

What is the intention of this software ?

This tool can be used to correct (or rectify) perspective distortions in images.

If the lense of a camera is a fisheye or a lense with high distortion, the camera calibration can be used to correct this behavior, **before** correcting perspective distortions. (see last chapter)

For example: Taking picture of buildings results often in images looking like this:



To rectify the perspective view of the image, “PerspectiveImageCorrection” can be used. After processing the image by this tool, the image looks like this:



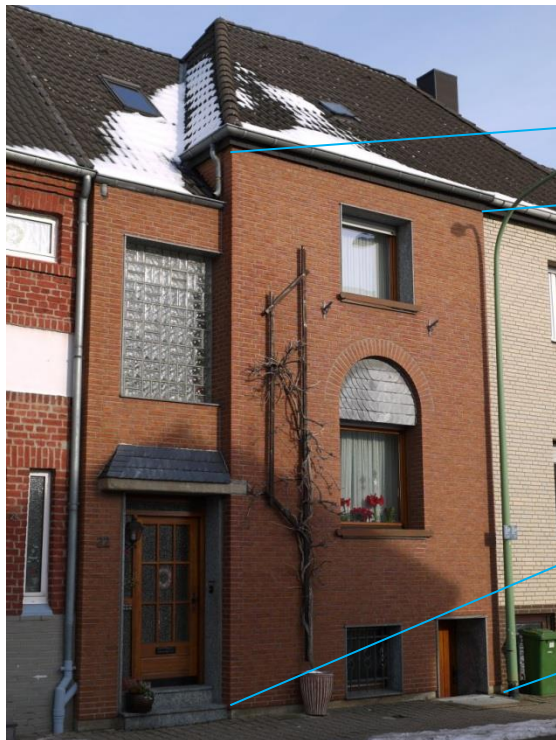
Another intention is, to take measurement in the rectified image. Knowing the size of one of the parts in the rectified image (or in the real world) it's possible to take measurements in the rectified image.

How to use PerspectiveImageCorrection ?

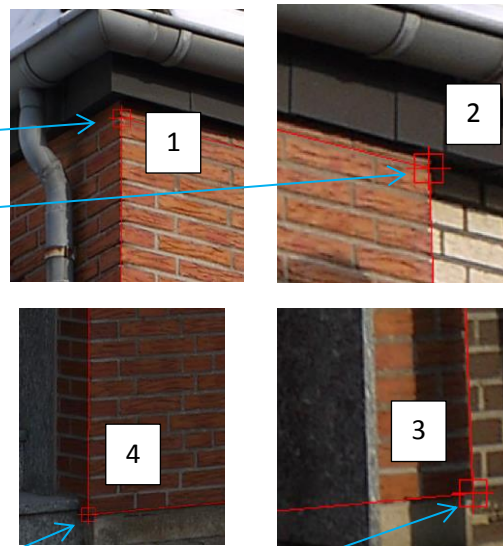
One example is shown now.

- Start the application
- Load one source image (File -> Load Source Image, or use the symbol)
- In the source image set 4 points of a polygon, which defines a rectangular area in the real world. Each point is set by clicking on the image. After setting the 4th point, the image will be automatically rectified, and the result can be seen in the right “corrected image”.
The 4 points have to be set in a defined order, otherwise the corrected image will be turned somehow. **First set the upper left, then upper right, then lower right and the last is the lower left point.**
The more precise you set the points, the better the result will be !
Each point can be picked up and moved to make corrections by clicking into the little square around the point marking.
- A right click removes all polygon points.
- If “Options->Right View -> Process selected” is checked, then the corrected image shows only the polygon area of the source image. Otherwise the full image will be rectified.
- To zoom/un-zoom the image use the mouse wheel
- To pan the image click the mouse wheel and drag

Source Image:



Definition of 4 polygon points



Perspective Image Correction

Corrected (rectified) image: The 4 points defined in the source image are defining a rectangle in the rectified image.



Relation of polygon points in Original and rectified image:



Crop the Corrected Image

- It's possible to save the corrected image complete, or to crop the image, by defining a rectangle in the corrected image.
- A right click removes a defined rectangle.

The crop-rectangle is useful, because depending on the perspective distortion, the corrected image shows black areas, resulting from missing image data in the source image in this areas.



Other functions

Save corrected Image

Modify Y Scaling of the corrected image

Modify X Scaling of the corrected image

Process Image

Rotate source image by 90°

Load Image



Zoom in 10%

Zoom Out 10%

Zoom to fit

Rotate source image by 90°

Rotates the source image clockwise. Should be done before other operations.

Process Image

Calculates the corrected image (which is normally done automatically)

Save corrected Image

Saves the complete corrected image if no crop rectangle is defined, otherwise a cropped image will be saved.

