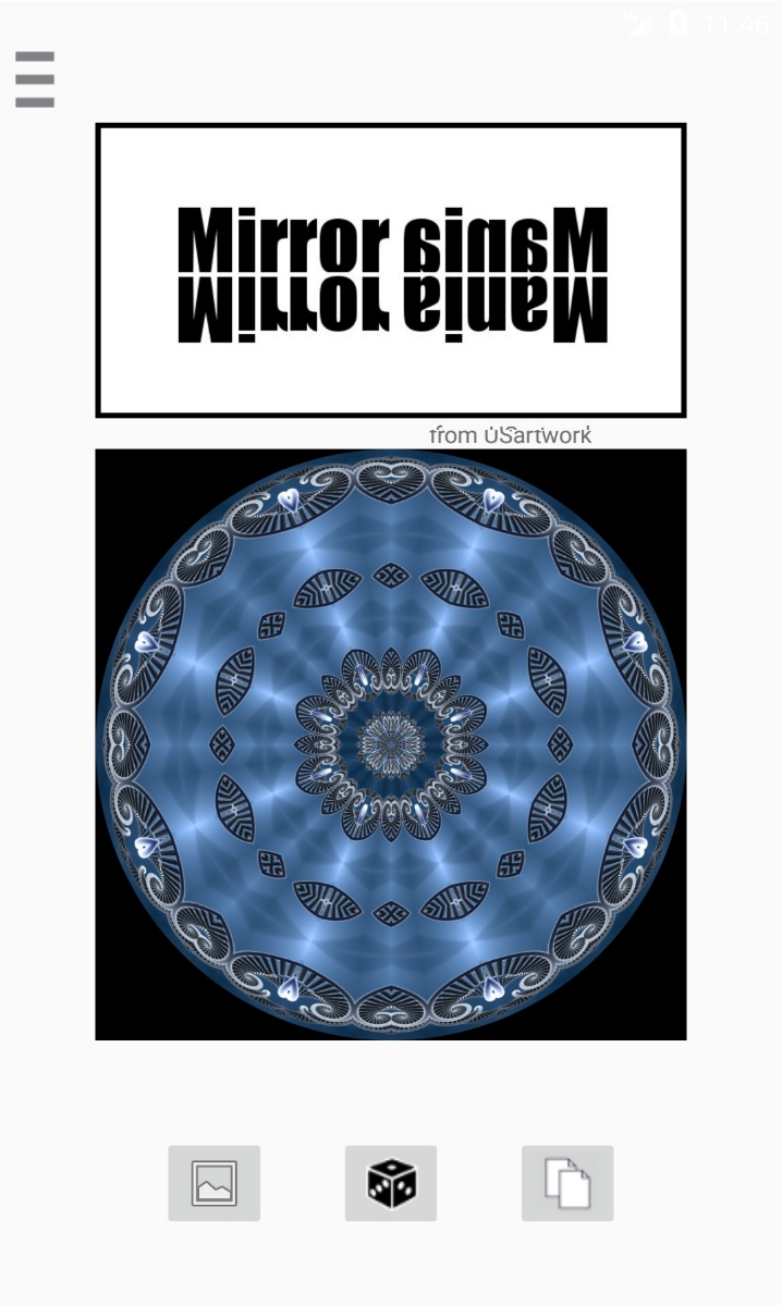

MirrorMania – An image creator from USartwork

A user guide

V 4.18 – 2023-04-06 by Ulrich Schraermeyer - https://usartwork.net

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1. Abstract

With MirrorMania you can create beautiful graphics and share them with your friends. Start with an image or a video from you gallery or with a random pattern proposed by the app. Now apply simple operations like rotating, cropping or scaling or use more complex filters to modify the image. Complex filters include various mirror effects, transformations and color changes. Each filter comes with a useful default setting but it can also be configured to behave differently. Hold down the filter icon to open its settings panel, adjust filter settings and try on your image. Or use the dice to set the settings sliders to random values and look what happens. If you like the result, accept it and continue with other filters.
There is no limit to your creativity. You can save the images you created at any time to your device or you can share them with others via email, messengers or social networks

Width and height of images created with MirrorMania are initially limited to the width of the device display. This is for example 1080 pixels for a Nexus 5X. Via advanced settings you can define your own size limit of up to three times the display width. This enables you to create hi-res graphics having enough resolution for fine art prints. You can also activate higher precision interpolation and set the JPEG quality of your created images. Those features will enhance the quality of your creations.

The following filters and image operations are currently available:

Image operations
- rotate 90° / -90°
- rotate by arbitrary angle
- flip horizontally / vertically
- flip on arbitrary line
- crop (using internal crop tool)
- crop and extend
- crop off frame
- crop to circle
- scale to square
- scale (to maximum)

Filters
- two way mirror
- three way mirror
- four way mirror
- multiply
- polar transform
- color shift
- color palette
- color enhance
- mosaic (Richter)
- whirl
- overlap
- ripples
- waves
- glass
- extend
- glitch

- stripes
- perspective
- lens effect
- circular transform
- merge
- area fill
- cover
- convolve
- flatten
- video scan
- way grid

Search for **usartwork** on Instagram to see examples of MirrorMania

2. Concept

MirrorMania creates personal pieces of art by remixing existing pictures or a random pattern into something completely different. Since the attractiveness of the created pictures usually comes from their symmetry, the title of the app is MirrorMania. Mirroring is a key pattern of image modification performed by the app. There are several filters available to perform various ways of mirroring images.
Another key concept is pixel transformation. With those kind of filters, all pixels from the current image are transformed to another location in the target image. The most popular kind of transformation filter is the polar transformation, which can transform rectangular structures into circular ones based on a mathematical formula. And vice versa. But MirrorMania comes with three more of such filters, like a simple filter that wraps the whole image into a circle or one that performs a lens or “fish eye” effect or another one that performs a complex nonlinear polar transformation.
MirrorMania also comes with filters build to enhance the image color quality, like with standard image processing tools. For example changing brightness, contrast or saturation. Or color modifications like color shift filters, or color threshold filters. And also a filter that narrows areas of similar color to an average color.
Last but not least there are filters to perform a wave or whirlpool type distortion like ripples or twirls on the water distorting a reflecting image.
Some mirror filters and many pixel transformation filters may produce non rectangular images. Those filters allow you to to define the way how those “off image areas” are filled. They can either be filled with a static value, the so called “fill color” and this “fill color” can be set to black (default), white or transparent. Or they can be filled by extending the nearest image pixel to the image border or they can be filled by repeating the inside image.

Example:
A polar transformation of an image using the three possible fill modes “fill”, “extend” and “repeat”

3. The MirrorMania art workflow

When opening the MirrorMania app, below the logo and one of the (randomly selected) sample graphics there are four image buttons to start with.

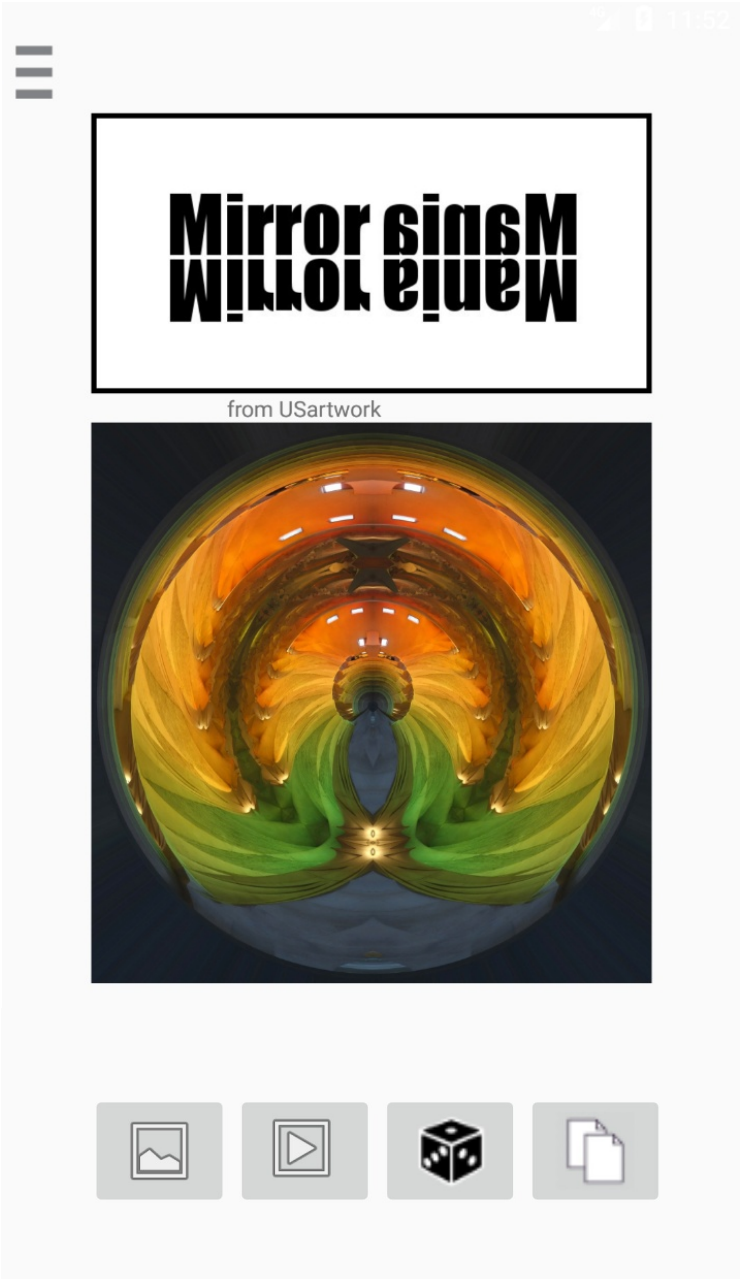


Image gallery

Touch this button to open the Android default gallery browser, presenting to you all kind of images stored on your device by various applications (including MirrorMania). Select a picture to use it.

Video gallery

Touch this button to open the Android default gallery browser, presenting to you all videos stored on your device. Select a video to use it. The video will be played in an embedded player. You can seek to any video position. At some point in time, touch the “grab image” button located below the player to make the video frame at the current location the image you will be working with.

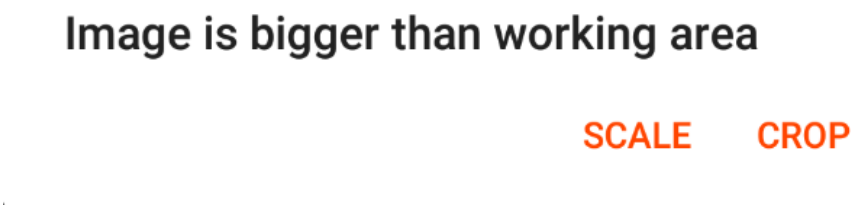
Dice

Touch this button to let MirrorMania create a random image for you. Such an image will consist of overlapping rectangular and circular forms with random colors.

Paste

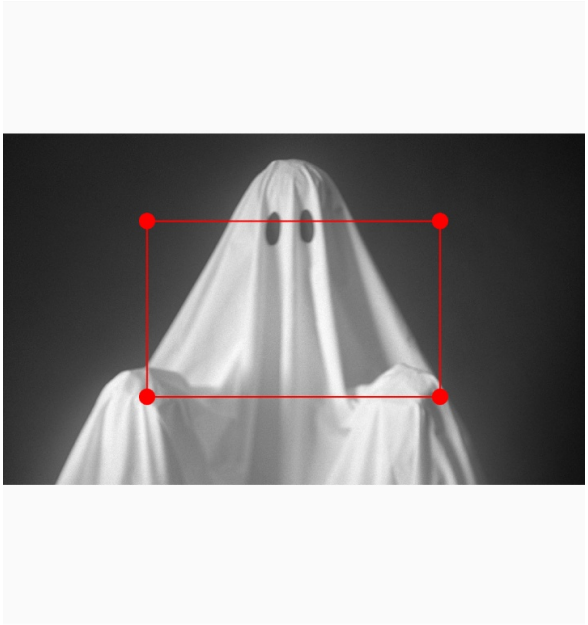
Touch this button to import an image URL from the system clipboard. If such an URL is available, the image will be downloaded and opened in MirrorMania. This also works for image/video sharing links from Instagram or download links from Vimeo.

When using **Gallery** or **Paste** the image to start with can be bigger than the working area provided by MirrorMania. Remember the size of the working area differs from device to device and is initially limited by the display with (in pixels). The app is designed to have an almost square working area but depending on the displays side ration, it can be slightly different. The app will still show images scaled to fit the display but it will internally calculate with a bigger image size, in the end producing high resolution images. In either case, the selected image can (still) be bigger than the working area. In such a case, before being able to start filtering images, a dialog is presented to the user.



By touching **SCALE** the app is instructed to scale the image to best fit the working area.
By touching **CROP** the app shows a scaled version of the image and brings up a crop tool which can be grabbed at the corner points to select a crop area. By touching into the centre of the crop area, the are can be moved.

An additional info text together with an OK button is shown below the image area.



Select a crop area and press OK to continue.

OK

After the crop tool is properly adjusted, touch OK to select the marked area of the image. The cropping is done on the original image, so no loss of quality takes place, before the resulting area is again scaled to best fit the working area (if necessary). For example if the image you selected has 2000x2000 pixels and the working area is set to 1080x1080, cropping a part of the image of less than 1080x1080 pixels will retain the original image resolution without the need for scaling.

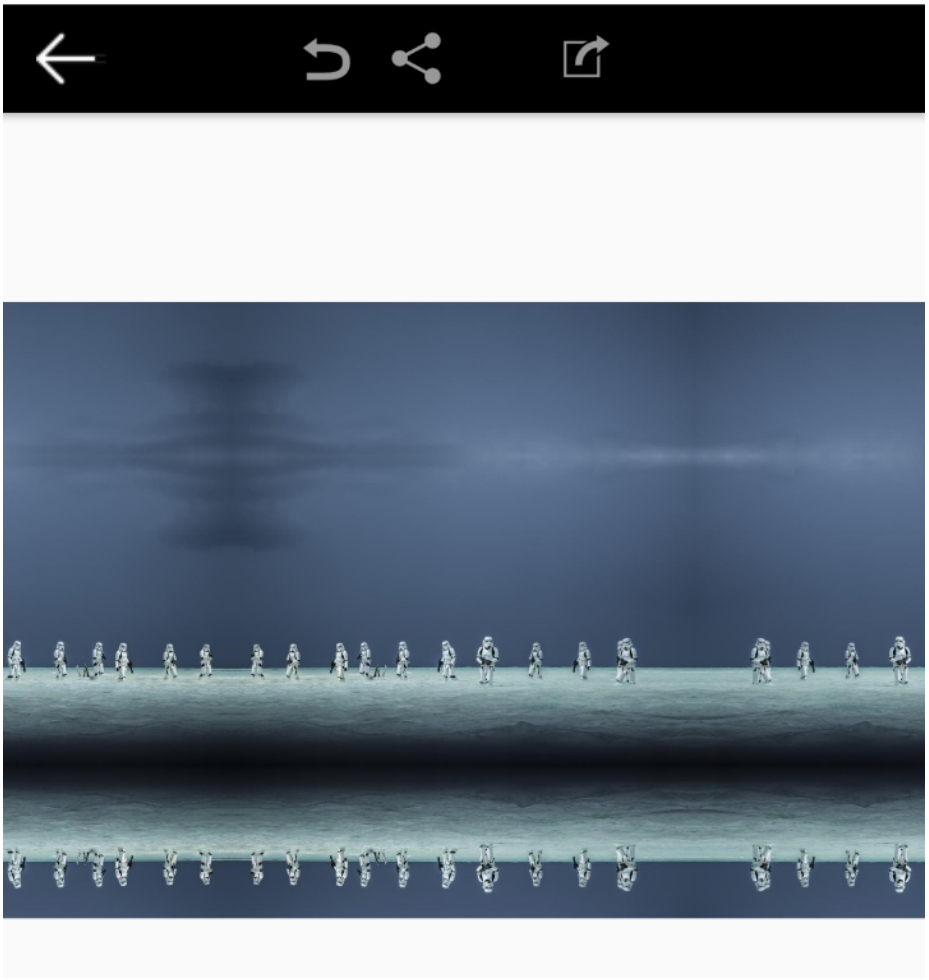
At this point, the image working area will show an image and below the filter area.

