040b73747265616d747970656481a203840163c48403737373810a0a810b0b815f5f84012584067f411b312d37OneVision-Image: Image Transformation

TMSVerknupfe.tiff ¬ **Image Transformation**

This tool enables you to manipulate an image in many different ways by connecting it with a second element that transforms each pixel of the source image. Depending on the transformation function you use, each pixel's position in the source image will be altered according to the value of the corresponding pixel in the transformation element.

Nearly all types of OneVision elements can be used as transformation elements, although the best choices are images and blends. Only the intensity channel of the transformation element is used, and the source element is transformed only where both elements overlap. Grayscale blends offer the best and most predictable results.

The following transformation functions are currently available:

;TMSVerknupfe.rtfd;Drehen;¬ Rotate
;TMSVerknupfe.rtfd;Dreheneinfach;¬ Rotate (absolute)
;TMSVerknupfe.rtfd;Skalieren;¬ Scale
;TMSVerknupfe.rtfd;Skaliereneinfach;¬ Scale (absolute)
;TMSVerknupfe.rtfd;Verschieben;¬ Displace
;TMSVerknupfe.rtfd;Verschiebeneinfach;¬ Displace (absolute/polar)
;TMSVerknupfe.rtfd;Ellipsenfunktion;¬ Elliptic Function
;TMSVerknupfe.rtfd;VerzerrGlas1;¬ Broken Glass 1
;TMSVerknupfe.rtfd;VerzerrGlas2;¬ Broken Glass 2
;TMSVerknupfe.rtfd;NeuePosition;¬ New Position
;TMSVerknupfe.rtfd;Mosaik;¬ Mosaic

Depending on the particular function, the transformation can be modified by additional parameters.

Predictable results are possible for most functions if well-defined grayscale blends are used as transformation elements. In most cases, experimenting is the best way to discover what various combinations will do.

Below, the <*Rotate*> transformation function is explained in detail as an example of how these functions can be used.

Drehen;¬Rotate
This function rotates the source image. To rotate a pixel, a center of rotation has to be specified. The coordinates of this center can be specified in the <*Center x*> and <*Center y*> fields. The <*Rotation Angle*> for each pixel is determined by the intensity of the corresponding pixel in the transformation element. The element is connected to the source image using the <*Connect*> command in the transformation parameters.

The following rules apply regarding the effect of the intensity of the pixels:

Intensity = 50%	- no rotation
Intensity < 50%	- positive rotation (clockwise)
Intensity > 50%	- negative rotation (counter-clockwise)

The rotation can be amplified by entering a value for the <*Amplification*> parameter, allowing the impact of the transformation to be controlled.

The results of this function are quite predictable if concentric, grayscale blends are used as transformation elements and the center of the blend corresponds exactly to the center of the source image.

The example below shows the transformation of an image by rotating it with a concentric blend:

880264_paste.tiff ¬ 517780_paste.tiff ¬
Figure: Source image and transformation element

396827_paste.tiff ¬
Figure: Transformed image

The outer area of the image is rotated counter-clockwise, because there the intensity of the blend is higher than 50%. In the center, where the intensity is lower than 50%, it is rotated clockwise.

Rotating an image with a blend that hasn't a center shows more peculiar effects. Here an example, using a linear blend:

paste.tiff ¬ 434164_paste.tiff ¬
Figure: Transformation element and transformed image

Even for this relatively simple blend, the result isn't obvious. Clearly, it can take a lot of experimentation to become familiar with this tool.

One last example:

251123_paste.tiff ¬ 12799_paste.tiff ¬
Figure: Transformation element and transformed image

Transformation Parameters
Each transformation function can use different parameters. The <*Transformation Parameters*> portion of the panel offers three entry fields and two <*Connect*> commands. The entry fields specify parameters for amplification, angle, position, and factor. The connect commands enable you to connect one or two transformation elements to the source image. If a parameter is not required by a function, its entry field or command button is disabled.

Connecting Transformation Elements
To connect an element to the source element, click on the <*Connect*> command and select the element you want to connect. Only one element can be connected with one command. The heading of the command indicates how the intensity of the selected element will be expressed. The text field displays the name of the element.

981575_paste.tiff ¬

Center Coordinates Position
For some functions, a center coordinate must be supplied. If an entry field displays the pointing finger seen below, the coordinates can be picked directly from the source image. To do this, switch to ªEdit Elementº mode and click on the desired position in your image. You can also enter the coordinates numerically.

902872_paste.tiff ¬

Some additional settings are also needed for image transformations:

Undefined Pixels

375091_paste.tiff ¬
Transforming images implies moving pixels from their original positions. This can have two results:
1. Parts of the image can appear twice in the transformed image or disappear entirely.
2. The new position of a pixel can be outside the original image, with no other pixel taking its place. This results in holes in the image that must be filled somehow.

The pop-up list offers three options:

1. Substitution - the holes are plugged with pixels of a color that you specify in a color well icon.
2. Original - the color of the original pixel is used.
3. Edge - the color from the nearest edge is used.

The following figure shows examples for all three options:

777165_paste.tiff ¬ 511498_paste.tiff ¬ 764088_paste.tiff ¬
Figure: Substitute color: blue; original data; edge data

Scaling
This allows you to scale the original image before it is transformed. This is useful if large parts of the image would end up outside of the original coordinates.

136561_paste.tiff ¬

470238_paste.tiff ¬
Figure: The previous image using a scale factor of 0.75

Modes
Two modes are available for calculating the transformation:

Simple
In this mode, the transformation function is applied once to each pixel.