Copy EXIF info from source to target

Copies the EXIF Information from the source file to the target file. This option only works if the "exiftool.exe" is installed on the PC. It can be anywhere in the system path or in the same folder of the PerspectiveImageCorrection.exe.

The "exiftool" from Phil Harvey can be download from internet.

Target folder and filename = source folder and filename

The preselected target folder and filename is the source folder

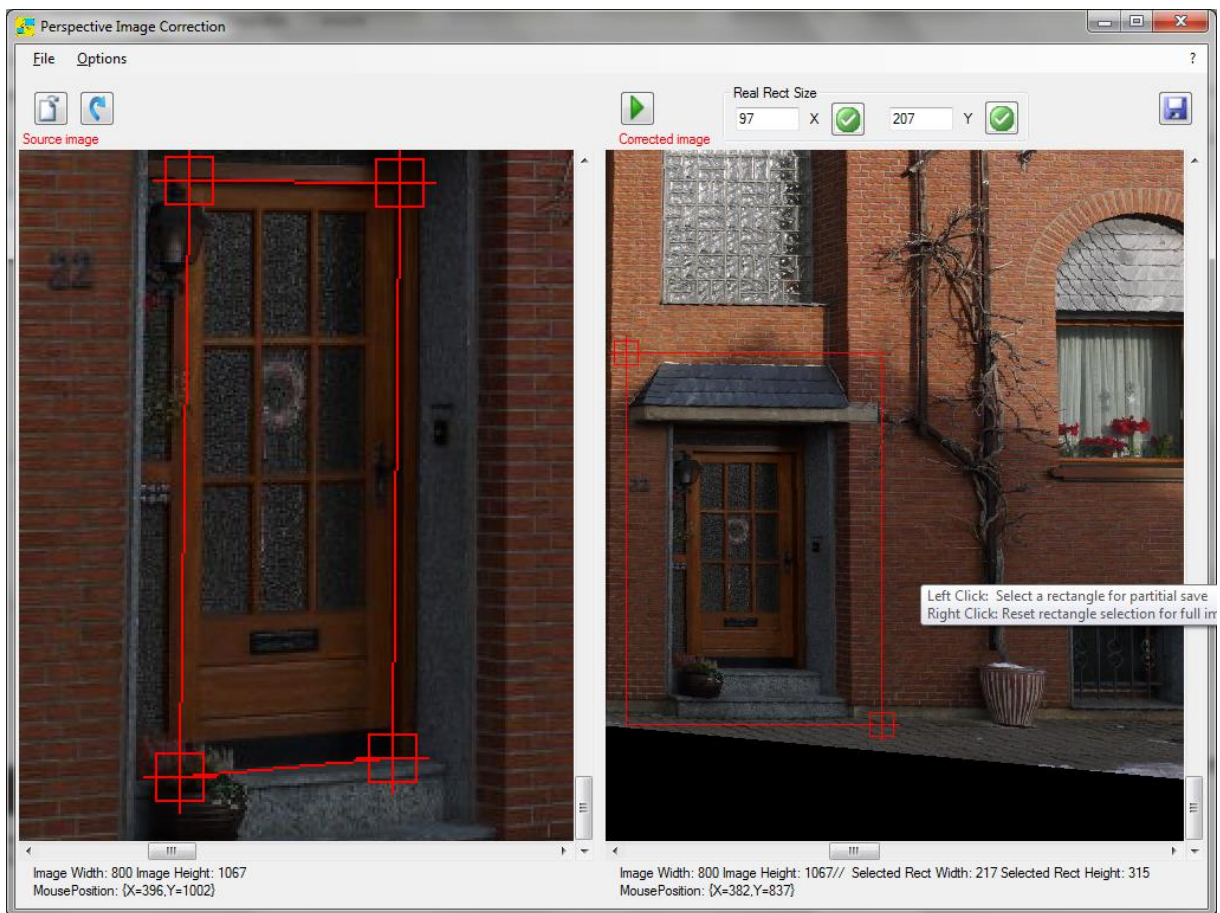
Modify the scaling of the corrected image

Sometimes the aspect ratio of the corrected image is not 100% correct. To correct it use the "Real Rect Size" settings. The X value corrects the width of the image, the Y value corrects the height of the image.

If you know the real size of an object, use the size of the object for the X and Y value. The unit for both values should be the same.

Example:

The door has a size of 970mm x 2070mm



- Fit the polygon in the source image to the size of the door, then the application tries to set the aspect ratio.
- Set the X value to 97 -> Click the green button. The image will be width-corrected
- Set the Y value to 207 -> Click the green button. The image will be height corrected.
- Define a Crop Rectangle in the corrected image to save it.

