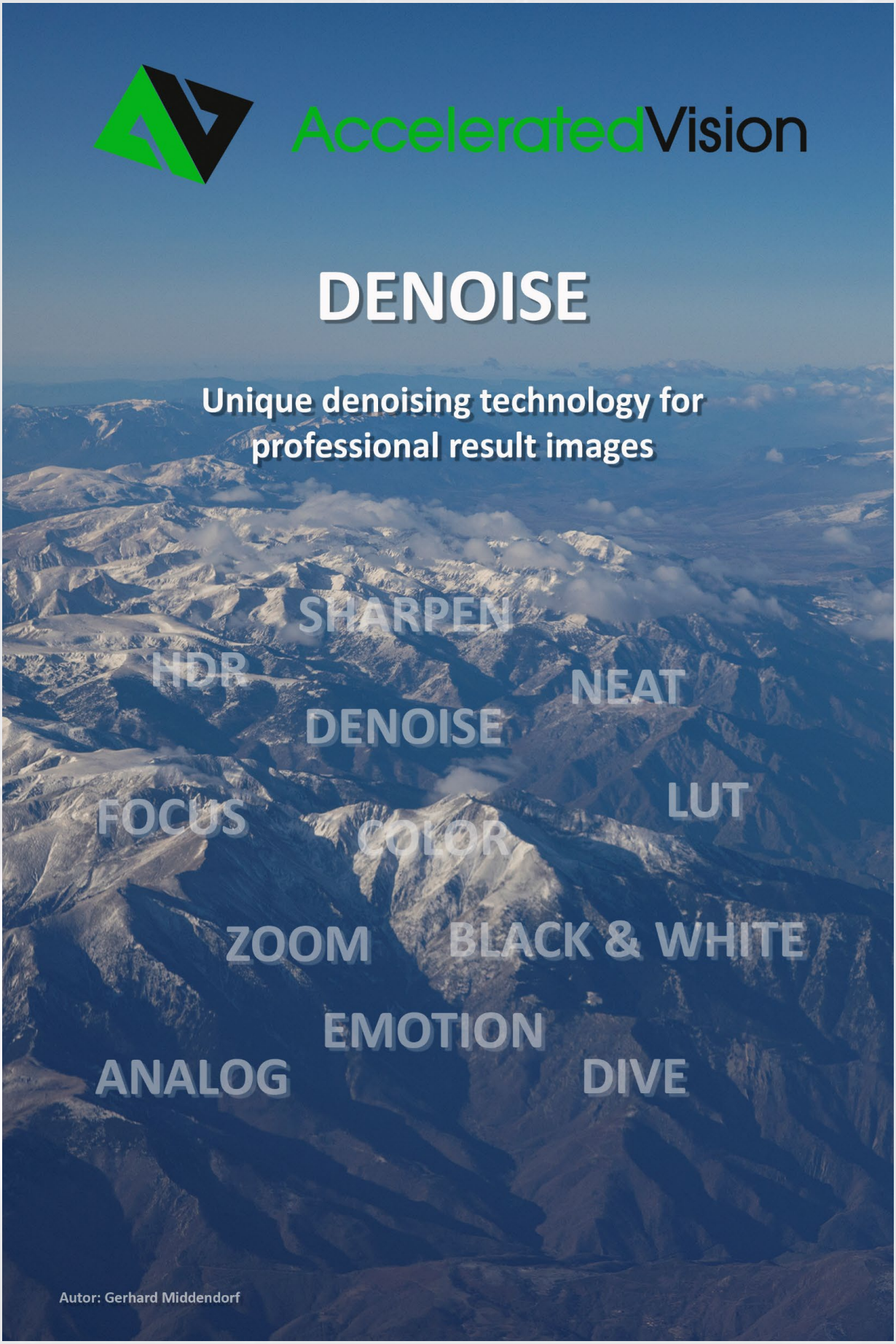

AcceleratedVision
DENOISE
Unique denoising technology for professional result images
SHARPEN
HDR
NEAT
DENOISE
FOCUS
LUT
COLOR
ZOOM
BLACK & WHITE
EMOTION
ANALOG
DIVE
Autor: Gerhard Middendorf

Guide to the special functions of the programmes

DENOISE

Noise can lead to very different emotions: Noisy images from lively celebrations such as weddings and parties, interior shots of churches, museums, industrial or night shots, underexposed images that are very noisy after image recovery, astrophotography and many evening snapshots have one thing in common: there is not enough light for a ‘correctly’ exposed, blur-free shot, because in the most beautiful or unrepeatable moments, the subjects are rarely illuminated in such a way that they are suitable for ‘ISO 100’, so they can be photographed in optimal lighting conditions.

And anything that could compensate for the lack of light, such as a tripod for a long exposure or a flash, is rarely available or forbidden for the most exciting moments.
The consequence is that the ISO value has to be set to the camera-dependent maximum value if necessary and then photograph. Unfortunately, the pleasure of looking at the slightly to very noisy images, in which the noise is perhaps not immediately visible on mobile phone displays, is rather diminished in any case at all enlargements and especially in the desired printouts.

But it's better to have very noisy photos than very blurred ones, because really blurred images can no longer be saved in **SHARPEN**, although the programme does an amazing job and converts ‘normal’ blurring or blurring into brilliantly sharp resulting images.

No need to despair if you have noisy images, because there is the best solution: **DENOISE** takes professional image denoising to a new level.
It impresses with a denoising module that has been trained with neural networks (AI) for many solutions and visibly improves the resulting images.

Another advantage: you can leave the image analysis to **DENOISE's automatic** system and achieve a denoised result image in a flash with just 2 to 3 clicks.
Or you can **interactively** use the very extensive range of individual intervention options with various denoising and quality levels to adapt an invited motif even better to your personal ideas or to optimise it further.
Everything is possible, and you decide which options you want to use.

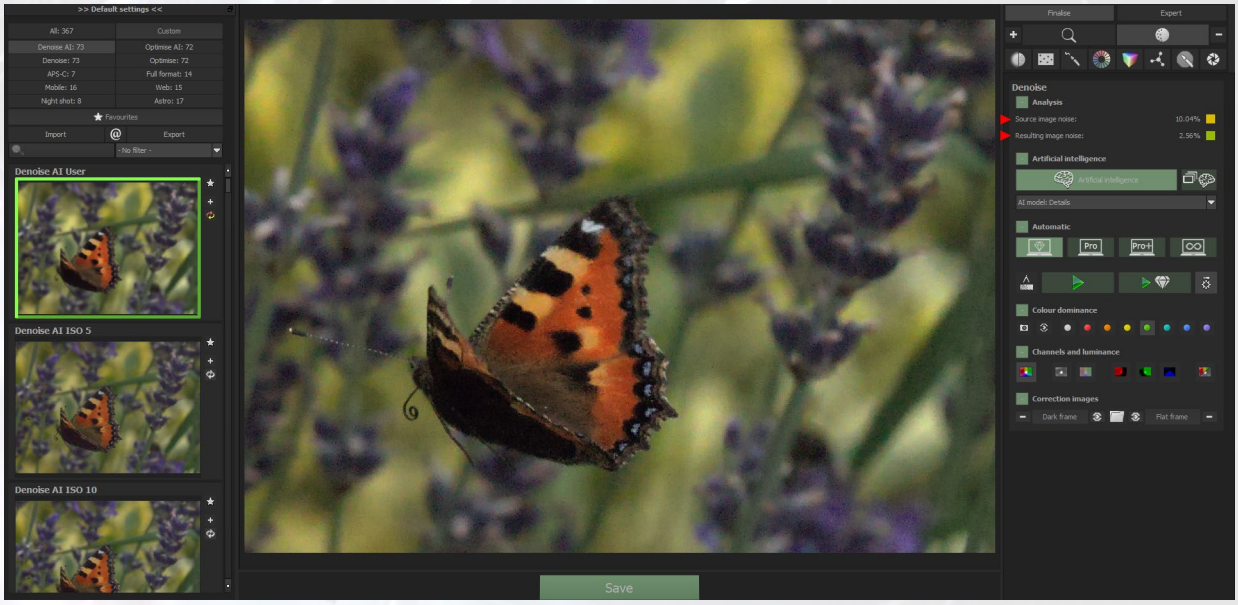
Note: The cross-programme functions, modules such as the RAW module, all other modules offered that can be displayed via the toolbar and the expert mode can be found in the corresponding guides.

Table of contents

1. Home page with 3 example images

After switching on the programme, the **DENOISE** start screen offers a special feature compared to the other programmes: 3 example images.

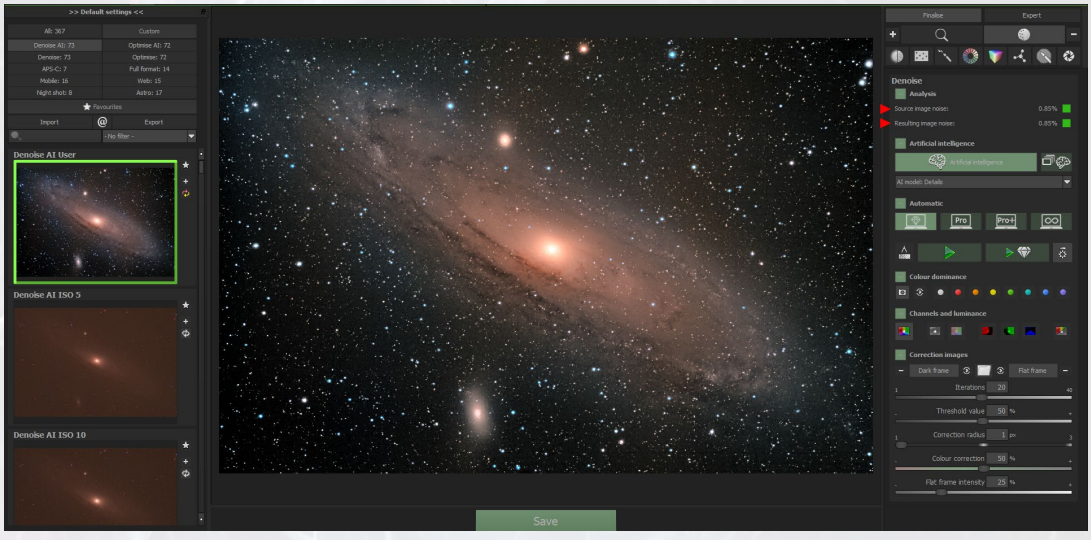
By clicking on one of the two buttons (1,2), the first two examples impressively demonstrate the performance of the programme from **the noisy original**, which you can see by right-clicking on the image (the graphic shows a section) ...



... to the **automatically denoised result image** with the information that the **source image noise** has been reduced from **10.04 %** to **2.56 %** in the **result image**. Thanks to the innovative technology, the loss of detail is so small that it is practically unnoticeable.

Example image Astrophotography

Via **File/Home Page** you return to the start page and can, for example, call up the third example image, which shows the **original** in the graphic (right-click on the image) and impresses with another speciality of **DENOISE**:

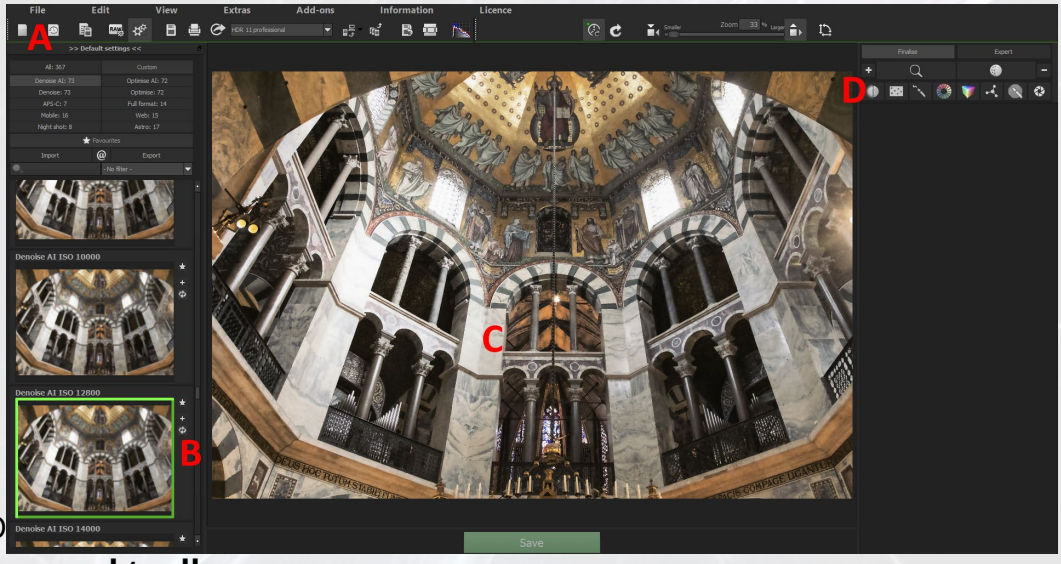


Astrophotography: The Astro preset category (see next chapter) creates spectacular resulting images such as this one of original images with only details and information present in the image that are made visible.
For many astrophotographers, denoising in this programme is not so important (in the example there is no difference between the noise in the source image and the noise in the resulting image) because the '**noise stacking**', which is often up to 100-fold or more, has denoised the image practically loss-free.
In '**noise stacking**', several individual images are combined into a single image to reduce noise and make finer structures visible.

Note: This impressive original was provided by the managing director of SOMAJA-Verlag, Markus Janes.

2. Workspace with toolbar and specialised presets

If you are the owner of another **Accelerated-Vision** programme, you do not need to change. The arrangement and use of the menus, tools and modules offered in the toolbar or the RAW module is identical, requires no familiarisation and is described in detail in the **General functions** guide.
Special features, such as the presets, are described on the following page.

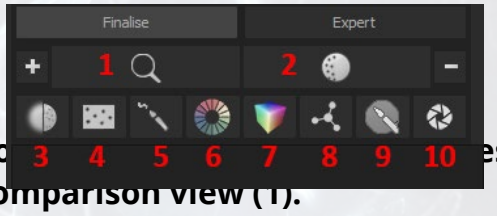


The D

A: **Menu and toolbars**.

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

C: **Image area with the automatically denoised result image and the green save button underneath**.

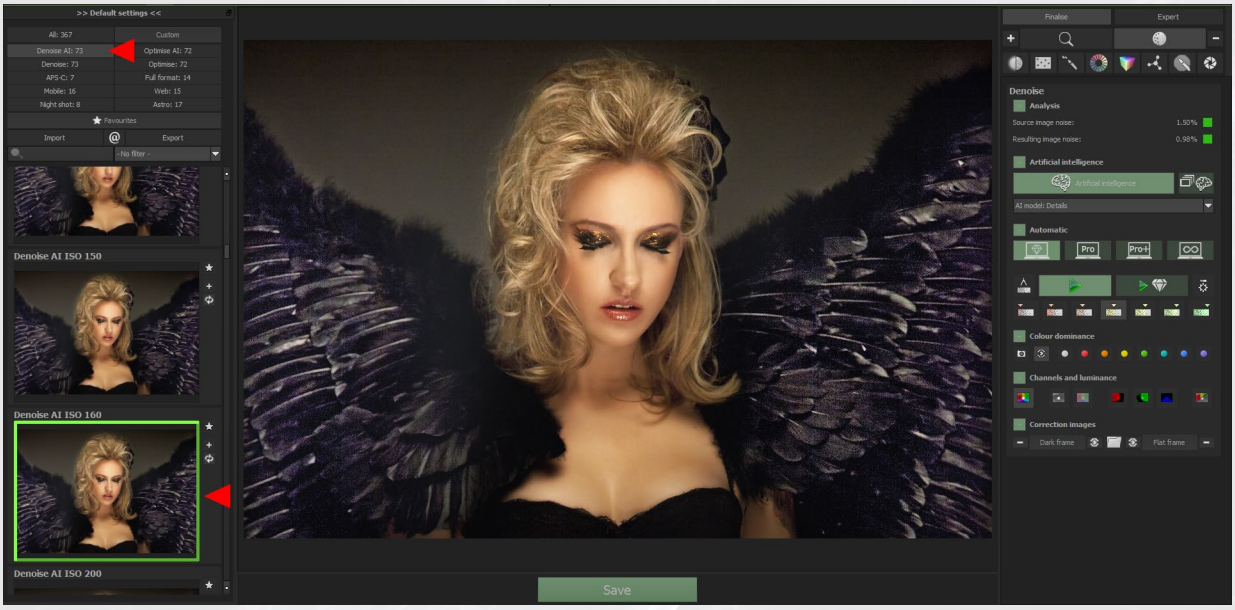


D: Toolbar in finalise mo es

- **magnifying glass/comparison view (1).**
- **Denoising area - the 'heart' of the programme (2).**
- **Virtual micro details (3).**
- **Graining module (4).**
- **Selective drawing (5).**
- **Colour module (6).**
- **LUT module (7).**
- **AI filter area (8).**
- **Sensor error correction (9).**
- **Focus peaking analysis area (10).**

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

Presets



With the exception of the **Astro** presets, the presets **in DENOISE** do not offer any creative image look variants such as **COLOR** or **BLACK & WHITE**, nor is there a default preset for an imported original.
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

After loading an image file, the programme automatically accesses a preset from the **Denoise AI** category after analysing the image and selects the one it considers suitable.
If required, select other presets from one of the categories offered:

- **Custom**: All presets you have created yourself are displayed in this category.
- **Denoise AI**: Ideal for quick, automatic denoising.
- **Optimise AI**: Optimises brightness and colours in the image in addition to denoising.
- **Denoise** and **Optimise** are identical to the previous version without AI support.
- **APS-C** (Advanced Photo System 'Classic'): Specialised for different image sensor formats.
- **Full format**: Corresponds roughly to our normal viewing habits.
- **Mobile**: Specialised for smartphones.
- **WEB**: Specialised in images for or from the Internet.
- **Night shot**: Specialised in twilight/night shots .
- **Astro**: This special category offers presets which, depending on the preset selected, remove different levels of noise and provide a choice of amazing image looks and moods.