Example screenshot – number of filters initially visible may vary from device to device

The filter area consists of two rows which may scroll horizontally. The top row holds the “complex filter” icons and the bottom row holds the “image operation” icons.
The “complex filter” icons show the image of a green starting airplane in front of an orange sky but already modified by the filters they represent (using the default filter settings).
The “image operation” icons show MM in a red frame but already modified by the image operation they represent (using the default settings).

4. Complex filters – Standard behavior

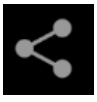
Touching one of the complex filter icons will apply the filter to the image using the filters default settings. The image is changed and the toolbar shows additional symbols.



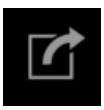
Example screenshot showing a filtered image with applicable toolbar symbols.

 **Undo**

Visually undo the last modification. Note that a complex filter operation is never applied automatically. After filtering, the current image is not yet modified and applying a different filter will again use the current image.

 **Share**

Apply the filter operation and bring up a list of installed applications that support image sharing. After selecting an application from the list, control is passed to the selected application to perform the actual (application dependent) sharing operation.



Apply

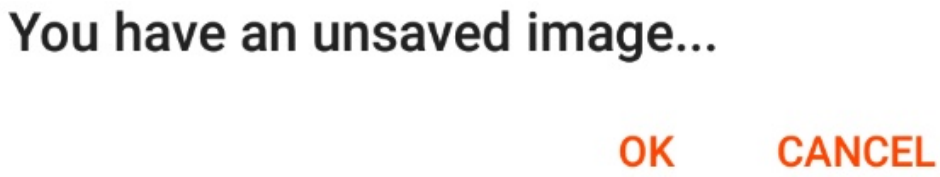
Apply the filter operation. This makes the image you see the current image. The **Apply** and the **Undo** symbols disappears and the **Save** symbol appears.

Save

Save the filtered image. The image is saved to the applications “Pictures” folder using a file name starting with “MM_” followed by a date/time stamp. The file is saved as a JPEG image using the currently defined JPEG compression quality (default value is 92, can be changed via “advanced settings”)

Back

Trying to navigate back to the previous screen while the **Save** symbol is still visible will bring up a dialog to avoid the loss of your filtered image.



Touching **OK** will navigate back to the previous screen discarding the filtered image.
Touching **CANCEL** will stay on the current screen allowing you to still save the image.

Using the Android standard back button while the **Save** symbol is still visible will NOT bring up such a dialog, thus discarding the unsaved image.

When the app is freshly installed, applying a filter brings up a popup explaining that holding (long touching) the filter icon will allow you to edit the filter settings. This popup can be discarded forever by touching “got it”. After the filter operation is performed there will be another help popup of the same kind, explaining to you how you can apply the changes made by the filter.

Copy/Paste

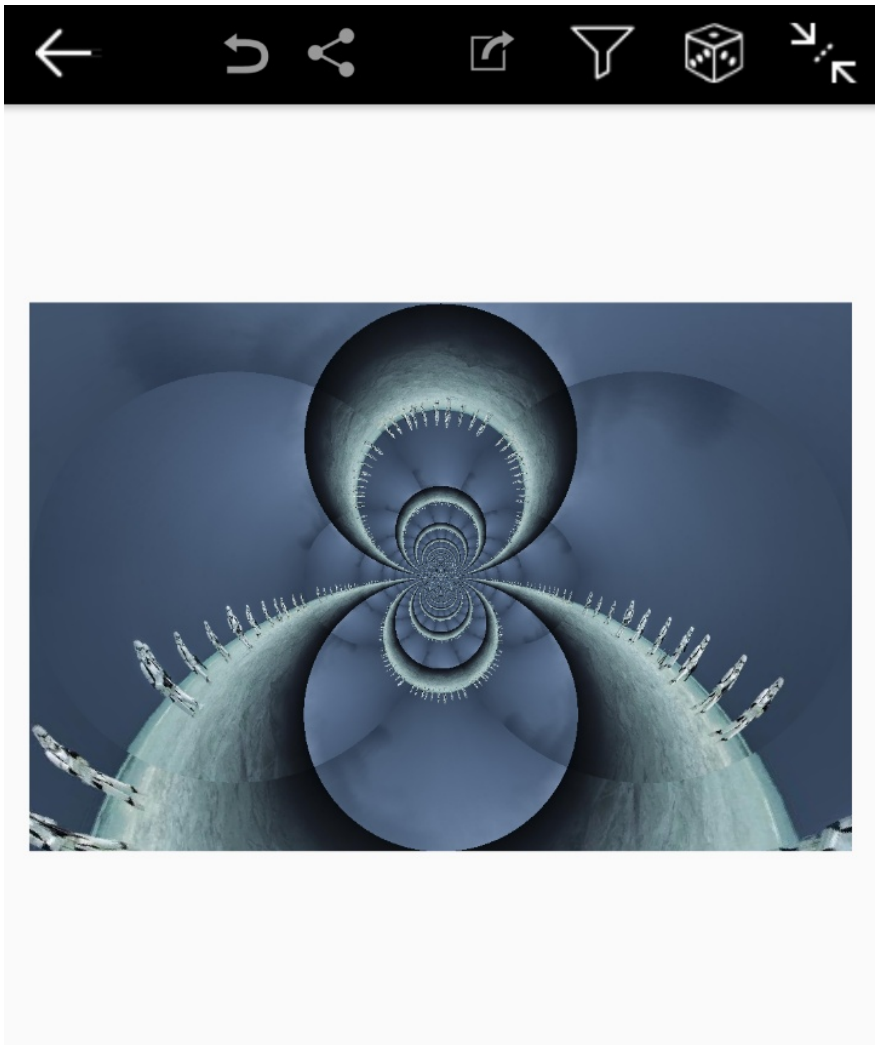
Touching the copy/paste icon transfers the current image (or if the crop tool is visible, the current crop area) to an internal clipboard. The icon color changes from white to green indicating that the clipboard is not empty and another touch executes a paste and not a copy. A long touch on the icon clears the clipboard. Pasting is only executed in image mode (filter details not open) and only if the crop tool is visible. In the conditions are met, the clipboard content is transferred into the crop area, scaling the clipped image if necessary.

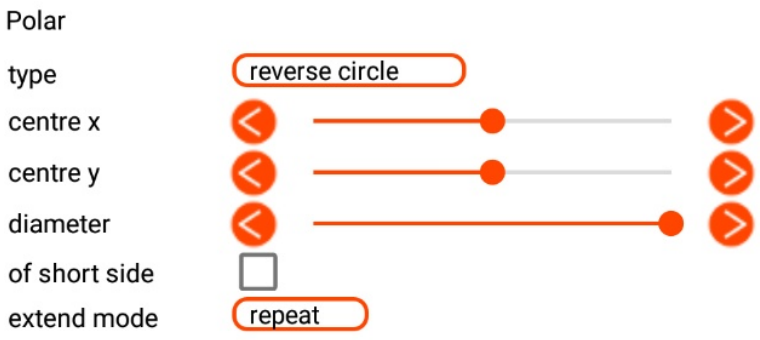
5. Image operations – Standard behavior

Touching one of the image operation icons will apply the operation to the image using the operations default settings. The image is changed and the toolbar shows additional symbols.

The only difference to complex filters is that the change is automatically applied. So the **Apply** symbol won't appear, instead the **Save** symbol appears directly. On the other hand, the **Undo** symbol won't disappear, so you can still undo the operation, even after having saved the current image.

6. Complex filters and image operations – Extended mode





Holding down (or long touching) a complex filter or image operation icon will replace the icon rows by a filter specific settings panel. Only the image operations “scale to square” and “crop to square” don’t come with such functionality.
In general, a settings panel will consist of a first line showing the filter name and one ore more lines displaying a property followed by a slider, a checkbox or a spinner (list of choices). For example:

A spinner (list of choices) shows the current choice inside an orange oval. Touch the spinner to pop up the list of possible choices and select the one you want.

A slider shows the current value of a property as a position between the minimum and the maximum possible value. Move the slider knob to adjust the value. While adjusting the slider, the property name and the current value will show up directly behind the filter name. Touching one of the two buttons left or right to the slider, will adjust the value by exactly one unit up or down. Touching the property name of a sliding property will also show current value directly behind the filter name.

A check box, as usual, shows a boolean property as selected or not selected.

The toolbar in this modes comes with two additional symbols.

 **Filter**

After adjusting the controls to the values you want to try the filter with, touch the **Filter** symbol to filter the current image according to the selected filter settings.

 **Dice**

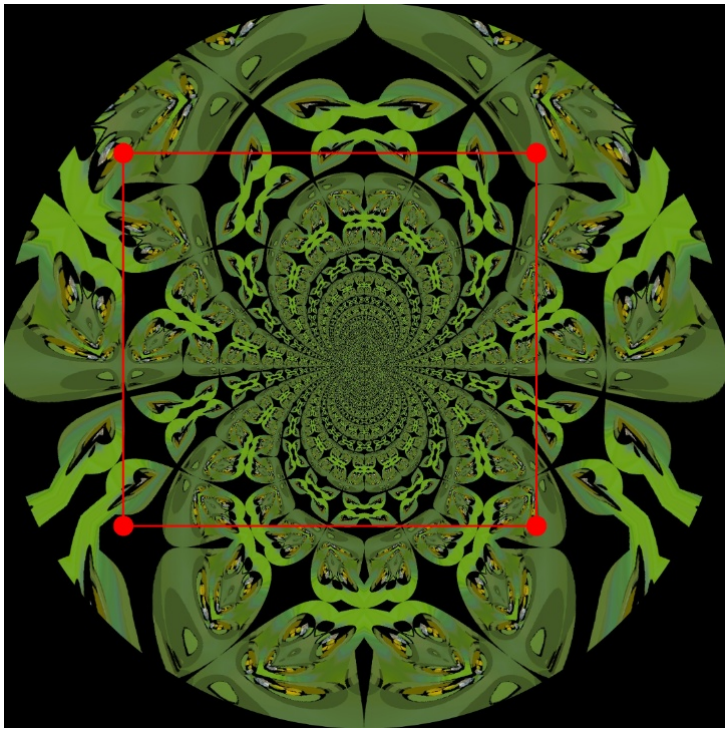
Sets the properties within the filter settings to random values before applying the filter to the current image. Locked properties are not affected. A filter property can be locked/unlocked by touching the property label. A locked property is indicated by a red label.

After having filtered an image, you will see the toolbar symbols as described in the previous section about the standard behavior. So all about applying a change, undoing a change, sharing and saving the image is the same. The only difference is in the **Back** symbol. In this mode, touching it will just close the settings editor and return to the screen showing the current image with the filter icons below.

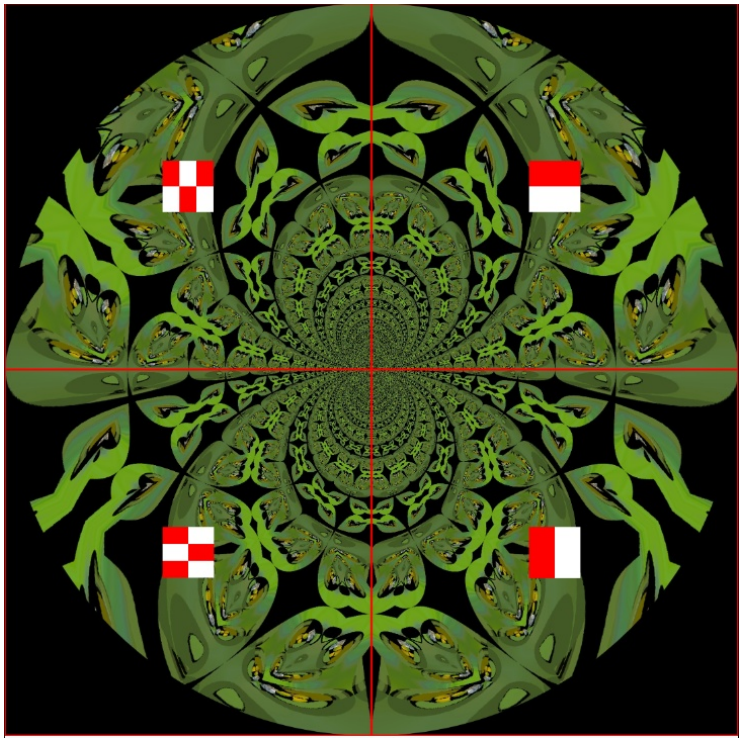
Applying complex filters to specific areas

Complex filters unlike image operations can be applied to specific areas of the image. Once you have a current image with the last change applied (**Apply** symbol is not visible), you can either swipe the image to bring up the crop tool or you can “long touch” the image to bring up the grid tool. The crop tool works as expected: You can grab the tool by one of the four corner points to adjust it as you want. Or press the top back symbol to make it disappear.
The grid tool is something special. It starts with a 2x2 grid and shows 4 symbols to change the 2x2 grid into a 2x3, 3x2, 1x2 or 2x1 grid. After applying such a row/column change, the 4 symbols will change to be able to create a different grid with one more column, one column less, one more row or one row less. The maximum number of rows or columns is 10.

If a rectangular area selected with the crop tool is visible, applying a filter will apply it only to the selected area leaving the rest of the image unchanged. If in this case filtering the (partial) image changes the (parrtial) image size, ir will be scaled to fit the selected area.
If a grid created by the grid tool is visible, applying a filter will apply it to all visible grid areas separately. This operation does not make sense for the two filters “color shift” and “color enhance” since they don’t transform image pixels.



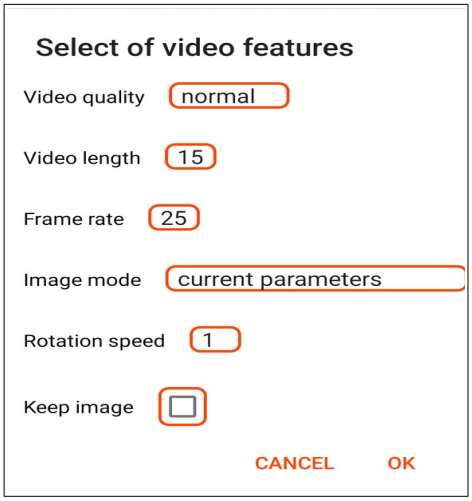
Sample image displaying the crop tool



Sample image showing the grid tool in initial mode (2x2 grid) with symbols to make it a 3x2, 2x3, 2x1 or 1x2 grid.

6.1. Generating a video

Holding the filter icon (long touch) opens a popup menu showing options to generate a video from the current image using the features of the current filter.



The video quality (bitrate) can be set to four levels normal, medium, high and very high.

The video length can be set in steps of 5 seconds from 1 to 60 seconds.

The video frame rate can be set in steps of 5 from 1 to 30 frames per second.

The video generation type has 4 options:

- **current parameters**: use the currently set filter parameters to create the first video frame and repeat the process with the filtered image.

- **current parameters, rotate down**: use the currently set filter parameters to create the first video frame and repeat the process with the current image rotated downwards by 1-10 percent of the height depending on the rotation speed selected.