How to use the camera calibration ?

The process of camera calibration is shown here:

- 1.) Either print out the chessboard "chessboard_X7_Y9.bmp" or display it on a distortion free screen.
- 2.) Then take some photos of the chessboard with the lenses you want to calibrate. Take more than two, better 10 or more photos showing the chessboard in each corner and field of view. The chessboard corners are used to find the correction parameters "Distortion" and "Intrinsic".
(3 sample files CHESSBOARD1..3.JPG are provided to show how the photos can look like. The photos had been taken with a GoPro Hero 4 Silver camera and with this 3 photos it's possible to roughly calibrate the lenses. Take much more photos for better calibration results)
- 3.) Set the "calibration chessboard size" under "Camera Calibration" (here 7 x 9)
- 4.) Load the images under "Camera Calibration" -> "Load chessboard images"
- 5.) Start the calibration process under "Camera Calibration" -> "Start calibration" and wait until the message "Calibration done" appears.
During the calibration the loaded images are shown in "Source", and the images where the chessboard has been detected are shown in "Corrected". If the calibration algorithm could detect the chessboard corners, this will be shown as lines. If the algorithm cannot detect the corners of the chessboard, may be due to bad focused images, the algorithm will fail.
- 6.) After successful calibration under "Camera Calibration" the calibration results are shown in "Show and modify calibration data".

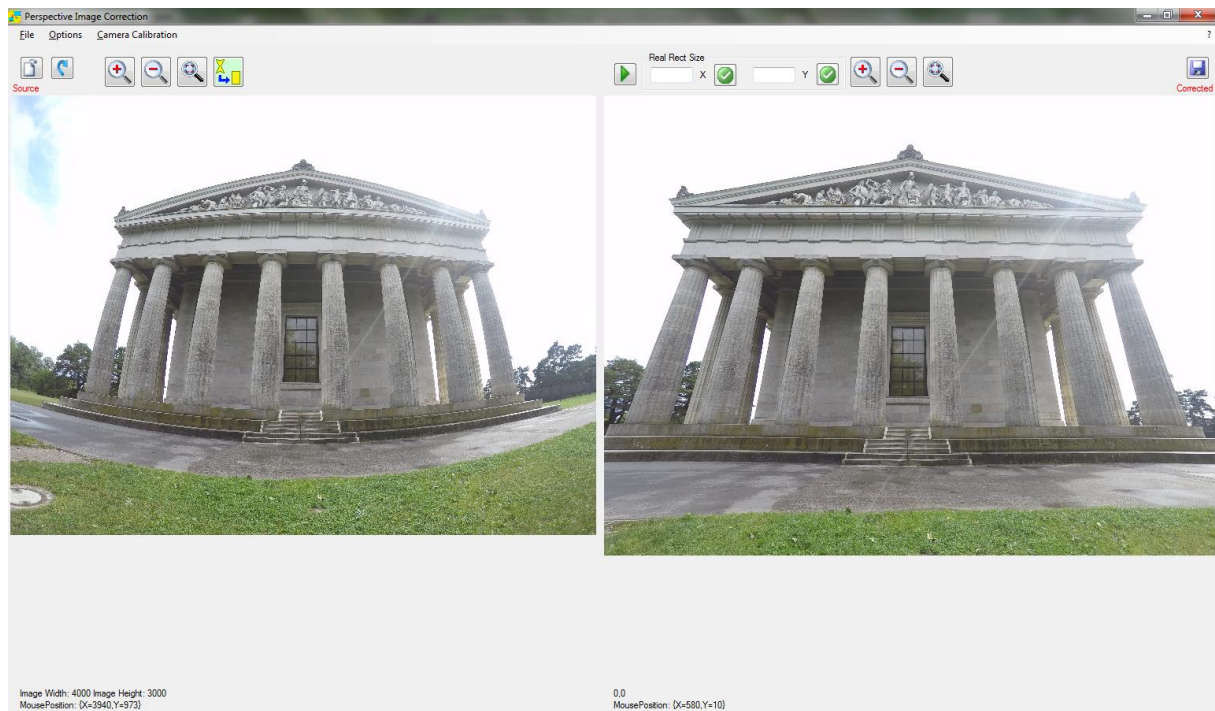
The camera calibration can be applied to the source image using the functions "Undistort Source..." .

The current calibration data, which is stored in the configuration file of the software can be stored in and loaded from separated calibration files, for different lenses.

The "auto undistort image active" can be switched ON and OFF. If the option is switched ON then every loaded image is first undistorted, before further processing.

Perspective Image Correction

Here the result of a camera calibration is shown:



The same image after rectification:

