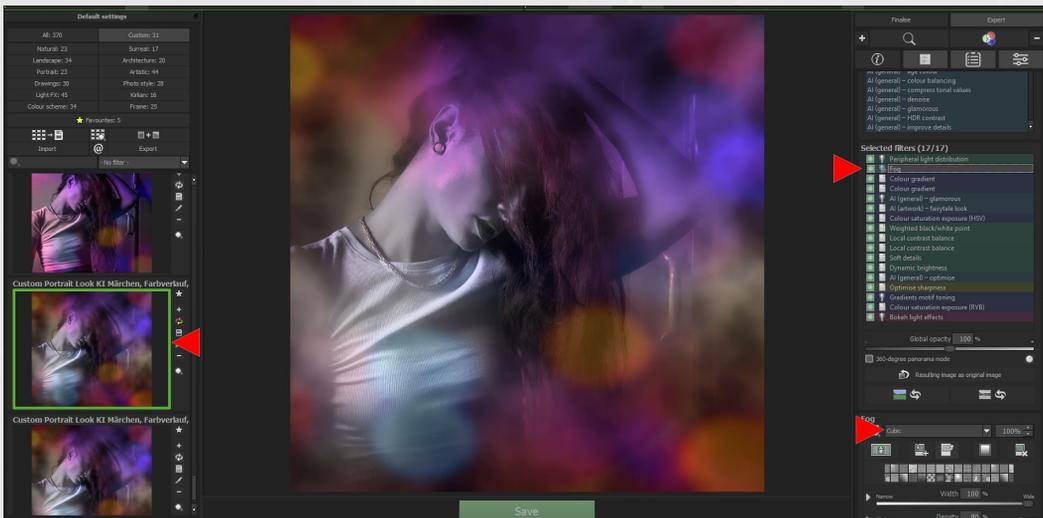
When looking at the original image, it is immediately apparent that the colour range has been greatly reduced. Red only appears on the lips, while green and blue are completely absent.

In the chapter on **parameters for optimal training preparation**, you will see how this shortcoming can be 'overridden' in the 'preparatory' parameters.



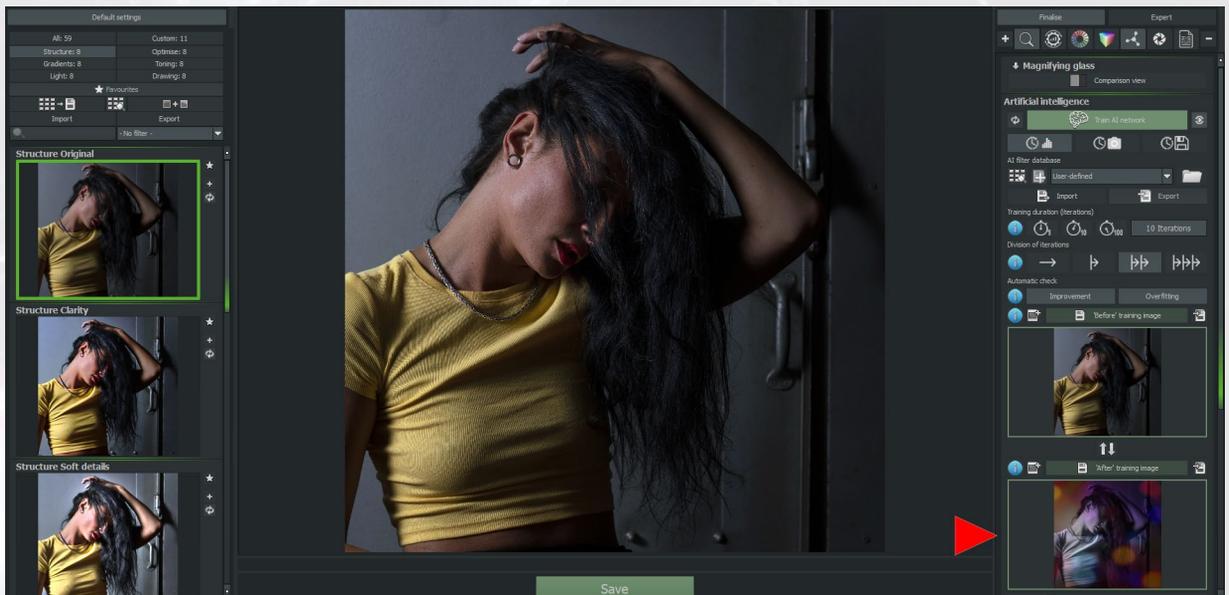
The desired image look was achieved by experimenting with 17 different effects, 15 of which were active, and saved as a preset in the **Custom** category.

## Variation with fog, peripheral light distribution and layer-effects



The two activated effects, **fog** and **peripheral light distribution**, create yet another image mood and show that layer-effects such as **'Cubic'** for fog or **'Double Strength'** for peripheral light distribution are of course no problem either.

These or similar image looks can be varied in a flash using the parameters of the selected effects and then trained again as new filters.



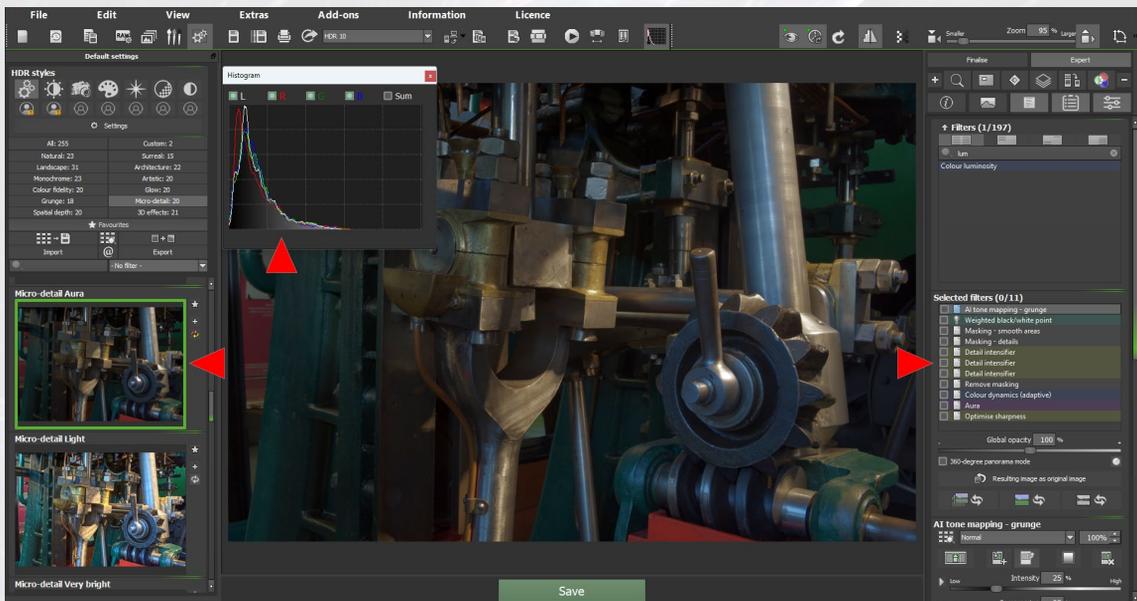
The training image 'After' shows the result with 15 active effects without **fog** and **peripheral light distribution**.

# HDR

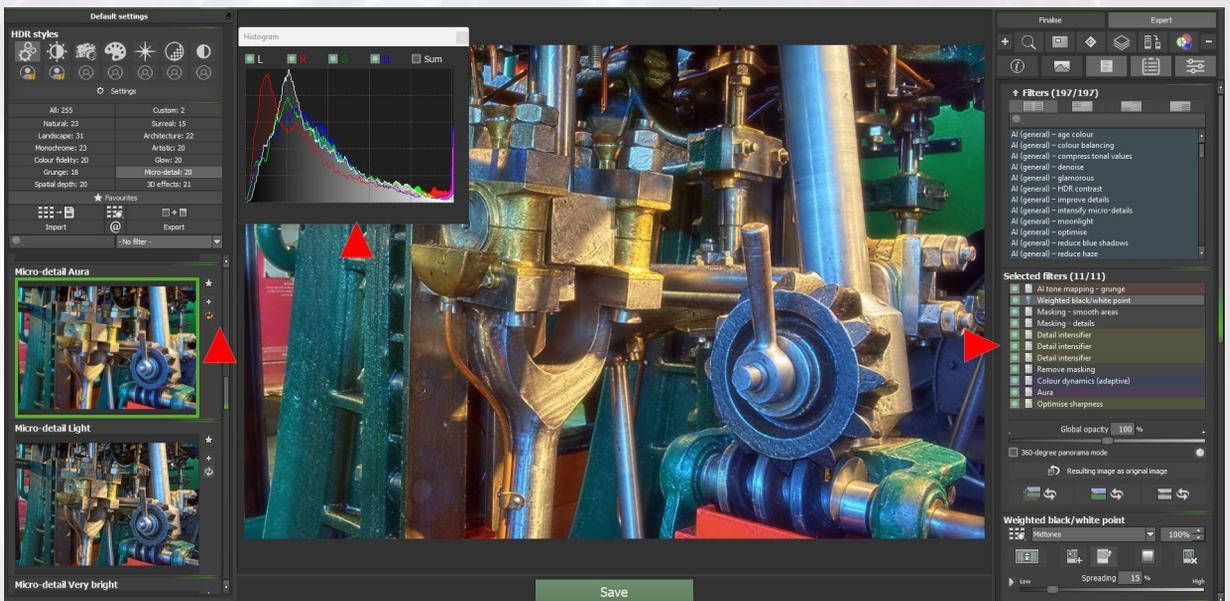
In HDR, **tone mapping effects** usually determine the image.

**Objective:** Details in highlights and shadows should be better emphasised (**tone mapping**), details in the image should be brought out more strongly (**detail intensifier**) and the overall look of the image should appear more radiant (**Aura, Colour luminosity**).

**Note:** Ideally, **exposure bracketing** should be imported in HDR. In the example, a **single image** has been imported.



The original without effects shows in the histogram that the dark areas dominate the image and the light areas are almost absent.

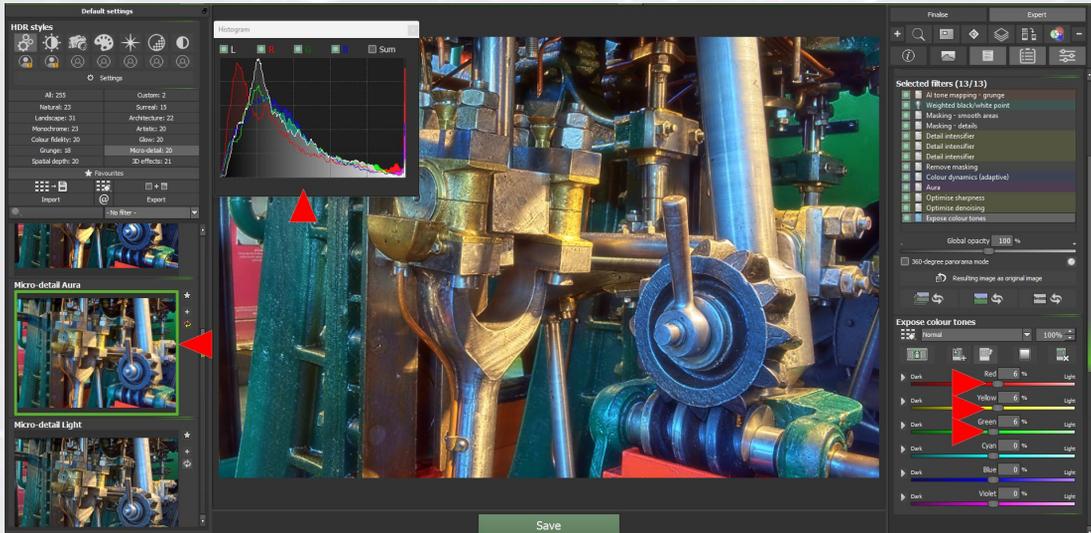


The Preset **Micro-detail Aura** from the **Micro-detail** category already reflects the objective very well and, with a few changes, fulfils all the requirements for the intended new filter; the histogram has been well 'stretched'.

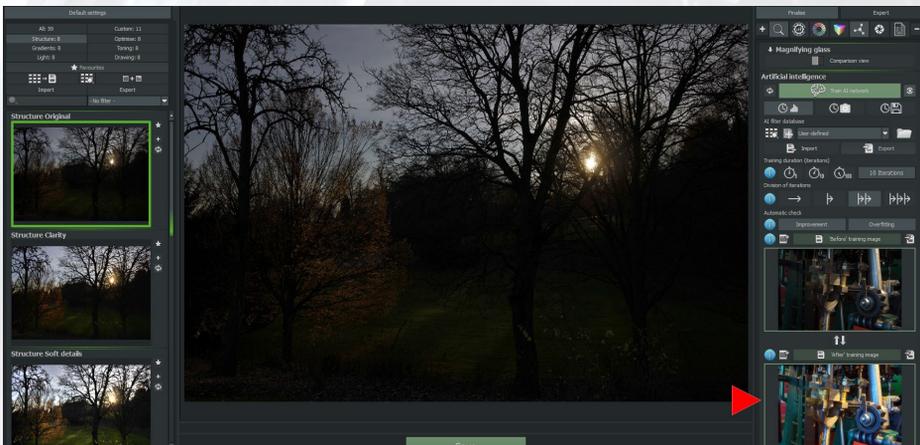
## Changes:

- One of the 3 **detail intensifier** is deactivated.
- The two effects **Optimise denoising** and **Expose colour tones** are also included.
- **Expose colour tones have been slightly varied.**

Now we see a completely different picture: the histogram is used to its full extent, as in the unchanged preset, the depths are effectively enhanced, and all details are very well highlighted. The aura effect gives the image an attractive luminosity.



Load the result image into AI Filter as a training image 'After'



The result image is saved, loaded as the 'After' training image, and can be trained as a new filter (see also the chapter on **parameters for optimal training preparation**).

**Note:** The few examples show that almost any combination in one of the **Accelerated Vision programmes** can be used to prepare filter training, including, of course, the effects in the programmes for 'problem solving' such as noise reduction in **DENOISE** and sharpening in **SHARPEN**. The **AI denoising or sharpening** filters in the **RAW module** or **Expert mode** are already so effective and professional that in most cases they are sufficient for training an AI network.

## Example 6: Using programmes from other providers such as Photoshop



In this composition, in which the meadow contained all colours except blue, the missing colour was added by the model who was 'placed' in the picture.

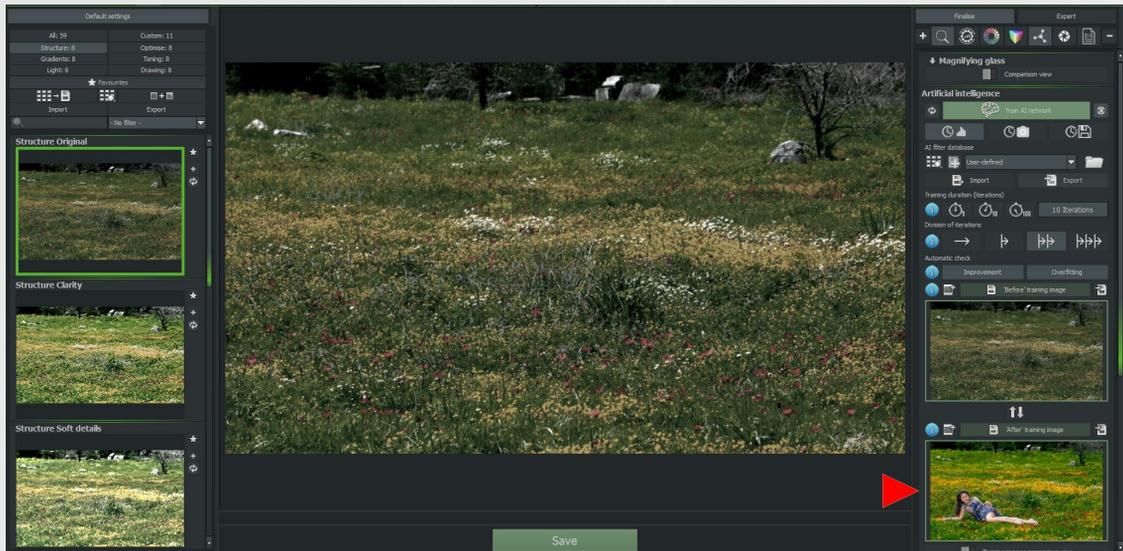
**Objective:** To refresh pale, desaturated colours so that they appear as vivid as in the 'result image'.



This objective is achieved with another interesting option for training a filter in a desired direction: Converting an 'after' training image, such as the composing image, into a 'before' image with desaturated colours in order to train both images in **AI filters** so that image motifs with similarly pale colours appear colourful and fresh again.

In **Photoshop**, the Hue/Saturation adjustment layer has been selected and the Saturation slider has been moved to the left until the image is heavily desaturated.

## Load 'before' and 'after' training images into AI Filter



If the original has been saved as the 'after image' and the desaturated image as the 'before image', both images can be loaded into **AI Filter** as "before" and 'after' training images and trained with the set values as in all other examples.

**Note:** You can also use this 'trick' for other tasks, such as noise reduction or sharpening, by adding noise to a noise-free image, e.g. in the Grain module or reduction of contrast of a sharp image.