320098_paste.tiff ¬
Figure: Transformation, using the function Rotate (absolute), rotation angle 15 degree

In the simple mode, you have additional options for controlling shading effects and the exactness of the calculations.

There are three options for the calculation:
1. Coarse - the image is transformed without anti-aliasing, creating an image of preview quality.
2. Coarse Interpolation - anti-aliasing is used, but at low resolution.
3. Exact Interpolation - the most exact calculation and the most time-consuming one.

If either <*Coarse Interpol.*> or <*Exact Interpol.*> is selected, parameters for special shading effects can be entered for a three-dimensional effect. The <*Shade*> parameter defines the impact of the shading and is used in connection with the intensity value of the transformation element. <*Shade Angle*> specifies the direction (expressed in degrees) from which a simulated light is shining.

961231_paste.tiff ¬

Example for shading effects:
989713_paste.tiff ¬ 260254_paste.tiff ¬
Figure: Transformation without and with shading

If no shading is to be used, set the <*Shades*> parameter to zero.

Motion
Unlike <*Simple*> mode, this mode applies the transformation function to the source image several times, and each transformation is layered on the transformed image. This gives a blurring effect, as if the image were moving.

In this mode, no shading is available. Instead, you can use the <*Flashes*> parameter to specify how many transformations you want to take place. If the <*Stroboscopic Effects*> option is off, the transformations are blurred when layered upon each other. Otherwise the steps of the intermediate images remain visible.

The pop-up list for this mode also lets you determine how light and dark areas will be treated. <*Light - Dark*> mingles all areas. If <*Light*> is selected, light areas are transferred to dark ones, but dark areas don't affect light ones. <*Dark*> does the opposite.

385787_paste.tiff ¬367905_paste.tiff ¬
Figure: Transformation with and without stroboscopic effects

If you use <*Preview*> for displaying a transformed image, the transparency of the source image won't be displayed, but this doesn't effect the final result.

Note: The transparency of transformation elements is evaluated in only two levels: If it is completely transparent, then the image is not transformed; if it is not completely transparent, the image will be transformed.

Preview
This command shows a preview image of the transformation, without changing the original data.

Apply
The <*Apply*> command transforms the selected image.

The following transformation function are available:

Rotate
(see ;TMSVerknupfe.rtfd;Drehen;¬).

Dreheneinfach;¬Rotate(absolute)
This does the same thing as <*Rotate*>, but it requires no transformation element, using instead a constant rotation angle for each pixel. This angle is entered in the first entry field of the <*Transformation Parameters*> portion of the panel.

387283_paste.tiff ¬

Skalieren;¬Scale
The scale function is similar to the rotate function. The source image is scaled from a fixed center and either enlarged or reduced. The final scaling for each pixel is based on the intensity value of the transformation element, the amplification, and the scaling factor.

912556_paste.tiff ¬ 41819_paste.tiff ¬
Figure: Transformation element and scaled, transformed image

Skaliereneinfach;¬Scale (absolute)
The scaling of each pixel of the source image is determined by a scaling factor instead of a transformation element.
222183_paste.tiff ¬

Verschieben;¬Displace
This function displaces each pixel of the source image vertically and horizontally. Two transformation elements are required, one for the horizontal effect, one for the vertical. For each transformation element, an amplification factor can also be specified. The following rules apply:

Intensity	<50%	>50%
x-direction	left	right
y-direction	up	down

Example:
837649_paste.tiff ¬ 225278_paste.tiff ¬
Figure: Transformation elements and transformed image

Verschiebeneinfach;¬Displace (absolute, polar)
This function doesn't use a transformation element. Instead, each pixel is moved in the direction specified by the <*Angle*> parameter. <*Number of Pixels*> specifies how far each pixel is moved. This function very works well in combination with the <*Motion*> mode.

Ellipsenfunktion;¬Elliptic Function
The results of this function are hard to predict. The function works as follows:
Each pixel is replaced by another pixel taken from an ellipse around it. The <*Amplification x*> and <*Amplification y*> parameters determine the radius of the ellipse. The intensity of the corresponding pixel in the transformation element specifies the angle.

234028_paste.tiff ¬ 477847_paste.tiff ¬
Figure: Transformation using the elliptic function

VerzerrGlas1;¬Broken Glass 1
This uses the transformation element as a pane of glass through which the source image is viewed. The intensity of the transformation elements alters the reflection of the surface of the glass. This can be augmented with the <*Amplification*> parameter. Combined with shading effects, this function creates quite interesting results.

944981_paste.tiff ¬ 159862_paste.tiff ¬
Figure: Example for Broken Glass 1

VerzerrGlas2;¬Broken Glass 2
The results of this function are similar to the elliptical function, but its effects are more variable. The calculation is similar to Broken Glass 1.

NeuePosition;¬New Position
Each pixel in the source image is replaced by another one, based on the intensity of the transformation elements. Two transformation elements are required to determine the horizontal and vertical positions of the replacement pixels. The lighter or darker the value in the transformation element, the farther the replacement pixel is

taken.

338607_paste.tiff ¬ 940554_paste.tiff ¬ 208164_paste.tiff ¬
Figure: Transformation elements and transformed image with New Position

Mosaik;¬**Mosaic**
The intensity values of the transformation element determine how coarse the corresponding area in the source element is displayed. The lighten the transformation element, the coarser the transformed image.