- **current parameters, rotate left**: use the currently set filter parameters to create the first video frame and repeat the process with the current image rotated leftwards by 1-10 percent of the width depending on the rotation speed selected.

- **random parameters**: randomly set the (unlocked) filter parameters to create the next video frame and repeat the process with the filtered image.

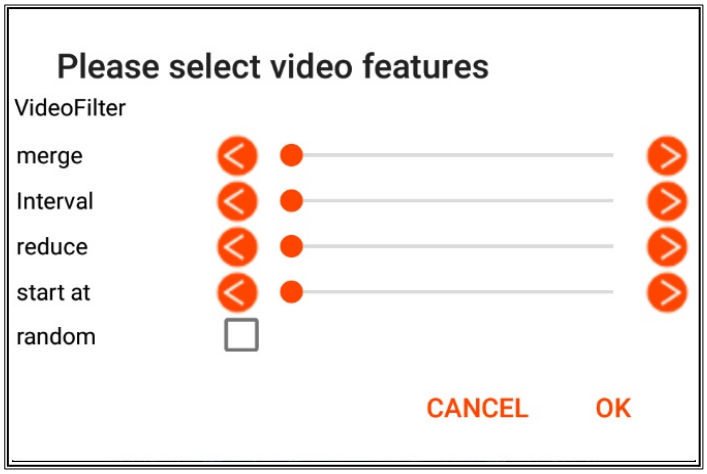
If the “keep image” checkbox is selected, all video frames are created by filtering the original image, otherwise the filtered image is chosen.

In general: If the filter changes the image size, the image size is scaled to the original size before writing the video frame.

During video generation you see a colored progress bar. You can interrupt the video creation progress by pressing the devices back button.

6.2. Filtering a video

If you started the current Mirrormania session by opening a video, holding the filter icon (long touch) opens a popup menu showing options to generate a filtered video from the current video using the features of the current filter.



Basically this filter reads all frames from the current video and applies the current filter (using current filter parameters) to the frame before writing it to the result video file.

Merge (0-99): When merge is greater than 0, the filtered frame is merged with the original frame sing the ratio defined by the merge parameter. For example 50 means 1:1.

Interval (1-25): When interval is greater than 1, frames are skipped. Interval=2 means that only every second frame is used, interval=3 uses every third frame and so on.

Reduce (calculated): Moving the slider presents scaled-down frame sizes to be used for the result video.

Start at (0-99): Moving the slider you can set an offset (in %) to be skipped in the beginning. For example having a video of 1m30s, starting at 20% means the filtering process will start at 0m18s.

Random (checkbox): By setting this option, the filter will randomly set the (unlocked) filter parameters before filtering the next frame.

In general: If the filter changes the image size, the image size is scaled to the original size before writing the video frame.

During video generation you see a colored progress bar. You can interrupt the video creation progress by pressing the devices back button.

6.3. Merging filter results

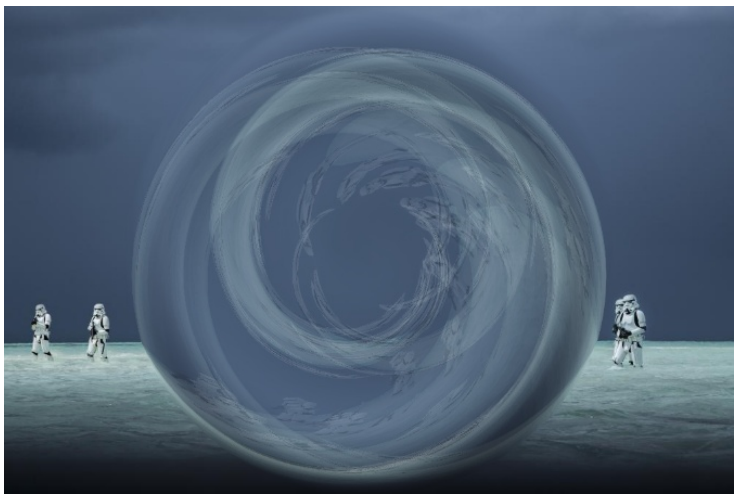
Random merge:

Holding the dice icon (long touch) performs eight consecutive filter calls setting random property values to all unlocked filter properties. First, a little popup is shown, where you can select the merge mode from (basic, add, subtract, exclusive or). Afterwards, all results are merged into one image. This operation might take some time. The dimension of the first image becomes the dimension of the result image. If the filter changes the image size at some stage, the image is scaled to the dimension of the first image.

Controlled merge:

Merge tool

Touch the merge tool to enter merge mode starting with the current image. First, a little popup is shown, where you can select the merge mode from (basic, add, subtract, exclusive or). The icon becomes green once the image is stored in the merge stack. All subsequent filter calls using the filter or dice button are added to the merge stack. When you touch the merge tool again, the merge result becomes the current image and the merge tool icon gets white again. While in merge mode random merging is disabled. The dimension of the first image becomes the dimension of the result image. If the current filter changes the image size at some stage, the image is scaled to the dimension of the first image. If an error occurs, the merge tool icon becomes red indicating that the current image is not added to the merge stack.



Example: Merge result of eight whirl filter calls with random angle value.

7. Complex filters in detail

Many filters have two centre sliders to define the center point of a filter operation in an x,y coordinate way (in percent). Those sliders have been replaced by a centre tool.

Touching the icon resets the tool to the default value 50,50. Touching the image sets the centre tool to an x,y percent value calculated from the touch point. Some screen shots in this documentation still show the old sliders.

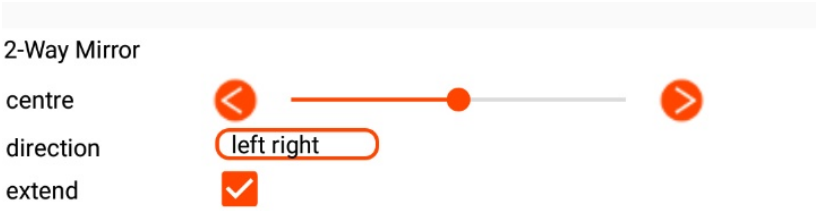
Some filters use a colour picker

If the colour picker is present, you can preset the picker by touching the image. The colour found at the touch point will be used to preset the colour picker.

Some filters have an image picker

Touching the left icon will open the gallery app to select an image. Touching the right icon will use an image from the clipboard, which is either the internal clipboard or (if it is empty) an URI from the system clipboard. If the image can be selected from a clipboard, the icon becomes green.

7.1. Two way mirror filter



This filter mirrors the image along the x or y axis. By default, it mirrors along the y axis (left-right) at 50% of the width. This will mirror the left half of the image over the right one.
By changing the centre parameter, the point where mirroring takes place can be moved.
By changing the direction parameter to top-down, mirroring will take place along the x axis.
The extend parameter defines whether mirroring should extend the image, if centre is not equal 50.

Examples:


Original image


centre=50, direction=left right


centre=25, direction=left right, extend=no

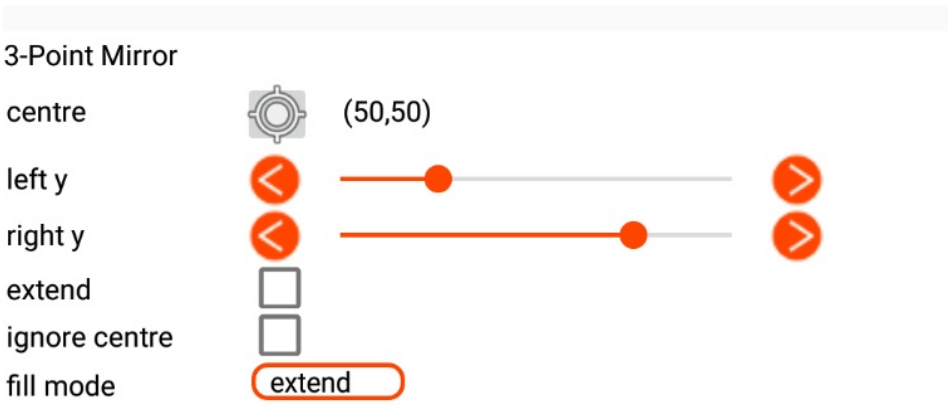

centre=25, direction=left right, extend=yes

centre=50, direction=top down

centre=25, direction=top down, extend=no

centre=25, direction=top down, extend=yes

7.2. Three point mirror filter



This filter mirrors the image along a line from the left side to the right side of the image, which crosses an arbitrary point called “centre”. So the line goes from (0,left y) to (centre x, centre y)and then to (width,right y).
The extend parameter defines whether mirroring should extend the image.
The “ignore centre” parameter, when set, disables crossing the center point which makes the “mirroring” line a simple line from (0,left y) to (width,right y).
The fill mode parameter defines how to fill empty space created by this filter. Possible choices are empty, extend and stretch. As usual, empty means black, white or transparent (see chapter Concept), extend fills up the current column with the nearest image pixel and stretch stretch the column to avoid empty space.

Example: Original image
All examples use left y = 25, centre x = 50, centre y = 50, right y = 75

extend=no, fill mode=empty

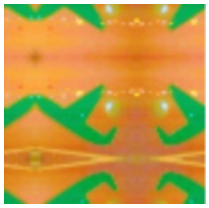
extend=no, fill mode=extend

extend=no, fill mode=stretch

extend=yes, fill mode=empty

extend=yes, fill mode=extend

7.3. Four way mirror filter



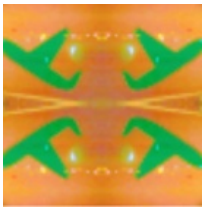
This filter mirrors and wraps an image along the x axis and the y axis based on an arbitrary point.

Example:

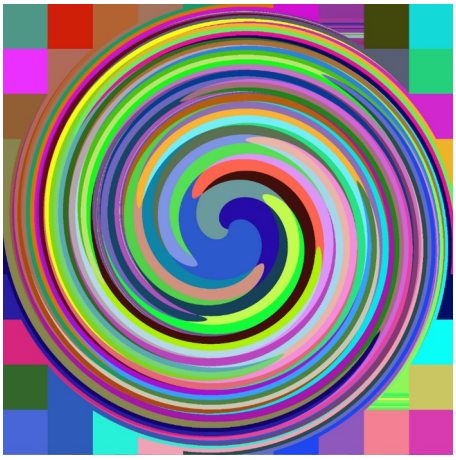
Original image

centre x = 25, centre y = 25

7.4. Multiply filter

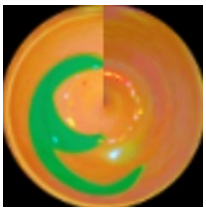


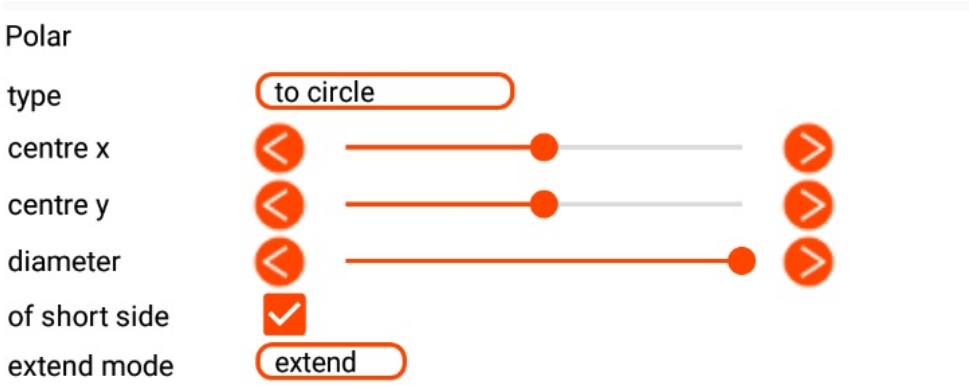
This filter extends the image into a multiple rows and columns matrix with an optional gap (using the current fill color). There is also an option to mirror the image in an alternating way before putting it into the destination matrix.



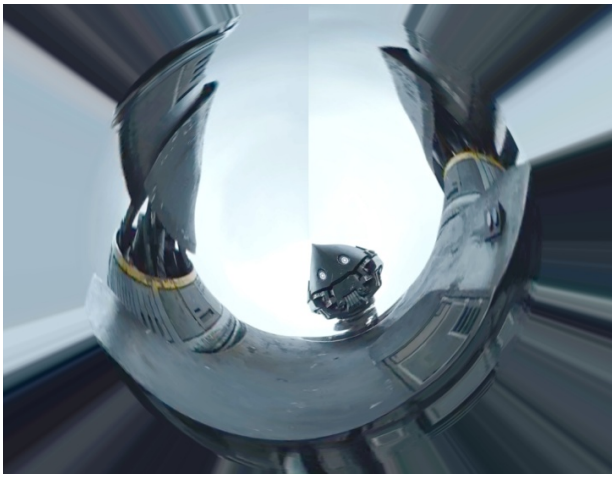
rows=2 colums=3 gap=24 mirror=yes

7.5. Polar filter

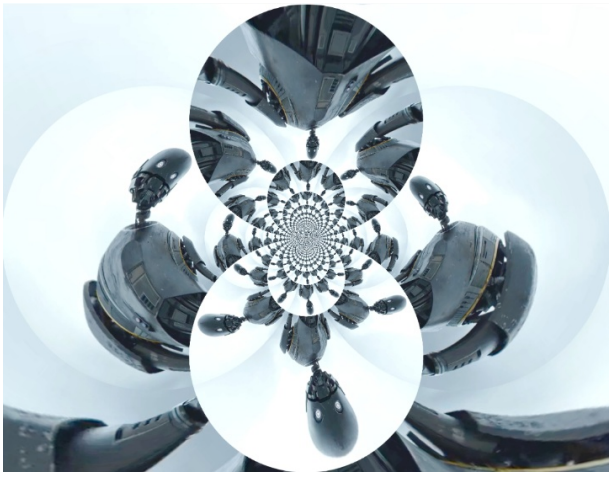




This filter performs a polar transformation of the image pixels with respect to a centre point and a diameter (in percent). There are three possible transformation types “to circle”, “to rectangle” and “reverse circle” which create very different effects. For non-square images the diameter parameter can be specified to related to the shorter or longer side of the image. The effect of the extend parameter is explained in the chapter “Concept” before.