Astro-Presets

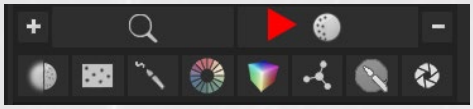
At the top of this preset category are the already very impressive, but more “subtle” changing presets such as **Astro Balanced**, further down are the presets that stage the respective original even more spectacularly ...

... like **Astro Red shifted**, which you have already seen in the chapter Start screen with 3 sample images and the same original ...

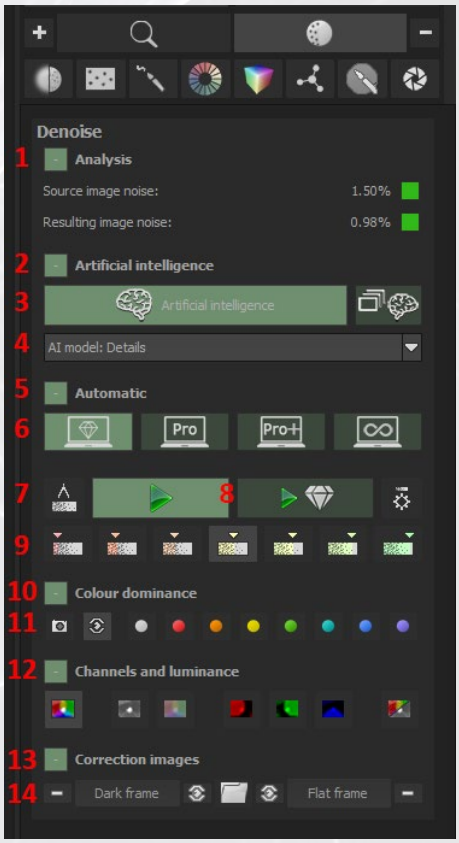
... or **Astro Cool Depth**.

Note: In **Expert mode**, the selected filters/effects belonging to the presets are displayed on the right-hand side, which you can deselect and reselect as required in order to assess the effect on the image.
Expert mode is described in detail in the **guide** of the same name.

3. Denoising area - Overview



Click on the button to display the 'heart' of the programme, the extensive **denoising area** with all modules and options described in the following chapters:



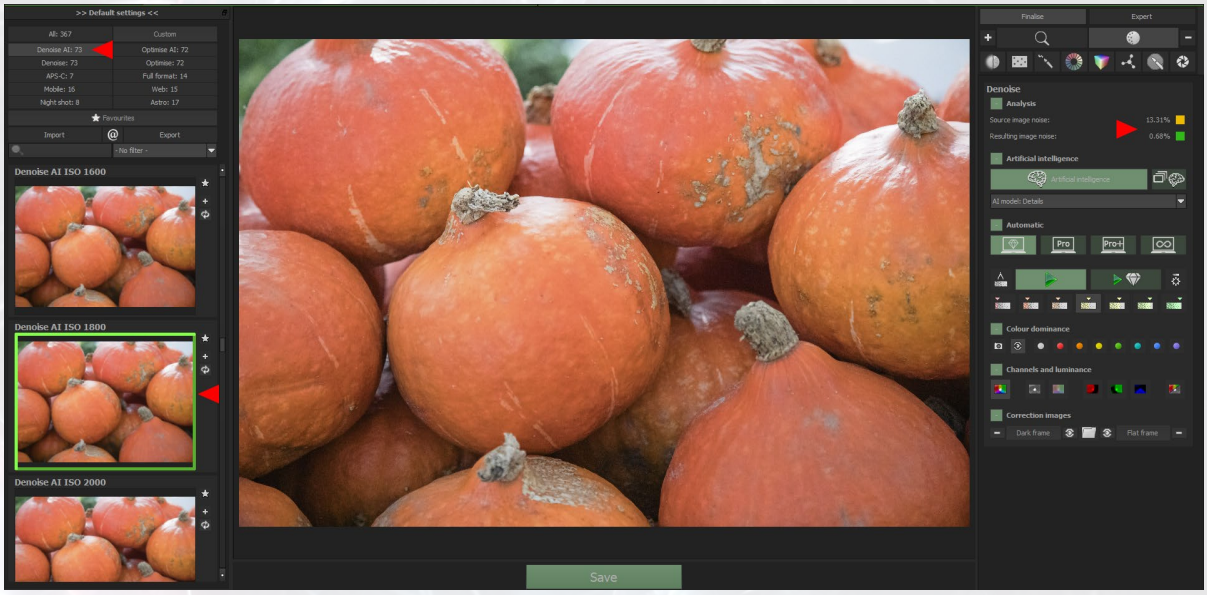
1. Opens or closes (Click on the plus sign) the **display of the automatic image noise analysis**.
   Display of the source image noise and **resulting image noise** after automatic denoising.
2. Opens or closes the area for **artificial intelligence** settings in denoising.
3. **Activates denoising with artificial intelligence, denoising process with deep learning in neural networks.**
4. **Choice of different AI models**.
5. Opens or closes the **area of denoising functions**.
6. **4 modes** for different **calculation accuracies**.
7. **Visual display** of the measured noise ranges.
8. **Functions that automatically select a denoising preset that matches the original.**
9. **7 options for the intelligent automatic denoising function**.
   By default, it is in the centre and produces a **homogeneous image**.
10. Opens or closes the area of the **dominant colour for the denoising calculation**.
11. **10 options for different colour dominances**.
12. Analyses the noise according to **channels** (red, green, blue) or **luminances**.
13. Opens, closes the range of **correction images** such as **dark/flat frames**.
14. **Activates/deactivates the calibration with the dark frame/flat frame**.

4. Flash workflow

If you rely completely on the automatic system, **you will get a very good, convincing result in 2 steps in a flash**.

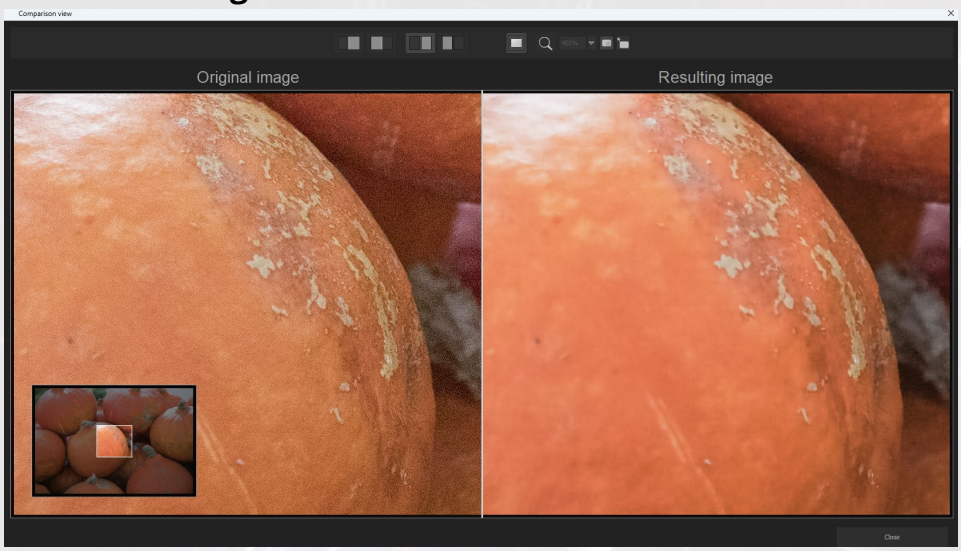
Step 1: Load image file (see guide **General files).**

The automatic system analyses the loaded image, which was taken at **ISO 8,000** and shows a section of the image in the graphic ...

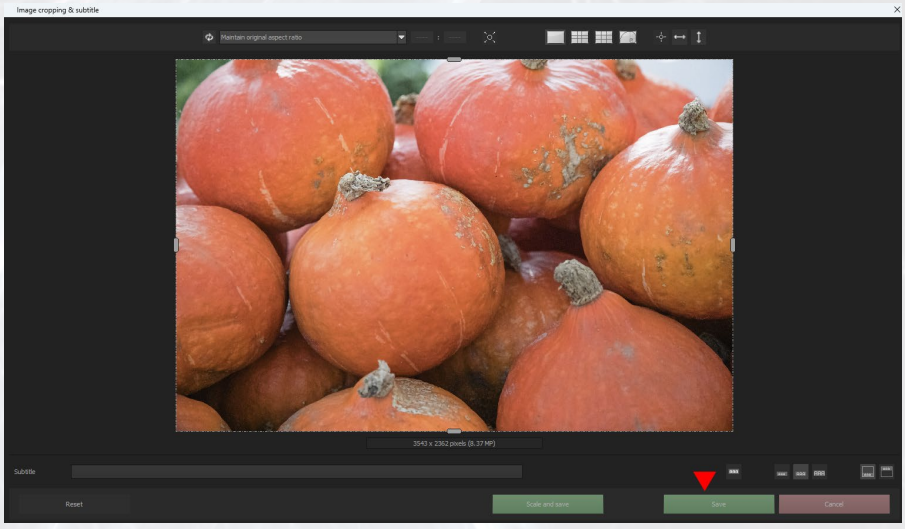


... and selects the appropriate preset from the **Denoise AI** category, in the example Denoise AI ISO 1,800. The lightning-fast resulting image confirms the impressive transformation from the original with **13.31%** source image noise to the absolutely convincing result with a resulting image noise of **0,68%**.
The result is impressive thanks to the interplay between the automatic system and other modules such as the intelligent automatic denoising system, which produces a homogeneously denoised image in the standard setting that retains all the details important to the image.
This automatically achieved very good result without individual intervention can therefore be the first choice in many cases.

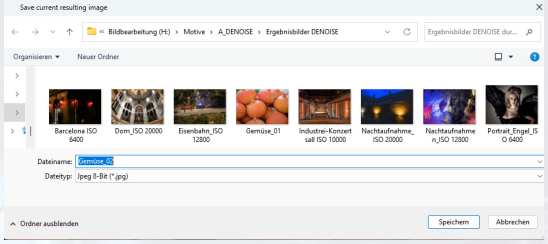
Step 2: Save result image



If you are satisfied with the result by comparing it with the original by right-clicking in the image or calling up the comparison view, switch to the new image by clicking on the **green save button** ...



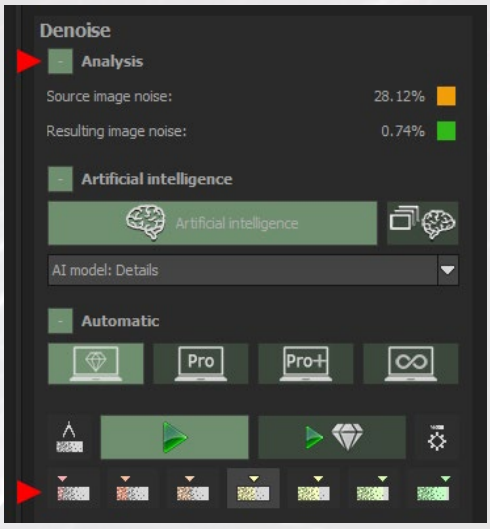
... to the **Image Cropping & Subtitle window**, where you can crop the image and/or add a caption if required.
Scale and save offers the option of using various scaling presets, e.g. for social media formats, before the image is saved. Click on the 2nd **green save button** ...



... save the image in a folder of your choice.

Note: All image cropping and scaling options are described in detail in the **General functions** guide.

5. Proposal for an extended workflow



Of all the options in the noise reduction area, the three areas **Noise Reduction**, **Automatic** and **Artificial Intelligence** with the modules in the upper area **Analysis** to **Intelligent Automatic Noise Reduction** after importing an original (graphic on the left) are primarily responsible for the quality of a noise-reduced result image.

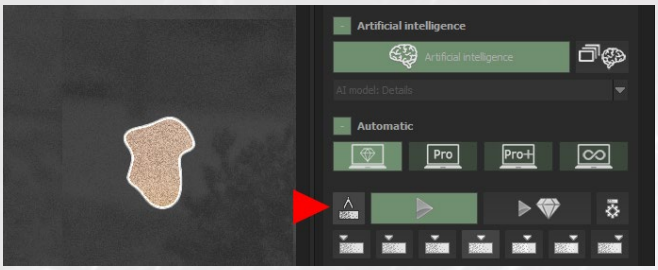
The suggested extended workflow, which you can of course modify as desired, is **intended as a guide for a sensible sequence of individual interventions** in order to obtain an even better result image or one that is optimally tailored to your personal taste.

The subsequent chapters, which refer to these modules and describe them in more detail, follow this order.

1. **The automatic function removes noise from the imported original** (see flash workflow).
2. **Analysis area: Check the result of the noise reduction process.**

The automatically analysed image noise values are displayed with the two determined values for **Source image noise** and **Resulting image noise** and visualised using two ‘traffic light colours’. The result image with the result image noise is displayed immediately, and the automatically determined preset on the left-hand side is outlined in green.

3. **Enable measured noise areas visualisation** (optional)

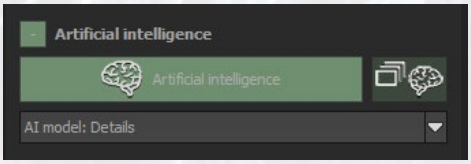


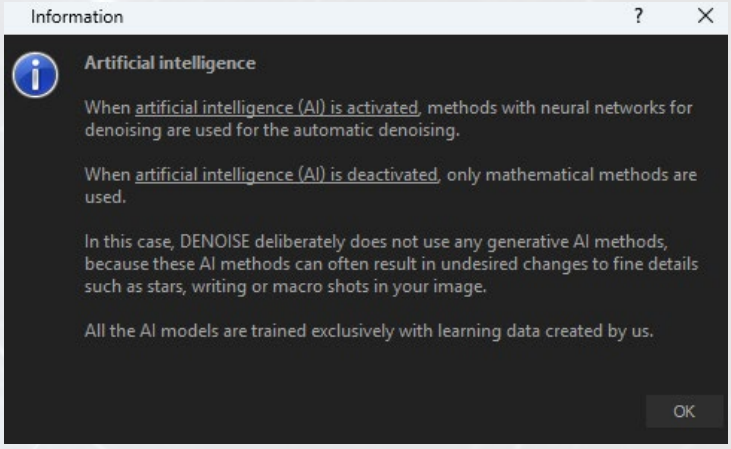
Here, if required, you can display the measured noise ranges by clicking on the **circle symbol**.

4. **Try out the settings for the degree of noise reduction**

These **7 settings** for the degree of noise reduction are directly related to the values in the analysis area. The default setting is in the middle for a **homogeneously denoised image**.
If you select a 'grainier' setting (to the left of the centre), more image noise will be allowed with a higher value and more details and structures.
If you select a 'softer' setting (to the right of the centre), the image will be denoised more strongly with less noise in the resulting image, a correspondingly lower value, but less detail and structure in the image.

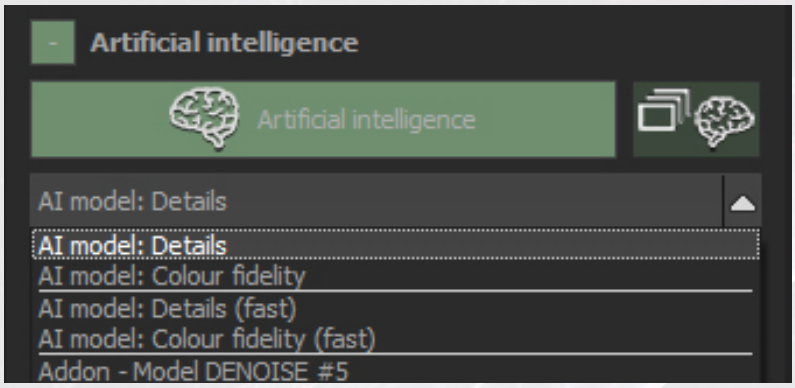
5. In the next step, experiment with the field of **artificial intelligence** if necessary.