## Image example 2



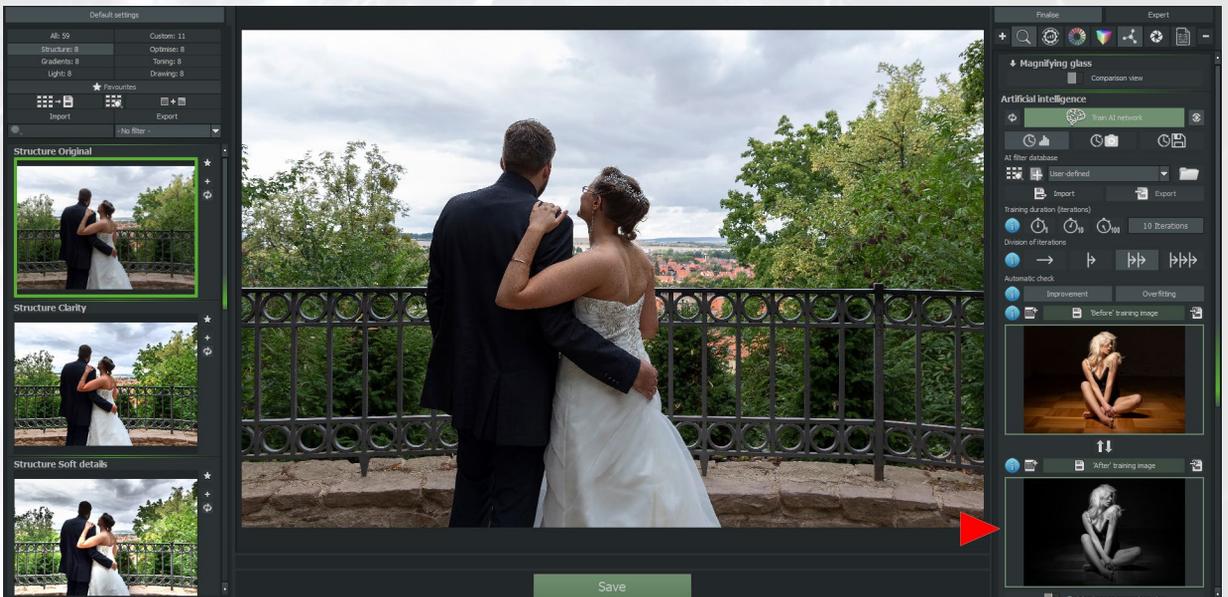
**Objective:** To convert a colour image into a black & white image with a vignette that darkens evenly from the centre outwards in all directions.

## Implementation in Photoshop



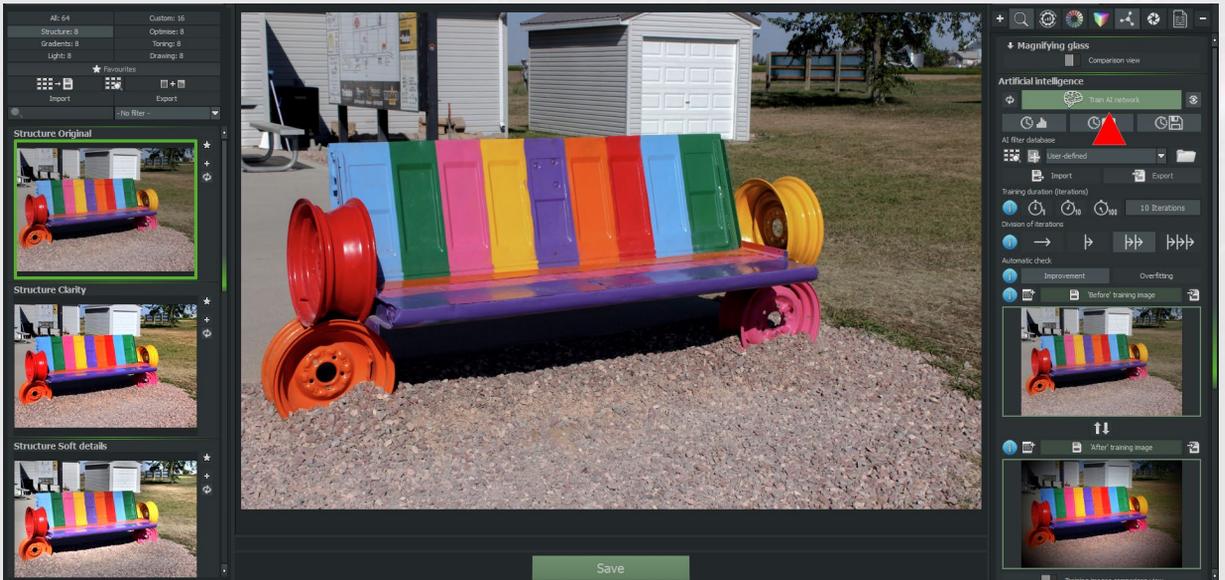
The conversion to **black & white** or a **greyscale image** was achieved using the **Black and White adjustment layer**. The **vignette** was created using the **Ellipse selection tool**, the selection inverted with a soft edge of 400px. This inverted selection has been darkened as desired after selecting the **Tone Correction adjustment layer**.

## Loading the 'before' and 'after' training images



Once both images have been saved, they can be imported into AI Filter at any time as 'before' and 'after' training images and used for training purposes.

## 8. Train AI network



The neural network trains the change from the 'before' training image to the 'after' training image with all applied effects in a filter **locally on your computer**.

The filters to be trained can be roughly divided into **three categories**, which makes it easier to select the appropriate parameters.

**Category 1: 'Simple filters'** (often with default settings) can be compared to many **LUT** capabilities: changing **brightness, contrast and colours**. In addition, **vignetting** can be 'built in'.

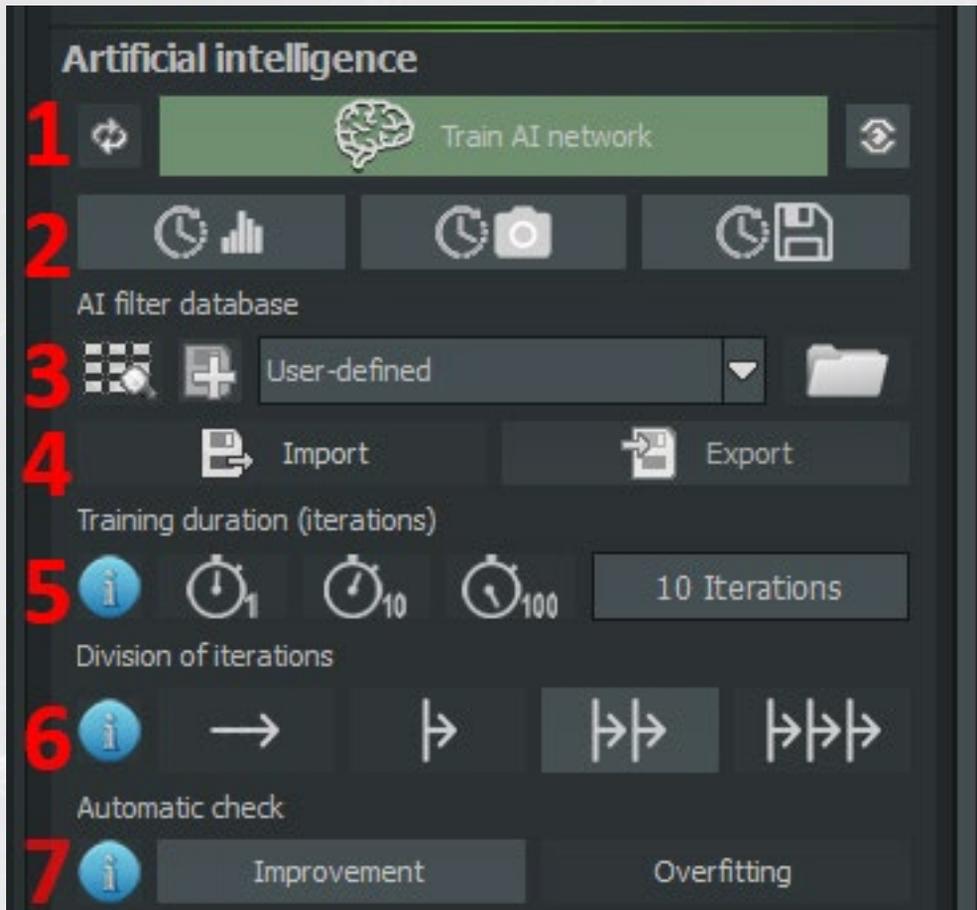
**Category 2: More complex filters** that have to perform a specific task, such as **noise reduction, sharpening, creating micro details, or removing chromatic aberrations**.

**Category 3: Position filters** that convert **position-dependent effects** such as **bokeh** into filters that can also be classified as more complex filters.

The examples listed cannot be trained as a filter using a **single** parameter that takes into account all conceivable tasks. Even a **combination of several parameters** that summarises different problem solutions with standard settings is not capable of training completely different objectives, as described in the categories, as a filter for all cases.

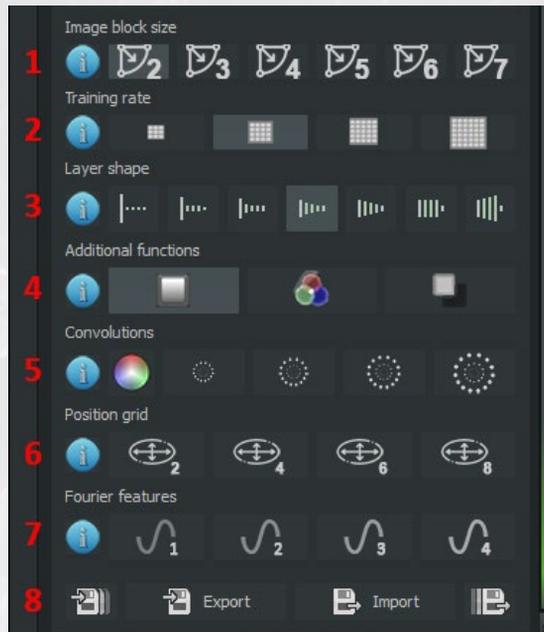
In this guide, the numerous setting options for the **parameters below the 'After' training image** are deliberately described in the following chapter with selected examples so that, after creating the "Before" and 'After' images, you can quickly see the results with an example image.

## Overview of training area



1. **Train AI Network button:** Starts training with the set values.
2. **Display and storage options.**
3. **AI-filter database:** **Select** a pre-built or custom filter from the database or **save** a filter you have trained yourself.
4. **Import/Export functions:** **Imports** or **exports** a self-trained network to or from a selected folder. If it is imported, it can then be further trained.
5. **Training duration (iterations):** Sets the **training duration** for the next training session to **1, 10, 100**, or a **manually entered number** of runs.
6. **Division iterations:** Disables/enables the **division of training runs** (iterations). Division increases the learning rate and **leads to faster results**.
7. **Automatic check:** The automatically activated **Improvement** interrupts the training if the improvements per training run are at too low a level. The automatically activated **Overfitting** interrupts the training if no improvement could be determined in an additional determination of selected control data.

## Overview of parameter range with default settings



- 1. Image block size:** Sets the size of the image blocks from **2x2** to **7x7**. **Small blocks** are well suited for **simple** training scenarios such as **colour, contrast, brightness, large blocks** for structures such as **micro details** and **sharpening, noise reduction**.  
**Default setting: 2 (2x2).**
- 2. Training rate:** Determines how many training elements the network should be trained with, from approximately **500** to **30,000**.  
**Default setting: Level 2** (approximately 2,000 training elements).
- 3. Level shape:** Certain level shapes are suitable for different tasks. The further to the **left** a level shape is selected, the **easier** the tasks should be; the further to the **right**, the more suitable they are for more **complex tasks**.  
**Default setting: Funnel shape** (middle position).
- 4. Additional functions:** Provides the network with additional information such as **gradients, additional colour, additional contrast** to improve learning outcomes.  
**Default setting: Gradient.**
- 5. Convolutions:** These mathematical convolutions enable the network to better recognise **colour** and **brightness** details in 4 stages and one colour mode.  
**Standard setting: None.**
- 6. Position grid:** **Special form of gradient detection** with 4 different position grids, e.g. for **bokeh**s.  
**Standard setting: None.**
- 7. Fourier features:** This function can be used to map **complex progression structures**.  
**Standard setting: None.**
- 8. Quick export/quick import and export/import functions.**

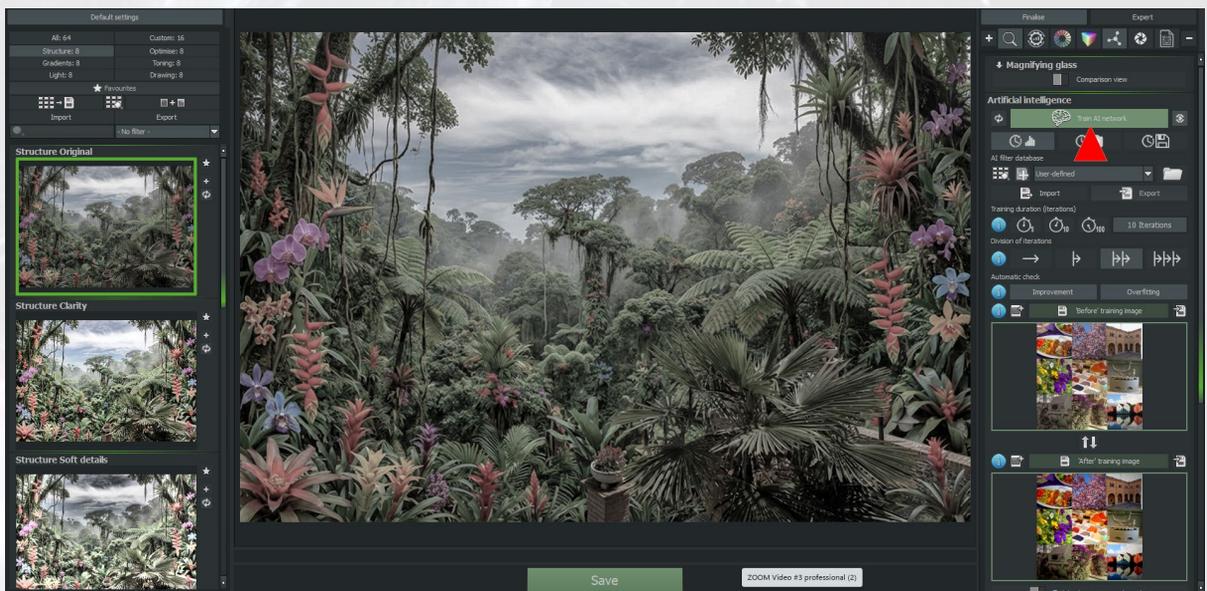
## Training the filter



In the example, the original, in which all colours are represented, should be

- brightened (**dynamic brightness**),
- increased the intensity of the colours (**Colour palette saturation**),
- the contrast can be increased (**Brightness contrast gamma**) and
- a Vignette darkens the image evenly from the centre outwards (**Vignetting**).

**Note:** Instead of this collage, the image on the first page of this chapter, for example, would have been just as suitable for this task.



Once you have set all the parameters as desired or accepted the default settings, which work well in most cases, the training can begin.

**However, it makes sense to decide in advance on the number of training runs (iterations) and the division of the iterations (see next page).**

**Note:** You can track the training progress with the 'before' image or, as in the example, load another image, in this case a fantasy image generated by AI in Photoshop, to immediately assess whether the filter also works with other subjects with, for example, paler colours.

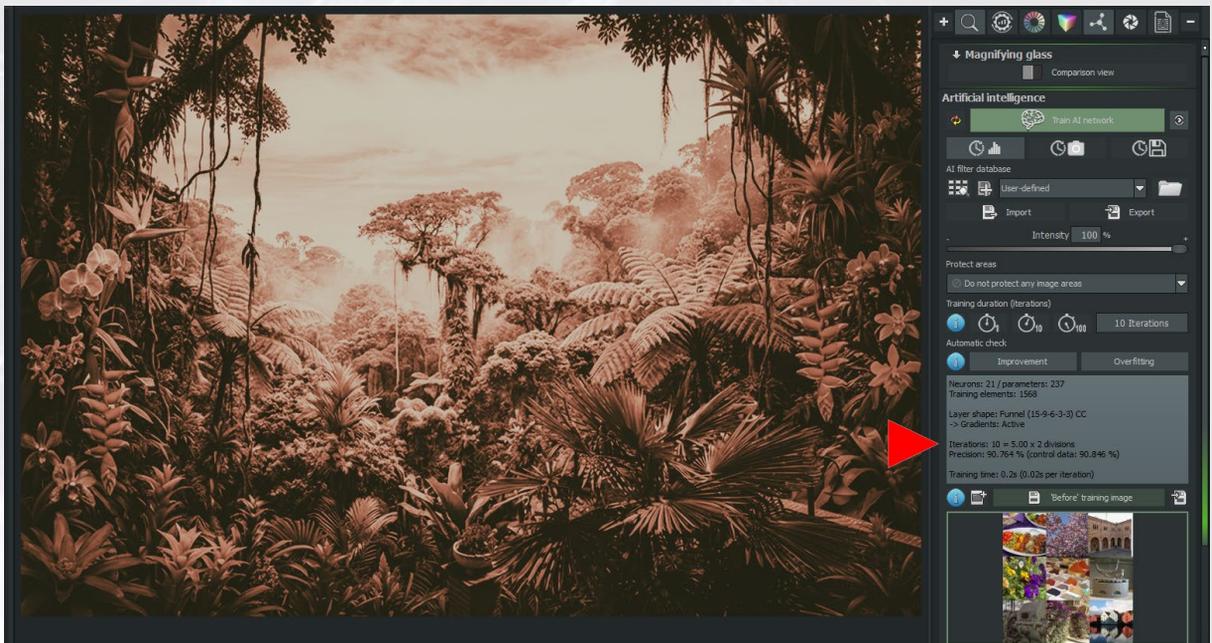
## Start training with the default settings without individual preselection



Before you train the network, the default settings are displayed:

- The **training duration** is set to **10 iterations** (training sessions),
- the **division of iterations** at the **middle position**.

Why is it useful to think about **whether** to accept these settings or choose your **own** beforehand? This becomes clear when you click on the green button **Train AI network**.



- In the **centre of the image**, you can see the **training progress**, which is, of course, still completely unsatisfactory.
- The option to **split iterations** is **hidden**.
- An **information window** displays the key settings and parameters used.

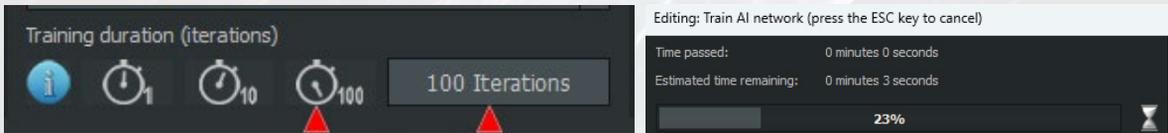
You could now click on **“Train AI network”** until you are satisfied with the result. A small **“detour”** to explain the decision-making and information options is helpful in order to carry out the training more effectively and systematically.