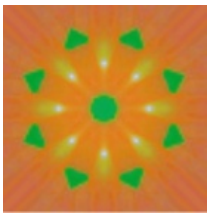


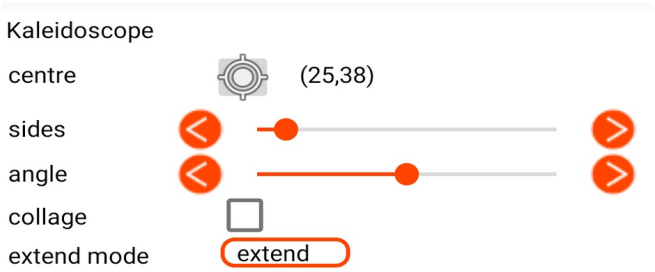
type=to circle, extend mode=extend



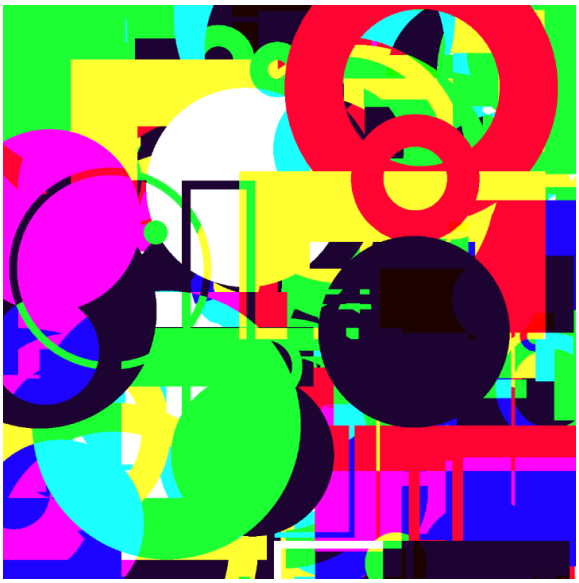
type=reverse circle, extend mode=repeat

7.6. Kaleidoscope filter

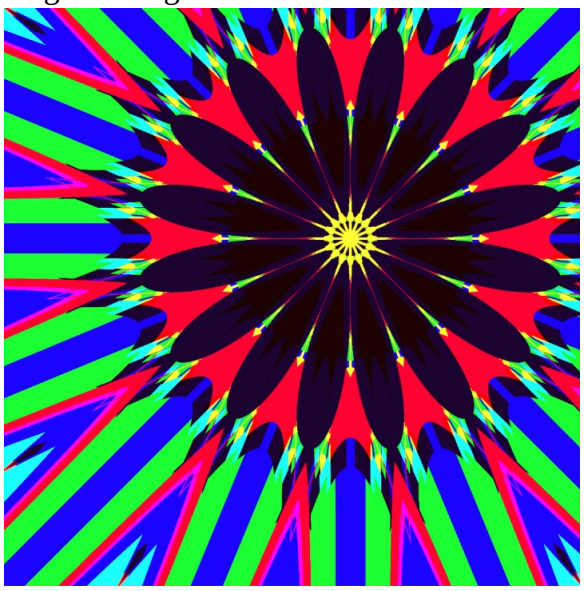




This filter produces a kaleidoscope effect of the image around the selected centre point. The number of sides (rays) from the centre to the border can be set. You can additionally set an angle of rotation which modifies the effect. Checking “collage” will show 4 results in a grid, where the current filter settings are applied to the current image and also to the image rotated by 90, 180 and 270 degrees. The effect of the extend parameter is explained in the chapter “Concept” before.



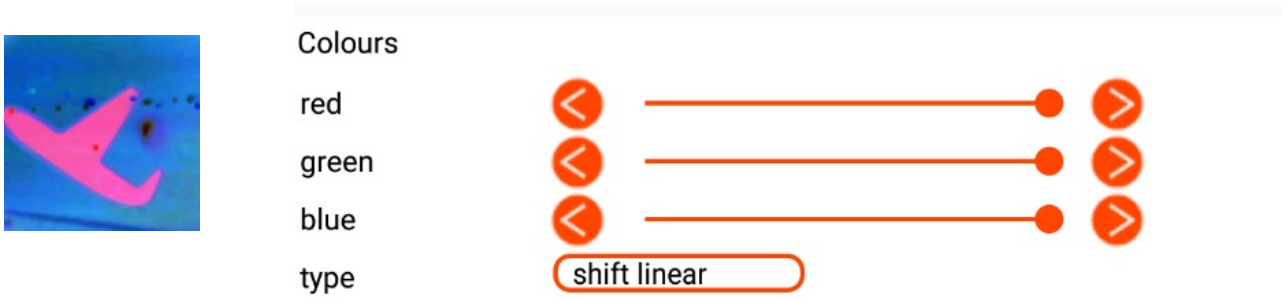
Original image



cx=0.6, cy=0.4, sides=16, extend mode=extend

cx=0.6, cy=0.4, sides=16, extend mode=repeat

7.7. Color filter



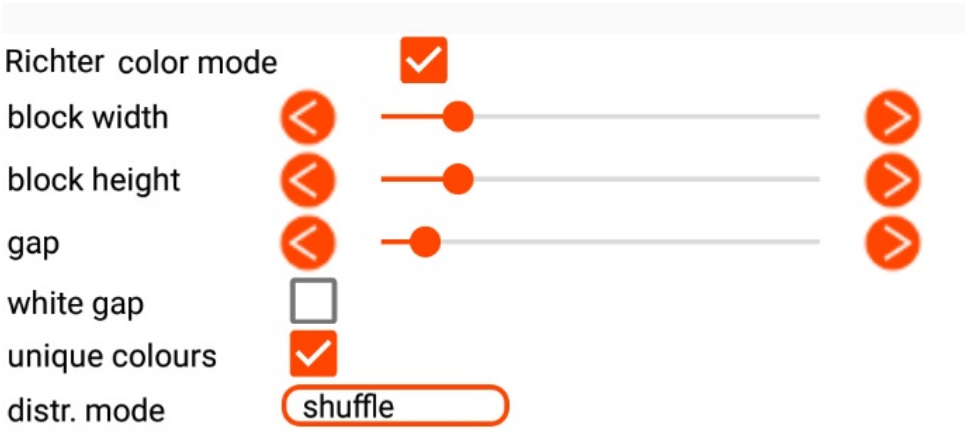
This filter performs more or less complex color shift operations to all image pixels. The easiest and default one is a color inversion, creating a “negative” of the image. There are two color shift modes, four color threshold modes and a fill mode. A color shift doesn’t reduce the number of colors whereas a color threshold reduces the number of colors by changing multiple colors to a single color depending on the threshold mode and the threshold color value. In fill mode, the image is completely filled with the color defined via red/green/blue.

Example: The six color shift modes based on the same color applied to the same image

7.8. Color quality filter

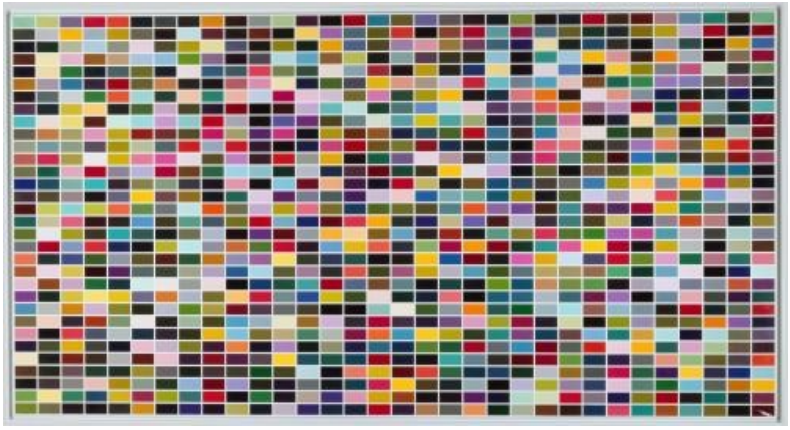
This filter changes the image (color) quality by modifying its contrast, brightness and saturation within certain limits.

7.9. Mosaic filter (Richter)

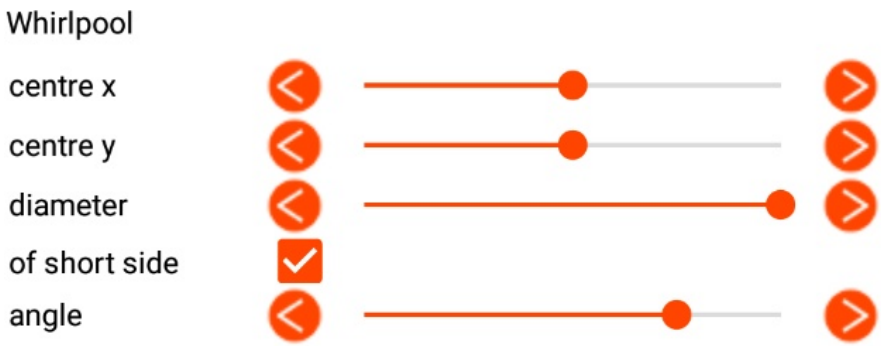


This filter creates a mosaic from the current image by diving it into rectangles which are filled with the average colour (for all pixels contained in the rectangle). You can also choose to have a (black or white) gap of a certain width between the mosaic fields. By selecting “unique colours” you can set the filter to change the colour of a mosaic field to a slightly different one if there is already a field with this colour. By choosing a distribution mode you can select how to distribute the mosaic fields. Either you keep them in their place which makes the image look like a “pixelated” version of the original. Or you can shuffle the fields randomly or you can sort them by colour either in a top-down-left-right or a left-right-top-down way. In case of a sorting the colours are sorted by “brightness”. Unchecking the “color mode” button doesn’t average the tiles thus making the “unique” colours option redundant.

The filter name “Richter” references to German painter Gerhard Richter and his picture “1024 Farben”.



7.10. Whirlpool filter



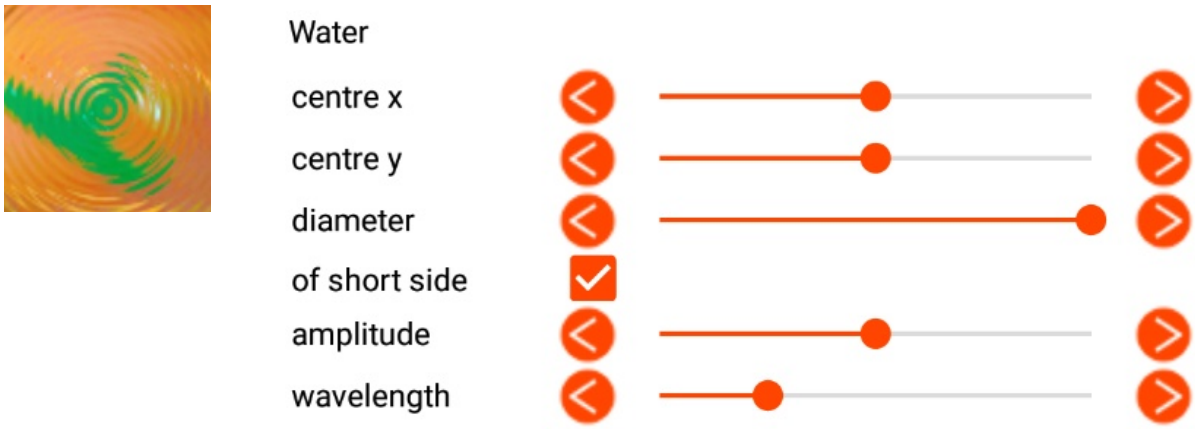
This filter performs a whirl effect on the image pixels with respect to a centre point and a diameter (in percent). For non-square images the diameter parameter can be specified to related to the shorter or longer side of the image. The intensity of the whirl effect can be controlled by setting the angle in a range from -720 to 720 degrees, where negative angles produce clockwise whirls and vice versa.

Example: Random image with whirlpool filter on cx=0.5, cy=0.5, diameter=0.75 and angle=720

7.11. Feedback filter

This filter repeatedly overlaps the image with a shifted, zoomed and rotated version of itself using opacity. The opacity and various shift parameters can be set. You have to experiment with the parameters to find out how the influence the result. For example use a slightly negative zoom and a slightly positive rotation to blend increasingly smaller and rotated versions of the original image over the image. Example below.

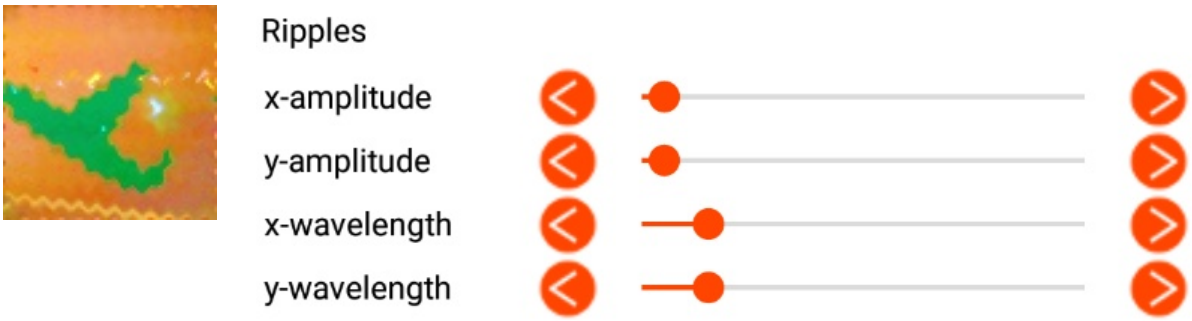
7.12. Water filter



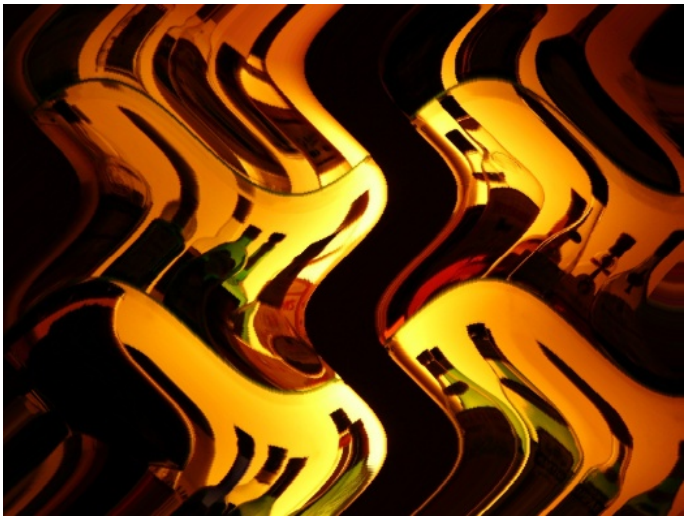
This filter performs simulates the effect of drops falling on water on the image pixels with respect to a centre point and a diameter (in percent). For non-square images the diameter parameter can be specified to related to the shorter or longer side of the image. The amplitude and the wave length of the ripples can set within a certain range.

Example: Random image with ripple filter on cx=0.5, cy=0.5, diam=1, ampl=0.75 and wave=0.5

7.13. Ripple filter



This filter creates a ripple effect on the whole image. You can set the ripple amplitude in x (left-right) and y (up-down) direction as well as the ripple wavelength for both directions.



Example: Image of bottles in a bar with ripple effect on x-amp=48, y-amp=67, x-wl=46, y-wl=71

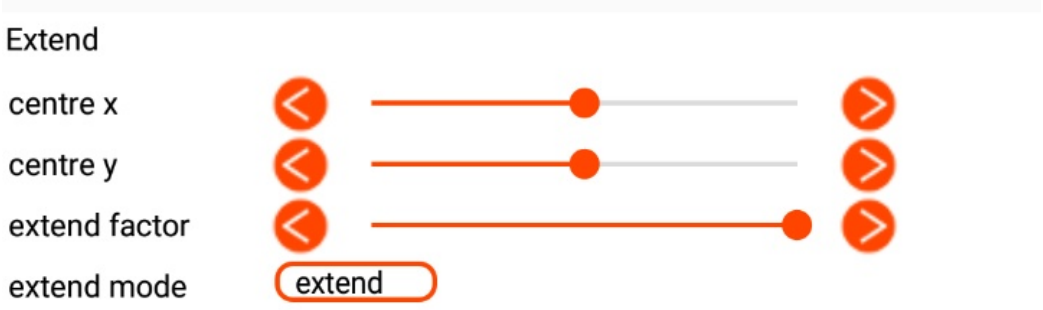
Original image

7.14. Glass filter

This filter creates an effect like looking onto the image through various kind of glass surfaces. The effect ranges from creating minor ripples to a complete harmonic distortion. You can influence the glass effect by setting the x (left-right) and y (top-down) ripple factors, the overall amplitude and the turbulence of the effect.