Noise reduction using artificial intelligence, a **noise reduction process using deep learning in neural networks**, is active by default. It should be noted that **DENOISE** does not use generative AI processes; instead, the AI data has been trained exclusively with its own learning content.
If you still want to use the purely mathematical method, click on the **Artificial Intelligence** button. The window that appears will reiterate the information described above.

6. Try out models



You can try out different **AI models** as needed. By default, **AI model: Details** is set. Clicking the button displays additional models with different denoising focuses for you to try out:

- **AI model: Details**
- **AI model: Colour fidelity**
- **AI model: Details (fast)**
- **AI model: (Colour fidelity (fast)**
- **Addon-Model Denoise #5**

With the **AI model: Details**, the focus is on preserving all **image-critical details in the image**, **Colour fidelity** is mainly trained for **colour-accurate reproduction** at the expense of some details, making the image appear 'softer'. The faster variants calculate faster and have been trained with smaller neural networks, producing slightly different results.
Add-on model **DENOISE #5** calculates noise reduction based on the **DENOISE #5 version**.

7. Try out different quality levels

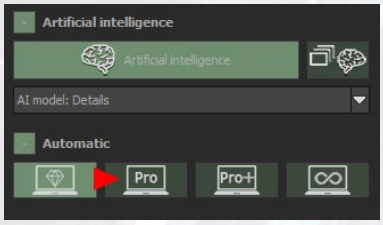
These **four quality levels** are also closely related to the seven settings for the degree of noise reduction.
The first level, **balanced mode**, is set as standard.
Up to the fourth level, **Pro Infinity mode**, the accuracy of the calculation increases with each level, resulting in even better overall quality, especially in terms of colour fidelity.
Note: If you collapse this or other modules by clicking on the green **plus sign**, all settings remain active but are not visible. Clicking on the greyed-out plus sign again will display all options again.

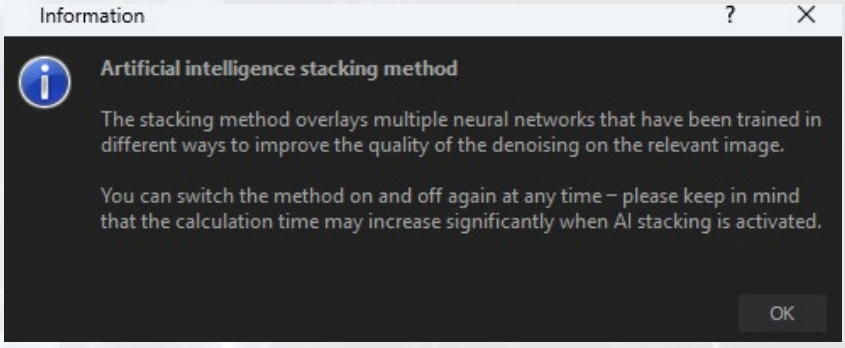
8 Try out Denoising **and Optimisation** presets

In addition to the default denoising preset with a preset from the **Denoise AI** category, you can click on the button to the right of it with the **diamond symbol** to select a preset that combines **denoising** and **optimisation**.

DENOISE now selects a preset from the **Optimise AI** category, which additionally performs histogram matching and optimises sharpness.

9. Try AI stacking to finish

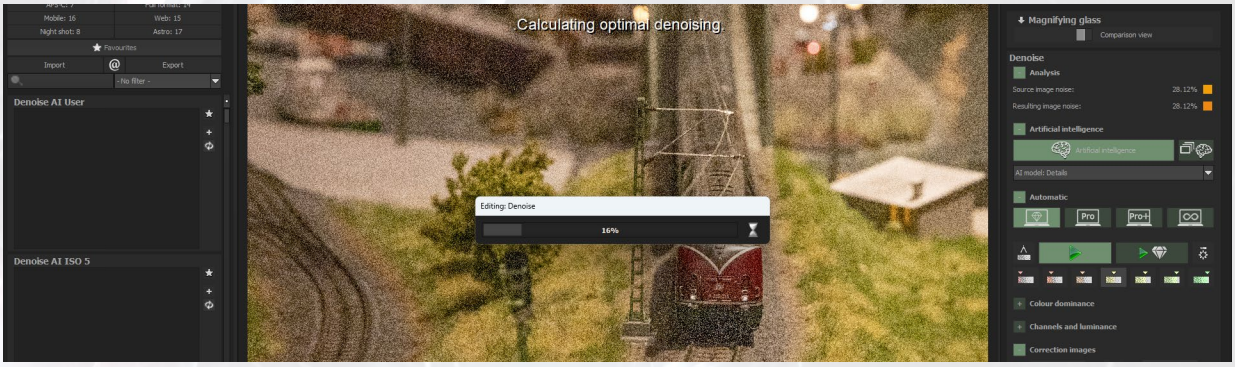




Clicking on the button to the right of **Artificial Intelligence** displays the information that this process uses not only an AI model, e.g. the default setting **Balanced**, but also **Pro mode**. These two result images are calculated and superimposed on each other (stacking).
The result is an even better image.
If **PRO +** was previously set, activating this module will calculate and 'stack' **all 4 modes**.
Now you can see the best result that can be achieved with **DENOISE**.

6. Analysis area

The aim of denoising is to reduce the resulting image noise during the denoising process to a specific value that is dependent on the loaded original.
A specific value means that the best result is not the lowest value at which the image is completely denoised, but the value determined at which **all image-relevant details and contours are retained and the smooth surfaces are optimally denoised**.



Optimum denoising is determined: If you load an image, the **optimum denoising** is determined in one or more passes and displayed with the information **Editing: Denoise**.
During this calculation process, the automatic system attempts to determine the resulting image noise so 'intelligently' that the image is not completely 'ironed out', but the residual noise ensures that as little detail as possible is lost from the original image.
During this calculation time, the presets on the left-hand side are not visible because the selected preset is still being determined during the calculation.

Note: The programme **does not add any additional details** as many programmes with generative AI do, so the image rights always remain with you or the rights holder.

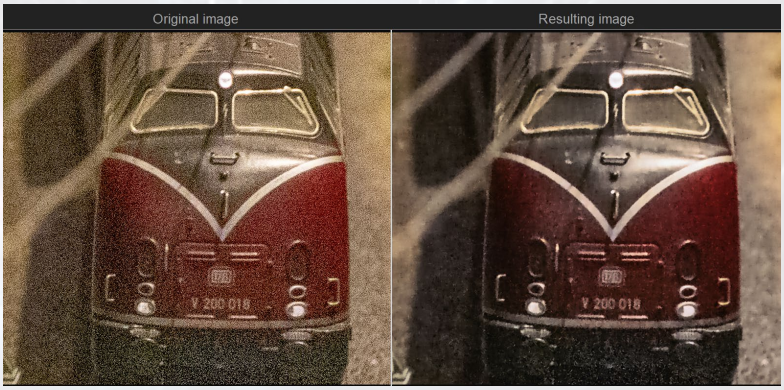
Measured values are displayed

After the calculation, the denoising analysis shows how much **Source image noise** there is in the smooth areas of the image in the original. In the example, at **28.12%**, this is more than a quarter of the total information, which consists solely of noise. The 'traffic light colour' **orange** confirms the high noise content of the image, which was taken at ISO 12,800.

The **Resulting image noise** of **0.74** is very good and is visualised by the **green** 'traffic light' colour.

Note: Noise can only be determined in smooth areas where there are no details or contours (see also the chapter on **visualising the noise measurement**). The 'art' of intelligent denoising is therefore not to smooth the entire image in an undifferentiated manner as with a soft focus with a resulting image noise of 0%, but to recognise all details, edges and contours and preserve them as well as possible.

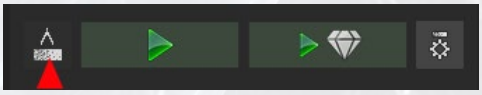
The result image shows the selected preset **Denoise AI ISO 22,000** from the Denoise AI category on the left-hand side and confirms the comparison with the original by right-clicking in the image ...



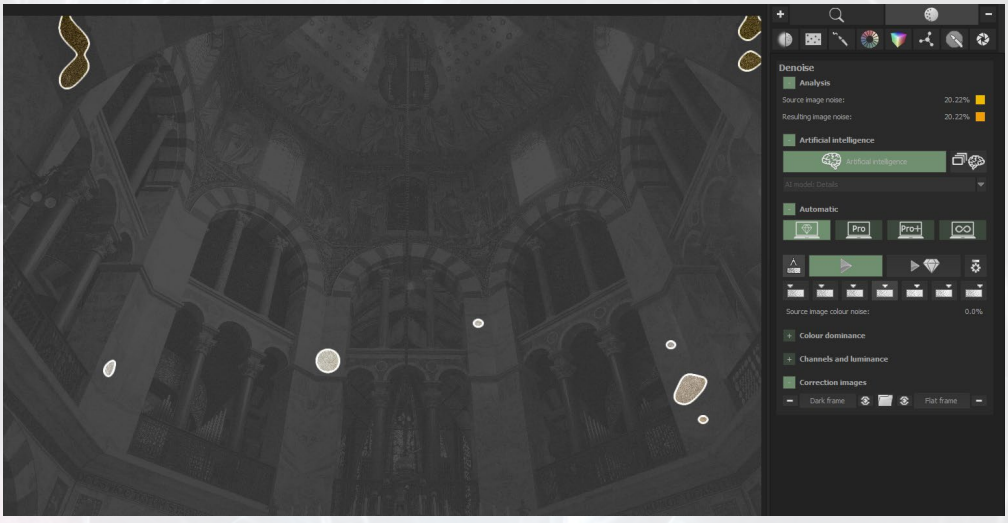
... or in the comparison view the analysis: The smooth surfaces are cleanly and effectively denoised, details, edges and contours are well preserved, which leads to the very good and impressive result.

7. Visualisation of measured noise areas

As already mentioned, after loading an image file, **DENOISE** determines the proportion of image noise in the smooth areas, because noise can only be analysed where there are **smooth areas** without details and the determined source image noise would be distorted by including the contours.



By clicking on the **circle icon** ...



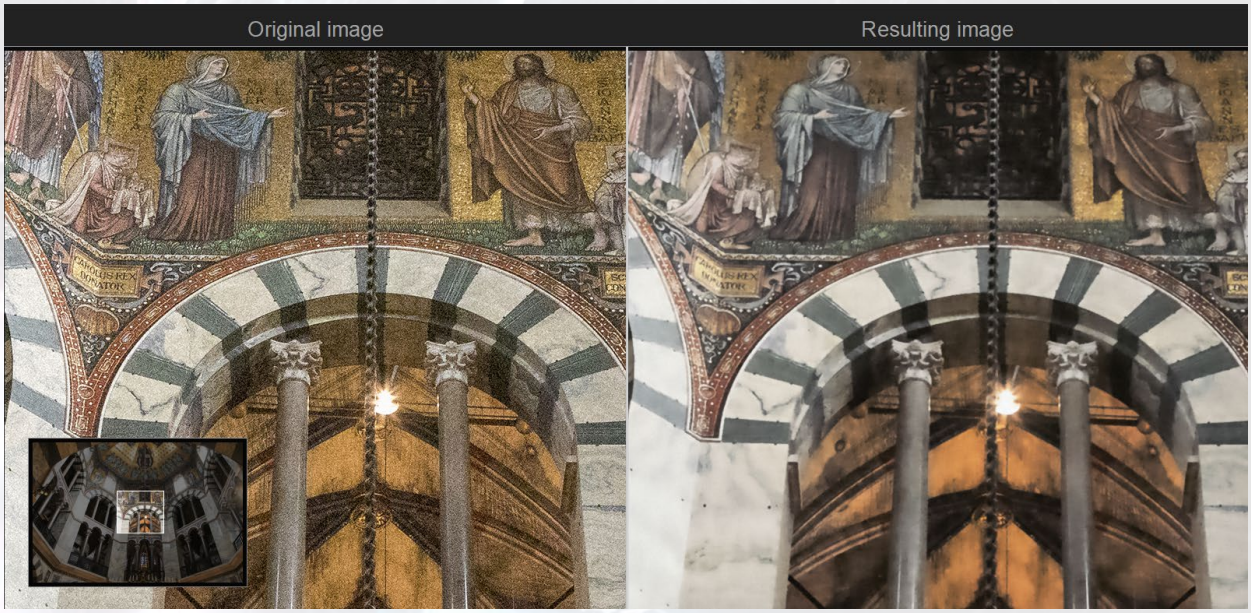
... you can display these smooth areas, from which **DENOISE** selects the information for the automatic denoising calculation with the corresponding preset on the left-hand side. These are all the **small areas outlined in white** that are not greyed out.
The seemingly small area is sufficient for analysis and the conclusions drawn for denoising because image noise is always evenly distributed across the image. This visualisation is, of course, different for each image.

Hide the display again: Click on the circle icon again to return to the 'normal' interface.
Note: You can display this informative message at any time, but it is not part of a workflow.

8. Settings for the level of noise reduction

These 7 settings for the degree of noise reduction ...

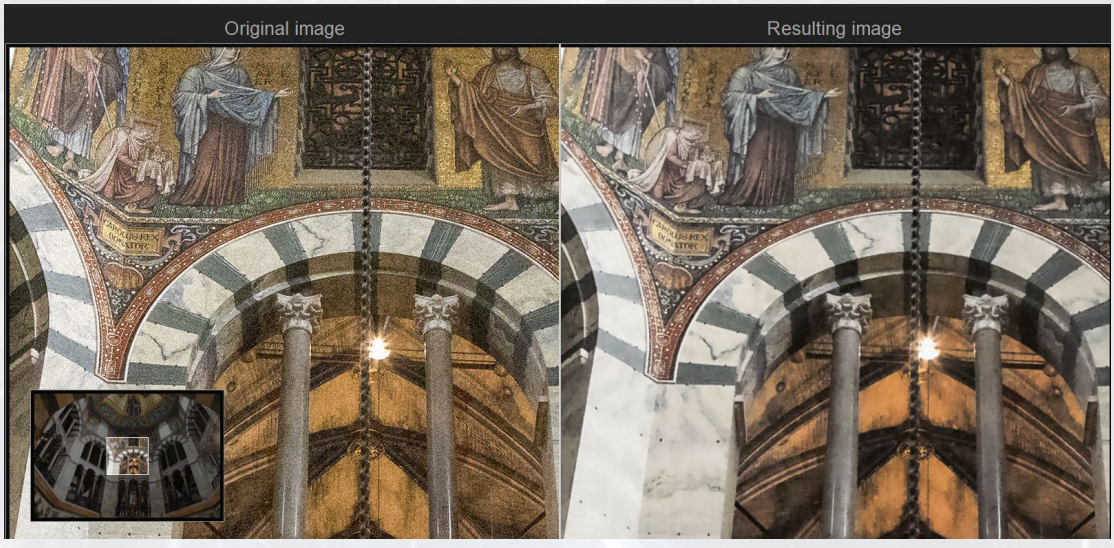
... are directly related to the values in the analysis area of the respective loaded image and, depending on the selected setting, 'determine' how far the value of the result image noise should deviate from the automatically determined value, and whether the result image should appear 'grainier' with more details or 'softer' with fewer details and contours.



The default setting is in the middle for a **homogeneously denoised image**.
The **Source image noise** was determined to be **20.22%** in the example, and the result image noise was **0.93%** with the **Denoise AI 12,800** ISO preset. The comparison window confirms the very good and homogeneously denoised image.

Selecting a setting with higher residual noise

If you now select a setting to the **left of the default setting**, the intelligent automatic noise reduction function will produce an image with a **slight residual noise level** (**1.76%** in the example), which can lead to an even more natural and convincing impression for selected subjects such as this one...



