Stitching panorama photographs with *Hugin* software

Dirk Pons, New Zealand

March 2018. This work is made available under the Creative Commons license Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) which means you are free to Share and Adapt the material for non-commercial purposes.

**Introduction**

Large scale vistas, or panoramas, can sometimes be too big to fit into the frame of view of the lens. In which case it is necessary to take multiple separate photographs and join them together. This process is called *stitching*. This can be done manually but the results are usually poor, with seams showing and different levels of exposure apparent. This tutorial shows how to stitch panorama photographs with *Hugin* software. This is a basic level tutorial.

**Take your photos**

Take a series of photos of the view before you. Make sure that each image has an overlap of about 1/4 of the frame with the next image. Do not move your position appreciably while taking the photos. The direction of the sequence does not matter (up down, left right) as the software will sort it out. However it will make more sense to shoot from left to right. To start with, only take two or three photos until you are comfortable with the Hugin workflow.

Often an effective approach is to use a zoom lens and take multiple magnified photographs. This provides maximum detail in the final photo. Do not change the zoom settings during the sequence.

Do not worry about the fact that the lighting and hence exposure settings may be different in the various directions. Hugin will correct all that.

However you should be worried about a moving scene. An ocean with waves will not work well, as the waves move between shots. I know of no method to fix this problem. Urban landscapes can also be a problem when people and vehicles move about, though there are advanced methods for sorting that case out.

Put all the photos in one directory.

In this tutorial I have four photos of the Hurunui River bridge (New Zealand) at 200mm. I am interested in capturing the detail in the mountains behind, hence the zoom. I am going to stitch this view.
Download the software

Open the software. Ensure that it is in the simple mode (interface/simple), and on the ‘assistant’ tab.

Add photos and stitch

**Step 1: Load images**

Drag your photos onto the grid area. Alternatively press ‘1. Load images’ and browse to your photos. They will initially be imported and arranged by order of filename. Do not worry if they are out of order.
Hugin also takes in the camera and lens metadata with the photos, and uses this in the stitching process. If your photos are without this data, then you will have to guess it.

**Step 2A: Align**

Now press ‘2. Align’. The algorithm compares each photo against every other one, and seeks pixels that are similar. You can watch the process in the text window, but there are no settings at the simple interface. Hopefully this process works and you will have a stitched preview. If it fails, it is usually because there is not enough overlap between images, too much overlap, or you moved the camera too much relative to the view. The latter is particularly problematic when stitching macro photographs.

If the process fails, you either have to go into the more advanced user interface and try to solve it manually. Or re-shoot the sequence.

In my case the report indicates ‘very good fit’. This means that I had a good amount of overlap between the images.

**Step 2B: Rotate - if necessary**

However the image is rotated and small. This is a consequence of how the auto-rotate feature works in my camera. This only occurs if I shoot in portrait – it is never a problem in landscape.
It’s easy to fix, and here is how.

To solve this problem I need to rotate the image, which I do under the ‘Move/Drag’ tabsheet. I need to rotate it 90 degrees in roll, then press ‘Centre’.

Sometimes ‘Fit’ and ‘Straighten’ will help. You can also drag the image with the mouse to being it into the centre.
Step 3: Crop – optional

My image is now looking about right. Next I will crop it. My individual images were not in a perfectly straight line, hence the stepped black border above.

Usually the software will automatically crop the panorama to the largest possible rectangle. However here is how to adjust the crop if necessary. Go to the ‘Crop’ sheet and press ‘Autocrop’.

This will give some translucent white border bars on the image – drag these to crop to your preferred limits.
Step 4 – Create the panorama
Up to here the software has only created a preview. Next this has to be merged into the final image.

Now go back to ‘Assistant’ tabsheet. Press ‘3. Create panorama’. In most cases you can use the default setting which is ‘Exposure corrected, low dynamic range’. Change the ‘LDR Format’ to your preferred file type. I have used JPEG. Press ‘OK’ when ready.

It will ask you for a place to store the project file (pto file type). It does not matter where you place this. However I’d select the same directory as the photos for convenience.

Hugin also asks what you would like the final file called, and where you want to store it. Select somewhere where you can find it, because this is the one you want to keep. I put mine with the source images.

Hugin does not modify the original source files in any way. So my files are entirely safe.

Step 5 – Get the panorama!
Stitching images requires the computer to do a lot of work. It might take a little while, or a lot if there are many images. There is no real prompt to say the process is finished, at least not one that most people would recognise as such. Nor does Hugin open the finished file for you. So when things seem to have stopped working, go find the merged image and view it with whatever viewer you usually use.

Here is the finished bridge picture.
The software has done a great job. I cannot see any seams in the clouds. Also the bridge railings all line up – which is often a difficult area for stitchers.

**Closing comments**

There were no cars on the bridge in this case. If there had been, I could have ended up with a panorama with the same car on different parts of the bridge! Or even worse, half a car. A similarly odd situation arises if you have a person who moves through the vista as you take the photos. There are ways to solve this problem, but that’s an advanced topic.

If the stitcher does not work, its generally because of poor quality of the input photos, rather than a problem with the software.

Advanced uses of Hugin include 360 degree panoramas, multiple tiling, focus stacking, and exposure stacking. However I find the exposure stacking rather temperamental in Hugin.

With very long sequences, take care to keep each image on a straight-ish line. The more the individual images deviate from straightness, the more the image will have to be cropped back.

Do not use a polariser on the lens– it changes the colours in different directions, and this will appear as very obvious banding in the panorama.

**Hugin is a simple, fast, and robust way to stitch panorama photographs.** The developers have done a great job of creating software that everyone can use, and have generously made it available for free. This is a software tool that is useful for hobby and expert photographers.

For more tutorials on Hugin, including advanced features: [http://hugin.sourceforge.net/tutorials/index.shtml](http://hugin.sourceforge.net/tutorials/index.shtml)