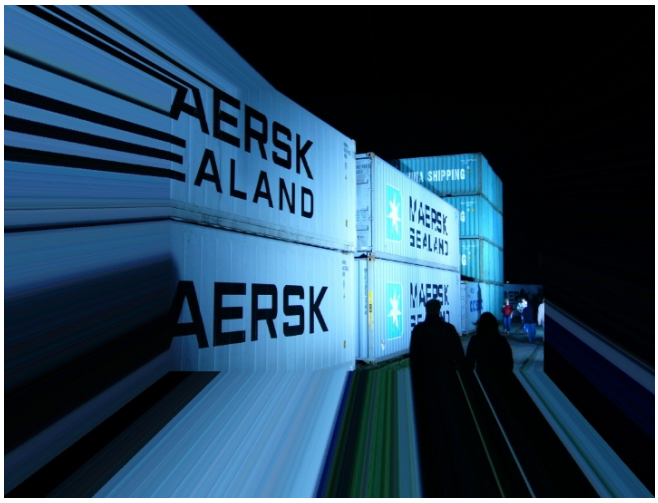
Example: Image from previous example with glass effect on x-f=38, y-f=30, amp=73, tur=2.8

7.15. Extend filter



This filter extends the image by a factor between 1% and 100% putting the original image into the centre, where the centre coordinates can be changed. The extension area is either filled by using the

current fill color, by extending the border color to the new border or by repeating the image towards the new border.



Sample image with extend filter on cx=0.6, cy=0.4, extf=0.75 and extmod=extend

Sample image with extend filter on cx=0.6, cy=0.4, extf=0.75 and extmod=repeat

7.16. Glitch filter

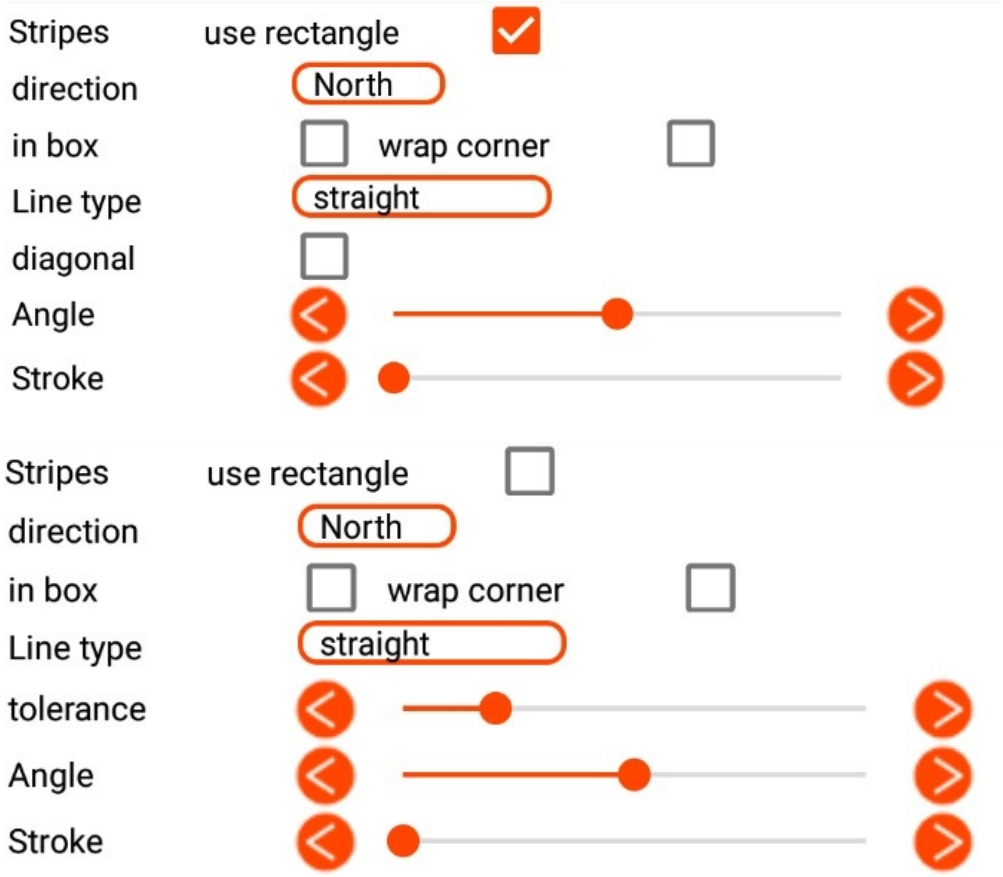
This filter produces an effect as if a glitch occurred while drawing the image from left to right (or from right top left). The glitch either shows repeating pixels or a pixel chaos similar to an image glitch on a TV screen. The glitch factor either defines the point at which the glitch occurs (internal

mode) or the duration of the glitch comapred to the image width (extend mode). The direction parameter can be “left” or “right” and the glitch mode can be set to “straight” (pixels repeating to the right/left) or “down” (pixels repeating to the left bottom/right bottom) or “random” (pixels repeating randomly) or “repeat” (repeat the respective part of the image) or “repeat down” (repeat the respective part of the image going down to the bottom).

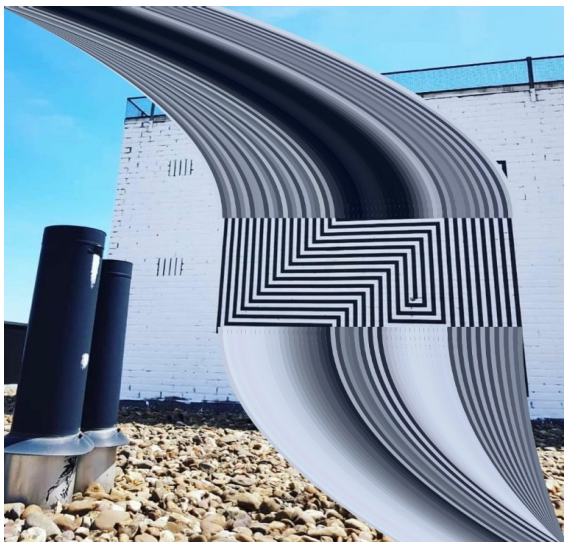
Sample image with glitch filter and factor=0.35, extend=no, direction=right and mode=down

Sample image with glitch filter and factor=0.3, extend=yes, direction=left and mode=random

7.17. Stripes filter



This filter extends the pixels along a selected area either towards the image borders or into the borders of the selected area (in box). The selected area can be a rectangle drawn with the crop tool (use rectangle) or the area is calculated by color similarity with respect to the last touch point and a tolerance value. In rectangle mode you can additionally choose if the extension should be based on rectangle side or a diagonal. You can select the direction of the effect, the stroke width, the angle and the line type (straight, curve up, curve down). If a non-zero angle is set, the extension line/curve may cross an image corner, but this is not done unless you check “wrap corner”. By default a line is changed in a way not to cross the corner.

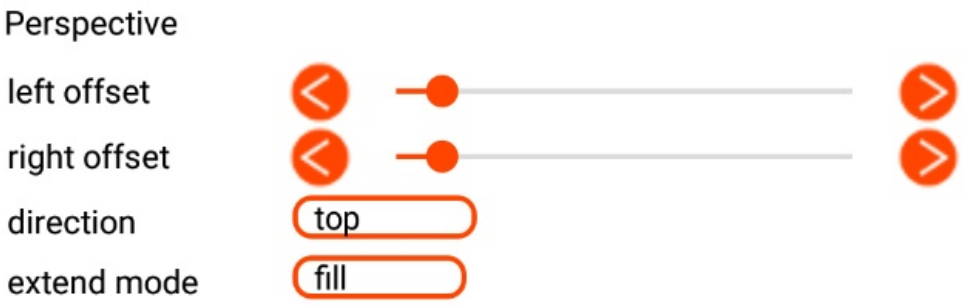


Example: In this image, a selected rectangle is extended “North” with line type “curve up” and angle = -50. And then again direction “South”, line type “curve down” and angle = 50.

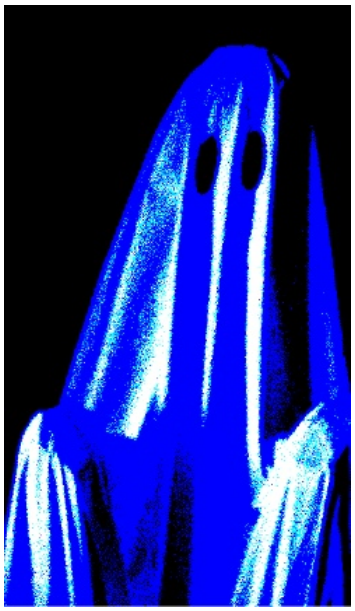
In this example area selection by colour is used after touching the red area. Direction is “North”, angle=50 and stroke=4. The line distance on the right side results from the relative “steepness” of the area border.

Afterwards we touch the light turquoise area in the bottom right half and use direction “West” with “in box” checked and angle=-5.

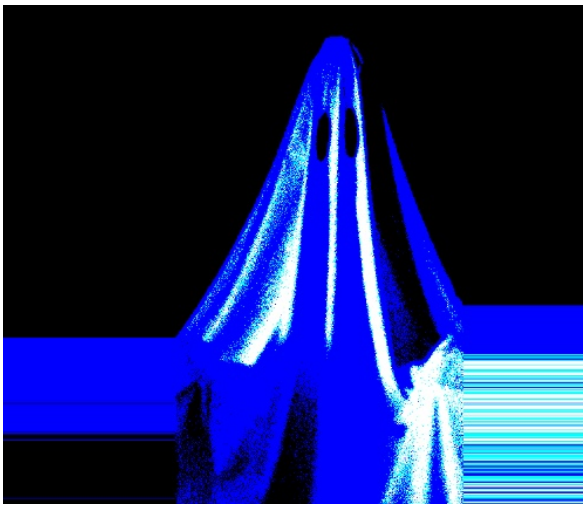
7.18. Perspective filter



This filter maps a trapezoid region of the image to a rectangular one thus changing the perspective. The trapeze is defined by two points along the x-axis, either on top of the image or at the bottom. After performing the filter the resulting rectangular image sits in the original image starting at the left offset with a width of “right offset – left offset”. If the extend mode is set to “fill”, the outside of the new image is set to the current fill color. If the extend mode is set to “extend”, the outside of the new image is filled by repeating the left/right border pixels of the new image. If the extend mode is set to “cut”, the image is cut to the dimension of the new image.

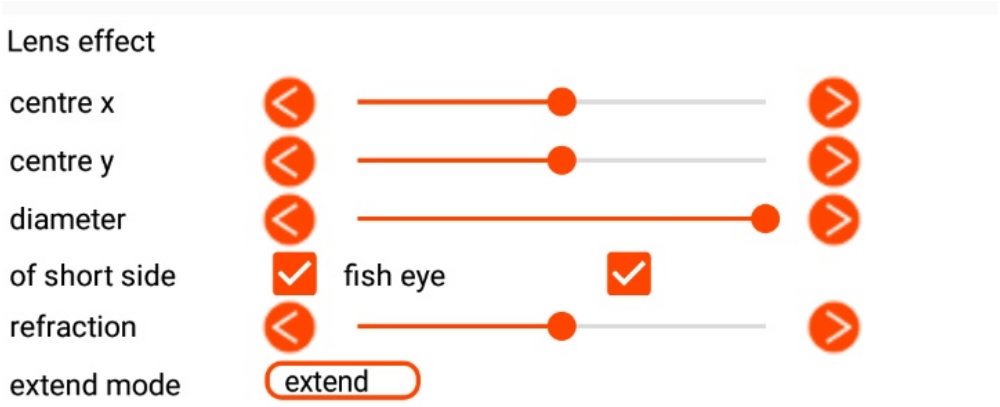


Sample image with changed perspective using parameters left=0.2, right=0.3, direction=top, extend mode=cut

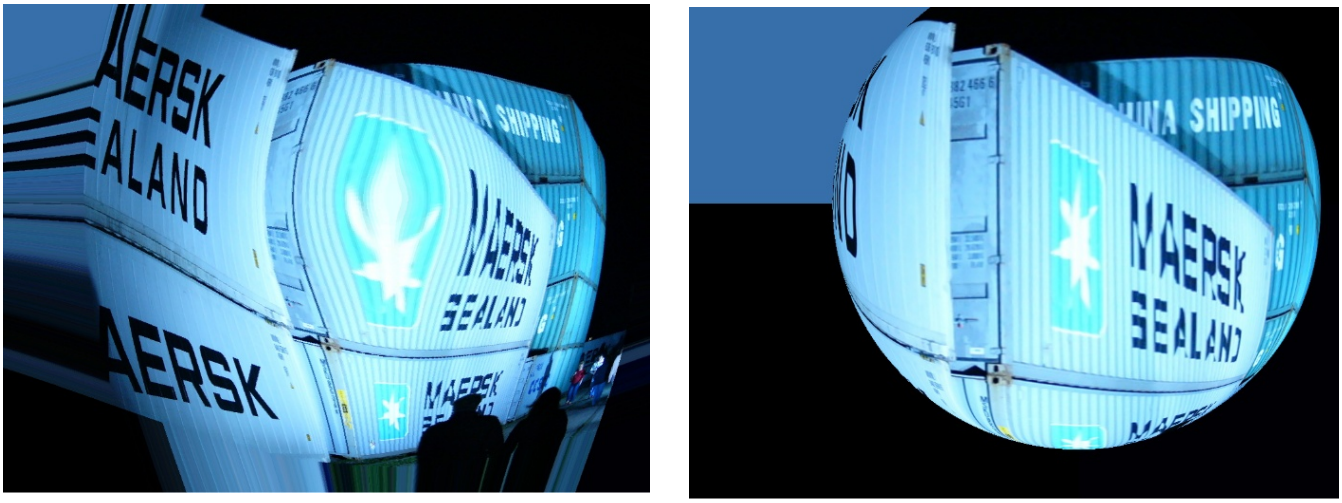


Sample image with changed perspective using parameters left=0.3, right=0.2, direction=bottom and extend mode=extend

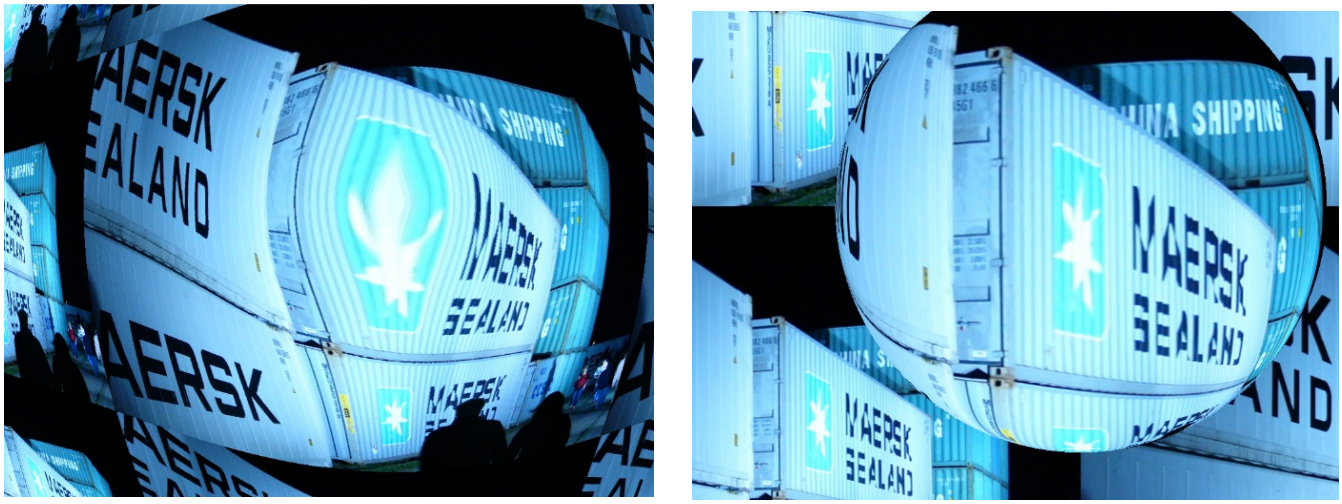
7.19. Lens effect filter



This filter creates a lens effect on the image with respect to a centre point and a diameter (in percent). For non-square images the diameter parameter can be specified to related to the shorter or longer side of the image. The default lens effect is a fish eye effect. The refraction index can be set within the range of 1 to 3. The effect of the extend mode parameter is explained in the chapter “Concept” before.