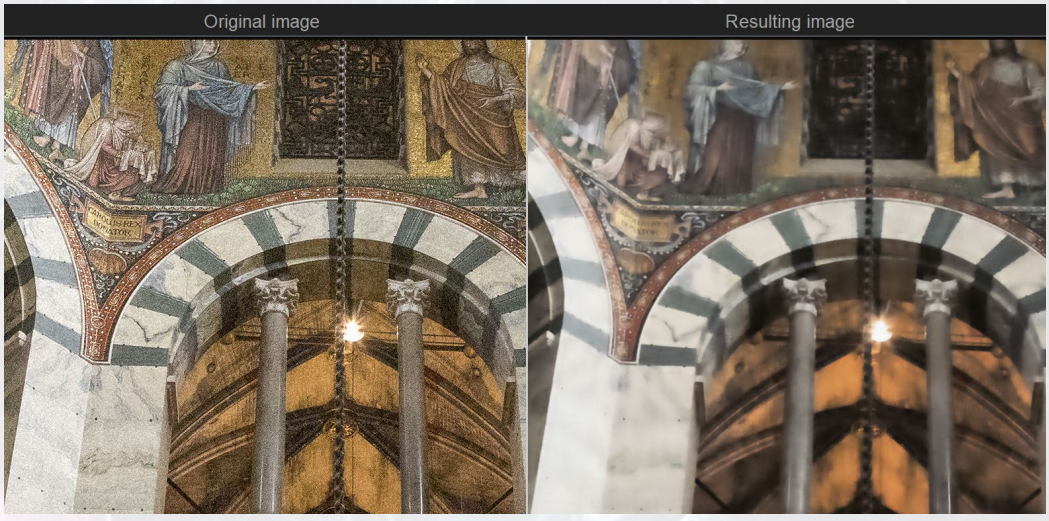
... which is confirmed in the comparison view.

The further to the left of the centre value you select a setting, as in the example on the far left, the more 'grainy' the image becomes and the stronger the residual noise.

Here, the **Resulting image noise** is **3.31%**, and the selected preset is **Denoise AI 1,800 ISO**.

Selecting a setting with lower residual noise

If you select a ‘softer’ setting to the **right of the centre**, in the example on the far right, the image will be denoised more strongly, and the intelligent automatic denoising function will produce a **‘soft’ denoised image** with less noise in the final image.
In this extremely ‘soft’ setting, the value is **0.16%**, and the selected preset is **Denoise AI ISO 51,200**, which may be desirable for certain subjects, but in most cases appears too smooth and lacks detail...

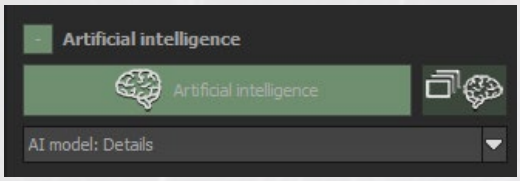


... which is impressively confirmed by the comparison view.
But here too, the intelligent automatic noise reduction system has recognised all contours and preserved them clearly.

Note: Like all settings, the presets on the left side can be overridden at any time by selecting a different preset if another default setting better suits your needs.

Conclusion: By confirming the default setting or choosing an alternative, as in the example, where a slightly grainier setting makes the resulting image look even more convincing, you can adjust the desired denoising result to suit your preferences.

9. Artificial intelligence

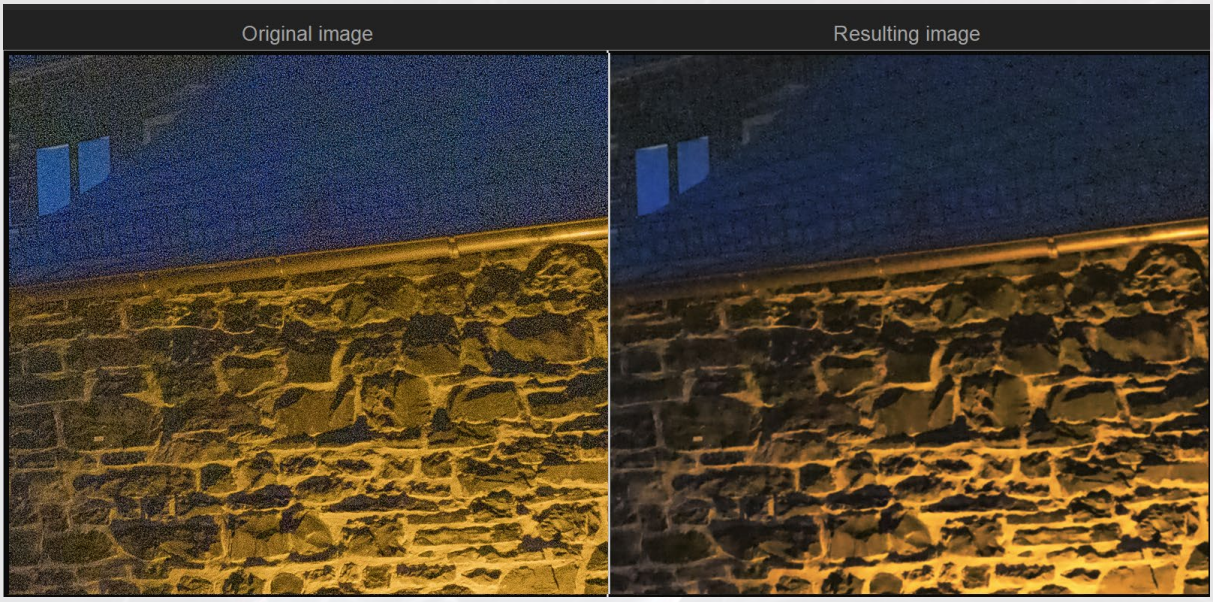


Noise reduction using artificial intelligence, a **noise reduction process using DEEP learning in neural networks**, is active by default. It should be noted that **DENOISE** does not use generative AI processes; instead, the AI data has been trained exclusively with its own learning content.

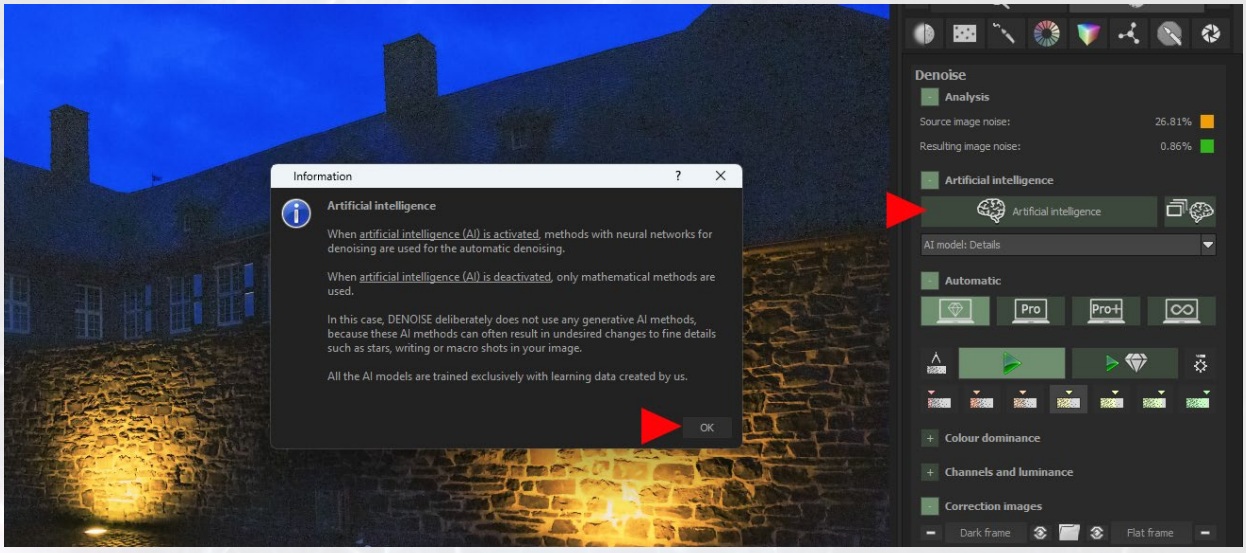
In the heavily noisy image example, which was taken at **ISO 20,000**, ...

... the **automatic denoising process with active artificial intelligence** produces an astonishingly good result image.
The **source image noise** has been determined to be **26.81%**. This means that more than 1/4 of all information in the image is noisy. The **resulting image noise** is **0.86%** with a selected preset **AI denoising ISO 9,000**.

Comparison view with active AI module



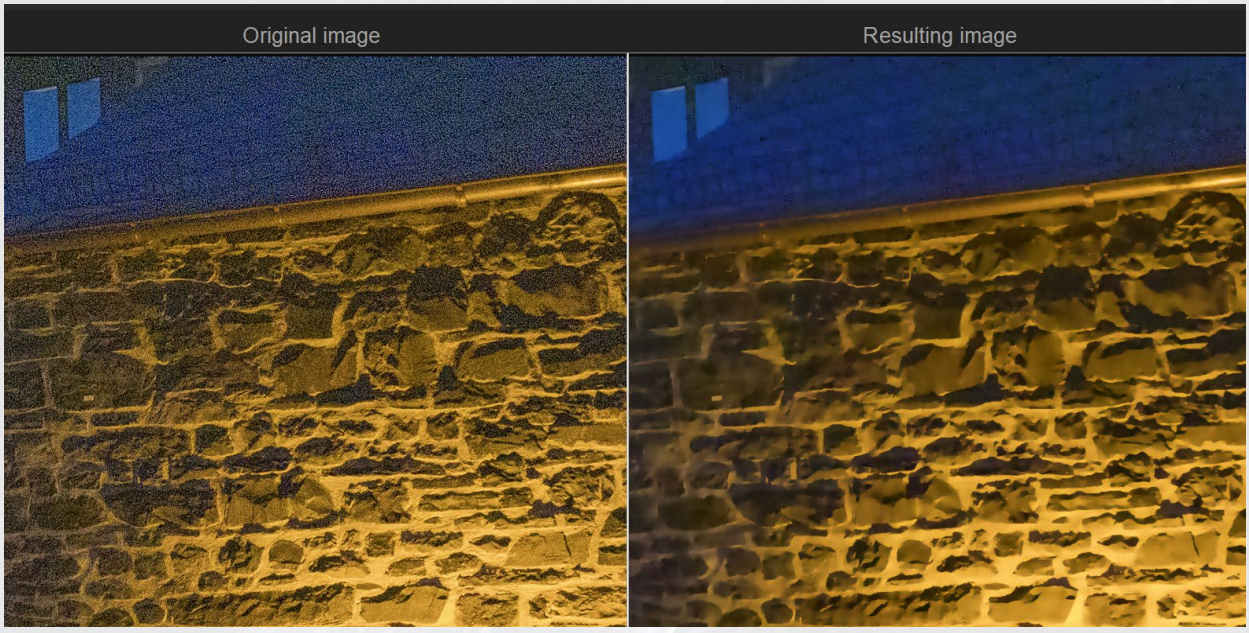
The comparison view confirms the impressive denoising of an image that at first glance appears to be ‘irretrievably’ noisy, using all standard settings.



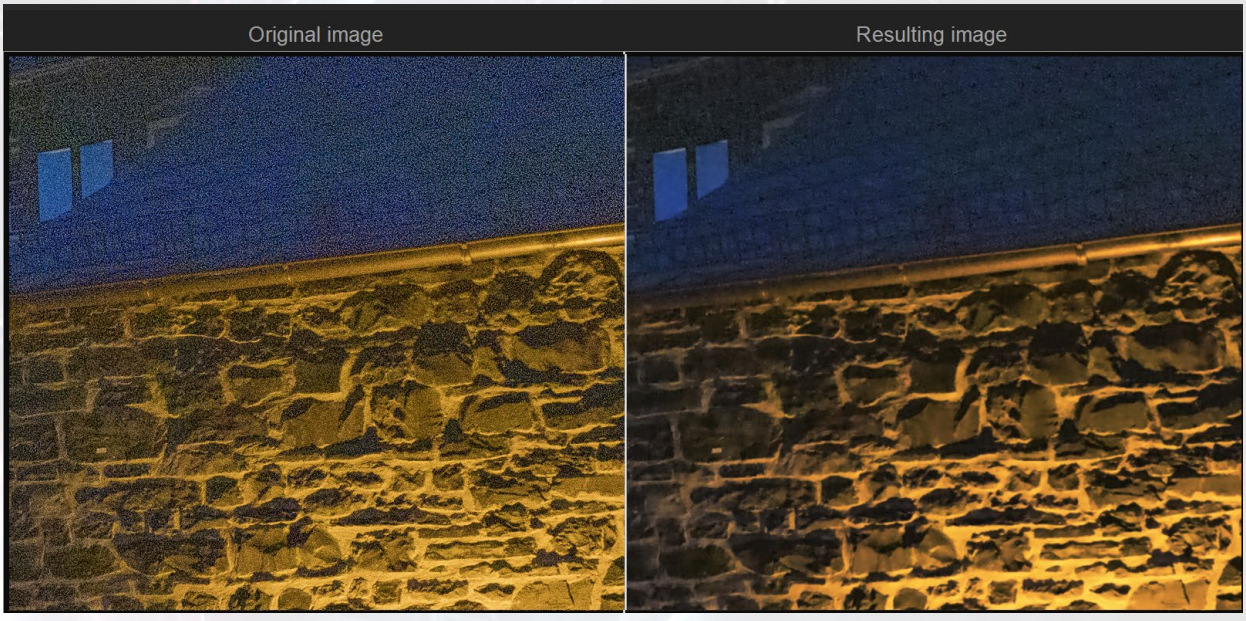
Disable AI module: If you still want to use the purely mathematical methods of **DENOISE #4**, click on the Artificial Intelligence button. In addition to the greyed-out button, the window that appears will remind you of what has been described above.

The purely mathematical method can also distinguish very well between smooth areas and details, but it **smooths the smooth areas more visibly than when calculating with the active AI module**, as the comparison view on the next page shows.
The **Resulting image noise** has changed only slightly, from **0.86%** to **0.90%**, and the preset has remained the same.
By clicking **OK**, the loaded image is recalculated and you can assess which calculation method achieves the better result for you.

Comparison views with AI module switched on and off

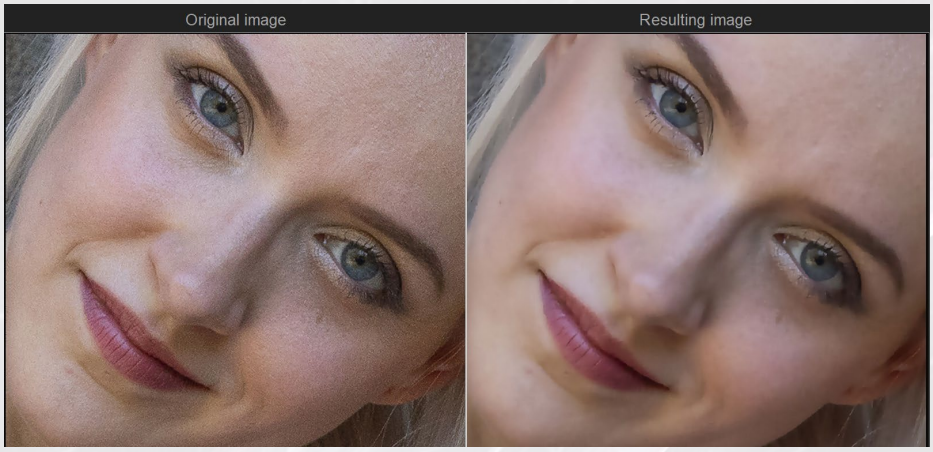


Compare the two comparison views of the result images with the **AI module switched off** ...

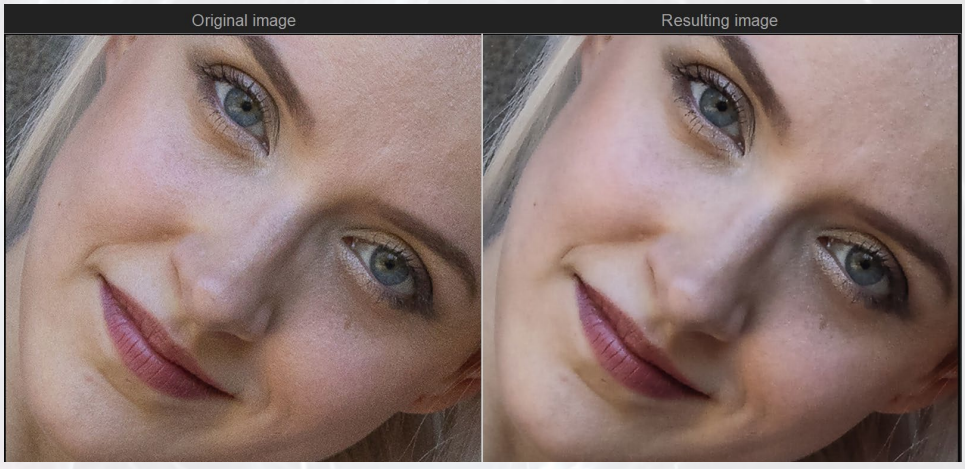


... and the AI module, which is enabled by default and can **practically always be the first choice**, the difference is clearly visible: there are slight colour changes along the contours in the upper graphic, everything appears much smoother and less structured, which could of course be corrected somewhat by selecting a 'grainier' setting.
The denoising process **trained with neural networks** in the graphic below is impressive in every respect and delivers an excellent result image.

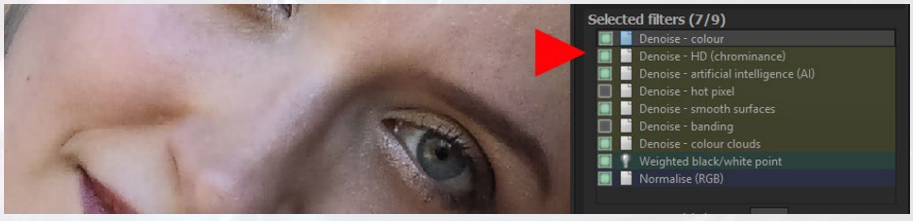
Comparison views portrait without and with active AI module



The practically always better choice of the AI module, which is switched on by default, applies to all types of motifs with very few exceptions, such as X-ray images, where not a single detail should be lost.
The example of a portrait shot taken at **ISO 1,250**, with a **source image noise** of **3.46%** and a **resulting image noise** of **0.92%**, illustrates the difference once again: in the comparison view above with the **AI module switched off**, the skin has been very well denoised, but the lips, eyebrows and eyes have become too ‘soft’.



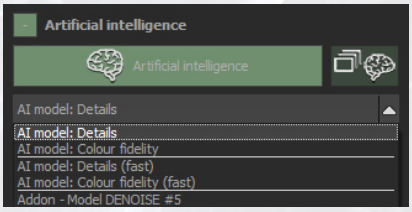
With the **AI module switched on**, the skin is also very well denoised, the pore structures are well preserved and the lips, eyebrows and eyes have retained their original contours and structures.



Note: After switching to **expert mode**, you will see that the purely mathematical denoising effect **HD** (**chrominance**) also plays an **additional role** in the active AI module, albeit with reduced opacity. The **Denoise -AI effect** determines the very good result.

10. Try out AI models

If necessary, you can for each invited motif ...



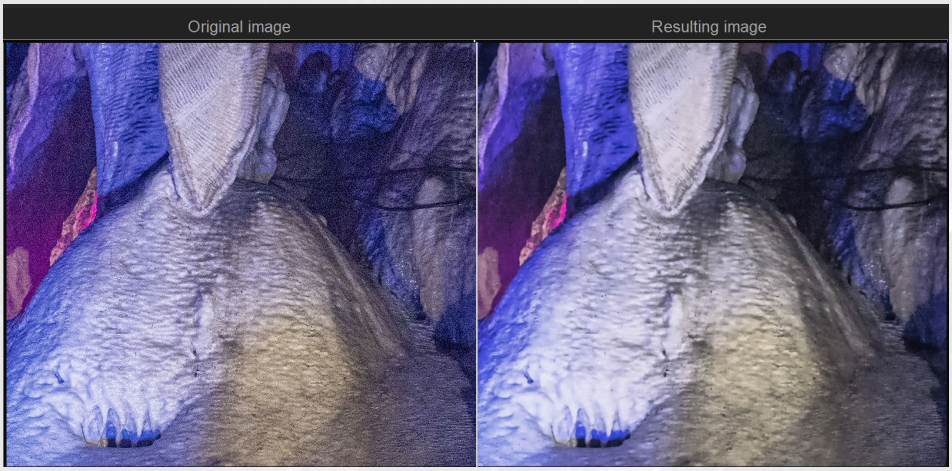
... try out **different AI models**. The default AI model is Details.
Clicking on the button displays additional models with different noise reduction focuses for you to try out:

- **AI model: Details**
- **AI model: Colour fidelity**
- **AI model: Details (fast)**
- **AI model: Colour fidelity (fast)**
- **Addon model Denoise #5**

In the **AI model: Details**, which in most cases is best suited to the tasks and solutions offered, the focus is on preserving **all image-critical details in the image**.

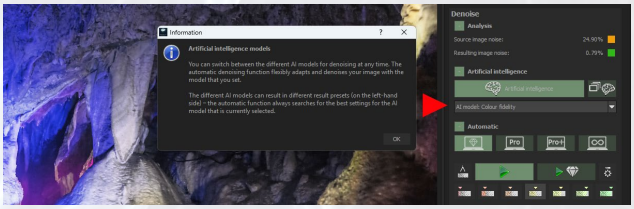
In the example image, which was taken at **ISO 12,800**, the **source image noise** is **24.90%**, the **resulting image noise** is **0.79%**, and the selected preset is **Denoise AI 12,800**.

Comparison view AI model details



The comparison view confirms the very well-implemented objective of the **AI model Details**: The strong noise reduction does not come at the expense of important image details or structures; the result appears homogeneous and convincing.

Note: The coincidence between the ISO value of the image and the automatically selected preset of **12,800** is rather coincidental, because **DENOISE** takes the **average of all ISO values** that the cameras **would** generate for this noise. On average across all cameras, this preset would therefore be used in the example for the image taken with ISO **12,800**.

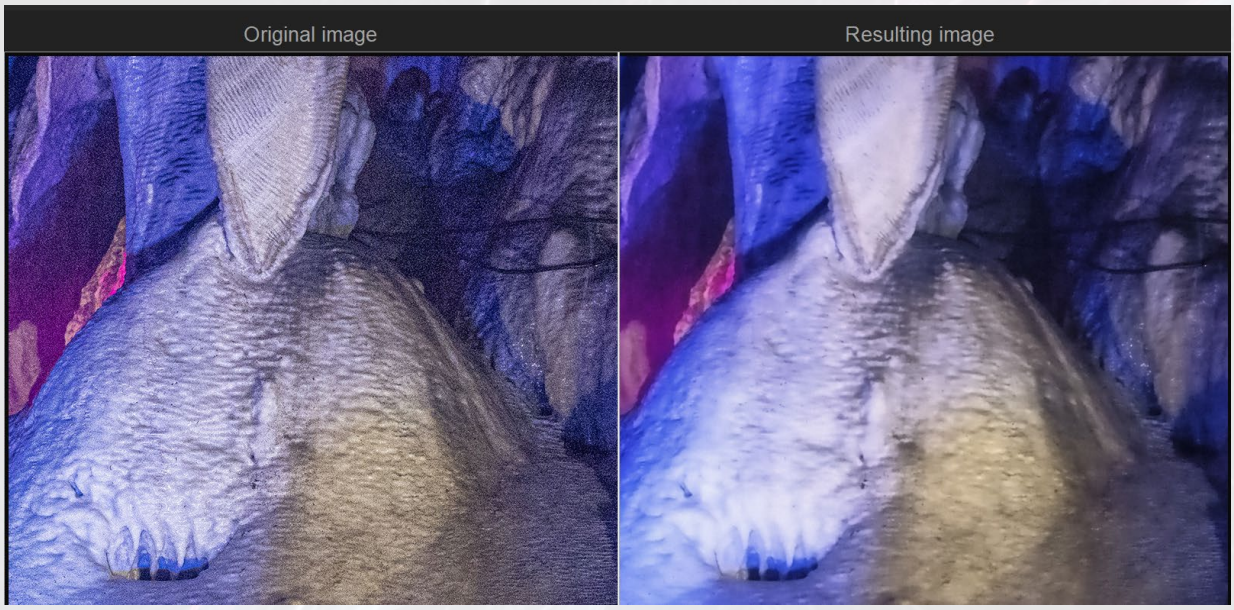


If you want to try out the **AI model Colour Fidelity** on the same image motif, information will be displayed indicating that you can switch between the individual models at any time. The automatic denoising function adapts flexibly to the newly selected model and denoises it accordingly.
The fact that different AI models can also lead to different result presets on the left-hand side...

... can be seen after recalculation. The image noise has changed only slightly; the selected preset is now **Denoise AI ISO 7,000**.

AI model: Colour fidelity

This model is primarily trained to reproduce **colours accurately** at the expense of some details, the image appears 'softer' overall than with the **AI model Details**.

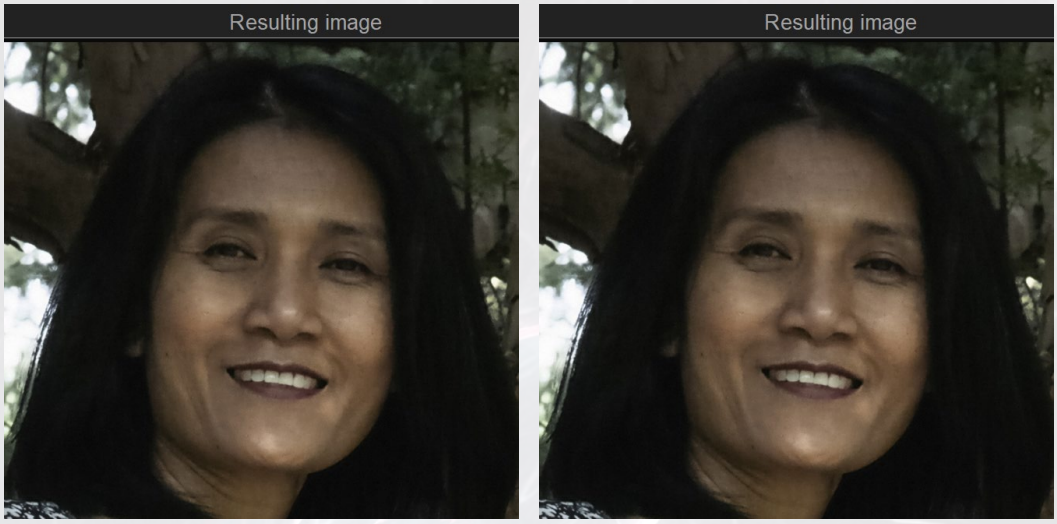


The comparison view confirms the promise: the colours remain very natural and unaltered, but the level of detail has been reduced.

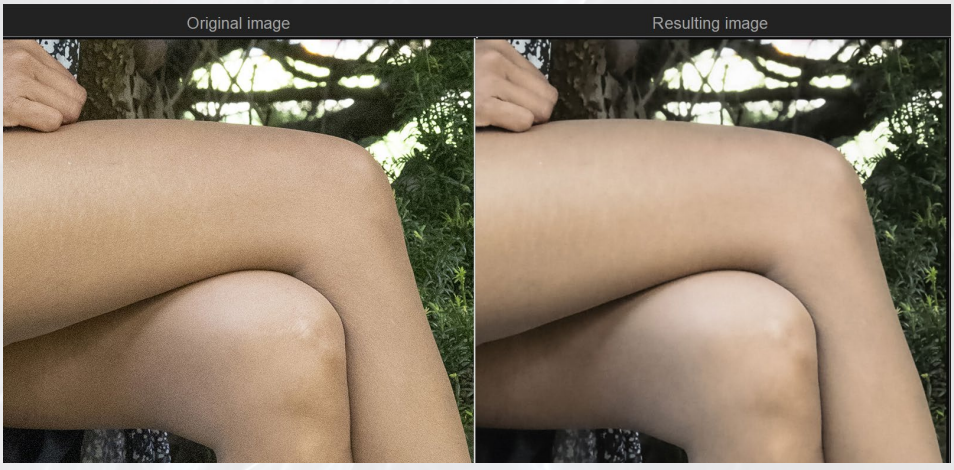
Colour fidelity: Good choice for portraits: The situation is different for portrait shots such as this one, which was taken at **ISO 5,000** and has a ratio of **12.76% source image noise** to **0.79% resulting image noise** with the standard settings (AI model: **Details**).

With these or similar motifs, the somewhat 'softer' image look of colour fidelity after denoising is convincing, and the unadulterated colours contribute to the very good result, as can be seen in the comparison views on the next page.

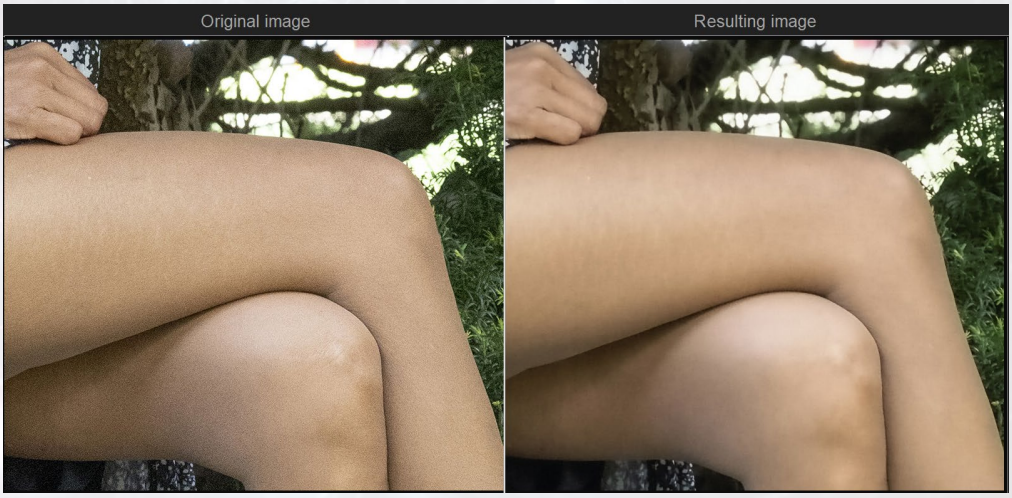
Comparison views **Details** and **colour fidelity**



Comparative views of the face (**left** graphic: **details**, **right** graphic: **colour fidelity**) ...

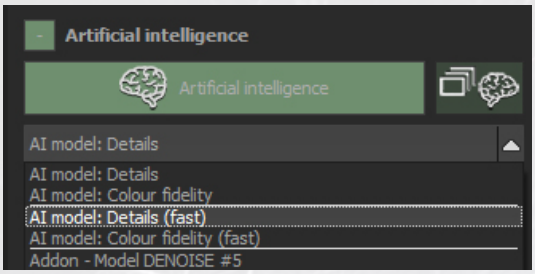


... and the legs with the AI model: **Details** ...



... and **colour fidelity** confirm that these or similar motifs are a good alternative to the standard model settings.
You decide whether you prefer this image look or whether you favour greater detail in 'striking character portraits'.

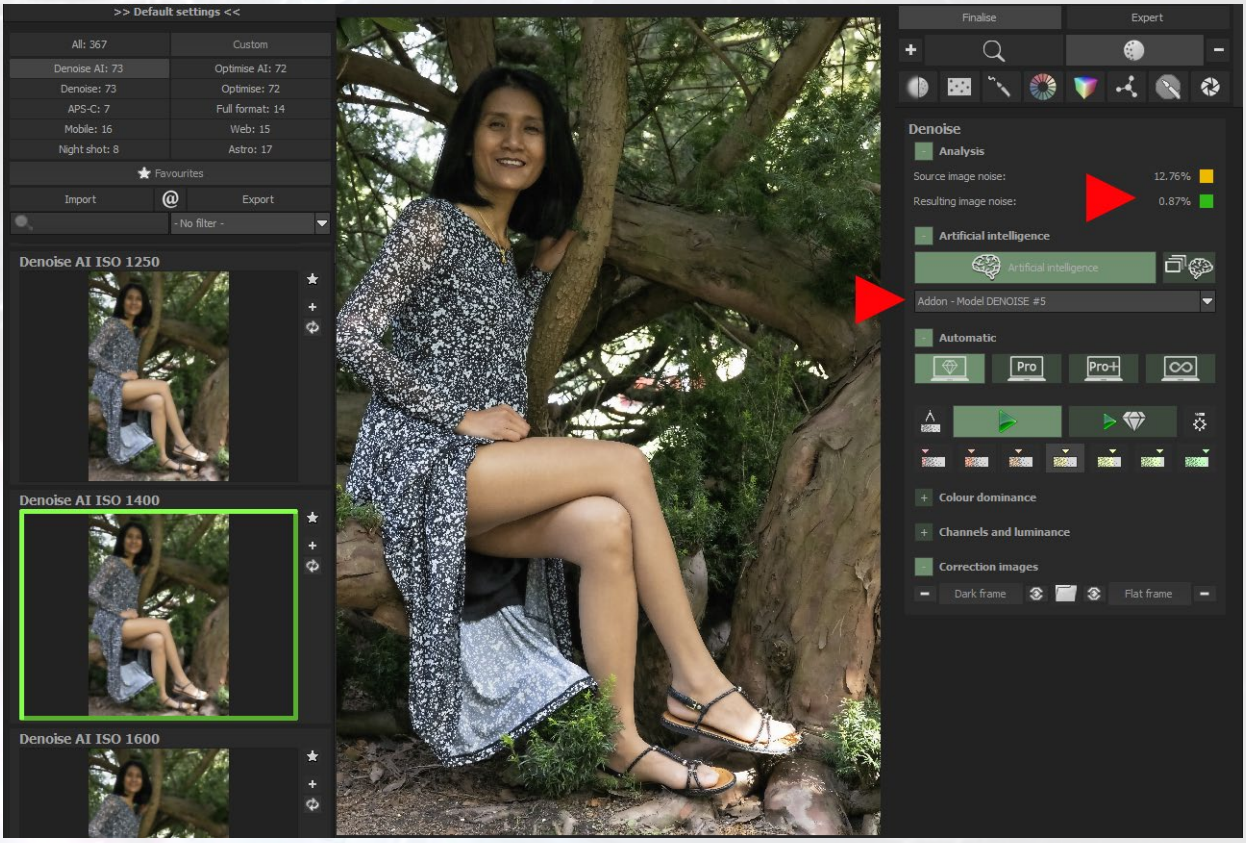
Faster models



The two faster variants, **AI model**: **Details** (**fast**) and **AI mod**el: **Colour fide**lity (**fast**), are useful when the processing time for large image files takes too long. These models calculate faster, **almost twice as fast in the AI area** compared to the standard model, have been trained with smaller neural networks and also produce other results with slightly lower quality.

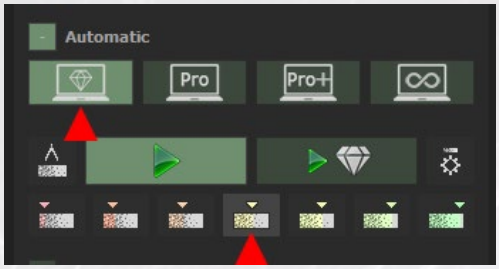
Addon-Model DENOISE #5

This model calculates noise reduction based on the **DENOISE #5 version**, which already had an AI model.
If you want to use this version for the AI models because you particularly liked it, click on the button ...



... and obtain the denoised result image with **DENOISE #5**. This model is also somewhat 'softer' than the Details model.

11. Four levels of quality

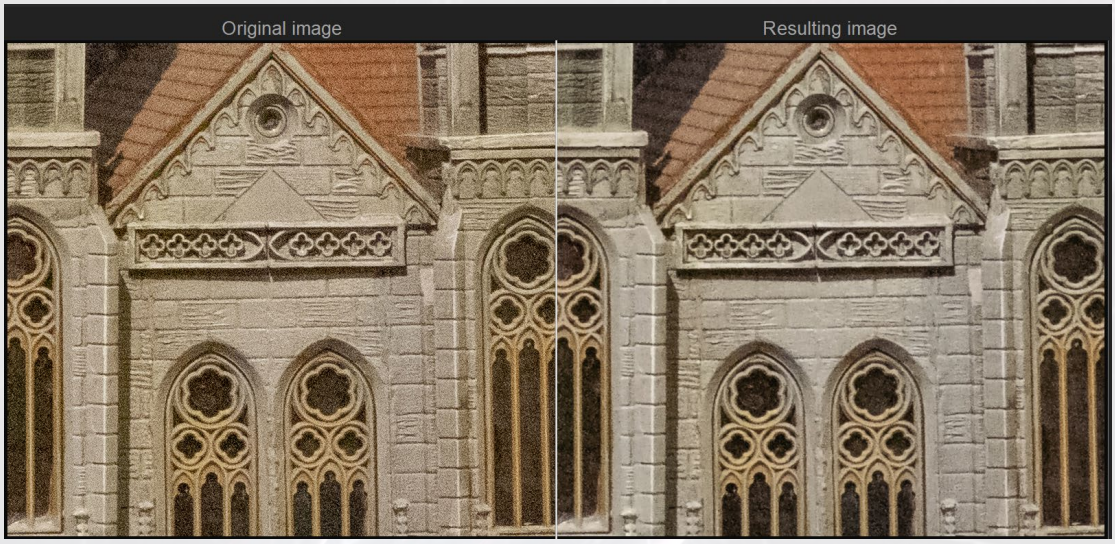


Like the 7 settings for the degree of noise reduction, the 'softness levels', the **4 quality levels** have a **direct influence on the value of the noise in the resulting image**. By default, the first quality level, the **balanced mode**, is set. **At each 'higher' quality level, the denoising is recalculated, but with greater accuracy.**
The result is **slightly altered colours with higher colour fidelity** and **changes in the values for image noise**, which, however, do not necessarily decrease with each change to a higher level, as the following example shows:

This image of a model railway was taken at **ISO 12,800** and has a **source image noise** of **12.90%**.

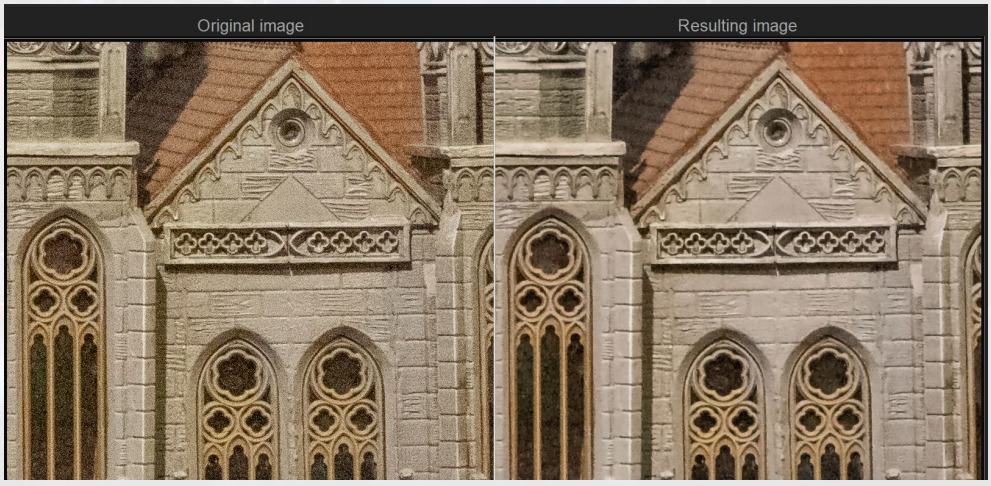
In the first standard variant, **Balanced Mode**, a value of **0.89%** has been calculated for the result image noise.

Comparison view, first quality level



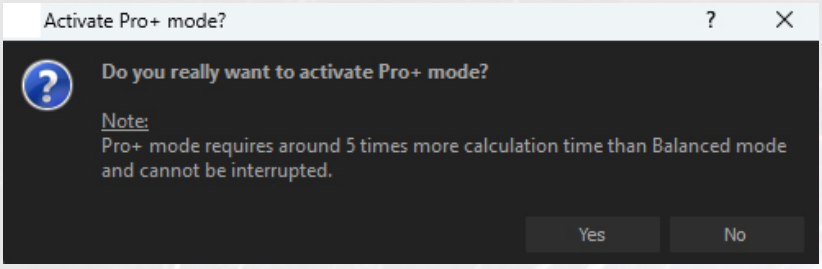
The comparison view shows the excellent denoising result with slightly ‘cooler’ colours or a more neutral colour tone compared to the original.

PRO quality level: Switch to the next higher quality level **PRO** by clicking on it, and the result will be recalculated with an image noise of **0.46%**, which is lower than the **0.89%** of the standard level.



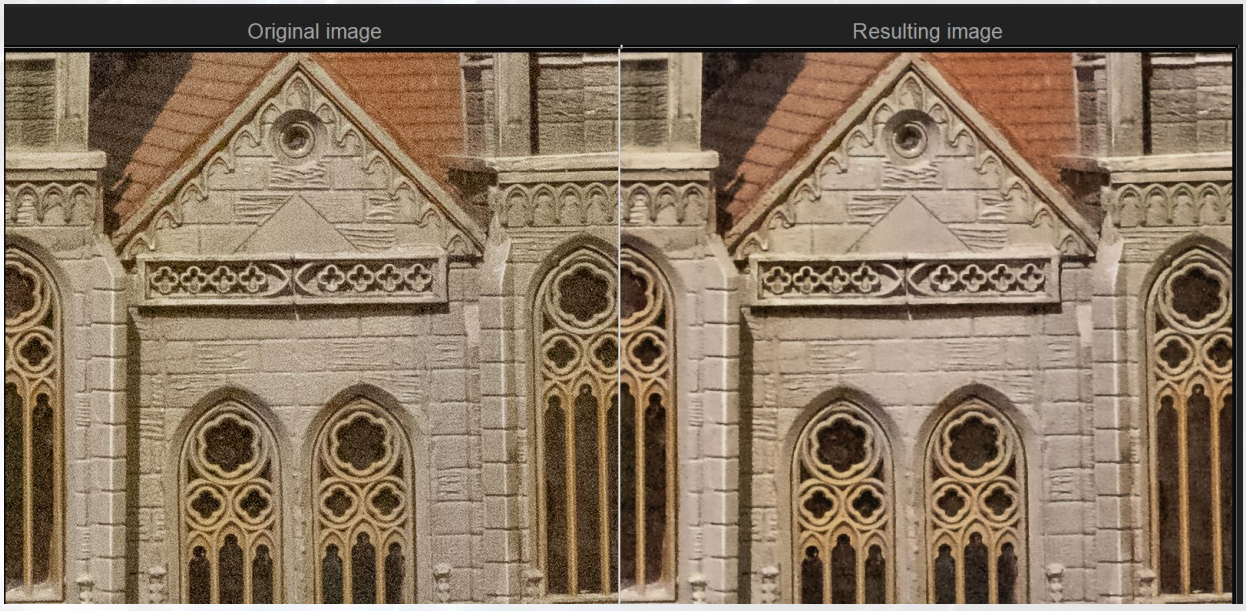
The comparison view confirms the statement that the optimised quality is also visible in improved colour fidelity.

Quality level PRO+



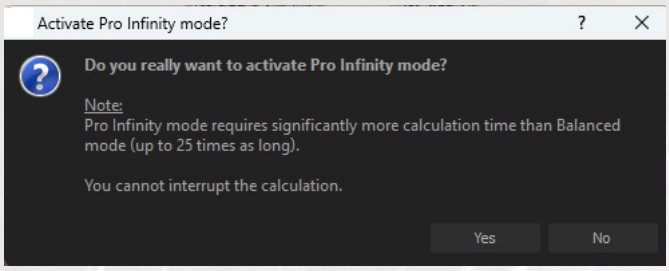
If you activate the next higher level, **Pro+**, an information window will appear indicating that **this mode requires approximately five times** the calculation time compared to the **balanced mode**.

Clicking **OK** recalculates the result image. Now the value of the result image noise is slightly higher than in the **Pro** level, at **0.58%**.



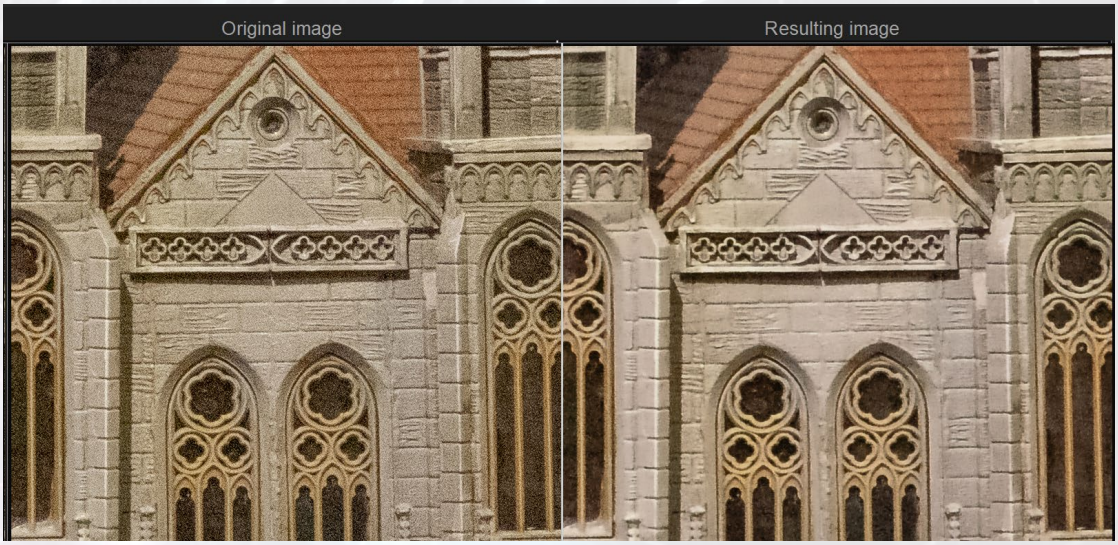
The comparison view shows an impressively denoised result image with unaltered colours. At this quality level, the ratio of computing time to the further optimised result is also very good.

Quality level PRO Infinity



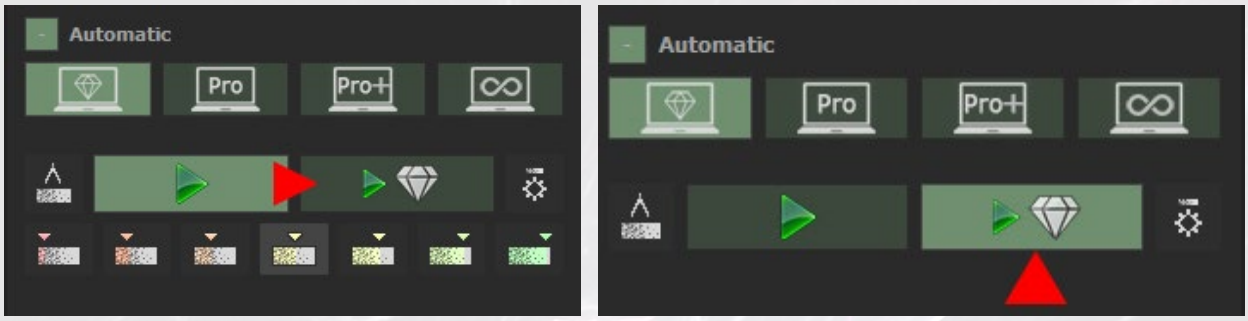
If you activate the highest level, **Pro Infinity**, an information window will appear indicating that this mode requires significantly more calculation time (**up to 25 times more**) than the **balanced mode**. For large files, this can take several minutes.

Clicking **OK** recalculates the result image. Now the value of the result image noise **is 0.53%,** which is roughly equivalent to **0.58%** of the **Pro+ level**.



The comparison view confirms that in special cases, the high effort can be worthwhile and shows a slight increase in detail and colour fidelity. You decide whether the significantly longer computing time is acceptable.
As a rule, it makes sense to increase the quality levels gradually until you achieve the best possible result, which of course also depends on the imported motif and the noise in the source image.

12. Denoising plus optimisation preset



The default setting (graphic on the left) automatically selects a denoising preset that matches the original image loaded.
If you switch to the function on the right by clicking on the button with the **diamond symbol**, an **optimisation preset** is selected in **addition** to the same denoising preset, which performs a **histogram** adjustment with two effects and slightly enhances image **sharpness**. Two very different image motifs can illustrate this.

Image example 1: The subject of these pumpkins, which you are familiar with from the flash workflow with slightly different shooting data and which was shot at **ISO 10,000**, ...

... as always, the standard settings produce a very good result image with **source image noise** of **20.17%** and **Resulting image noise** of **0.79%**.

Comparison views of both functions

This view shows a comparison of the original and the result image with the **standard denoising setting without optimisation**.

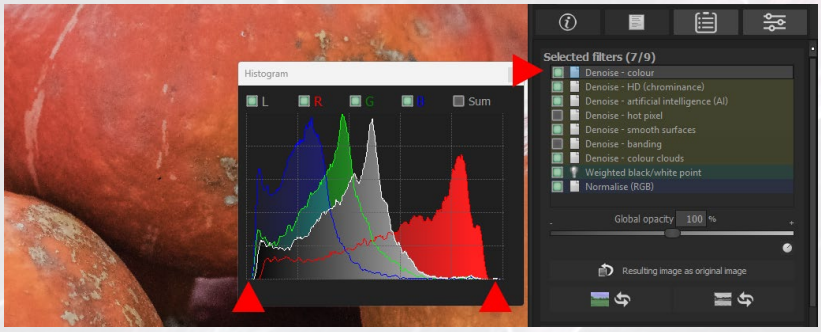
In the comparison view with the **appropriate denoising and optimisation** preset, it is clear to see that the colours have become more vivid and the image appears sharper overall.

The result image noise has increased from **0.79%** to **1.05%**. The selected preset on the left is now **AI Optimise ISO 3,200** from the **AI Optimise category**.

Conclusion: As seen with the 7 settings, an increased value for image noise can lead to a subjectively better result because, for example, more important image details are retained.

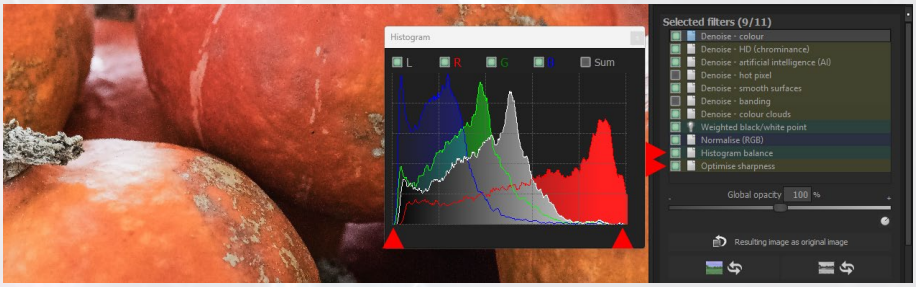
Comparison of presets in expert mode

If you want to understand the difference between the two functions or influence them according to your preferences, switch to **expert mode** for both functions (see **Expert Mode Guide**).



The first graphic shows the selected filters and effects that belong to the **AI Denoising ISO 3,200 preset**. Of the 9 filters, 7 are active, most of which are denoising filters that reduce or eliminate colour noise (**Denoise Colour**) or the 'main effect', **Denoise** (**AI**), which effectively removes noise with the help of a complex trained neural network.

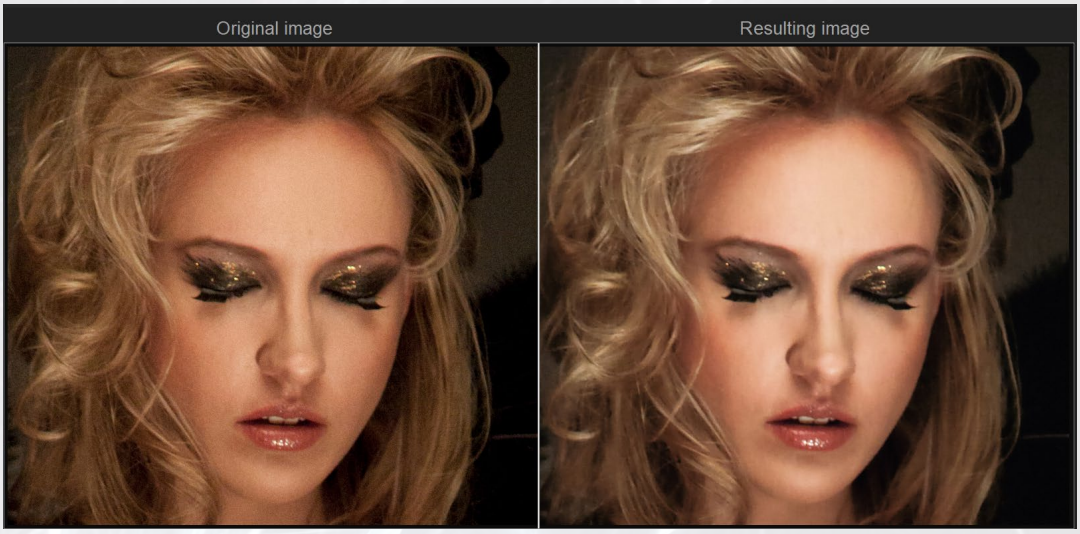
The **histogram** displayed via the toolbar illustrates that noisy images have a gap between black (left) and white (right) after denoising, because the 'smoothing' of the image causes these 'dropouts' in **black** and **white**.
That's why the preset includes a **weighted black/white point effect**, which largely compensates for this shortcoming and allows you to further optimise the image using the **spreading parameter** if necessary.
The last effect, **Normalise** (**RGB**), effectively removes colour casts if they are present in the image and, like all effects, can be adjusted as desired.
The preset shows that **DENOISE** not only effectively removes noise, but also **optimises the contrast and colour of the image**.



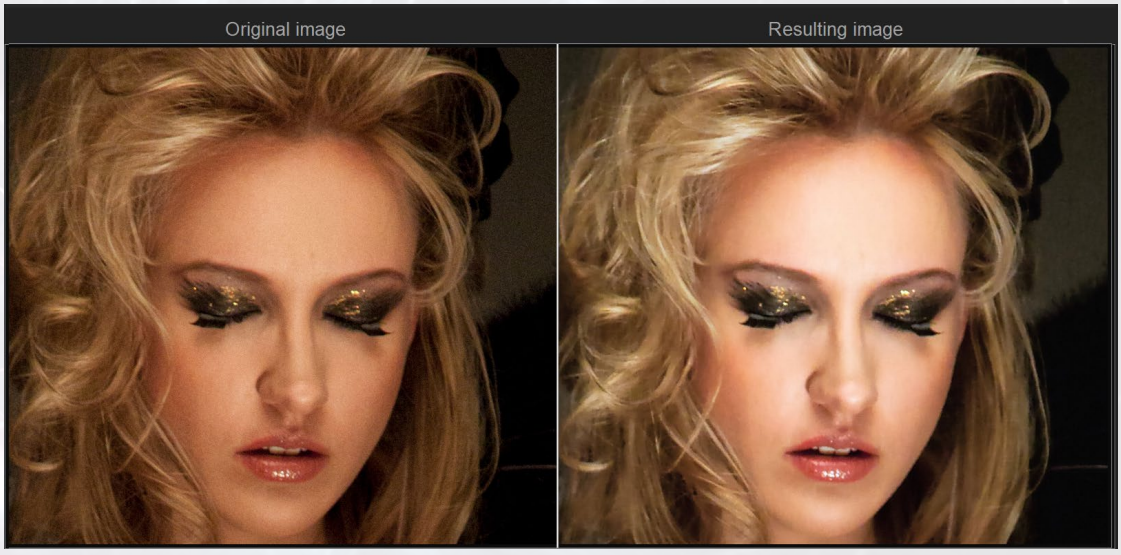
The **Optimise AI preset** with the same ISO number has two additional effects: **Histogram balance**, which evens out the brightness in the image and fills gaps in the histogram, and **Optimise sharpness**, which optimises image sharpness. You can also further customise this effect to suit your preferences using the corresponding parameters.
The interaction of these two effects accounts for the visible difference between the two functions.

Image example 2: Comparative views of the two functions

The second image example, featuring a model and taken with **ISO 5,000**, confirms the visible difference between the two functions and makes it clear that the choice is a matter of personal taste, depending on the subject.

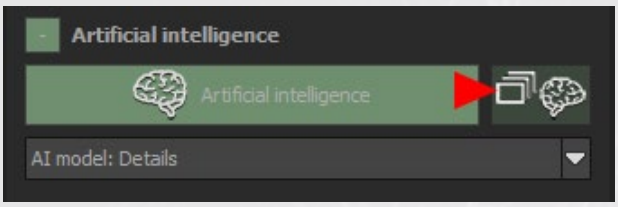


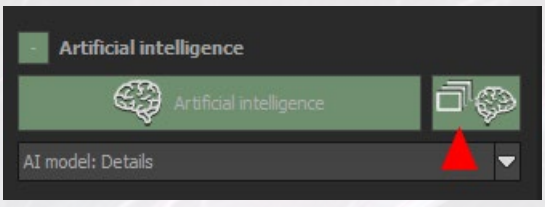
With the standard denoising preset, you get a result image that is very well denoised and very close to the noisy original in terms of overall effect.



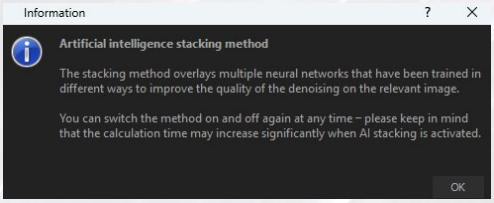
The optimisation feature adds more depth and character to the image because it emphasises the desired highlights, the sharpness effect makes the image appear more vivid, and the image look is slightly more exciting.

13. AI-Stacking

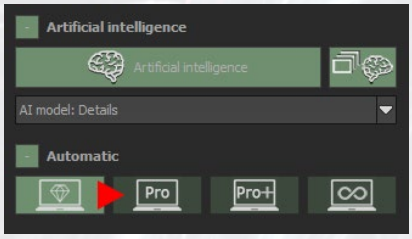


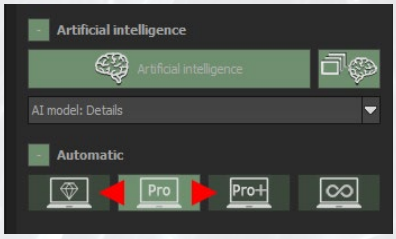


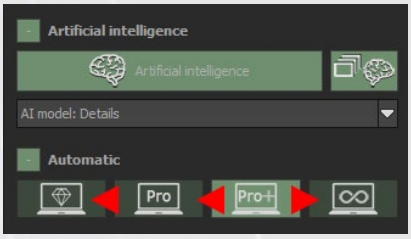
You can select this innovative method as the 'crowning glory' of an extended workflow if required, in order to give the image the final 'polish' after any changes have been made.



If you activate **AI stacking** by clicking on the button with the stack symbol, information is displayed that **several** differently trained neural networks are superimposed with the result that the quality of a loaded image is improved once again.







Stacking with 2 modules: If the **Balanced mode** is active by default, **DENOISE** does not use this **one** AI model, but **Balanced and Pro** (graphic on the left). Both result images are calculated and superimposed, so to speak a noise stacking of these 2 AI models. This leads to a slightly better result image with finer details.
The programme takes the currently set mode, all modes before it and the next higher mode.

Stacking with 3 modules: If you have selected **Pro mode**, the **Balanced and Pro+ modes** are also calculated and then superimposed to create the resulting image (centre graphic).

Stacking with 4 modules: If the **Pro+ mode** is active, the previous **Balanced, Pro and Infinity modes** are calculated accordingly and all 4 modes are stacked on top of each other for the resulting image (diagram on the right).

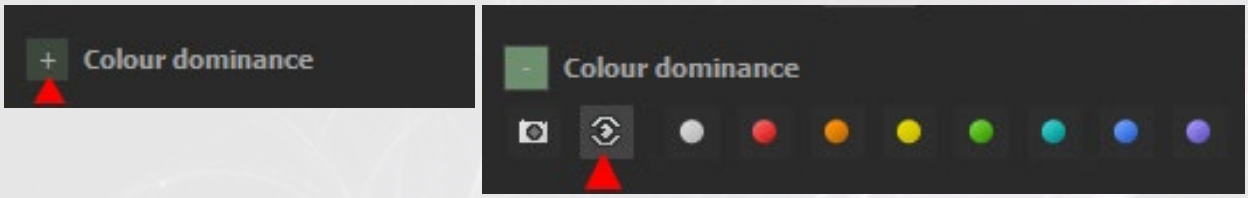
The resulting image calculated in this way has the best quality that can be achieved with DENOISE. It therefore makes sense to place this option at the **end of a workflow**.

Comparison views without AI stacking/with AI stacking

The two comparison views of image sections of the image motifs already shown in the previous chapter emphasise the explanations: The graphics show identical presets with **active Pro+ mode** but **without AI stacking** on the left-hand side and **with AI stacking** on the right-hand side.

The slightly improved resulting images are equally impressive due to the denoising and the retained level of detail and justify the increased computing time, especially for desired enlargements or prints.

14. Colour dominance



In this module, which is closed by default, you have the option of **specialising the denoising process for a selectable colour space or dominant colours**. However, the effects on the resulting image are minimal, so you usually do not need to make any individual changes here and can trust the default settings.

Clicking on the **plus sign** displays the selectable areas.

When the **eye symbol** is activated and preset as standard, the colour dominance used corresponds to the **brightness perception of the human eye**. This so-called 'retina method' evaluates red at about 21%, green at 72% and blue at 7%, which corresponds to the colour distribution of the human eye and means that **green is calculated slightly more accurately than blue**.

If you activate the **camera icon** (left) by clicking on it, the **colour dominance is automatically determined from the camera data** of the original image.

The selectable **main colours** (from left to right) **neutral grey**, **red**, **orange**, **yellow**, **green**, **turquoise**, **blue** and **violet** ensure that the denoising processes treat the selected colour tone with increased precision, thus producing finer accuracy.

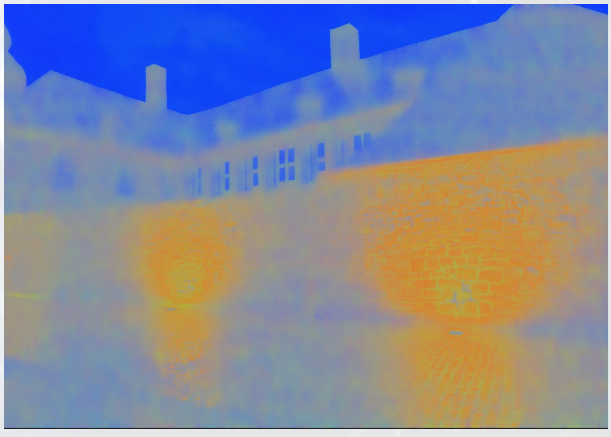
For example, if you activate **red tones** as in this motif, this colour will be slightly favoured during the denoising process, which can lead to a slight improvement in the result.
If you activate **orange tones**, which usually dominate skin tones, these colours will be denoised even more precisely and finely.

15. Channels and luminance

This module, which is closed by default, is used exclusively for **visualising colour channels and luminance** (brightness) in the image, similar to the **Measured noise areas** function, which visualises **noise measurement**.

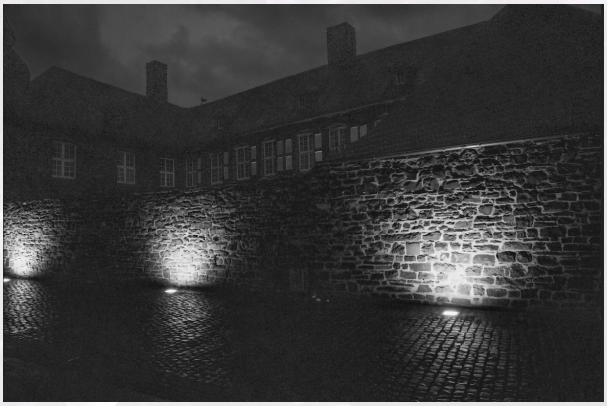
Click on the **plus sign** to display the various options.

By default, the image is displayed with **all colour channels** (**1**).



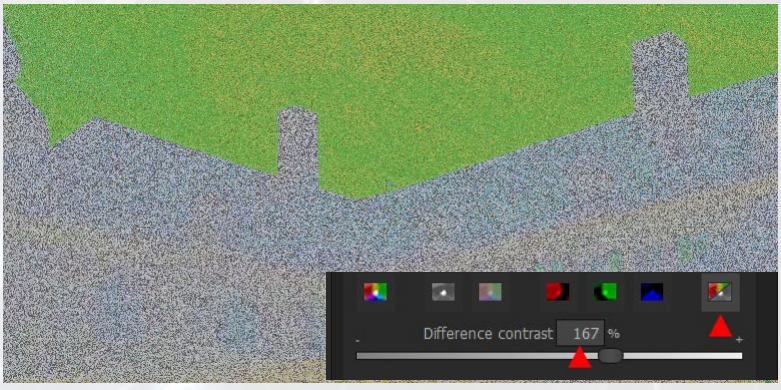
Brightness (graphic on the left): The activated **second button** displays the **brightness** (luminance).

Colour map (graphic on the right): The **third button** displays the **colour map**, which shows the **pure colours at standard brightness**.



Red channel: If the **fourth button** is active, you will see **the brightness of the red channel** (graphic on the left).

Green channel: Clicking on the **fifth button** displays only the **brightness of the green channel** (graphic on the right).



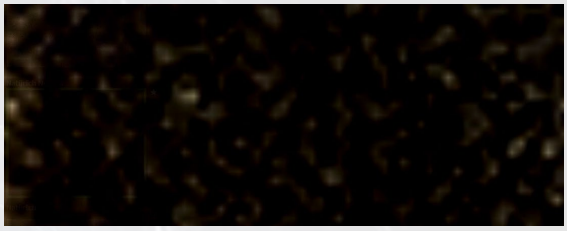
Blue channel: The visualisation of the **brightness of the blue channel** (**6**) shows the dominance of blue in the sky (graphic on the left).

Difference between result image and original image: Activate the last button (**7**) to see the **difference between the result image and the original**. The **contrast slider** that appears allows you to adjust the display to make it more contrast-rich and thus more visible (graphic on the right).
This informative display shows in colour **what has been removed** from the image, **primarily noise**. The fewer details visible in the image, the better the denoising and the fewer details the denoising has eliminated. If you look at the (blue) sky, it becomes clear that relatively **little has happened in the blue channel** during denoising, because only the colours green and yellow are visible. **DENOISE** has therefore primarily removed **green** and **red noise**.
The areas below show that they have practically no structure.

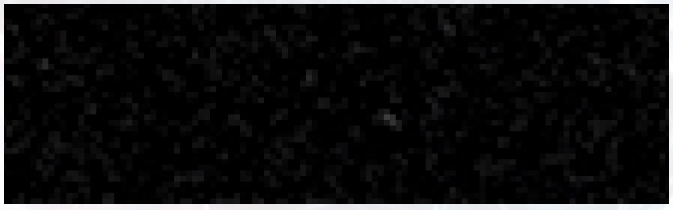
Conclusion of this visualisation: The denoising worked very well.

16. Correction images: Dark- and Flatframes

This module, or rather the results it enables, are particularly well known to astrophotographers, but they may also be of interest to all amateur and professional photographers.
Very few camera sensors or lenses are completely flawless. Sensor errors, which can arise, for example, due to incorrect colour interpretations, can possibly be detected when the image is greatly enlarged as so-called **hot pixels**, which can glow red, green or other colours, or as other disturbances.



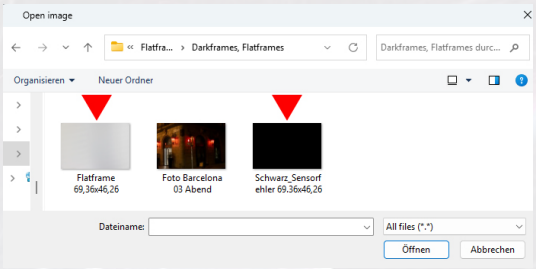
Example: In this image, which was taken with ISO 6,400, no noise is visible at first glance. However, at maximum magnification (100x area magnification, 1000% zoom) and full resolution, spots are visible, especially in the upper right area (graphic on the right), and these errors can be corrected with **dark frames** and **flat frames**.



In this module, you can import **correction images**: **dark frames** taken with the aperture closed (with the lens covered) (graphic on the left) and **flat frames** taken against a bright neutral background (graphic on the right). In this module, you can import correction images: dark frames taken with the aperture closed (with the lens covered) (graphic on the left) and flat frames taken against a bright neutral background (graphic on the right).

It is crucial that these correction images are captured with exactly the same pixel size as the original so that the disturbances in these correction images are superimposed pixel-perfectly in the same places as in the photographed original.

Import Dark frame

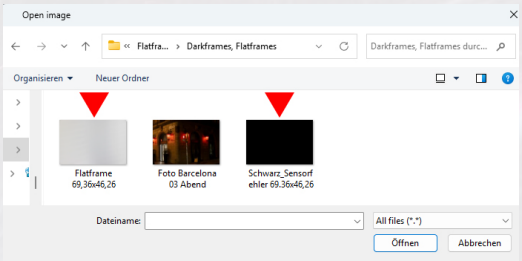


By clicking on the button with the **folder icon**, you can load the **dark frame** from the folder where the dark and flat frames were saved, **but it will not be recalculated automatically**.

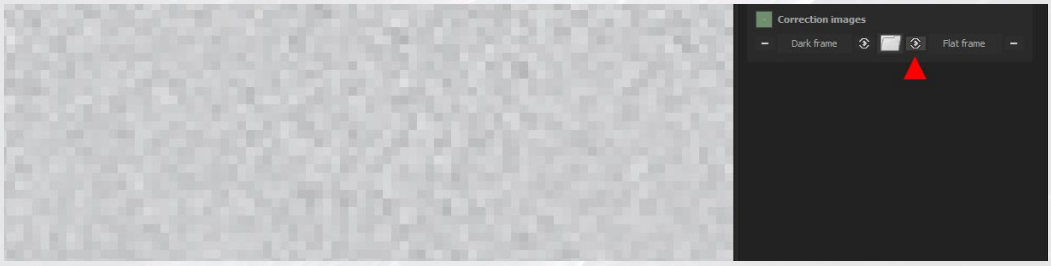
By clicking on the **eye icon**, the **dark frame** can be shown or hidden, revealing sensor errors at maximum magnification.

By clicking on the **Darkframe button**, the dark noise errors of the sensor are now corrected in **six passes using the default settings for the denoised image without a correction image** (graphic on the left), resulting in a slightly improved, ‘cleaner’ image (graphic on the right).

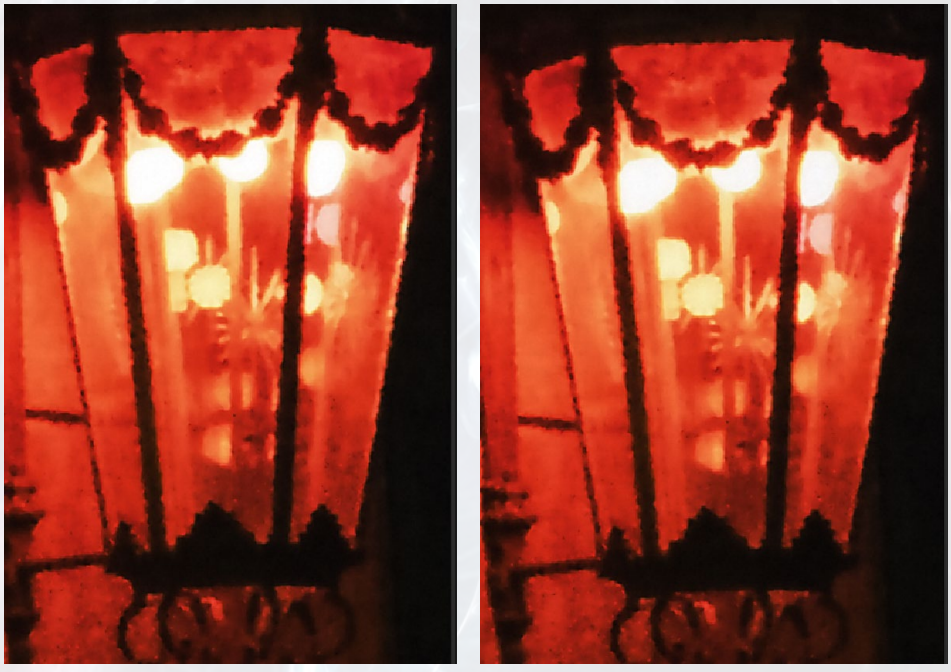
Import Flat frame



Click the button with the **folder icon** again to load the flat frame from the folder where the dark and flat frames were saved.

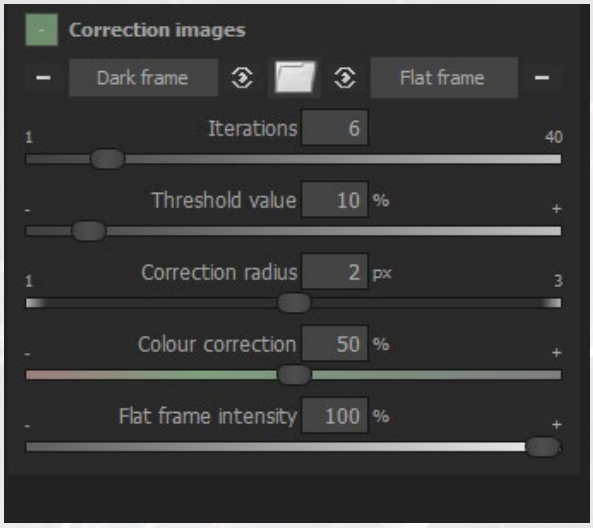


By clicking on the *eye icon*, the **flat frame** can be shown or hidden and, at maximum magnification, shows that even very good sensors or lenses are not completely error-free.



By clicking on the **Flatframe button**, any **brightness distortions and sensor spots** are now corrected in addition to the noise reduction calculation with **Darkframe** (graphic on the left).
The result image noise has decreased from **1.02%** without correction images to **0.22%.**
This combination can be used alongside the automatic mode at any time (graphic on the right).

Show parameters



As soon as the **Darkframe or Flatframe button is active** (highlighted in grey), the corresponding parameters are displayed:

Iteration: The set number indicates the number of passes (iterations) that increase the accuracy of the calculation by this factor. When the **dark frame is active**, it is calculated into the original image in **6 passes** (default setting), thus correcting the noise errors of the sensor.

Threshold value: The threshold value specifies how **bright** a pixel in the dark frame must be for a correction to be triggered. Even at a low value of 10%, a correction will be applied to the original.

Correction radius: The correction radius specifies how far around a pixel in the dark frame the original is corrected if a pixel in the dark frame was faulty, e.g. a red hot pixel, which is usually larger than one pixel. Therefore, the slider is set to a correction **radius of 2 pixels** so that the 'error pixel' is corrected over a slightly larger area.

Colour correction: Colour correction 'tells' **how much colour correction should be applied** if, for example, a hot pixel is found that is not only red but also green or another colour.

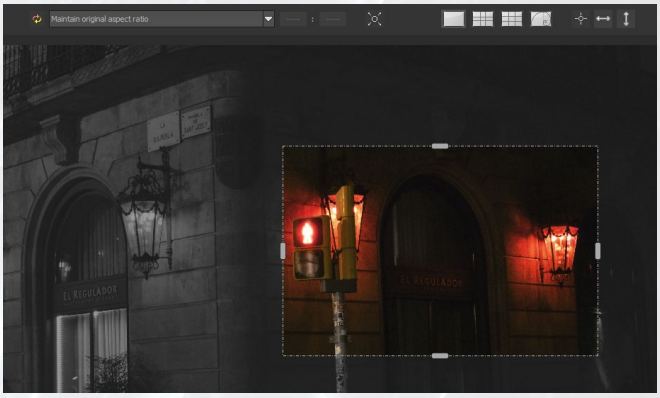
Flat frame intensity: This control is only displayed when the Flatframe button is active and determines the strength of the flat frame correction from **low** to **intense**.

Remove correction image: Click on the **minus sign** to remove the corresponding correction image.

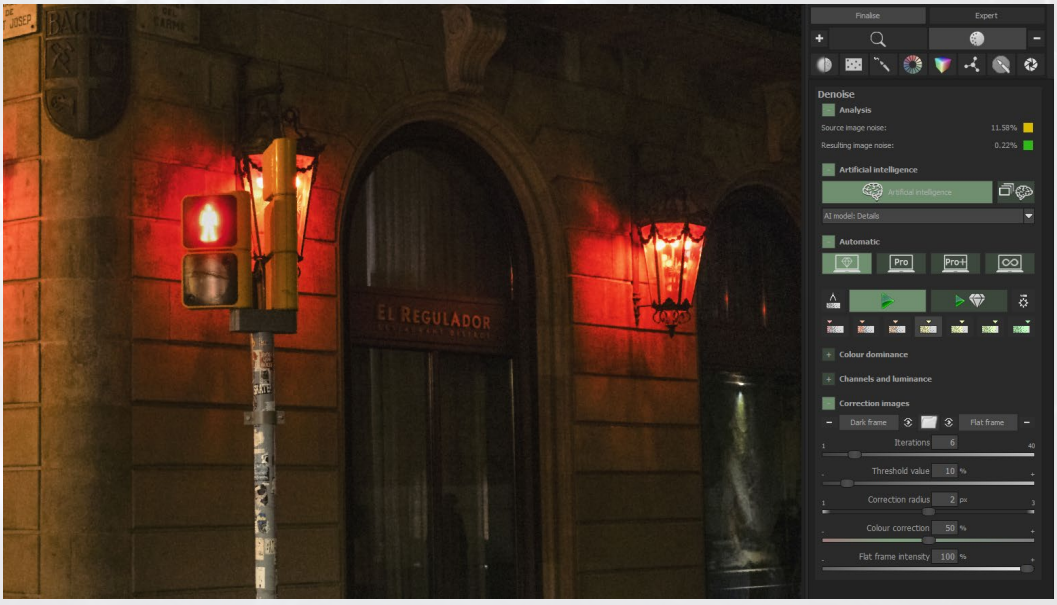
Note: The module remains active even if you collapse it by clicking on the **green plus sign,** the correction images are only automatically removed when the next image is loaded.

Changes made in the RAW module or during cropping are applied.

If, as shown in the example image, you want to align the image in the **RAW module** (see **RAW module guide**) in the **Distortion section** and brighten the dark areas of the image in the **Exposure section** using the **Dynamic Brightness slider**, the correction images will be **aligned synchronously** and all other changes will be taken into account when switching to post-processing.

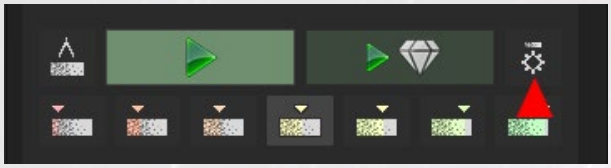


The same applies to all modifications made, such as **image cropping** (see **General Files Guide**) or alternative quality levels.



The resulting image is impressive in every respect, with excellent noise reduction and image quality.

17. Configure your own preset individually



If you want to understand the effect of individual effects in a denoising preset and try out the effects of combining several effects, thereby becoming the 'director' of the denoising process, you can do so easily and intuitively in a **'trial preset' with numerous denoising and other effects in expert mode**.

Example: Once you have imported an image, it is automatically analysed and denoised. In the image example, which was taken with **ISO 5,000**, the source image noise is **20.80%** and the resulting image noise is **1.14%**. Click on the button with the gear icon (graphic above) ...

... changes the preset selected by the automatic function from **Denoise AI ISO 2,000** to the preset **Denoise AI User**.
Since **no denoising** is performed now, because the noisy original image should be visible, the value of the result image noise is identical to that of the source image noise.

Try out individual or multiple effects

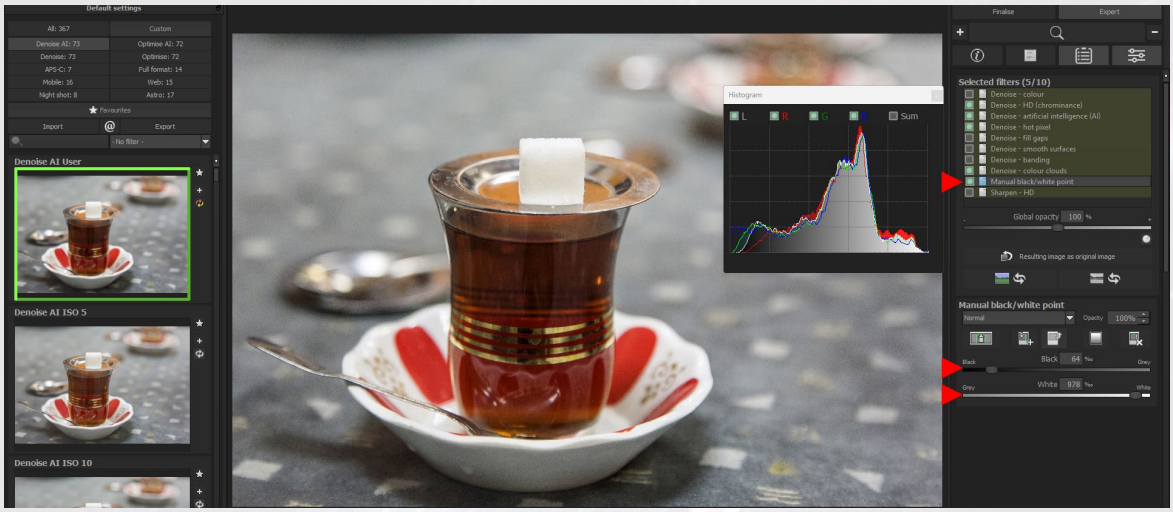
Clicking on the **Expert button** switches to **expert mode** (see **Expert Mode** Guide), in which the list of **selected filters** and the **parameter area** are displayed.

The list of selected effects contains 10 **disabled effects**, ...

... most of which you have already seen **active** in the chapter on denoising and optimisation presets.

Activate effect Denoise – AI: Clicking on the grey box in front of the effect Denoise – AI turns the grey box bright green and the effect of the now active 'main effect' is calculated immediately.
Change parameters: One or more parameters are displayed for each active effect, in this example intensity. Increase the **intensity** of noise reduction, e.g. from the default setting of **300** to **600**, which does not result in excessive blurring of the contours, and this correction will also be recalculated immediately.

Activate further effects



With just a few clicks, you can try out the numerical impact of switching on several effects on the resulting image noise and see the effect on the image live every time you switch an effect on or off or vary the associated parameters.

In the example, in addition to the activated **Denoise - AI effect**, the **Denoise - HD**, **Denoise – hot pixel**, **Denoise - colour clouds** and **Manual black/white point** effects have been activated.
With this filter, the displayed histogram and thus the image was manually changed with the **black** and **white** point sliders and optimised slightly.

If you switch back to **Finalise mode**, you can check the calculated value of the resulting image noise, which is **1.95%** in the example, at any time and, if necessary, try out further effects in Expert mode until you see the best possible resulting image from your point of view.

Reset preset: The **coloured arrows** surrounding the preset indicate that the original preset has been changed. Click on the arrows to reset it to the default settings.