## Choice of number of runs (iterations)

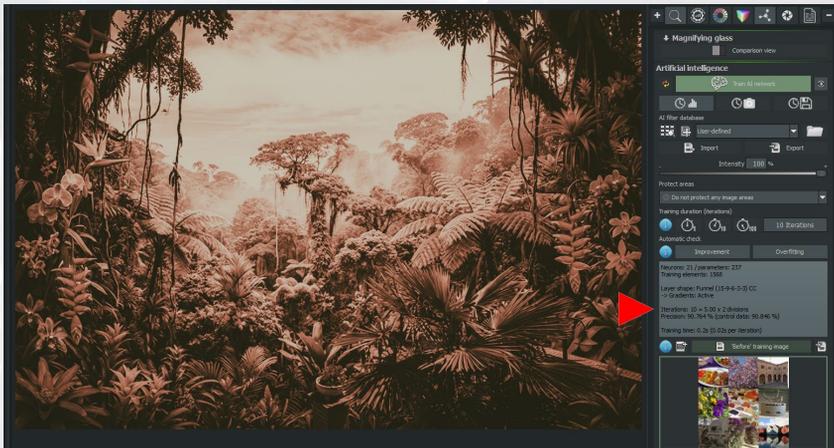
AI filters are trained in several passes, or **iterations**. This gradually trains the network to convert the 'before' image into the 'after' image.

If you activate the **first** button, the training duration is set to one run. The result will never be convincing because neural networks 'thrive' on long training periods and numerous iterations (deep learning) in order to gradually improve the result with each iteration.

If you activate the **second button**, the training duration is set to **10 runs**, as seen.



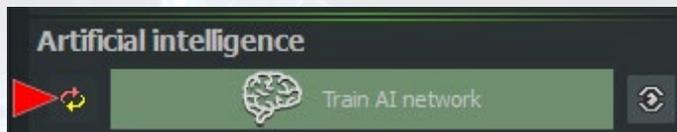
If you activate the **third button**, the training duration is set to **100 runs**. After clicking on **Train AI Network**, the progress bar will appear.



Once training is complete, the interim result is displayed after **110 iterations**, which is already significantly better, but still with very desaturated colours. This is because colours are only 'worked out' in the last third of the training process.

**Manual selection:** You can also overwrite the number in the **input field** and enter a different one, e.g. **500**.

**Cancelling the current training session:** You can use the Escape (**ESC**) key to cancel a process that is taking too long at any time.

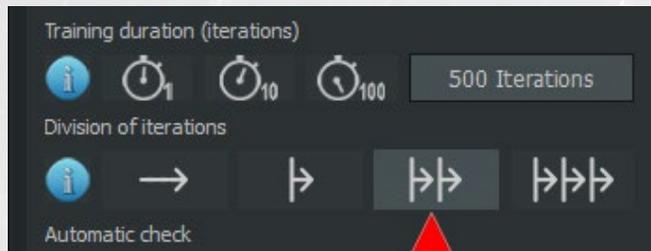


**Resetting the training:** Clicking on the coloured circular arrows cancels the entire training process carried out so far, resets all values to default values and allows you to start again with different settings.

## Division of iterations

As seen, the AI filter is trained in several passes.

**Division of iterations speeds up the process to achieve the best result.**



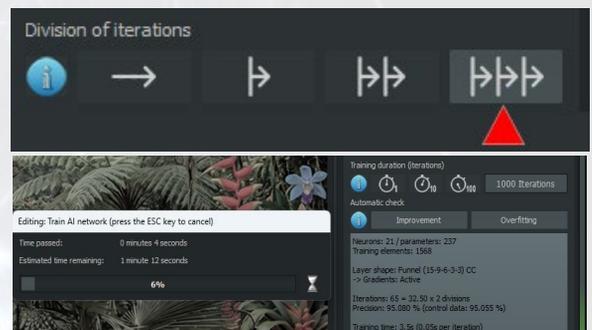
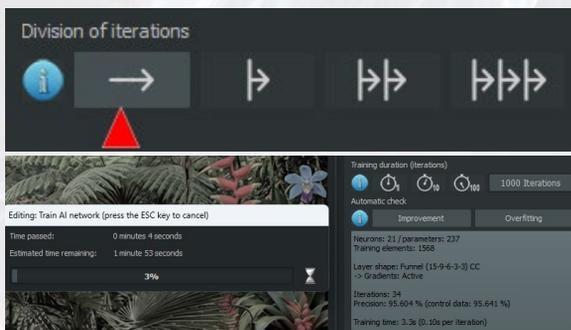
A **medium value** is set by default.

The **higher** the selected degree of division, the **smaller the iteration elements** calculated, which shortens the training time and thus also the time needed to assess whether the filter is working as intended or needs to be improved.

It **always** makes sense to share iterations because this helps the network achieve a good result more quickly.

You can't go wrong if you always choose the **maximum division**.

The more complex the **neural network system** becomes and the further to the right the parameter settings are (see next chapter), the greater the time advantage. With very simple networks (the parameter settings are far to the left), the time advantage is small.



Nevertheless, the advantage is also evident in this 'simple' network:

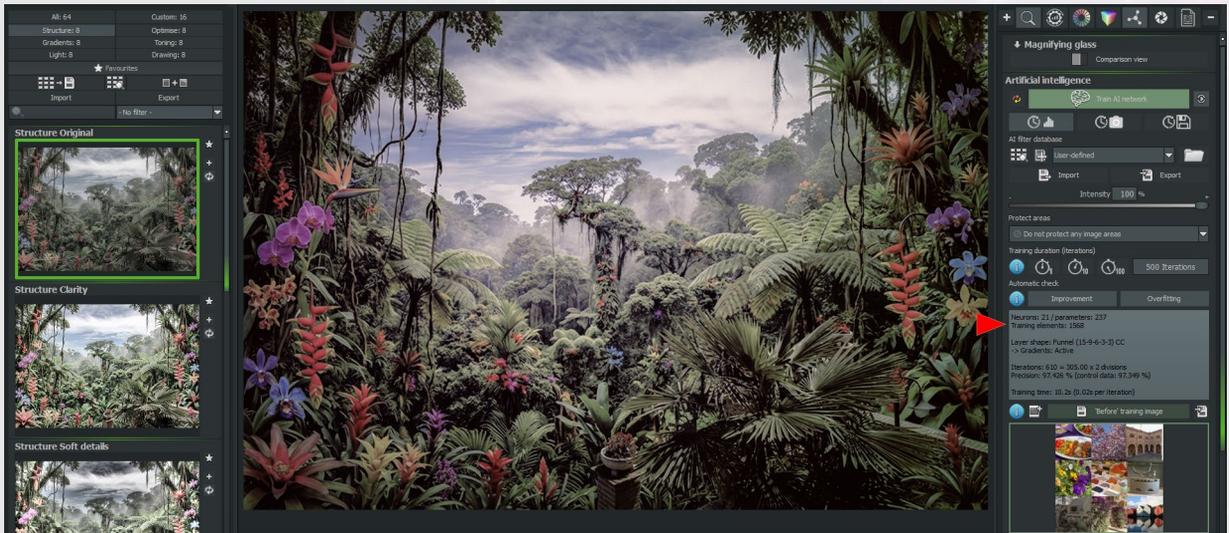
With 1000 iterations set manually, the division has been deactivated in the graph on the left. The training time is specified as **1 minute, 57 seconds**.

The **highest division level** has been selected in the graphic on the right.

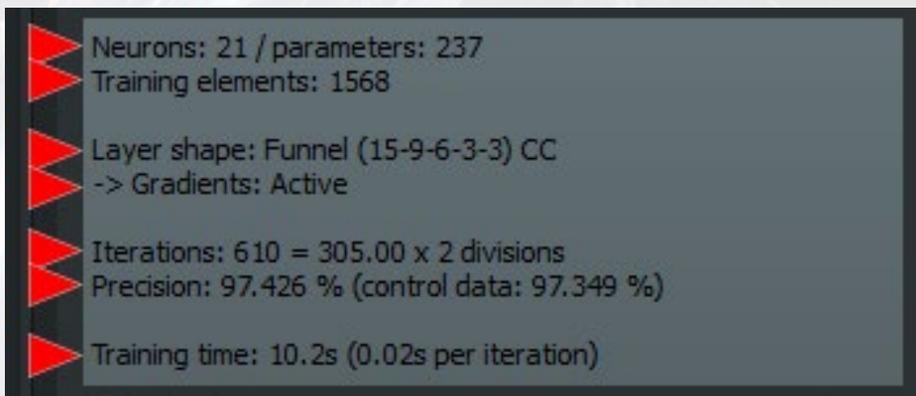
The training time has now dropped to **1 minute, 16 seconds**.

## Information window

The most important current information is logged in the **information window** that appears after each run.



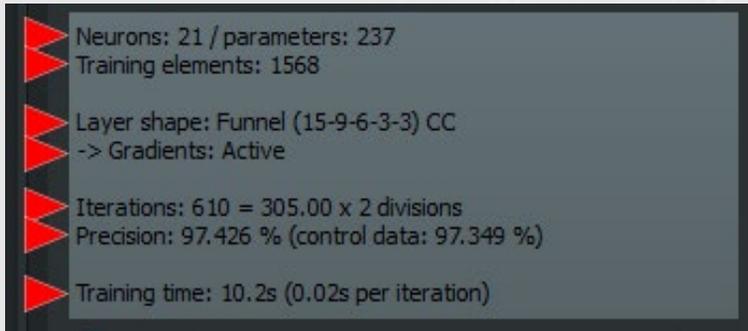
**Example:** In this network, first **10**, then **100**, and finally **500 iterations**, i.e. a total of **610**, were trained with the **highest division level**.



In addition to this log, further information is displayed in the window:

- **Precision:** This important information provides information about the approximation to a 'perfect' result. This would be 100%, which is practically unattainable. For values around **98%** as in the example and higher, the impression of the result image should confirm that the filter works very well.
- **Training time:** The total training time of 10.2 seconds, or 0.02 seconds per training run, is extremely short and suggests a 'simple' network.

## Neurons, parameters

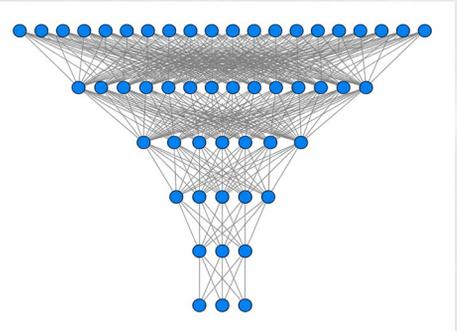


Neurons: 21 / parameters: 237  
Training elements: 1568

Layer shape: Funnel (15-9-6-3-3) CC  
-> Gradients: Active

Iterations: 610 = 305.00 x 2 divisions  
Precision: 97.426 % (control data: 97.349 %)

Training time: 10.2s (0.02s per iteration)



The number of neurons is given as **21**, i.e. a network with **21 mathematical neurons** compared to the neurons or **nerve cells** in humans, of which our brain has more than 100 billion!

You can imagine these neurons and the structure of a network as **nodes**, as shown in the graphic on the right (an image generated by AI in Photoshop). The first level (top) contains all **parameters** used, in the example **237**.



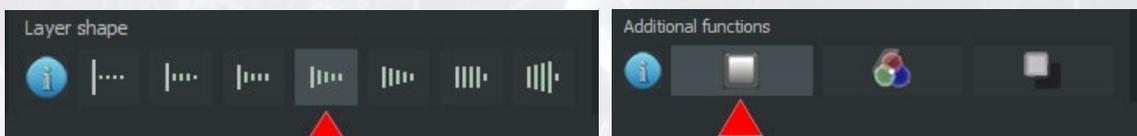
**Image block size:** If, as in the training example, the standard size of the **image blocks of 2x2 in RGB** (3 colours) has been retained, the value is  $2 \times 2 \times 3 = 12$ .

The **total number of parameter settings is 237**, which represents the **connections** (connection lines in the diagram) **between the neurons**.

In the example, **237 lines** would belong to **21** (blue) **nodes**.

For example, if a pixel in the top right of the image is **green**, other neurons should be triggered via the connections using a weighting.

This means that the information is continuously condensed per level until, at the end, **one** RGB pixel, i.e. **3 nodes**, is produced as the result, which corresponds exactly to the converted 'new' pixel.



**Layer shape:** The shape provides information about how quickly a network is **compressed** from the starting point to the end. The graphic at the top right resembles a **funnel** that becomes increasingly narrower.

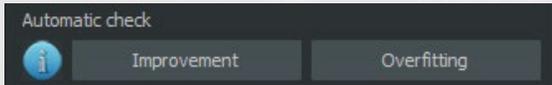
In addition to other selectable layer shapes, this **funnel shape** is set as the default in **AI Filter**.

The numbers in brackets indicate the sequence described above from start to finish with 3 junctions.

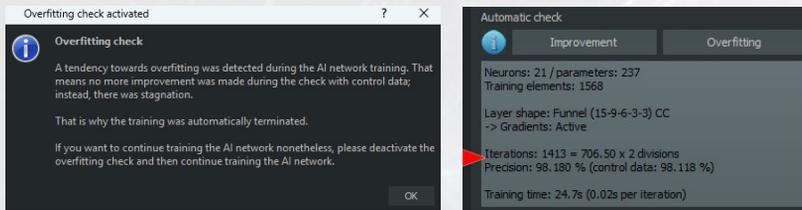
**Additional functions:** The information listed below, **Gradient: Active**, confirms the default setting for the **active gradient function** (graphic on the right).

## Automatic check

The filters cannot be 'over-trained'.



There are two automatic checks: **Improvement** and **Overfitting**.



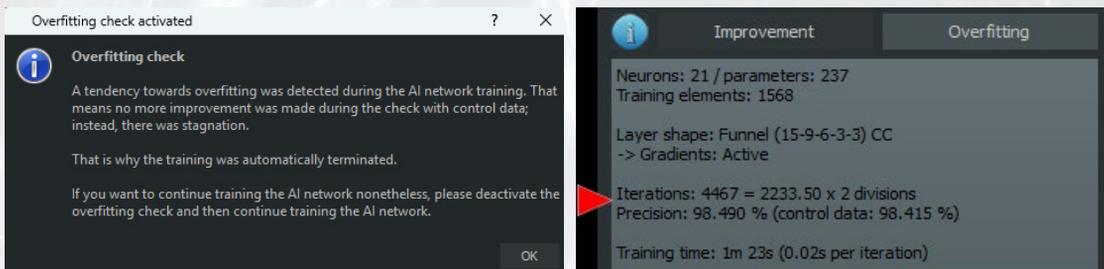
With each iteration, this safeguard 'checks' whether the improvement is still significant enough and 'worthwhile'.

In the example, another 500 iterations were calculated after the 610 iterations. If 500 iterations are selected again and training is started, a message is displayed stating that **no further significant progress can be achieved during the last iterations and that training has therefore been terminated**.

This can be tracked precisely in the information window: the number of iterations was **1,413** when the process was terminated, and the accuracy increased from **97.4%** after **610 iterations** to **98.2%**, which is a very good value. This does not necessarily mean that, with the function **deactivated**, clicking on the button **cannot improve** the result, even if it is not 'worthwhile' from the programme's point of view.

If you are not completely satisfied with the result, try one or more training runs with the function deactivated until **overfitting** is indicated.

## Overfitting



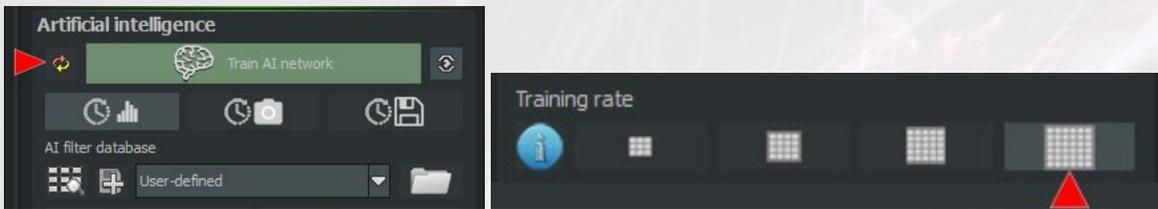
This safety device is activated primarily when **the training rate is too low and too few training elements are used for the task to be solved** (see next page).

In fact, after selecting 1,000 iterations and restarting the training several times, the result in the example improved even further, with accuracy rising to **98.5%** at **4,047 iterations**.

If the result now deteriorates, the **Overfitting** button will appear with the message: **Any further training sessions will not improve the result**. If you do initiate further iterations, the training will be automatically terminated.

## Saving the filter in the database with a high training rate

The aim of the training is, of course, to **save the filter in the database** so that it can be used later in this or other programmes for many image motifs.



The finished, very good filter **will not work 100%** because the **training rate** is only set to the **default level 2**, which is not suitable for a finished filter and is not accurate enough.

As this image shows good results very quickly, she is very well suited to 'trying out whether everything works', as the training example shows.

To set a higher training rate, you must first **reset the network** by clicking on the coloured circular arrows (graphic on the left), as no parameter changes are possible during an 'ongoing process', as shown by the parameter area, which is hidden immediately after a training session is started.

**For finished filters that are to be saved, select levels three or four.** In the example (graphic on the right), level 4 has been selected, which calculates with **30,000 training elements** instead of the **2,000 in level 2**.

This means that a total of 30,000 x 237 parameters, or **7,110,000 combinations**, are trained, a number that becomes much larger for more complex tasks.

## Train and save final filter

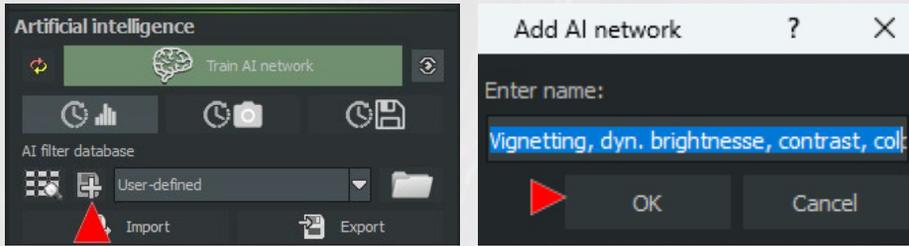


After **6,000 iterations**, the filter is very good, which is confirmed by the visual impression and the numbers in the info window:

**30,504 training elements** compared to **1,413** previously, in conjunction with **6,000 iterations**, have enabled this quality and accuracy of **98.502%**.

The 'last' 3,000 iterations only increased the accuracy by 0.1%, so after 3,000 training sessions, the result was comparably good.

## Add AI filter database

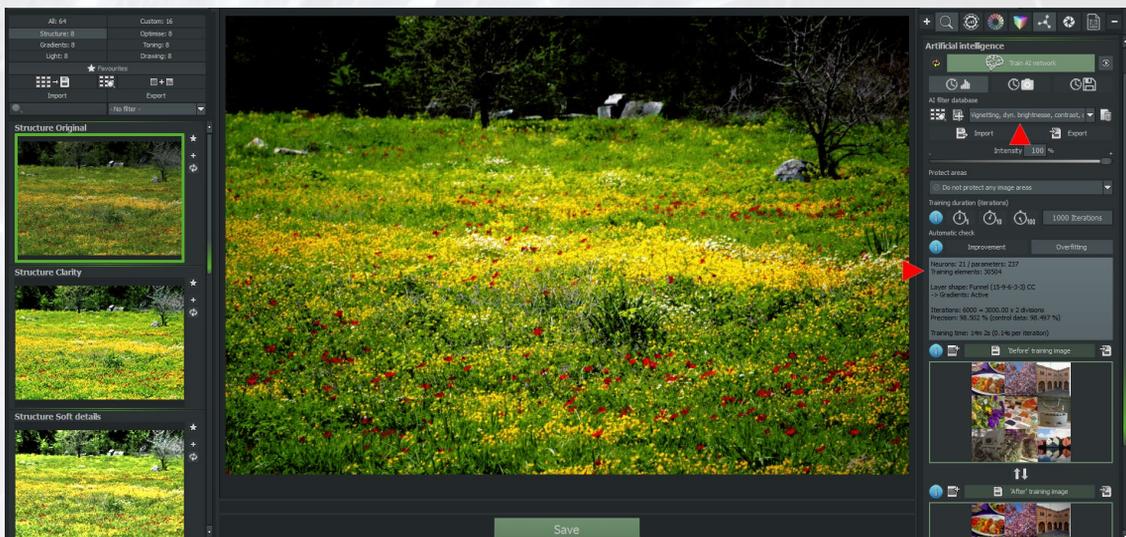


By clicking on the button with the **plus sign** in the **AI filter database** (graphic on the left), you can assign a 'descriptive' name in the window that opens. By clicking on **OK** ...



... the new filter is 'stored' at the bottom of the database and is immediately available in all programmes that offer the **AI filter area module** after the programme is started or, in the case of active programmes, after a restart.

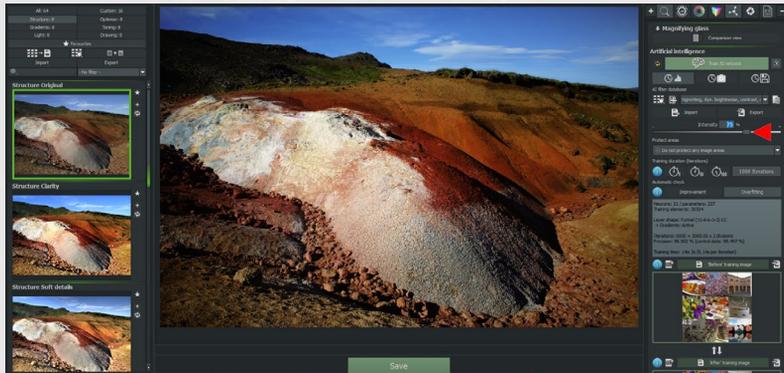
## Selection of the filter with all parameters and 'before and after image'



If you call up this filter at any time with the same or a different image motif in **AI Filter** or another programme, it will immediately take effect in conjunction with the selected preset, in this example Structure Original without effects.

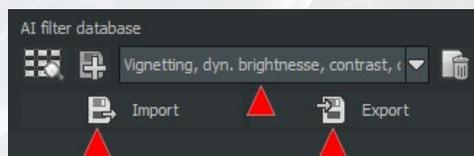
The advantage of **AI Filter** is that the info window and the 'before and after images' are displayed for each selected filter, which can provide valuable information when choosing the appropriate parameters for more complex filters, for example, with the 'supplied' filters.

# Intensity

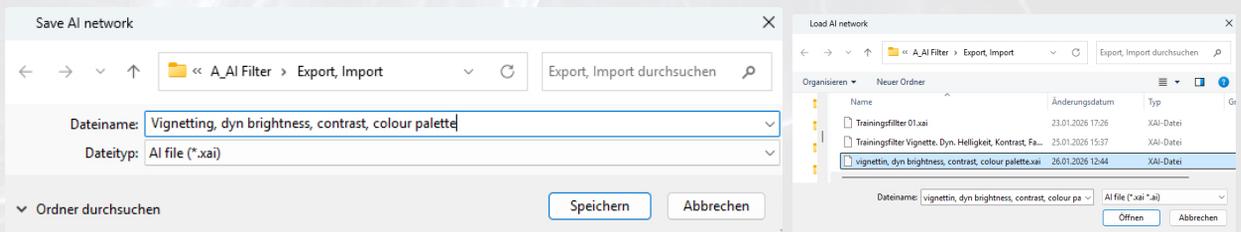


It is normal that a trained filter does not work equally well with all image subjects. You can enhance or change the effect by selecting alternative presets. If you want to **reduce** the effect, move the **intensity slider** to the left, in the example to **75%**, until the effect meets your expectations.

## Exporting, importing a trained AI network

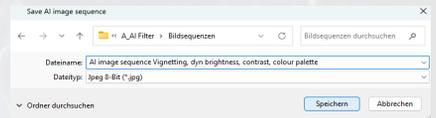


Each currently selected AI network can be saved (exported) as a file in a folder of your choice and re-imported as needed. By clicking on the **Export** button...

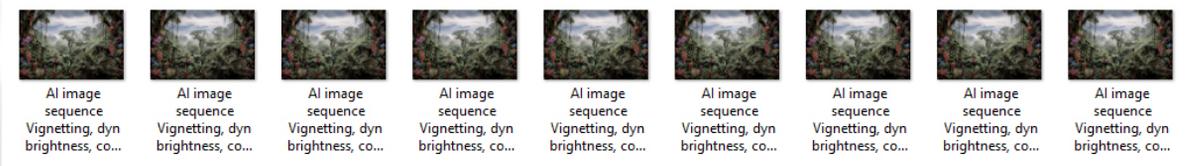


... save the desired filter and reload it at any time by clicking **Import**.

## Display and storage options



- The button **activated by default** (left) displays the current training data in the info window, as seen.
- If the **middle button** is active, the information window is hidden and training progress can only be tracked in the image area.



- If the **third button** is active (on the right), the entire training session is automatically saved in the form of a **sequence of images** for the training run.

## Workflow in keywords

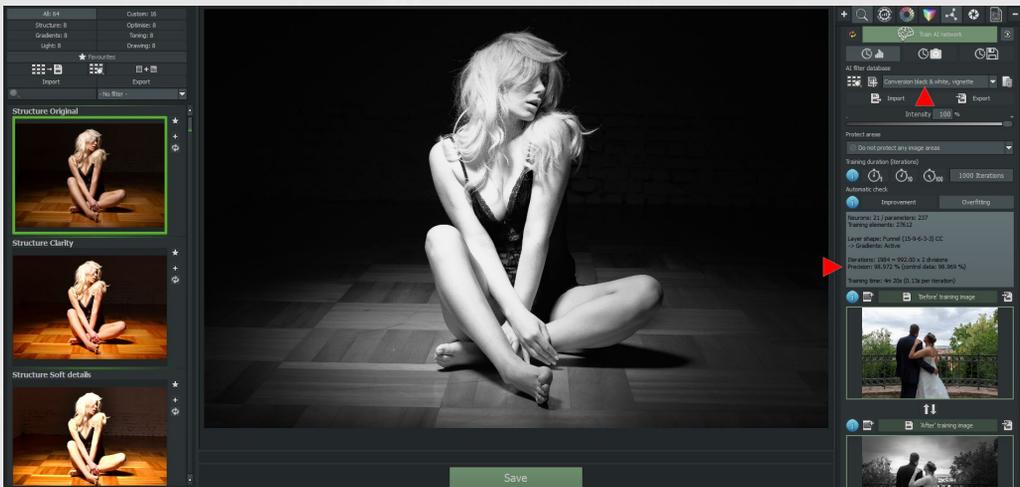
The workflow shown is always the same, with a few variations:

- **Selection of the "Before" training image.**
- **Creating the "After" training image.**
- **Transfer or load the two training images.**
- **Accept the default settings** or select **alternative parameters depending on the effects used in the "after image."** This is the most important decision for achieving a very good filter.
- **Choice of training duration - number of iterations.**
- **Selection of the division level, which can always be the highest level.**
- **Start training** by clicking on **Train AI Network**. Check the "interim results" and repeat the training until you are satisfied with the result. If the result is not as desired, the network must be reset, more suitable parameters selected, and training restarted.
- **Training the final filter:** Reset the network by clicking on the colorful circular arrows, select the **3rd or 4th level for the training rate**, and **restart the training** until the desired result is achieved.  
**Note:** For more complex networks, a **quick export** and **quick import** of all selected settings ensures that you train the filter with the same parameters (see next chapter).
- **Save the filter in the database.**

## Filter example 2 with standard presets in keywords



This image, which you have seen like many of the following images in the chapter "**Editing the after image according to specific criteria**," has been converted to **black and white** or grayscale in Photoshop. A vignette darkens the image toward the edges.



After loading the two training images, a reference image was imported that shows how the trained filter works on other image subjects during the training process.

After the filter impressed with the “fast” training rate of the second stage, the result with the fourth stage, **30,000 training elements**, and an accuracy of **98.972%** was very good and has been stored in the database.

### Image example 3 with the same workflow



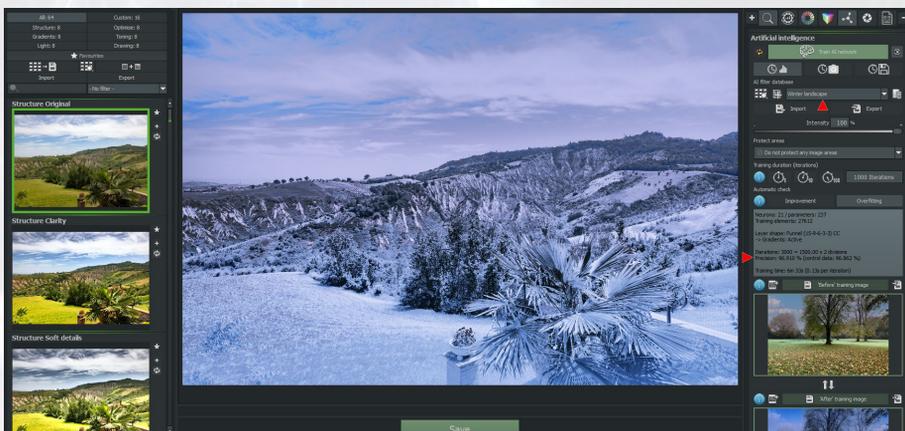
Neurons: 21 / parameters: 237  
 Training elements: 27612

Layer shape: Funnel (15-9-6-3-3) CC  
 -> Gradients: Active

Iterations: 3000 = 1500.00 x 2 divisions  
 Precision: 96.910 % (control data: 96.862 %)

Training time: 6m 33s (0.13s per iteration)

This image motif was transformed into a **winter landscape** in the **RAW module** in the **Artificial Intelligence section** using the **Winter Colours slider**. The training would work just as well for a transformation into **autumn colours**.



This impressive filter was trained and saved using the same parameter settings as in the previous image examples. The accuracy of around **97%** is completely sufficient in this case and could not be further improved after the first 1,000 iterations.

## 9. Parameters for optimal training preparation

The training of an AI network is carried out locally on your computer using very computationally intensive processes.

One of the challenges facing **AI Filter** is therefore to ensure that training times do not become excessively long, but remain within reasonable limits for cost and motivation reasons, in order to reward the fun and desire to experiment with trying out completely different “before and after pictures”, various parameters and settings with many quick successes. before and after images, different parameters and settings, with many quick successes.



**The properties of the network are set in the ‘lower area’.**

**Everything below the ‘After’ training image affects the training quality or the quality of the path from the “Before” to the ‘After’ image, not the result image.**

The following pages explain the parameters that offer very different tasks with different solutions.

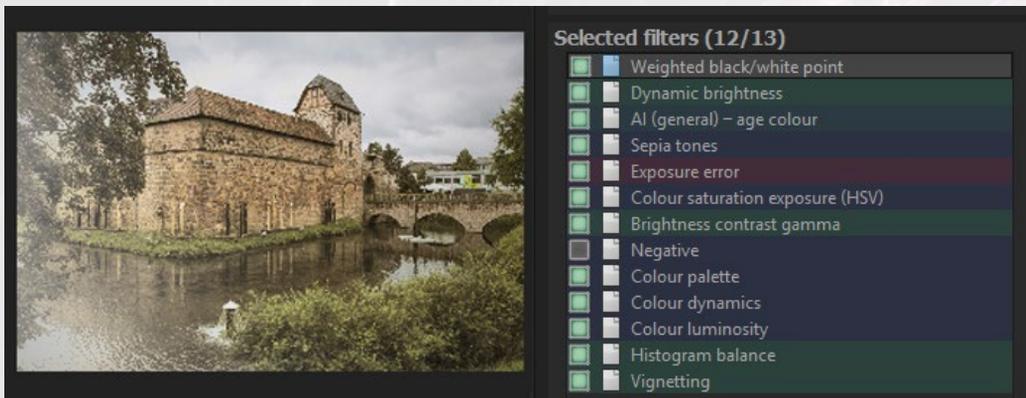
However, the explanations and illustrative examples can only serve as suggestions for your decisions.

There is no ‘magic formula’ for choosing the ‘right’ parameter with the ‘right’ setting level for an image that has been given a certain look using various effects and is to be trained as a “after” training image in comparison to the ‘before’ training image.

Therefore, if the result is not satisfactory at first, the ‘correct’ choice of a parameter with the appropriate setting or the combination of several parameters must be tried again after resetting the AI network.

### 3 categories can facilitate the selection of parameters and settings

The filters to be trained can be roughly divided into three categories, which were already listed in the last chapter and can facilitate the selection of suitable parameters.



**Category 1: 'Simple filters'** such as changes to **brightness, contrast** and **colours**. Simple **vignetting** is also included. The filters in the list of selected filters are examples of this category.



**Category 2: More complex filters** that have to perform a specific task, such as **noise reduction, sharpening, creating microdetails, or removing chromatic aberrations**.

The effects in the list of selected filters are examples of this. **The complexity does not refer to individual effects or their number for an image look, but to the number of different settings in the parameter area that are necessary for individual or multiple effects.**

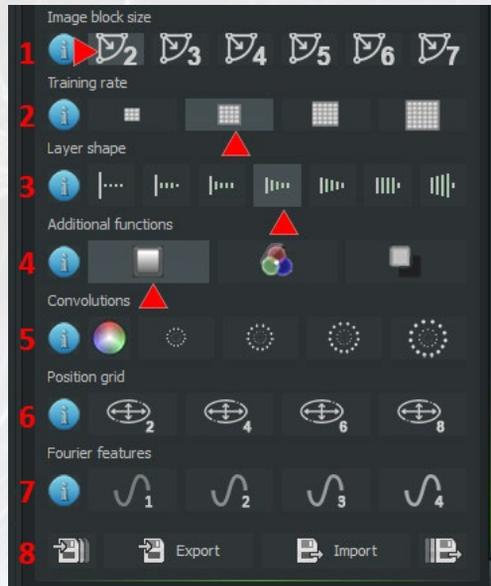
**Example: 5x5 blocks plus convolution plus Fourier features corresponds to a very complex neural network.**



**Category 3: Position filters** that convert **position-dependent effects** such as **gradients or bokeh with sharp edges** into filters that can also be classified as more complex filters.

## Standard presets: The fastest route to success

The overview of parameters has already been presented in the last chapter. The parameters are listed here without explanations, as these will follow in detail when the individual parameters are presented.



1. **Image block size: Default setting: 2 (2x2).**
2. **Training rate: Standard setting : 2.**
3. **Layer shape: Default setting: Funnel shape (middle position).**
4. **Additional functions: Default setting: Gradients.**
5. **Convolutions: Default setting: None.**
6. **Position grid: Default setting: None.**
7. **Fourier features: Default setting: None.**
8. **Quick export/quick import and export/import functions: These functions 'remember' the current settings.**

The **four standard settings** offer the great advantage that you can usually practise **all effects listed in category 1**, for example, (individually or in combination) **without making any changes**, as the filter examples in the last chapter have shown.

**Exception:** When training the **final filter for storage**, the network should be reset and **a high training rate** selected.

Typical effects that can be trained with the standard settings:

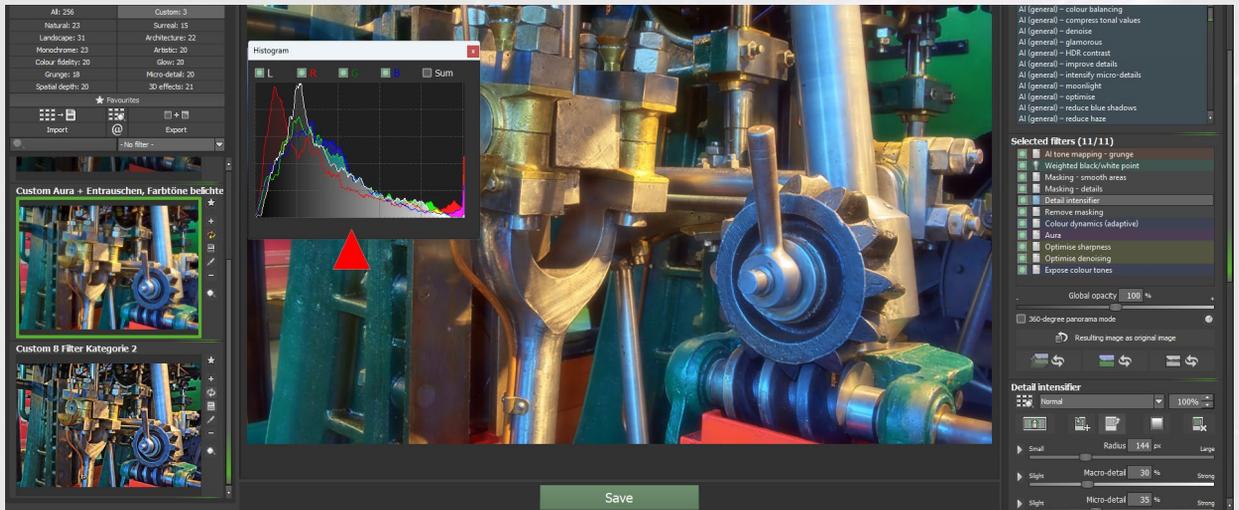
- **Dynamic brightness,**
- **Colour tone saturation/exposure,**
- **Brightness Contrast Gamma,**
- **Negative,**
- **Colour palette (RGB, HSV, HSL),**
- **Colour dynamics, colour luminosity,**
- **Histogram balance,**
- **Effects such as winter colours, autumn colours.**



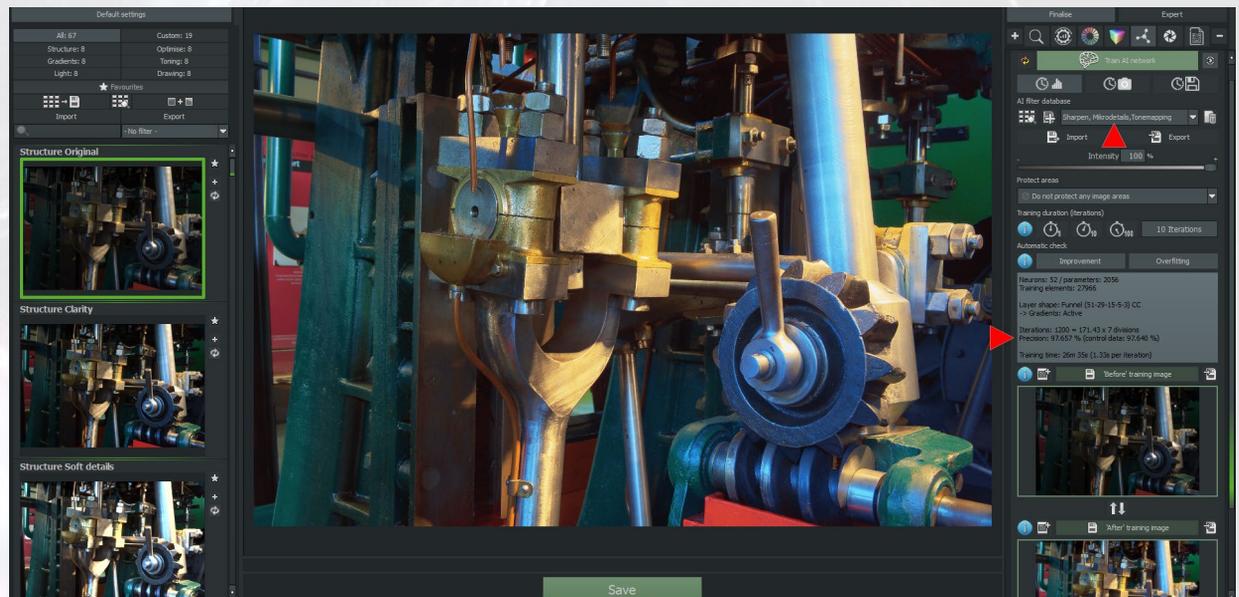
## Larger image blocks for more complex tasks



For securities in **category 2**, ...



... such as **sharpening, noise reduction, and detail enhancement**, blocks of at least **3x3** or **4x4** are necessary. In the example, a **block size of 4x4** has been selected.



The final, saved filter was trained in approximately 26 minutes with an accuracy of just under **98%**.

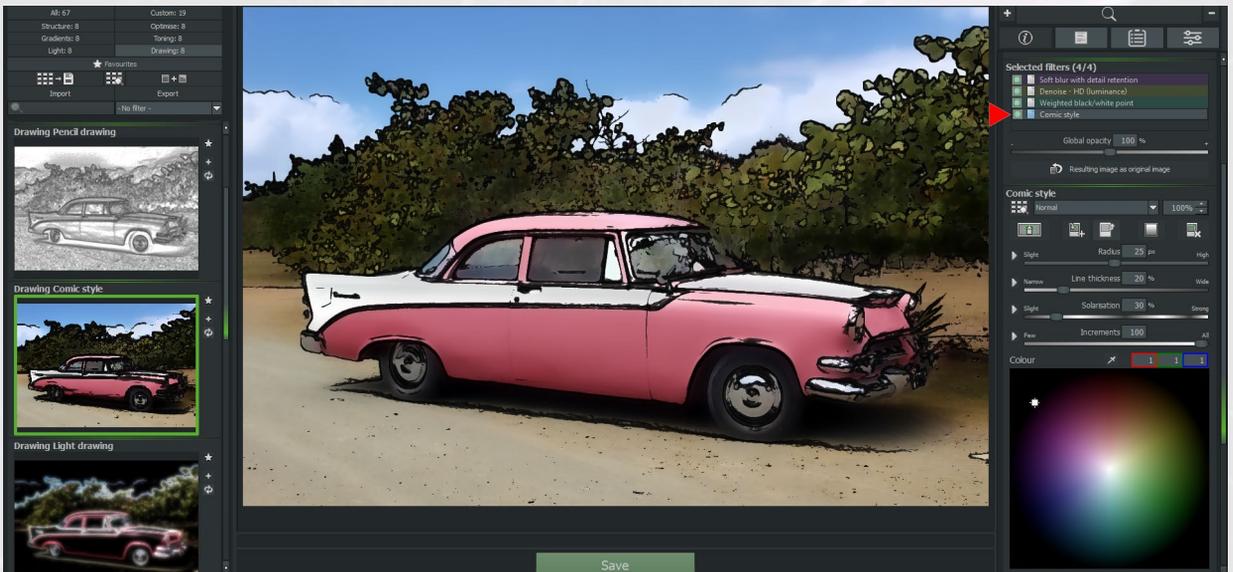
**The changed number of blocks is not displayed in the information window**, so it has been added again at the top of the graphic.

**Note:** Unless explicitly stated otherwise, all training examples in this chapter have been calculated using the **highest training rate** and **highest division rate**.

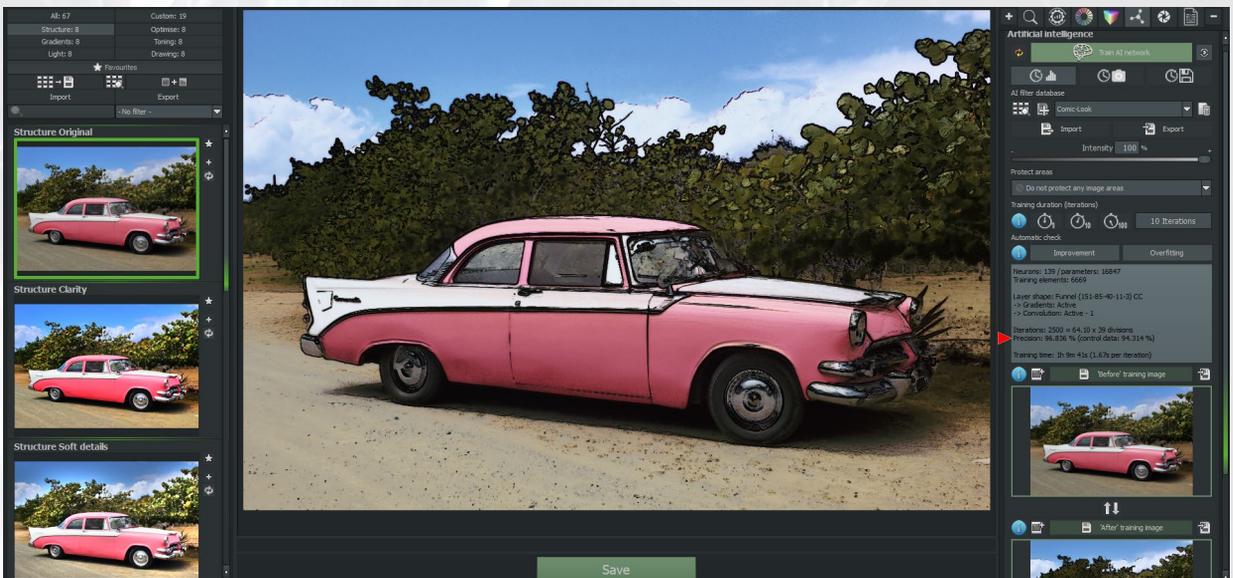
## Large image blocks for highly complex tasks



For example, use effects with **very high micro detail** enhancement ...

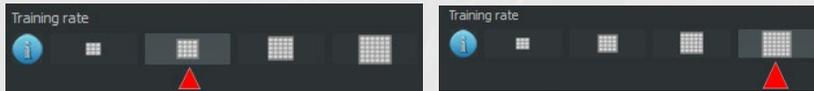


... or, for example, **comic-style** effects such as in the example, where several pixels of the surrounding area must also be taken into account in order to draw the contours, may require even larger blocks such as the **6x6** block chosen here.



After **2,500 training runs**, this filter achieved an accuracy of approximately **97%**. The training time was approximately **1 hour and 9 minutes**, with the last 500 iterations showing virtually no further improvements. The quality of the filter is impressive and very good.

## Training rate



The **training rate** represents the **accuracy of the training**.

The training rates are therefore not about a specific task, but about your decision on how **exactly the network should be trained**. If you just want to see whether the training works in principle, the training rate can remain at the **second level**.

If you want to build a finished filter that is to be used permanently, you must decide how much computing time is acceptable to you.

**The first two training rates are very fast** to calculate, but significantly less accurate.



**Image examples: 'Soft' gradients with smooth transitions and 'sharp' gradients and bokeh with sharp edges.** The graphic on the right is for demonstration purposes and could also be used for an image look if required.

**Level 1:** In the first level, **approximately 500 training elements are expected**.

**Level 2:** When this level is set, **AI Filter** randomly takes **only 2,000 sample blocks** of size **2x2** from the image, which is not very much and means a very rough calculation.

**Level 3:** The third level already has **8,000 elements**.

**Stage 4:** The final stage 4 (graphic top right) calculates with **30,000 elements**.

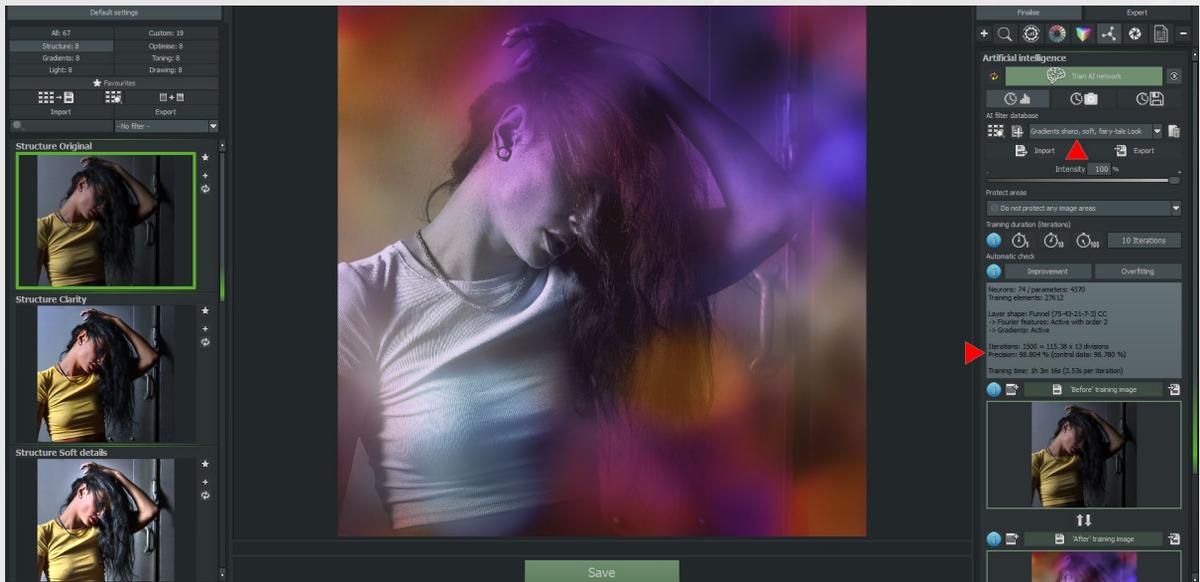
If the filter has to meet such diverse requirements as in the examples with large-area **soft gradients, square 'semi-sharp' small, very sharp colour gradients, bokeh with soft and sharper transitions**, and if various contrast and detail changes also characterise the image look, the third or, better still, the fourth level should be selected.

The **larger and more complex the neural network**, the **better the quality** of the desired trained filter at the highest level, at the expense of computing time, which can then amount to hours.

**Recommendation:** For the 'trial training', select the **2nd or 3rd level**, which offer a very good compromise between good accuracy, a **good result and a short training time**, usually seconds or a few minutes.

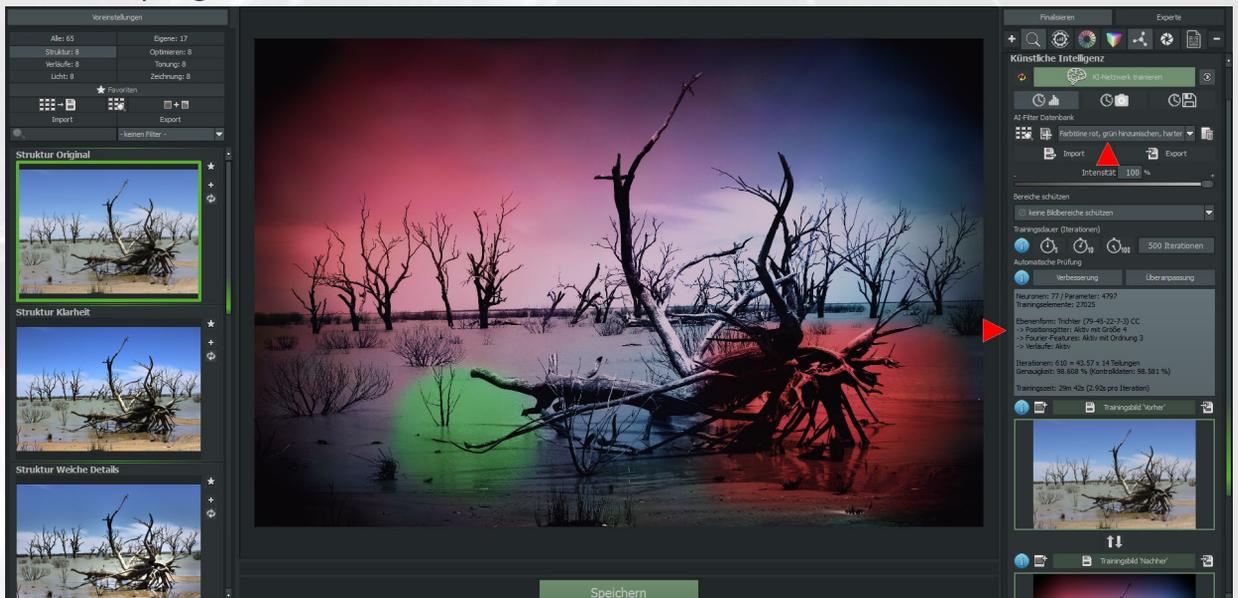
**The 4th level is maximally accurate and recommended for the final filter training, but also very computationally intensive with a long training time.**

## Trained filters of the sample images



After a training period of a good hour with 1,500 training units, the final filter for this 'fairytale look' with additional fog effect has achieved a **Precision of almost 99%**.

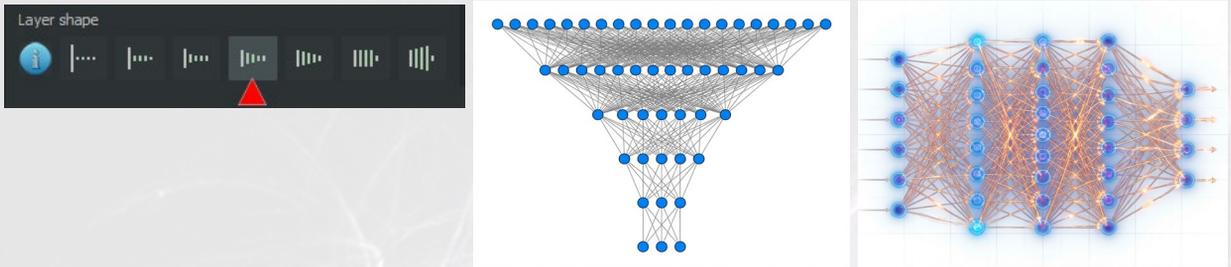
The result leaves nothing to be desired, because all of the challenges mentioned were practised very precisely and extensively, with all colour nuances and different progression forms.



The second final filter from the 'demo image' is just as satisfactory. The training result was achieved after just under 30 minutes with 610 iterations and an **Precision of 98.6%**.

The information window displays further information about the selected **position grid** and the **Fourier features**. These functions are explained on the corresponding pages using the same image example.

## Layer shape



An AI network consists of different **layers** that are connected to each other with weight parameters. Each neuron in one layer is connected to every neuron in the next layer, gradually creating a **deep learning effect**.

You can train almost **anything in one filter**, e.g. brightness or colour differences, colour changes, vignetting, gradients or colour gradients, detail enhancement, tone mapping, contrast differences or contrast compensation, masking.

The level shape 'indicates' how **complex** the difference between the before and after images is and **how much the neural network should compress the data or how small the network should be made**. The further to the **left** the settings are selected, the more densely or quickly data is **compressed** into information. The further to the **right** the setting is selected, the smaller and more detailed variants are trained, **with more precise nuances in the result**, but a significantly longer training duration.

By selecting a layer shape, you determine

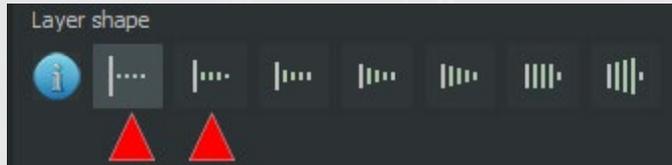
- whether the number of neurons per layer forms a **funnel shape**,
- a uniform (**linear**) shape or
- should form an **expanding** shape.

If the changes made in the final image are rather **large-scale, such as vignetting or colour changes, light gradients (category 1)**, the **standard funnel-shaped default setting can be retained** or the 'intensive funnel-shaped layer shape' to the left of it can be selected (graphics on the left and in the middle).

**The more settings are selected further to the right or switched on in the individual areas, the more complex and larger the neural network becomes** (graphic on the right) **and the longer the training takes**.

**Recommendation: To counteract the high complexity of different parameters and large image blocks**, the layer shape should 'move' further to **the left** during the 'trial training' so that you can quickly see how well the intended filter works.

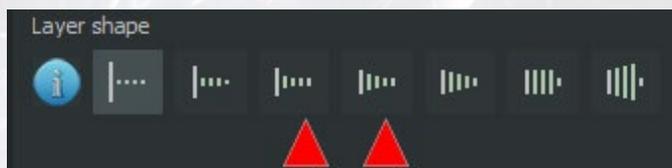
## Layer shape



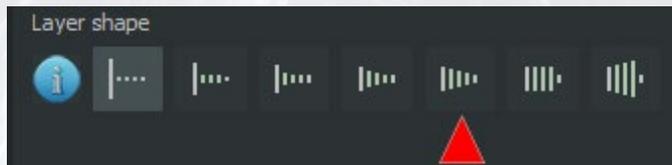
**L-shapes:** The two flat shapes to the **left of the default setting (L+ and L)** are particularly well suited for large image blocks as input data in order to compress data very quickly and thus learn large-scale structures.

Example: For a very **large image block with 7x7 pixels**, you can enter a highly compressed layer shape for the network in order to obtain a quick result despite the large image block, which takes a long time to train. These two layer shapes are therefore very well suited for 'trial training'.

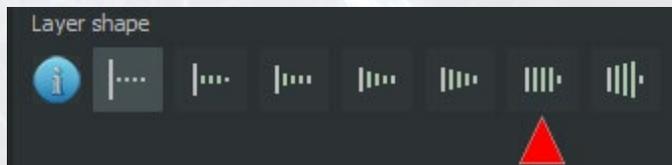
**'L+' is a very strong 'L', but even flatter.**



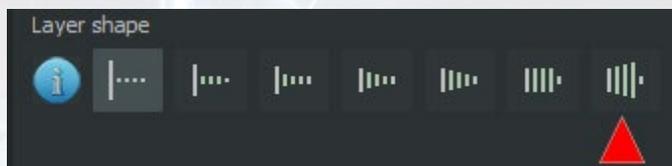
**Funnel shapes** such as the standard default setting are suitable for **simple AI networks** in which brightness, colour or contrast changes are to be trained.



In the **triangular level structure**, successive levels are compressed and reduced in size evenly. The essential information for training is compressed 'piece by piece'. This level structure is well suited to tasks similar to those covered by the funnel structure.



The **linear form** is well suited for learning more complex structures such as **denoising** and **sharpening**.



**Expanding shapes** are well suited for learning **very complex tasks** such as creating **additional micro details**.

To train the **final filter**, one of the last two options **to the right of the default setting** should be selected, as described.

## Training times compared for 3 level types

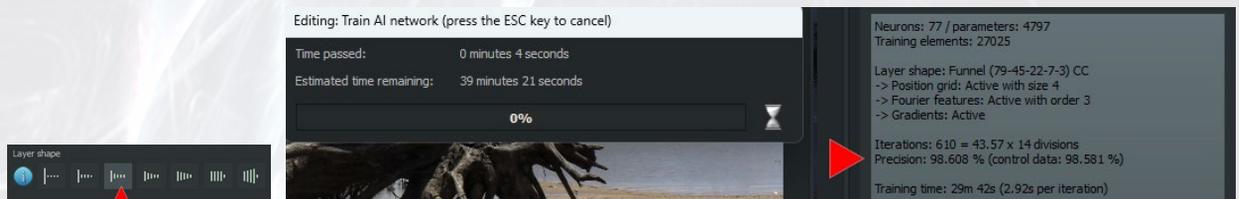


The training of this final filter of a complex network was automatically terminated after 610 iterations by the 'improvement check'. To prepare the filter, the following parameters, which deviate from the standard settings, were selected in this example:

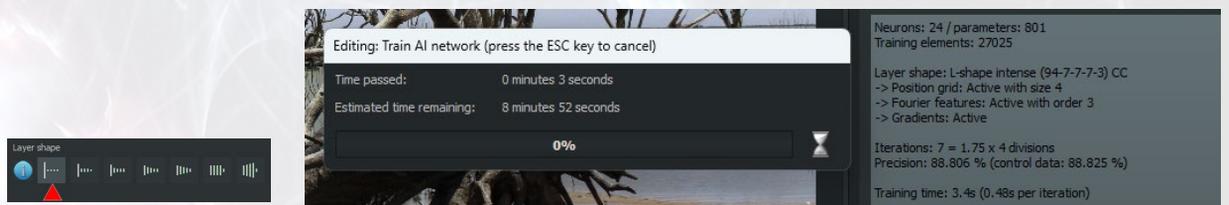
- **Size of image blocks: 4.**
- **Position grid: Active with size 4.**
- **Fourier features: Active with order 3.**

The training was conducted with the highest training and division rate.

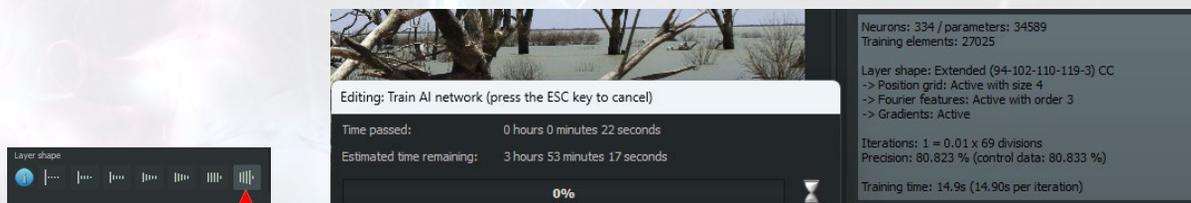
The following three graphs show the predicted training duration (the training was then terminated) with the same parameter settings but **different choices of level shapes**, which clearly illustrate how different training times can be under otherwise identical conditions.



**Funnel shape (default setting):** The training time is calculated in advance to be approximately **39 minutes**.

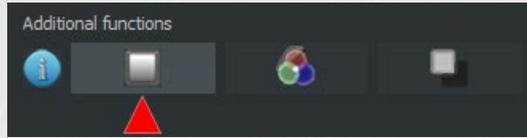


**L-shape ('L+')**: The training time is calculated in advance at just **under 9 minutes**.



**Extended level form:** The training time is calculated in advance to be approximately **4 hours**.

## Additional functions



The **vignettes** are preset for the **additional functions**.



This standard setting thus covers all cases in the 'after image' where, for example, changes in **colour and brightness**, as in this example...



... **only in the colour** ...



... or **only adjustments** were made to the **brightness**.

If there are no gradients in an image, this option can be disabled.

## Extension of colours, additional colour generation



This important function (data augmentation) is very helpful for images that have **few different colours** or in which a colour such as **blue** in the sky **is completely absent**.

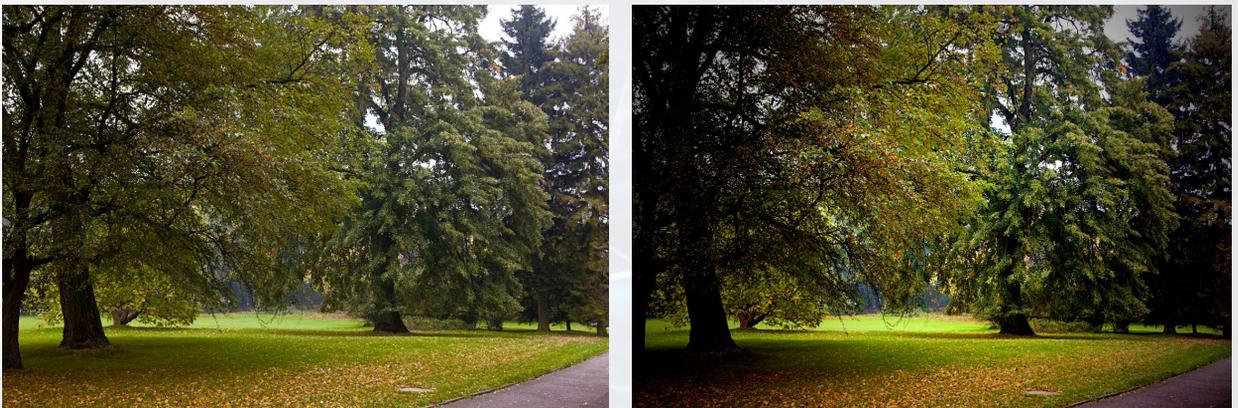


Compare your 'before' image with the modified "after" image and, **if you can confidently answer 'yes' to the question of whether all colours are already included, this function can remain deactivated.**

Since the neural network can only train elements that it recognises in the 'before' image, activate this function in such cases, because otherwise all images to which you later apply this filter will **have missing or distorted blue**, which may be desirable in exceptional cases.

When this function is activated, **various colour variants** of the image or **permutations of the colour channels** are generated internally (not visible) from the 'before' and 'after' images and then added to the training. This makes the AI network significantly more stable in terms of colour representation and **also takes into account colours that are missing in the 'before image'.**

### Image example



The filter to be trained should solve the task of adding a vignette to an image motif, slightly increasing the dynamic brightness and contrast, and specifically enhancing the colours using the 'Colour Palette/Saturation' effect.

**The colours blue and red are largely missing.**

## Filters without additional colours



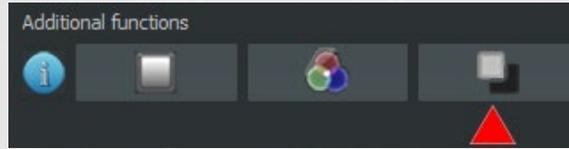
With the **additional function deactivated**, the filter result is far from the desired outcome, as shown by the thumbnail of the loaded reference image. The blue has not been applied, but only unnaturally darkened, while the other colours have been transformed into a greenish-yellowish look.

## Filters with activated additional colours

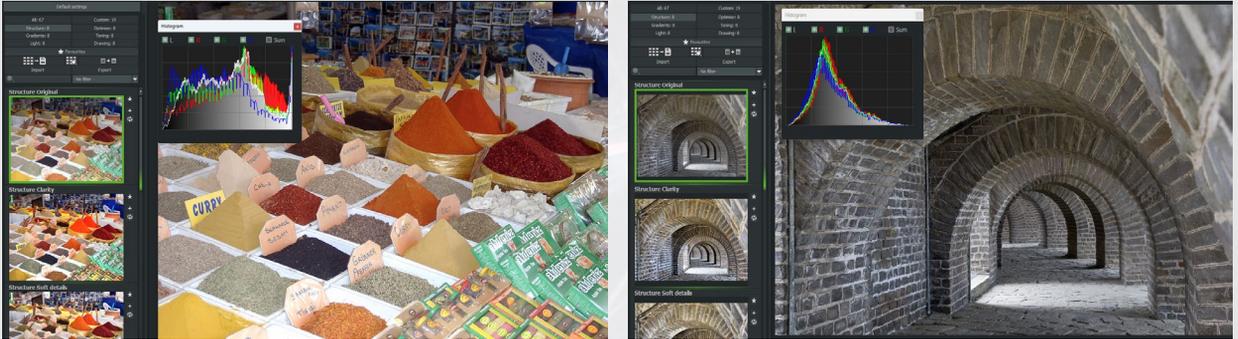


It's completely different with **the function activated**: the sky blue is only darkened where the vignette is applied; all other colours appear as desired.

## Contrast extended



Are there **dark** and **light** areas in the image ...



... as in the example image on the left, where the histogram displayed with the 'hits' in black (left) and white (right) also confirms that the contrast is sufficiently good, this function can remain deactivated.

If the images are rather **'flat' or low in contrast with small differences in brightness**, as in the graphic on the right, where the histogram leaves a small gap in the bright area and a large gap in the dark area up to the 'stop', it should be activated, either on its own or in addition to **one or both of the other additional functions**, as in the graphic above.

This active additional function does **not** mean that all images subsequently assigned to this filter will have **higher contrast**. This additional function, like the others, refers to the 'before' and 'after' images.

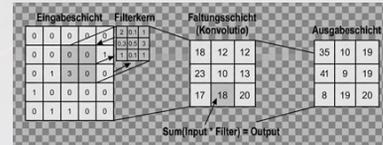
If the additional contrast is activated, both images are internally calculated **once with additional contrast and once with less**, so that areas in the image that are more or less rich in contrast are also taken into account.

Activating this additional function is particularly useful if the original image is rather 'flat' without strong contrasts, as it creates artificial, additional contrast for training purposes.

**Combination:** When **both contrast and colour functions are activated**, the 'before image' is used once as it is, once with **more colour**, once with **less colour**, once with **more contrast**, and once with **less contrast**.

Consequently, this means that **5 'before' and 5 'after' images are trained** and more training data is generated. For the network, the advantage is that it can achieve the desired result more accurately, but the training process is more computationally intensive and takes longer.

## Convolutions



These functions are disabled by default.

**Convolution** is a **mathematical operation** and means folding.

What is folded in convolution?

Not material such as paper, but **every pixel of the image is calculated using a matrix, a table.**

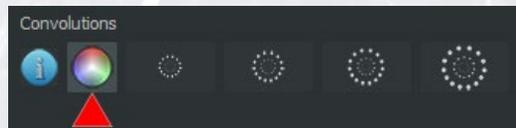
A **sharpening or denoising effect, large-scale detail changes in effects such as soft contrast and soft details consist**, for example, of **mathematical convolutions of the image.**

The **SHARPEN** and **DENOISE** programmes consist largely of these convolutions.

When folding, **pixels flow in all directions around a pixel** with different weightings in the calculations for all the effects mentioned, such as **sharpening** or **denoising**.

Effects such as **Soft Contrast** with a differently **softened mask** are also convolutions.

**AI Filter** offers **4 levels** ranging from **very subtle brightness and detail adjustments** to **very significant changes.**

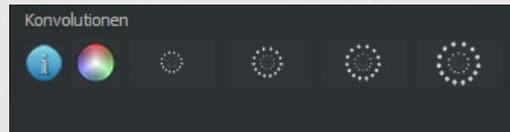


There is also a **Colour mode**: if the differences in brightness or detail in the 'before' and 'after' training images are different, they are integrated into the AI network when the **Colour mode is active.**

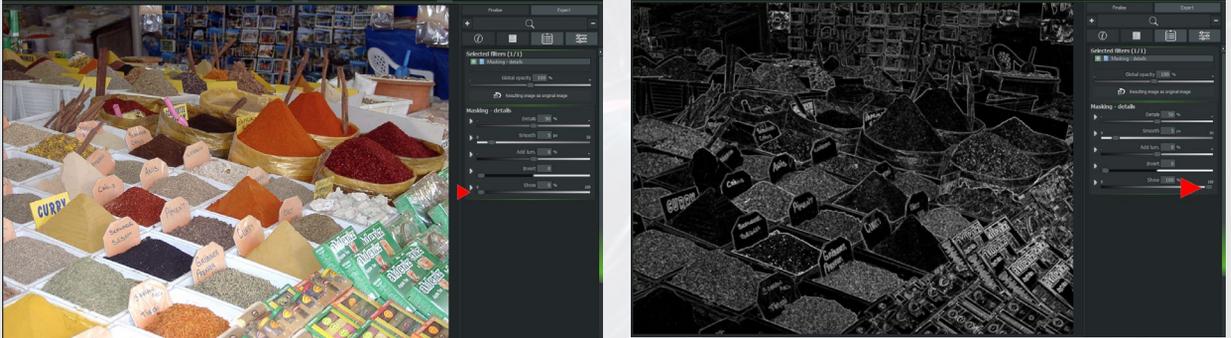
To determine whether you need to enable this option, you must answer the question: **Are the soft details in the image in colour or black and white?**

This will usually be in colour, so you can't go wrong if this option is switched on one step, except in the case of a black and white image.

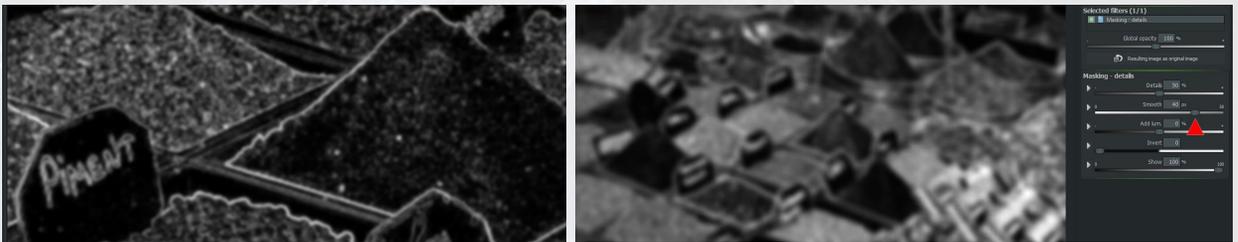
## Exemplary criteria for determining the convolution stage



The 'right' choice of the 4 convolution levels depends on the answer to the question: Do I only have **fine, soft details** or **coarser ones**?



For example, if you add the **Masking Details** effect in Expert mode to this original (graphic on the left), **the mask used to process the image** will look like the one in the graphic on the right when the display is turned on.



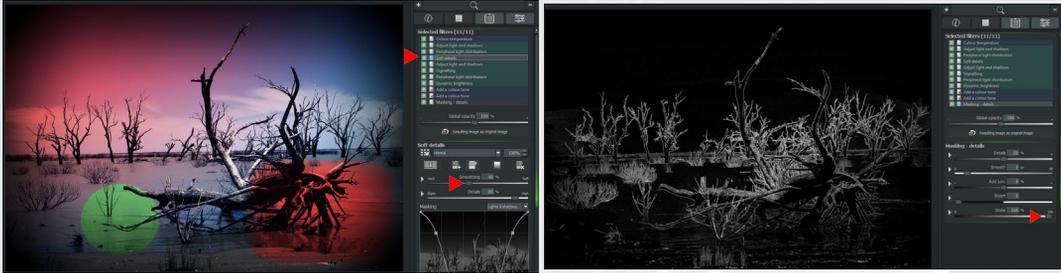
In **bright areas**, a lot to a great deal (**white**) is calculated, while in **dark areas** little to nothing (**black**) is calculated.

If the details are **soft**, the mask is **smoothed** as in the example, where the smoothing slider is set to **40%**, and **then** the image is calculated with it. Masks 'run' along a **contour**, as can be clearly seen in the graphics.

The more the mask is **smoothed**, the more, viewed from the contour (graphic on the right), calculations must be made **further and further outwards**, because the bright areas become wider and wider (and the 'halo effects' also occur).

**This generated mask is created from a convolution** because the 'surrounding pixels' on the left, right, top and bottom are included in the calculation to the extent that these pixels **change** in comparison to the pixel in the centre. If such a pixel **changes significantly**, the detail mask becomes **light**; if it changes **little**, it becomes or remains **dark**.

## Exemplary criteria for determining the convolution stage



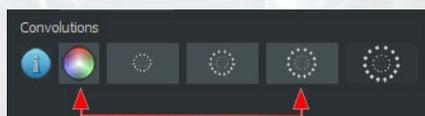
For effects such as **Soft Details** or **Soft Contrast**, all effects that use **soft masks**, you can use the corresponding **smoothing slider** to individually adjust the smoothing.

If the **Soft Details** effect is **activated** by clicking on it, the slider is set to a **default smoothing value of 40%** (left graphic). The effect can change significantly if the smoothing slider is moved to the **left** towards **hard** or to the **right** towards **soft** from the default setting.



**Note:** If you select **Masking Details** as the **only effect**, as in the previous example, or select it in a preset with multiple effects, as shown here, it will be inserted at the bottom of the selected effects. If you turn on the mask view for this effect, you will see the preset smoothing of **this filter (5%)**.

If this filter is to affect the **image** or parts of the image, it must, like all masks, be dragged with the left mouse button held down **above** the effect on which it is to be applied, e.g. above the two effects **Add Colour Tone**. Everything that is light to white in the mask (left graphic) is 'masked out', with the result that all added colours have almost disappeared (right graphic).

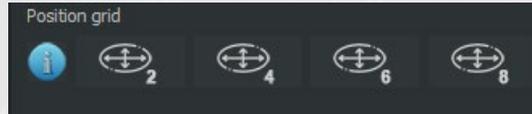


**Recommendation based on the descriptions:**

**The stages are not activated individually, but are switched on** as shown in the diagram, where the **colour mode plus the first three convolution stages** are activated.

- For effects with a smoothing function at around the **middle** (around 40 to 50%), switch on the **first two stages**.
- At around **70%**, the **third stage** should be added.
- At **100%**, you activate **all levels**.

## Position grid



The **position grid** is for **complex paths** and is **disabled** by default.



For **simple gradients** such as **vignetting**, the button Gradients for brightness, colour gradients and vignetting in the **Additional functions** is activated by default in order to train these as well, because the network must receive this information if, for example, the brightness in the image decreases towards the outside.

**Complex gradients** are primarily brightness and colour gradients that **do not simply run from bottom to top** or from the inside to the outside, as in a vignette, but rather depict more complex structures, as in the example images, where **bokeh** or **light spots** are only present in selected areas of the image, which is **dark** in some places and **reddish and brighter or green in others**, with a **sharply defined gradient**. Images, where bokeh or specks of light are only in selected areas of the image, the image is **dark in some places, reddish and brighter in others**, or green with a sharply defined gradient, then this is a **more complex variant of gradients**.

The position grids with a **bandwidth of 2x2 to 8x8 position information per training element** are a special form of trajectory detection.

**The more complex you assess the curves appearing in the training images to be, the further to the right you switch the position grid, e.g. '4' or '6'.** '4' means: **4x4 support points or positional data** from the image are also trained, which means that **4 positions horizontally** and **4 vertically**, i.e. 16 positions, are taken into account and these complex, very fine gradients are also trained.

Accordingly, it is **6x6** or **8x8** for position grids **'6'** or **'8'**.

Does a higher selection cause any harm? No, just as in all other series. However, at the highest level, the calculation time can take many hours!

## Interpretation of trends with consequences for the position grid



The potentially very long training times are a good reason to find the answer to the question before switching on a position grid: **What do you need in the training images in terms of position grids**, i.e. what is **not covered by the normal default history**?

In the graphic on the left, you can see a **soft colour gradient** in the top left corner that does not simply run from top to bottom, but is limited to the upper left part. In this case, for example, a **4-grid is useful**.

The sharper angular gradient at the bottom right is also too sharp for the 'normal' gradient, but it is quite large and not detailed, so the **1 grid is sufficient**.

**The sharper and more detailed a gradient is, such as the green one, the further to the right the setting should be selected, in this case, for example, the 6 grid.**

And this **sharpest and most detailed progression** also determines the **Fourier stage**.

The same applies to many **bokeh**s, where this 'fineness', even at the highest level with the **8-grid**, is often not sufficient to reproduce them in training. The **Fourier features** are also 'responsible' for this.

## Fourier features



This series offers 4 setting options from **1st to 4th order**. All options are **disabled** by default.

For tasks where even the **'fineness' of the position grids reaches the limits of feasibility, such as with bokeh**s, i.e. special circular light effects, or with **sharply defined gradients, Fourier features** or **Fourier information** solve this task.



Technically speaking, **Fourier** refers to frequency analysis or frequency decomposition. This function can be integrated into training and, when activated, ensures that particularly fine and nuanced image elements such as **light spots (flares), bokeh**s, **fine rays of light** or **fine light structures** are **trained** so that the results are even more precise, differentiated and closer to the 'after image'.

The selectable **order of the Fourier features** determines how complex the progression structures you want to map are.

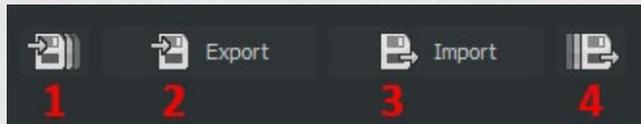
**Simpler gradients** can be mapped using Fourier features of **order 1**, while more complex light structures such as bokehs are learned more effectively and better with **order 3 or 4**.

As with all settings, there is a disadvantage: the higher the selected level or order, the longer the training times, especially if, for example, the highest setting has also been selected for the **position grid**.

**Recommendation:** For such 'extreme' combinations, reduce the level shape to an 'L-shape' so that the training time during the 'trial training' remains acceptable.

**Note:** In the next chapter, you will find a summary of recommendations for selecting parameters.

## Export and Import



1. Quick Export
2. Export
3. Import
4. Quick Import

If a network is stored in the database, nothing can be changed.

If one or more settings are to be changed, the network must be reset to an **empty network** so that everything can then be retrained with the changes made.

The **export and import functions** ensure that

- the parameter settings of a **finished filter are permanently** saved in a selected folder, which can be accessed again and again later,
- all current settings, i.e. the **complete configuration**, are saved in a **temporary folder**, an internal file, during **quick export**, which can then be retrieved at any time via **quick import**.

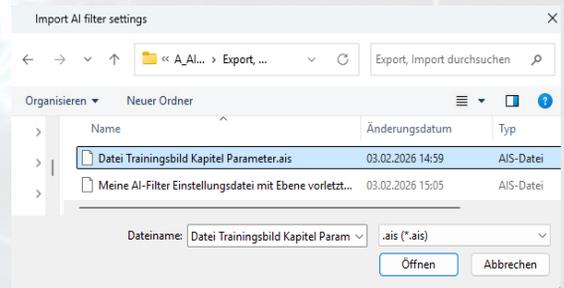
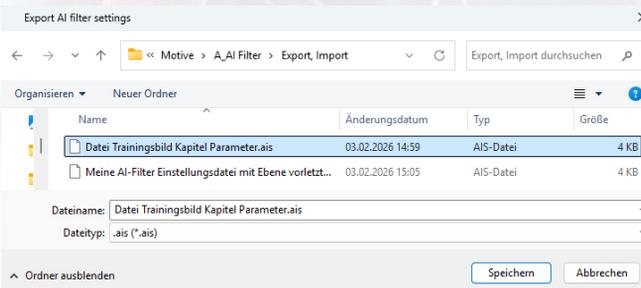
Using these quick export and quick import functions is highly recommended because it is difficult to remember all the settings.

Afterwards, it is easy to change the **training rate** or other parameters, for example.

### Quick Export/Quick Import

- Clicking on button (1) saves the current configuration in a temporary folder.
- Clicking on button (4) resets the network and sets all parameters to the 'cached values'.

### Export/Import



- Clicking on the button (2) saves the current settings in a folder of your choice.
- By clicking on the button (3), you can import the desired file from this folder.

**Note:** If you save the finished filter as a project, all parameter settings will also be saved.

## 10. Image example with selected criteria for parameter settings

As described at the beginning of the last chapter, there are no clear criteria for the 'correct' parameter settings for training the 'before and after images'. In case of doubt, several 'quick training runs' should be carried out first before starting the final filter with the highest training rate.

This is also perfectly normal, because there are no exact 'if-then' relationships, but rather your assessments with possible later corrections, which is what a neural network does.

**'Example workflow':** On the following pages, selected criteria for decision-making, based on the familiar example image, are repeated in 'condensed' form and then trained with all the set parameters to create a finished filter.



### Size of image blocks

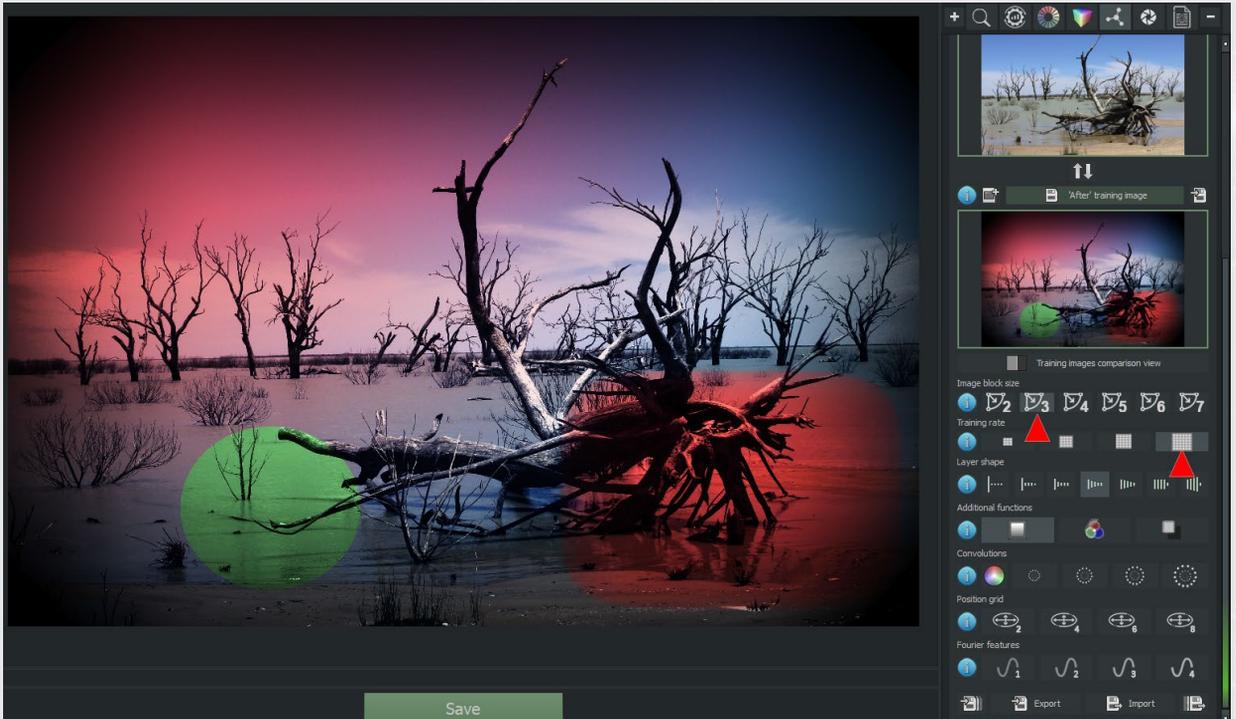
When selecting image blocks, the following question must be answered: Are there any **detail enhancements, sharpening or noise reduction** in the image?

- Size of **image blocks '1' and '2'**: If **none** of this occurs in the training images, **small blocks** are sufficient.
- Size of **image blocks '3' and '4'**: If there are **noise reduction** or **sharpness** effects in the image, a **medium image block size of "3" or "4"** is recommended.
- Image **block size '5' and larger**: Large, coarse structures, **large micro-detail enhancements** or **comic artists** who, starting from a single pixel, 'look' at multiple pixels in all directions in order to draw **contours** for a comic effect, for example, can achieve the highest precision. Starting from one pixel, several pixels are 'looked at' in all directions in order to, for example, draw the contours for a comic effect. This can be trained most precisely with **large image blocks of 5x5 pixel** units or larger.

**Recommendation:** The **larger the block size** (to the right), the **further to the left** the **layer shape** should be selected in order to guarantee fast or acceptable computing times for the 'trial training'.

» **In the example image, small blocks such as the selected 3x3 are sufficient.**

## Training rate



The **Training rate** is practically synonymous with the **accuracy of the training**.

If the default setting for the **second stage** is used, **2,000 randomly** selected sample blocks of size **2x2** are taken from the image, which is not very many, with the result that the calculation is very rough but very fast.

The last stage takes **30,000 elements**, is very accurate, but particularly computationally intensive and therefore slow.

**Only filters that are trained with the third or, better still, fourth level will function optimally or 100%. The first two levels are not suitable for a finished filter because they are not precise enough.**

**Recommendation:** If you want to test whether the filter works, use the **'fast' first stages** for the **finished filter**, use the **third or even more accurate fourth stage** with a long processing time.

» In the example image, the 4th stage was set for the final filter.

## Additional functions

**Note:** In terms of parameters, the series of training rates would be followed by the series of **level shapes**.

Since the choice of the appropriate layer shape depends heavily on all other parameter settings, the choice of layer shape, based on the example image, is described at the end of this chapter.



**Vignette:** This function is **active by default** and does not need to be deactivated in most cases, because at least one criterion of **brightness gradients, vignetting or edge light changes** occurs in almost all images and should of course be trained.

» **This default setting has been used in the example image.**

## Expansion of colours



This additional function enables the neural network to also train colours that do not appear in the training images or are barely recognisable.

Compare your training images and answer the question of **whether all colours are already included**. If the answer is yes, as in the example image, this function can remain deactivated.

If it is activated anyway, the computing time is significantly increased because each computing step takes three times as long for the three RGB colours..

» In the example image, this function has remained deactivated.

### Contrast extendet

When activated, this additional function does **not mean** that all images subsequently applied with this filter will have **higher contrast**. This additional function, like the others, refers to the 'before' and 'after' images.

If the contrast is sufficiently good with dark and light areas, as in the example image (graphic on the right), the **original image** that this function is primarily concerned with, which is also confirmed by the displayed histogram with the 'peaks' at black (left) and white (right), this function can remain deactivated.

If the images are rather **'flat' or low in contrast with little difference in brightness**, which can be seen in the histogram by 'gaps' on the left (black) and right (white), it should be activated. The image is then calculated once with **more contrast** and **once** with less contrast, i.e. **additional contrast is artificially generated for training** so that areas in the image with **more** and **less contrast** are also taken into account.

**Note:** You can activate **one** additional functions either individually or **in combination** with one or both of the other additional functions.

» In the example image, this additional function has remained deactivated.

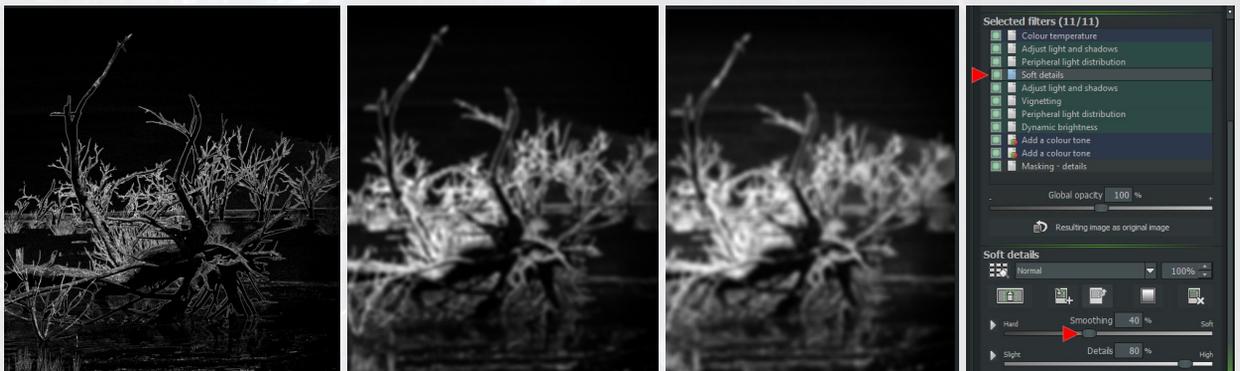
## Convolutions



The convolutions are **disabled by default**.

In this series, 2 questions must be answered if necessary:

- Are the soft details in the image **in colour** or only in brightness, i.e. **black and white**? In the example and in all assessments where you are unsure when using convolution, **switch on the colour**.



2nd question:

- If there are only **fine, soft details** in the image, has only a **low level of masking** (graphics from left to right), a **medium or strong level** of masking with high smoothing been set?

In the example, the smoothing slider for the **Soft Details** effect is set to a value of **40** (graphic on the right), which corresponds to a **medium value**.

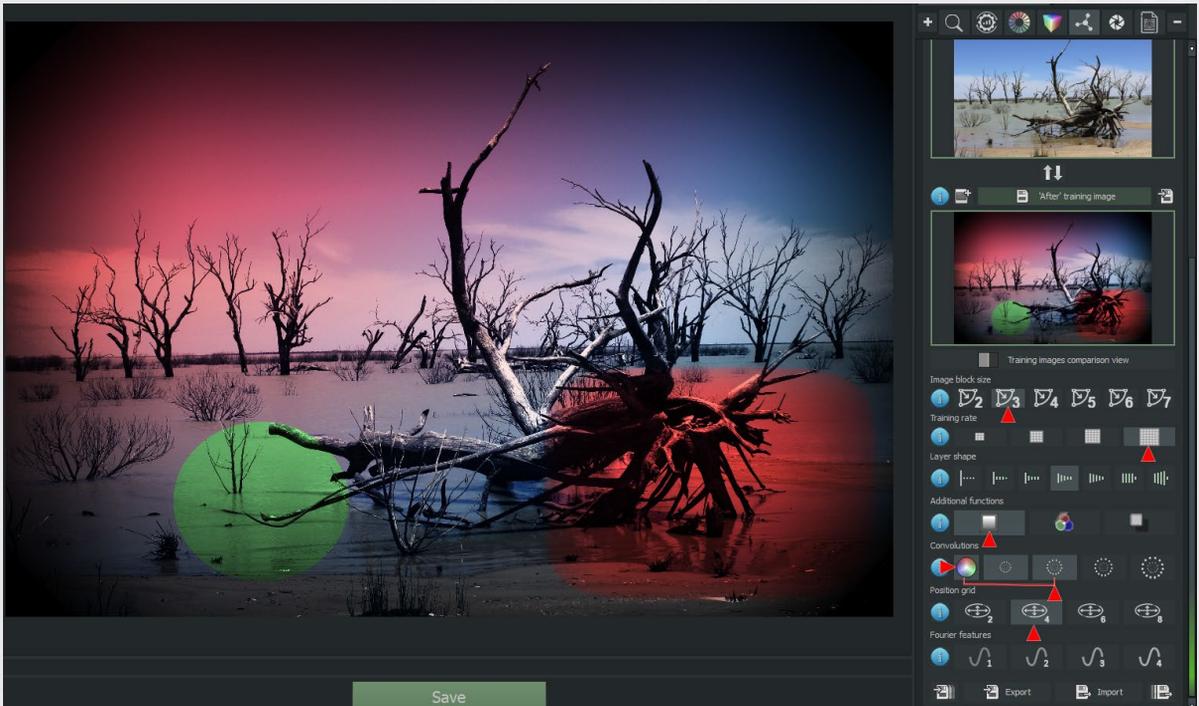
**Recommendation:** If in doubt, check in expert mode to see what values are set for effects such as **Soft Details** or **Local Contrast Compensation** on the **smoothing slider**. You can't go wrong by choosing a higher level.

- **Levels 1 to 2:** For low and medium values (**0 to approximately 40%**).
- **Levels 1 to 3:** For higher values (**approximately 50 to 70%**)
- **Levels 1 to 4:** For very high smoothing up to **100%**.

The individual stages are switched on one after the other.

» **In the example image, the colour mode and the first two levels are active.**

## Position grid



The **position grids** are **disabled** by default.

This series answers the question: Which setting must be activated that is **not** covered by the **default setting for the additional functions, which takes all normal processes into account?**

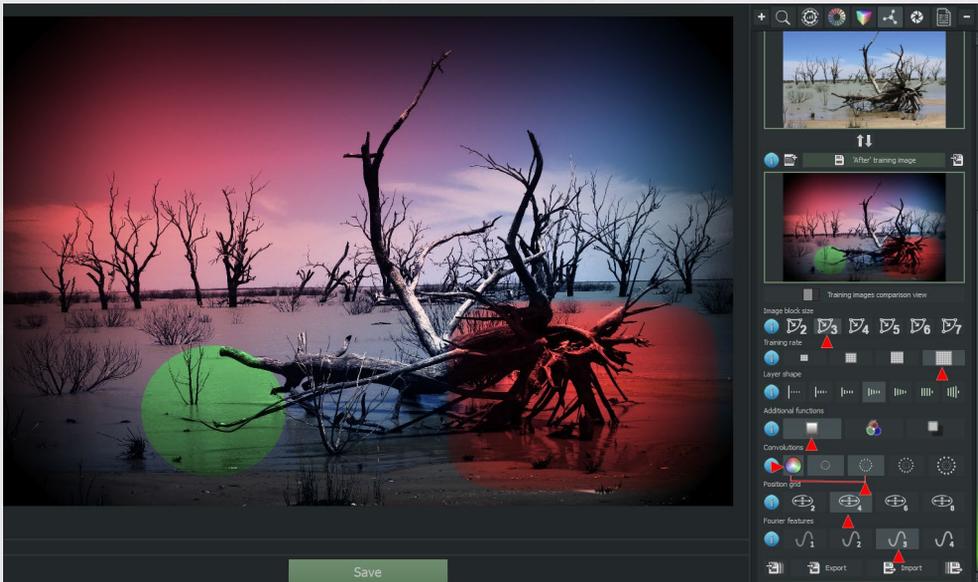
The image shows:

- There is a **soft colour gradient** at the top left. The **2x2** grid with 2x2 position information per training element is probably too small; the activated **4x4 grid** should be sufficient.
- At the bottom right, there is an **almost angular and significantly sharper gradient** than the one in the top left corner. This is also too sharp for a 'normal' gradient. If there were only this one gradient, the smallest grid (2x2) would probably suffice.
- At the bottom left is a **small, very sharp and round gradient**. The **sharper and more 'detailed'** it becomes, the **further to the right** a position grid should be selected. In this case, as with the gradient at the top left, the **4-point grid** should be sufficient.

**The same rule applies to the position grid as to the Fourier features: the most 'demanding' image element determines the choice.**

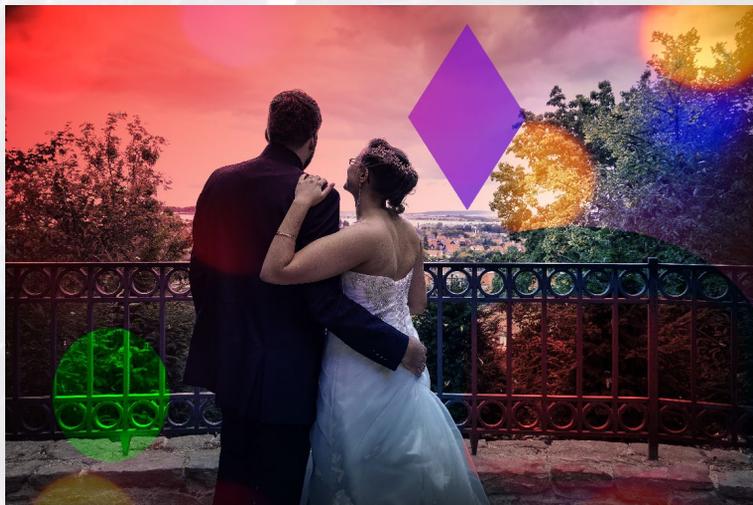
» In the example image, the 4-cell grid was selected.

## Fourier-Features



The **Fourier features**, which mathematically **'decompose'** the image into frequency components and thus create the conditions for displaying certain sharp structures, are **disabled by default**.

If you answer **yes** to the question of whether **sharply defined gradients** can be seen in the image, such as the 'sharp' green colour gradient in the example, you must activate one of the **Fourier features of the first to fourth order**.

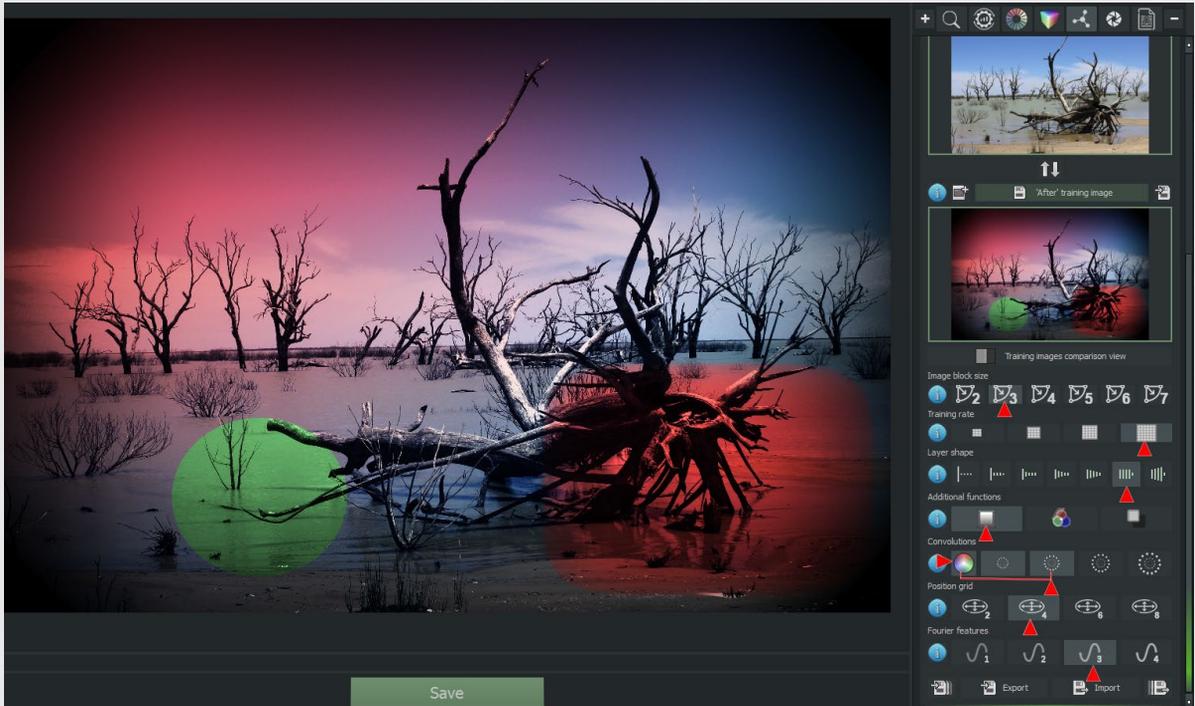


**The more complex the gradient structures, light effects or bokeh's, as in the graphic, the higher the order selected should be.**

As a rule, there is a dependency between position grids and Fourier features: if, when viewing the training images, you recognise the need to activate a position grid as in the **4x4 example**, you should also activate a Fourier feature. In this 'demonstration example', this could also mean the **4th order** if the 3rd order would not achieve the desired result.

» **In the example image (above), the third-order Fourier features were selected.**

## Layer shapes



There are no obvious criteria for choosing the appropriate **layer shape**. It **depends on all other parameter settings**. Nevertheless, there is a simple correlation:

**The more complex the settings are, the further to the left the layer shape should be selected for the 'trial training'** so that you can see an 'interim result' as quickly as possible, which allows you to evaluate the training of the final filter.

The choice of this ready-made filter depends on assessing or trying out 'how far to the left' the selected layer shape can be placed so that the filter is still very good and meets your requirements.

When training neural networks, it is impossible to predict which combination of parameter settings will yield the best results, which may require multiple attempts.

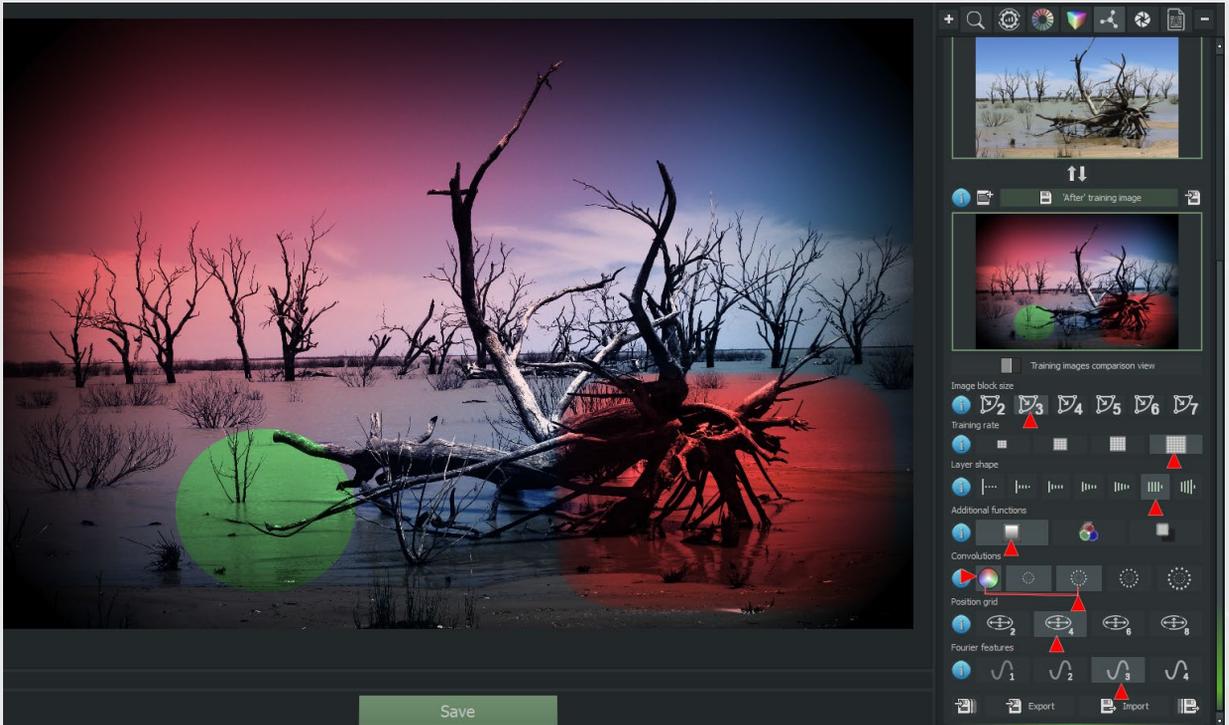
By accepting the default settings, you will generally not make any mistakes.

For example, use

- **large image blocks,**
- a **high order** in the **Fourier features** and
- **high settings** for the **position grids,**
- it is best to start by practising with a **small, flat shape** ('L').
- save all settings via **quick export,**
- reset the network,
- retrieve all previous settings via **quick import**
- and, depending on the estimated complexity of the finished filter, choose either the standard training rate or a higher one.

» **In the example image, the penultimate (linear) plane shape was selected.**

## Summary of the set parameters, finished filter



In the 'trial training session', the training rate and treadmill incline were set to the 'fastest' values. All other parameter settings were identical.

The **final, finished filter** was trained with the following parameter settings:

- **Size of image blocks: 3.**
- **Training rate: Highest level.**
- **Layer shape: Penultimate stage (linear).**
- **Additional functions: The default setting has been applied.**
- **Convolutions: The colour mode and the first two levels are active.**
- **Position grid: The 4-cell grid is active.**
- **Fourier features: The third-order Fourier features are active.**

Artificial intelligence

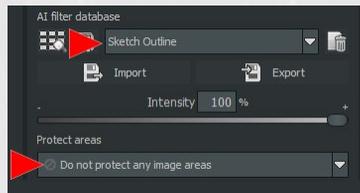
Neurons: 303 / parameters: 30603  
Training elements: 27025

Layer shape: Linear (100-100-100-100-3) CC  
-> Position grid: Active with size 4  
-> Fourier features: Active with order 3  
-> Gradients: Active  
-> Convolution: Active - 12 (Colour)

Iterations: 732 = 11.62 x 63 divisions  
Precision: 98.584 % (control data: 98.542 %)  
Training time: 3h 59m 8s (19.60s per iteration)

After a training period of approximately **4 hours**, the filter had achieved an accuracy of **98.6%** and was stored in the database with a very good result.

## 11. Protect areas



This area is also identical to that in all other modules in which area protection is offered.

**Area protection can only be applied to the finished filter, not to the training.**

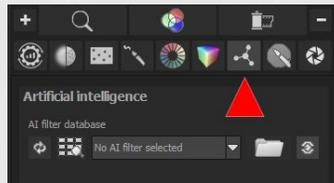


In the example image, the selected effect **Sketch Outline** has been applied to the entire image. If you want to exclude the sky from this effect, click on the button **Do not protect any image areas** or the small arrow next to it ...



... and then select, for example, **Intensely protect sky blue** from the context menu that opens. The result is as desired: the vintage car, the road and the trees have the new **Sketch Outline** look, and the sky is blue as in the original file.

## 12. Use filters in other programmes



In **AI Filter**, you can create your **own filters**.

In the **AI training area module** with **AI filters**, you can apply **all** of the filters offered, which have been previously trained with neural networks, to your image. The term **AI training area** does not mean that you can **train** effects in this module, but rather that you can access filters that have been previously trained in the **AI database**, enabling many exciting and surprising transformations of an image motif.

All supplied and self-created filters are offered identically in **all programmes in which this module is available**, as is the case with **LUT styles**.

This module is integrated in **COLOR, BLACK & WHITE, HDR, FOCUS, NEAT, SHARPEN, DENOISE, ZOOM, EMOTION, ANALOG, AI-Filter** and **FOTO 3D**.



Clicking on the button displays the module.



By clicking on **No AI filter selected** or the small arrow next to it, you can open the list of standard AI filters, including your own trained filters, which are located **below the white dividing line**. In this list, activate the desired filter, in this example **Conversion SW, Vignette**, by clicking on it.