Sample image with lens filter on cx=0.6, cy=0.4, extm=extend with fish=yes and then fish=no



Sample image with lens filter on cx=0.6, cy=0.4, extmod=repeat with fish=yes and then fish=no

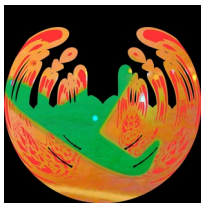
7.20. Circular filter

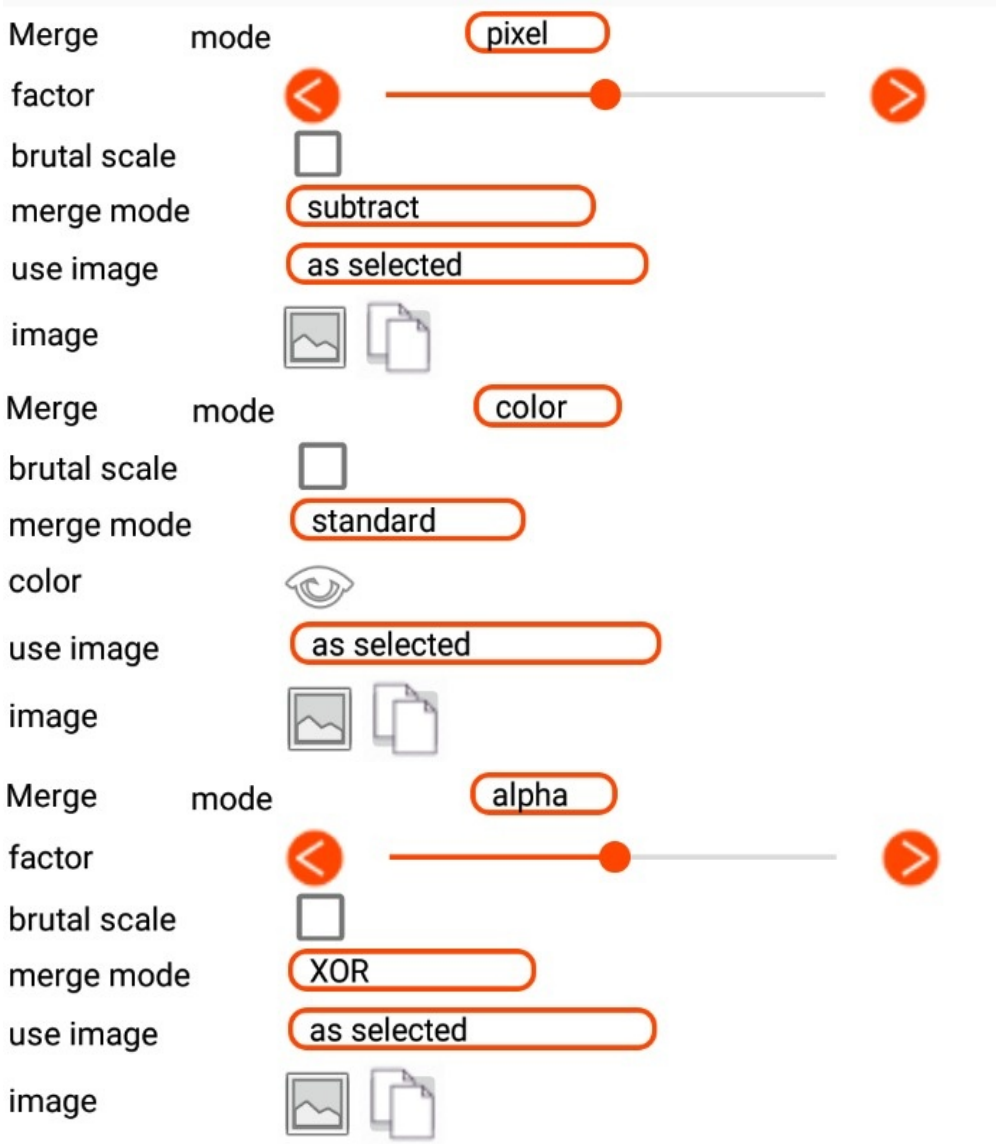
This filter maps the rectangular image to an ellipse with a semi-minor equal to the shorter side of the image rectangle and a semi-major between the shorter and the longer side. This “between” is defined by the ellipse factor, where a factor of 0 creates a circle with radius equal to the shorter image side and a factor of 1 creates an ellipse fitting the image rectangle. The effect of the extend mode parameter is explained in the chapter “Concept” before.

Original image


Sample image with circular filter, ellipse factor=0.5 and extend modes “extend” and “repeat”

7.21. Merge filter





This filter merges the image with another one selected via the “gallery” or the “paste” icon.
There are three basic modes, default mode, color mode and alpha mode.
In default mode, both images are merged using one of ten selectable merge modes (standard, add, subtract, exclusive or, complete, interpolate+, interpolate-, alternating 1, alternating 2, mosaic).
You can adjust a slider to define the merge factor. The factor controls, which of the images have more “weight” during merging. Sliding to the left gives more weight to the image in display, sliding to the right gives more weight to the image chosen from the gallery. The checkbox “brutal scale” controls whether the gallery image is brutally scaled to the size of the image in display before merging. If this is not set, the gallery image keeps its aspect ration but is fit into the image in display most likely resulting in a smaller result image. Withe the “use image” dropdown you select whether you merge with another image (from gallery or clipboard == as selected) or if you merge with a pre-filtered version of the current image. Pre-filters are: invert, shift, flip vertical, flip

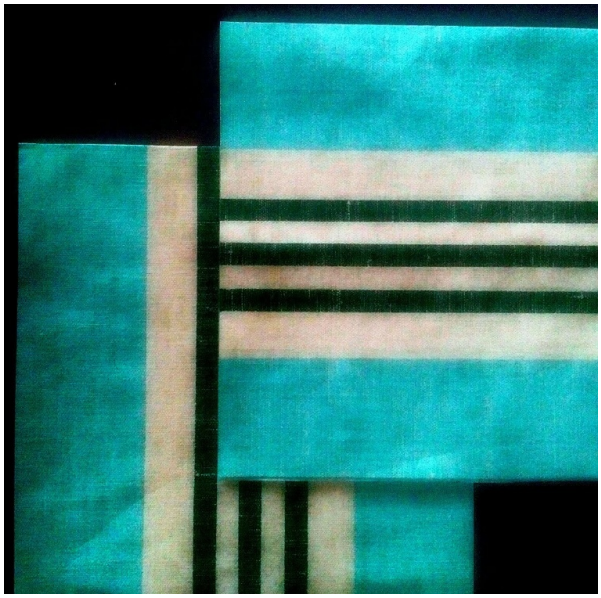
horizontal, rotate 180°, invert+flip vertical, invert+flip vertical flip horizontal, invert+flip vertical rotate 180°,
Exceptions: When using “shifted self”, the slider “factor” defines the number of pixels to shift. This option creates a line drawing of the image similar to a pencil sketch.

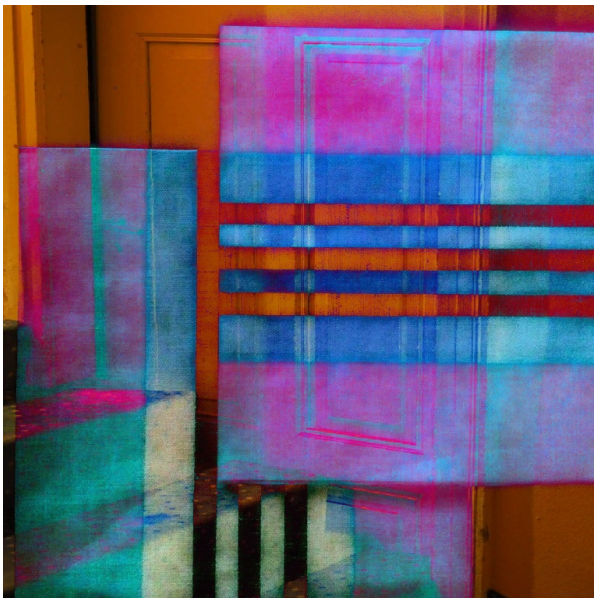
In color mode you can also select “brutal scale” and one of three merge modes (standard, difference,replace). In merge modes “standard” and “difference” you don’t have a merge factor, instead you can pick a color which influences the merge algorithm. Experiment to find out how.
In merge mode “replace”, all pixels “similar” to the selected color (with respect to tolerance) are replaced by pixels from the image to merge with.

In alpha mode, merging occurs by blending the two images. The merge mode influences the blending algorithm. There are 8 modes, SRC_OVER, XOR, ADD, MULTIPLY, SCREEN, OVERLAY, DARKEN, LIGHTEN which you can try. The factor slider behaves like in pixel mode.

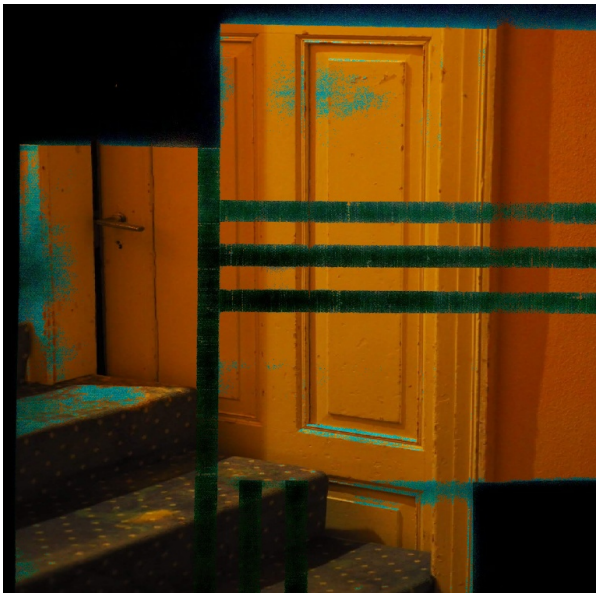
If an image is chosen via the “paste” icon, it first tries the internal clipboard and if it is empty the system clipboard (for an image URL).

Sample images:

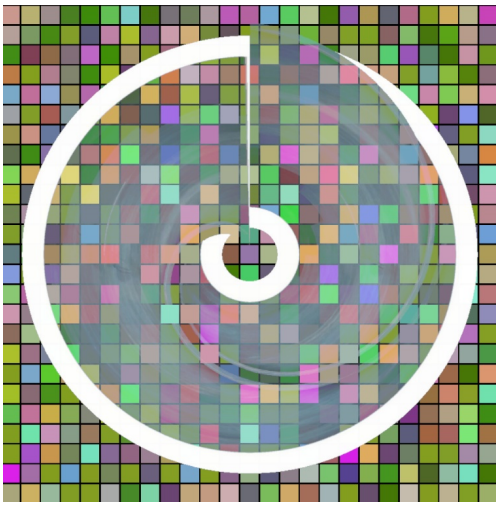


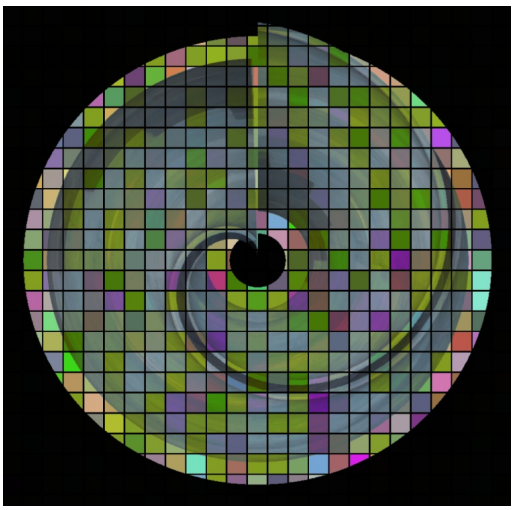


Example of two images being merged in default mode using merge mode “subtract” and second image brutally scaled to the size of the first one before merging.



Example with same two images being merged in color mode using merge mode “difference” and color black and second image brutally scaled to the size of the first one before merging.





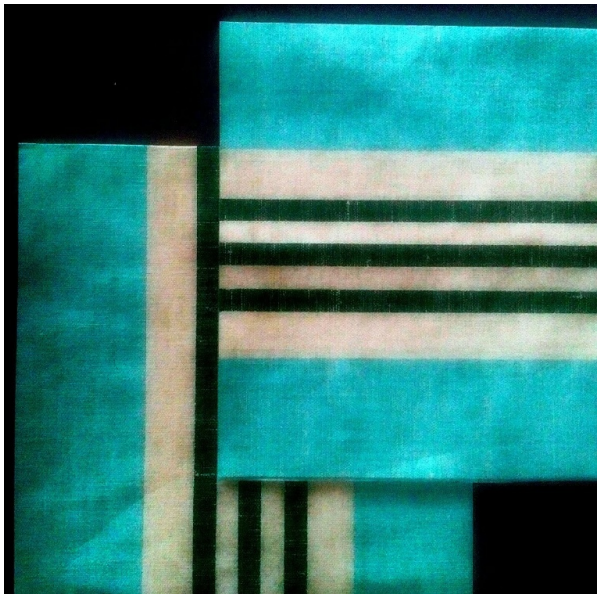
Example of images being “alpha merged” using LIGHTEN and DARKEN with maximum factor.

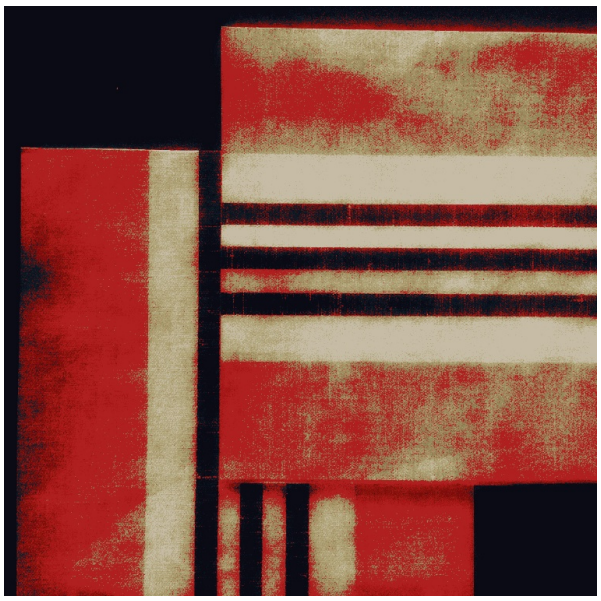
7.22. Palette filter

This filter either maps the colors of the current image to a number of colors from an image selected from the gallery or the clipboard (image mode) or it maps the colors to a set of calculated colors (color mode). If an image is chosen via the “paste” icon, it first tries the internal clipboard and if it is empty the system clipboard (for an image URL).

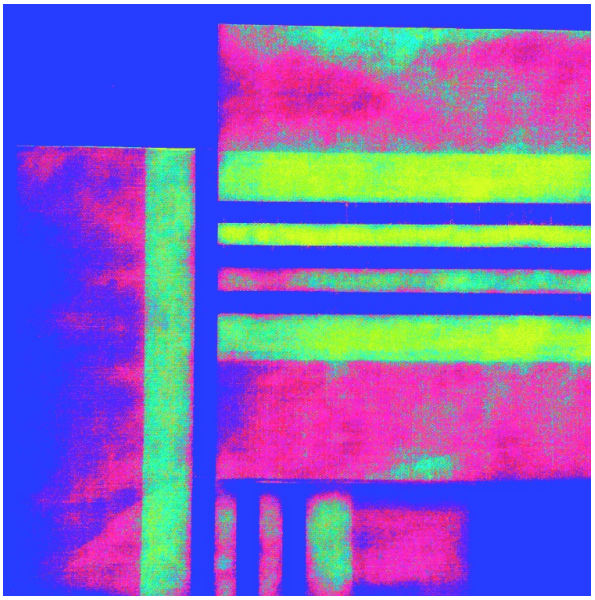
In default mode you can choose the palette size (1-128 colors) and the selection type (random, most used or least used).

In coulor mode you can choose the palette size (1-128 colors) and the calculation type (random, distributed, random one (random RGB color where only one base color has a positive value), spectral, grayscale1, grayscale2, gradient, blue, brown, gray, green, orange, red, violet, white, yellow). When type “gradient” is selected, the gradient can be set with two color chooser buttons (appearing dynamically)

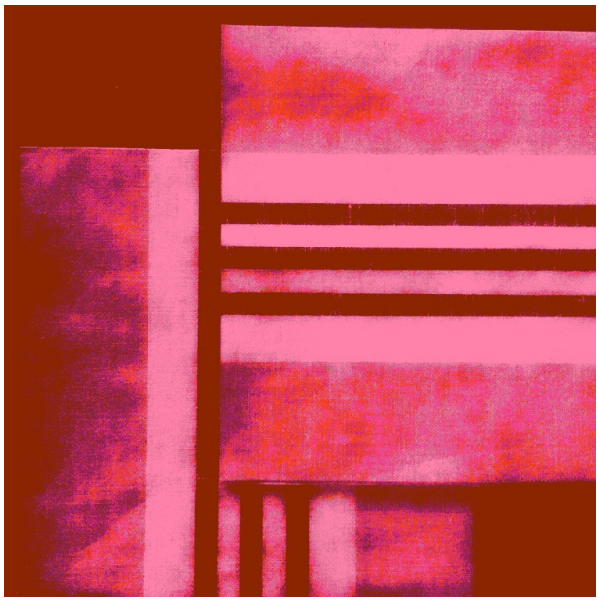




Example with colors of the first image mapped to a palette consisting of the 12 most used colors of the second image.

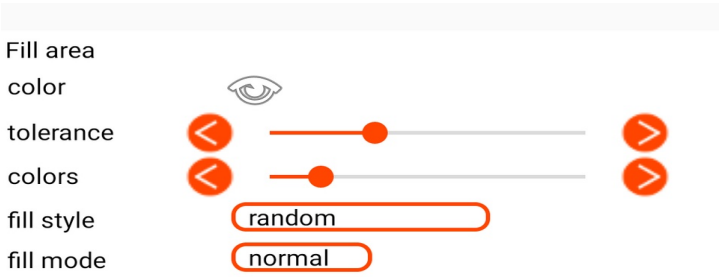


Example with colors of the first image mapped to a palette consisting of 20 spectral colors.



Example with colors of the first image mapped to a palette consisting of 16 shades of red

7.23. Area filling filter



This filter fills areas of similar color compared to a given colour and a tolerance value. The fill style can be selected from one of the values (fixed, random, blue, brown, gray, green, orange, red, violet, white, yellow, transparent, texture, noisy, border, border average, border random). With fill style “fixed” a second color chooser appears to select the fill color. In all other cases, the fill method is preset and you can only choose up to how many of the pre-set coulours will be used. With fill style “transparent”, the number of colors is irrelevant; the matching pixels become transparent. If fill style “texture” is selected an image chooser will appear, to select a texture bitmap. All closed areas of matching pixels are filled with a (possible truncated or repeated) version of the texture. Fill style “noisy” is similar to “fixed”, but instead of just replacing the matching pixels with a fixed color, some noise is added and the “colors” slider defines the amount of noise.

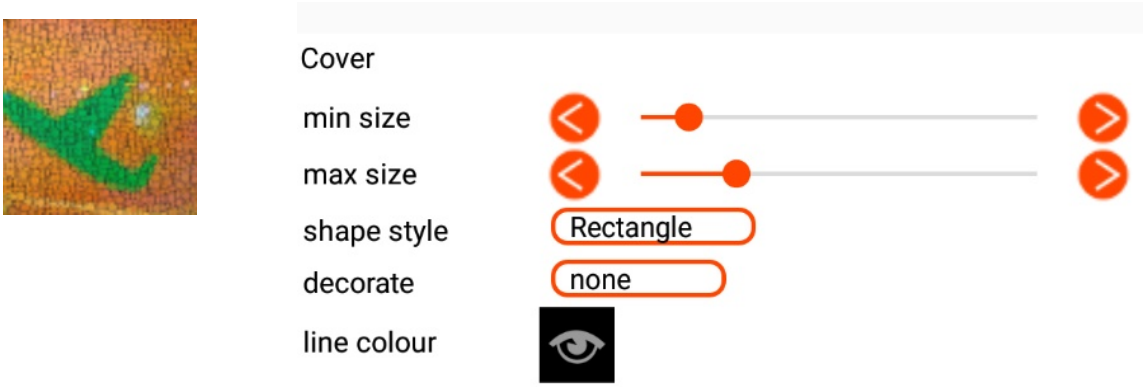
To understand the last three fill styles: Each area of “similar” colors found by the filter of course has a border. The border consists of a set of colors which are not similar. The last three fill styles refer to this set. In those styles the number of colors set is irrelevant. Style “border” will cycle through the border colors while filling the area, style “border average” will randomly pick border colors while filling the area and style “border average” will fill the whole area with the average of the border colors.

There are three fill modes to chose from. The default is “normal” and does exactly what is described above. The mode “fill rest” will set all pixels not covered by the fill operation to black pixels. The mode “fill all” will make the “replace colour” irrelevant and will fill all areas of similar colour.

If a rectangular area is currently selected, the “replace colour” is irrelevant. Is is automatically chose from the centre of the area. Moreover, only the fill area originating in the centre of the selection is filled. This will also ignore the “fill all” mode described above.

Example: Filling all areas having a “dark blue” (selected) color using tolerance=33 with up to 16 random colors.

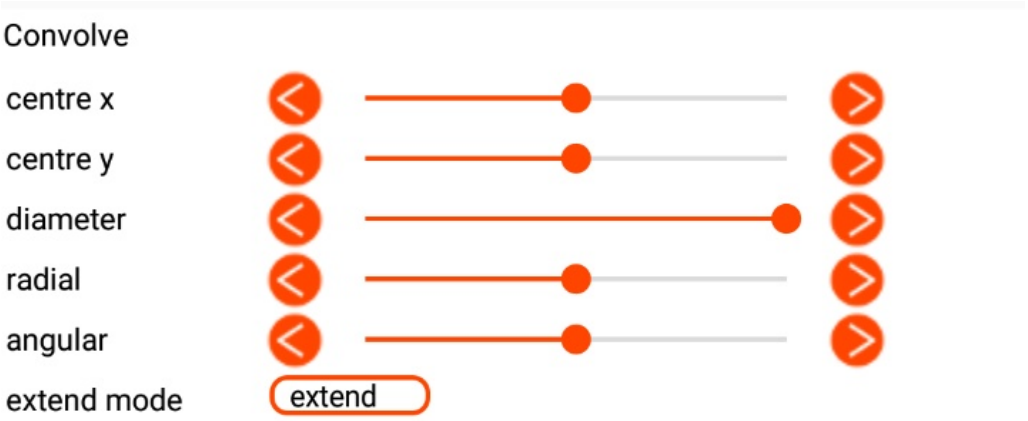
7.24. Cover filter



This filter covers the image with geometric forms (rectangle, triangle diamond, ellipse) filling the for with the average color of the pixels covered by the form. You can influence the original size of the forms (before they grow smaller during the iterative process of covering). You can also set the from type and you can define whether the forms will be framed and if yes how thick and using which color.

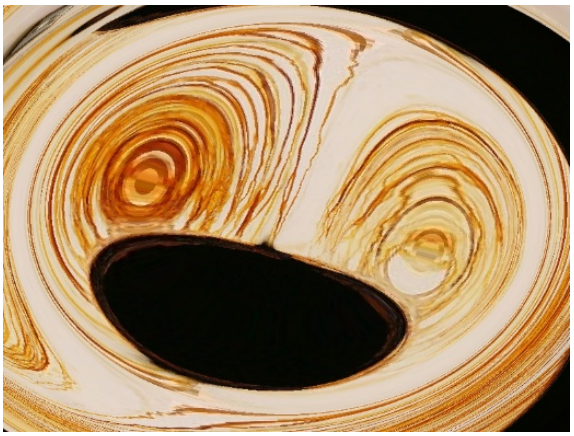
Example: covering an image with dark blue frames ellipsis.

7.25. Convolve filter



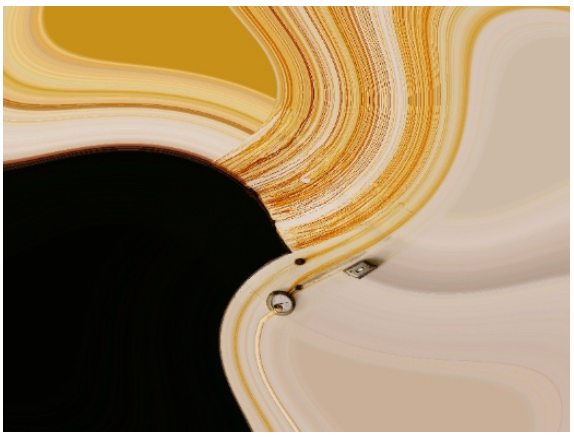
This filter transforms a rectangular form into a circular form by performing a nonlinear polar transformation. The centre point and the diameter for this transformation can be set. You can also change the coefficients of the mathematical formulas use to perform the transformation within a range of 0 to 2. The effect of the extend mode parameter is explained in the chapter “Concept” before. Changing the diameter, radial and angular parameters significantly influences the result of the transformation, so this filter is very suitable to roll the dice and see what happens.

Original image



diameter=0.84, radial=0.66, angular=0.4

diameter=1.0, radial=1.3, angular=0.7



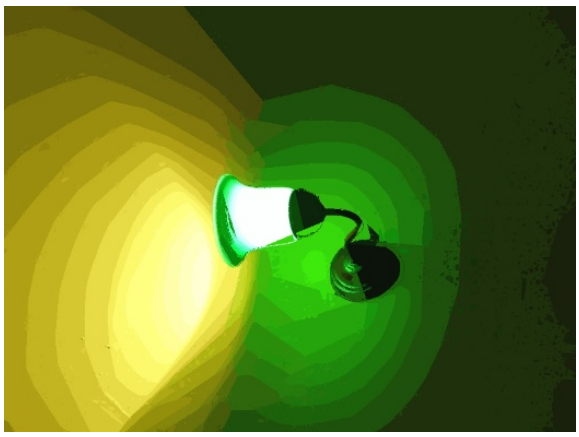
dia=0.35, rad=1.3, ang=1.34, extm=extend

dia=0.35, rad=1.3, ang=1.34, extm=repeat

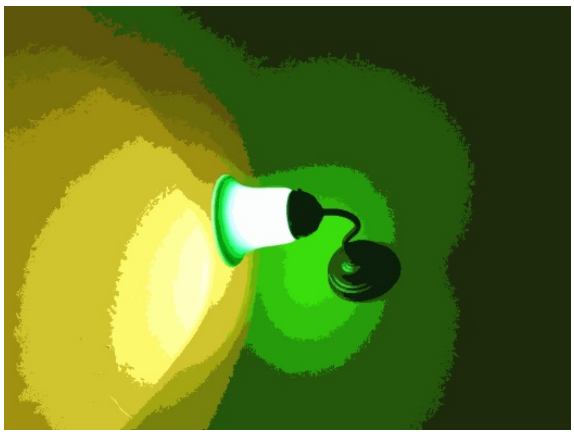
7.26. Flattening filter

This filter reduces the amount of color changes in the image by replacing adjacent pixels of similar color by a single color. The tolerance parameter defines the similarity. For example a tolerance of 20 means that adjacent pixels are treated as similar if their red, green and blue part differ in a value less than 20. Image areas detected this way can either be filled by their average color or by a random color similar to the average or by a completely random color. Such areas of similar color can be very complex and you can decide if the color replacement should take place exactly on all pixels or if a hull should be created first. Such a hull is a polygon which includes all pixels of the area but also other pixels to reduce the number of edges of the polygon. Using a hull creates a much more artful effect while not using a hull resembles more the effect of a very lossy JPEG compression. In case of using a hull you can also select that the border of the hull should be painted using the current fill color (if it is not set to transparent). Uncheck the “random” check box to create a reproducible image by flattening in a strict left-right-top-down mode.

Original image

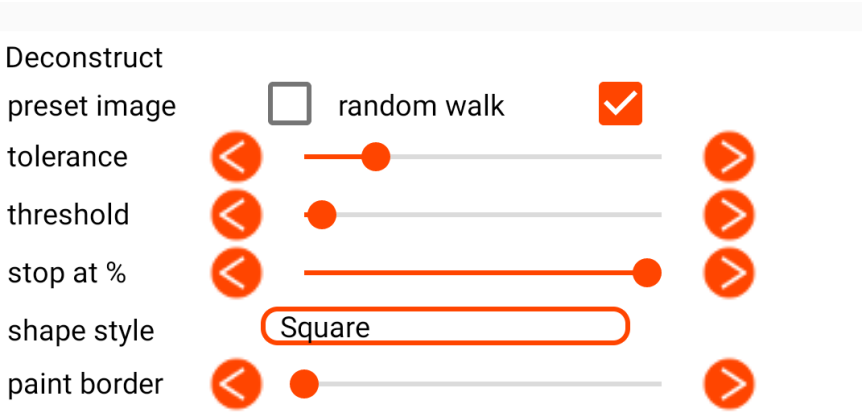


tolerance=20, use hull=yes



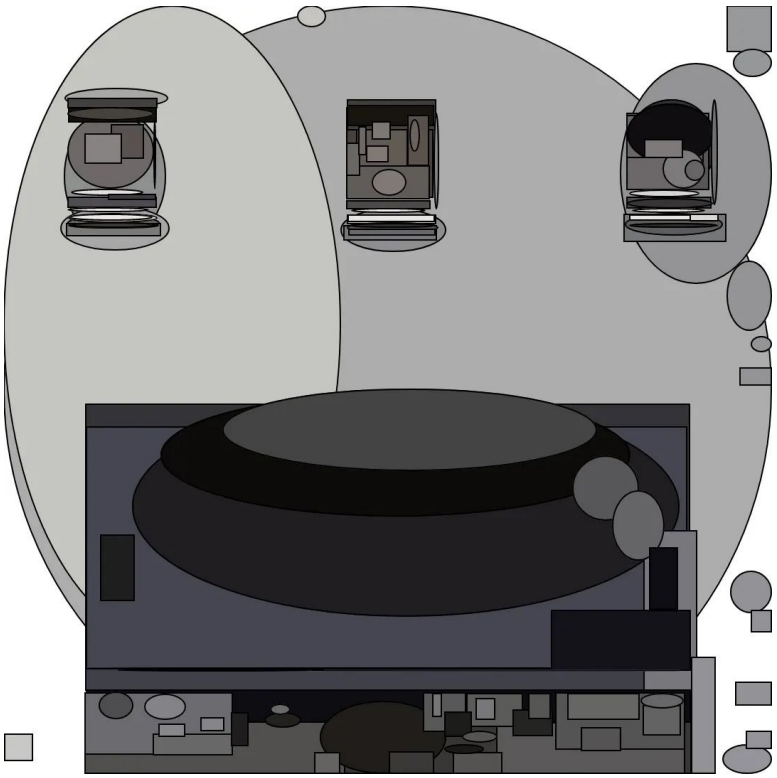
tolerance=40, use hull=no

7.27. Deconstruct Filter

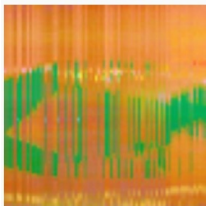


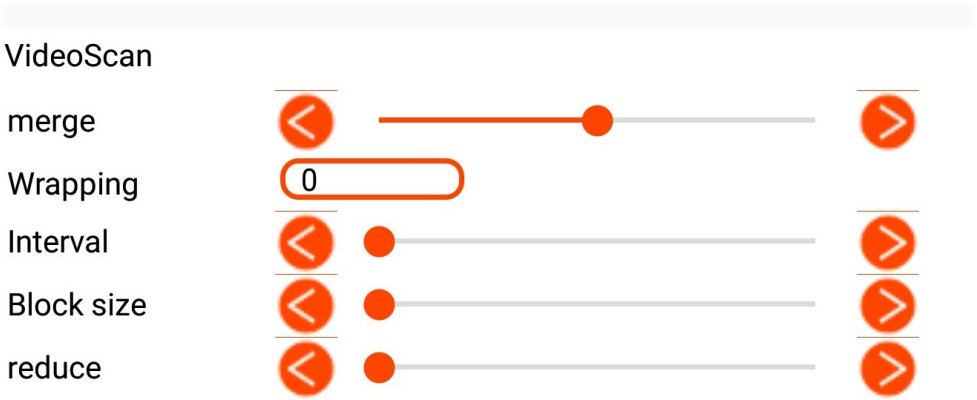
This filter replaces areas of similar color (the similarity is controlled by the tolerance parameter) with basic geometric shapes having the average color of the area found. The shape style can be chosen from square, circle, ellipse, rectangle, basic (random one of 1-4), bounding rectangle, bounding ellipse, bounded (random one of 6-7), best guess (6 or 7, whatever fits better) and random (random one of 1-9). The difference between basic and bounded is that in basic mode, the created shape holds exactly as many pixels as the area of similar colors. In bounded mode, the shape is drawn in a way that it contains all pixels of the area (so most likely much more). With the threshold parameter you can ignore smaller areas. With the “stop at” parameter you can interrupt the deconstruction process before it consumes all pixels. The result image can be preset with the original image to avoid white areas. If you unselect the “random walk” box, the algorithm works in a strictly top-down-left-right way creating the same result with every run (assuming no other parameter is changed). Last but not least there is a possibility to decorate the calculated shapes with a black border of defined stroke.

Example result:



7.28. Video scanner



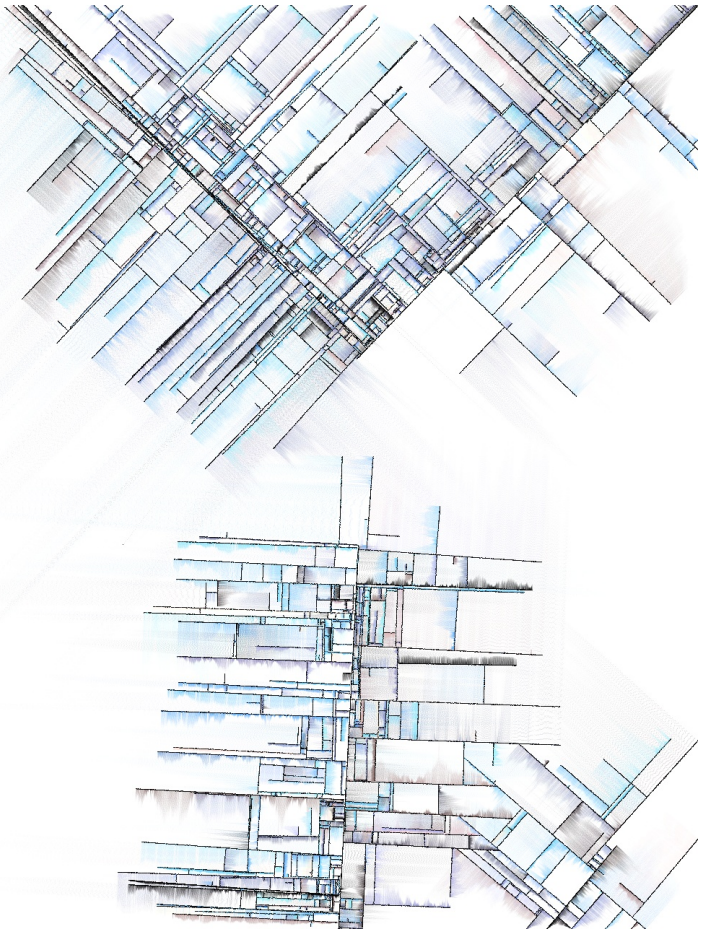


This filter is only available if you started with a video. It reads the video frame by frame and either adds a 1 (or block size) pixel slice of the current frame to a new image or it paints the current frame to the new image at the current position using a defined alpha value (merge factor). After this, the new position in the target image is incremented by the block size. With the “interval parameter” you can decide to use every frame, every second frame, every third frame etc. By setting a reduce factor you can scale down the frame before processing (reduce is a percent value). The merge factor ranges form 0 to 25 and the higher it is, the more transparency is used for painting the current frame over the target image. If the merge factor is set to 0, only a slice of “block size” pixels is used and copied to the new image. You can also define a wrapping mode. The value “0” indicates to always take the leftmost slice of the current frame (merge=0) or paint the frame as it is to the target image (merge>0). The value “+1” indicates that the current frame is shifted before using it, starting with 0 and later incremented modulo the frame with. The value “center” indicates that a slice is taken from the center of the frame (merge=0) or the frame is (circular)shifted by half of the frame width before using it (merge>0). The value “random” indicates that the slice position (merge=0) / shift factor (merge>0) is for each frame recalculated to be a random value between 0 and the frame width. The value “continous” indicates that the slice position continuously moves from 0 to “frame width” while scanning the video from the beginning to the end. The values “all in one 1(2)” results in merging up to 256 frames into one picture, taking the first up to 256 frames (256 distributed frames). In this mode, an even merge factor results in averaging pixels, and odd merge factor results in “xor-ing” pixels. In this mode the block size is irrelevant. The value “distributed” grabs all frames and places them to a random position within an area four times as big as a single frame (respecting the merge factor). In the end, the middle part having exactly the frame size is cut out and presented as result.

7.29. Way Grid Generator

This is not a filter. It generates a grid of lies which resemble a city map. From the current image it just takes the dimension and the color palette. It is possible to merge the result with the current image (use image) and to restrict the number of colors. Grid generation is influenced using parameters “iterations” and “breaks”. And you can decorate the gaps between intersecting lines by semi transparent pixels (fill gaps). The generator algorithm is based on an idea from Jared Tarbell.

Example:



8. Image operations in detail

Image operations behave different than complex filters in that the default operation (touch icon) is different to the extended operation (long touch icon and filter without parameter change). And some of the image operations have no extended mode at all.

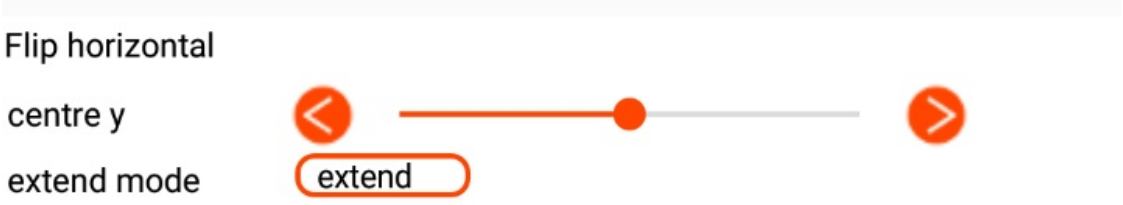
8.1. Rotate counter clockwise

This operation fast rotates the image by 90° counter clockwise in standard mode. In extended mode the rotation angle can be set between -180° and 180°. For square images the parameter “crop if square” can be set. In this case the image is first rotated, which creates a bigger image, and then cropped to the original size. Normally the rotated (bigger) image is just scaled down to the maximum allowed width (if bigger).

8.2. Rotate clockwise

This operation fast rotates the image by 90° clockwise in standard mode. In extended mode the rotation angle can be set between -180° and 180°. The rotation speed is slower for this operation because it is not done natively but by pixel transformation. This enables us to use the well known extend mode to fill the empty spaces created by rotation as explained in the chapter “Concept” before.

8.3. Flip horizontally



This operation flips the image along a horizontal line located in the middle of the image in standard mode. In extended mode, the position of this line can be set by specifying a percentage of the image

height. If this position is not 0.5, just a smaller portion of the image gets flipped and the rest of the image is handled as defined by the extend mode. Either the border pixel is extended or the (new smaller) image is repeated or it is just cut to the new smaller size.

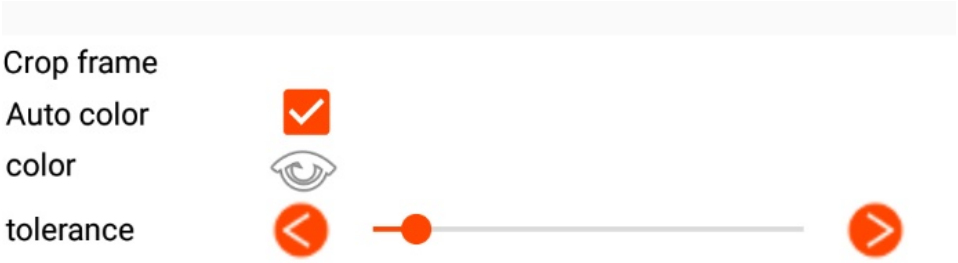
8.4. Flip vertically

This operation flips the image along a vertical line located in the middle of the image in standard mode. In extended mode, the position of this line can be set by specifying a percentage of the image width. If this position is not 0.5, just a smaller portion of the image gets flipped and the rest of the image is handled as defined by the extend mode. Either the border pixel is extended or the (new smaller) image is repeated or it is just cut to the new smaller size.

8.5. Crop to square

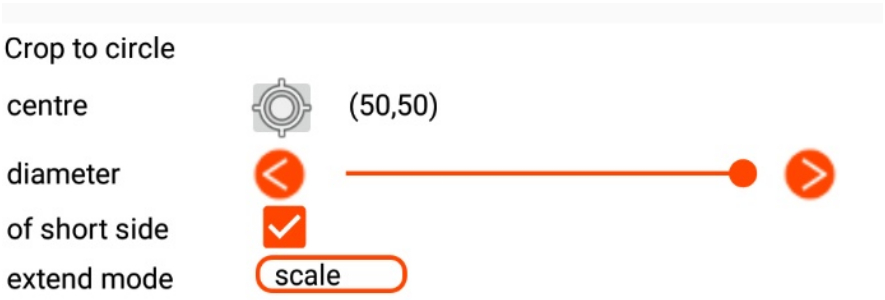
In standard mode this operation cuts the image down to a maximal square using the crop tool mentioned before. In extended mode you can define what happens with the cut-off part of the image. It is either cut off, filled with the current fill color, filled by extending the border pixel or filled by repeating the remaining part. The crop area can be set via sliders (simultaneously changing the crop tool) or by the crop tool (simultaneously changing the sliders).
There are three more (complex) cut modes. The rectangular cut removes a vertical stripe in the image shifting the part right from the cut to the left. The dimension of the stripe is calculated from the crop areas x position and width. The cross cut removes a diagonal stripe in the image shifting the part right from the cut to the left. The diagonal is defined by the crop area, either from upper left the lower right or from upper right to lower left. In this case (cross cut) an extra slider to set the width of the cut becomes enabled. There is also an oval cut that crops the image to an oval form defined by width and height. The missing part to a rectangle is made transparent, so if you paste the result image into another image, the oval form is retained.

8.6. Cut off frame



This operation tries to remove rectangular areas of similar colour from the outer side of the image. If your image for example has a white frame of 100 pixels all around, this operation will remove it. If the “frame colour” is not 100% unique you can enter the filters detail mode, where you can switch from automatic colour detection to manual colour selection and you can also change the tolerance of colour detection.

8.7. Crop to circle



In standard mode, this filter draws a circle with diameter equal to the shorter image side around the centre of the image filling the outside of the circle with the current fill color.
In extended mode centre and diameter can be set (in percent of image dimensions). For non-square images the diameter can be set to relate to the shorter or the longer side of the image rectangle. If the resulting circle extends the image, the diameter is adjusted so that the circle fits into the image as much as possible. You can use various extend modes like **fill** (fill area between circle and the enclosing square with current fill color), **scale** (scale to original size before filling), extend (repeat the outer circle up to the original size continuously scaling it) and repeat (repeat circles from outer to inner up to the original size continuously scaling them). While using this filter, the selected circle is shown red.

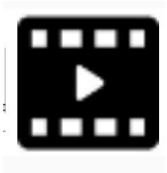
8.8. Scale to square

This operation scales the image to square with a side length equal to the smaller side of the rectangle (if the image is not already a square). The operation deforms the image. There is no extended mode.

8.9. Scale (to the maximum)

This operation scales the image to the maximum display size. The scale factor is determined by taking the minimum of (display width / image width) and (display height / image height).
In extended mode, the scale factors for width and height can be independently set from 0.01 to 4.0. You can also set a checkbox to force the same scale factor for width and height.

8.9. Play Video

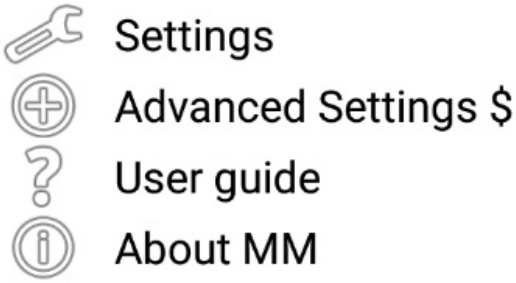


If you started with a video, this “filter” brings you back to the video payer and you can select another frame for editing.

9. The side menu

A side menu can be opened by touching the menu button in the upper left corner of the apps start screen or by swiping the start screen from left to right.

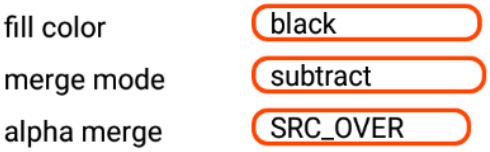
The menu contains the following items



9.1. Settings

In the settings page all available complex filters are listed together with a check box to enable/disable them. All filters are initially enabled and can be disabled.

Below you find a spinner to select the default fill color which can be white, black or transparent. This is used by filters offering a fill option like the crop filter.
Below you find a spinner to select the default merge mode from standard, add, subtract and exclusive or. The merge mode is used by the merge operations described in chapter 6.3. and also as a preset for the “merge mode” spinner in the MergeFilter.
Below you find a spinner to select the default alpha merge mode from a list of 18 values. The alpha merge mode is used by filters Feedback and VideoScanner and it defaults to SRC_OVER. It defines the way, pixel colours a calculated when merging images with opacity.



9.2. Advanced settings

On this page you find sliders to increase the internal image size, to adjust the JPEG quality and to switch pixel interpolation from “simple” to “complex”. Those features enable you to create higher quality images, good enough to produce fine art prints for your living room wall.

9.3. User guide

This menu item opens the external Url http://usartwork.net/mirrormania where you can download this user guide as a PDF.

9.4. About MM

This menu item shows a popup with some basic information about MirrorMania.
Example: