

Creating Simple Panoramas: getting started

Peter Gawthrop LRPS joined the RPS and DIG in December 2004. He is interested in using panoramas to capture scenes with field of view beyond ordinary cameras. This article provides an introduction to simple single-row panoramas. Peter can be contacted at peter@gawthrop.net.



When in Sydney, one of my favourite walks takes me from Berowra railway station down to Waratah bay. I don't think that a single picture can do justice to the scene, so I took five pictures and created the above panorama from them.

My early naive attempts to create panoramas involved loading pictures into layers, shifting them around and trying to blend the edges; this takes a long time and results can be poor. Now I use stitching to create seamless panoramas.

There are many stitching programmes available, I use **Hugin** (hugin.sf.net) which is available (free of course) on Linux, Mac and Microsoft operating systems - just go to the download page. However I expect that the principles are the same for commercial programs. **Enblend**, also available from the **Hugin** page, does a very nice job of blending the images, so download that as well.

Taking the pictures

- 1 The individual pictures will form a whole, so camera settings should be the same for each picture: put everything, focus, aperture, shutter speed and white balance on manual and leave unchanged for every picture. Take a note of the focal length.
- 2 Each picture must overlap the adjacent pictures by at least 25%. Using a tripod helps but is not necessary.

- 3 Try to avoid objects moving across picture boundaries.
- 4 Taking jpegs will do, but in this case the pictures were in Canon raw format and converted to 16bit tiffs using **Ufraw** (ufraw.sf.net) using the same setting for each picture.

Stitching the pictures

- 1 Run **Hugin**. This will bring up the **Images** screen. Use the **Add individual images** button to load the images; make sure the first is the leftmost and the rest are in order.
- 2 Use the tab at the top to access the **Camera and Lens** screen. Click on the first image and enter the focal length in the first box (this is expressed as the 35mm equivalent focal length, so I enter 28mm, not the actual 7.2mm of my camera). Tick the **Inherit** box to avoid doing this for each image. Check that the **Degrees of view** makes sense - it is about 63° for me.
- 3 **Hugin** needs to know the centre and horizon of the panorama. Return to the **Images** screen. Click on the centre image and click **Anchor this image for position** and **Anchor this image for exposure**. Click on set anchor image, a window pops up of which Fig. 1 is a part. Click to set the cross as shown; the critical



Figure 1: Anchor

thing here is to set the horizon correctly to avoid a banana-shaped panorama. In Fig. 1, I have chosen the far beach as the horizon.

- 4 Click on the **Control Points** tab to bring up that screen where there are two identical versions of image 0 (the left-most picture) side-by-side. Click on the 1 above the right-hand image; you now have images 0 and 1 side-by-side.

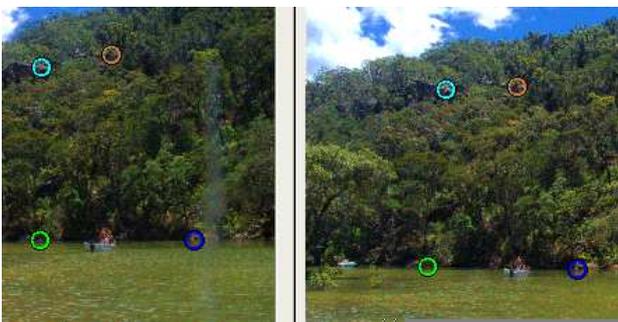


Figure 2: Control points

- 5 Fig. 2 shows four pairs of *control points*, that is points in the two pictures which are the same. It is important that the points that you choose cannot move; for example: don't choose the boat or a cloud. Points are selected by first clicking on the left-hand picture followed by a click on the right-hand picture at about the same place. **Hugin** automatically fine-tunes the second point to match the first accurately; if this doesn't work, choose a more salient point. Four points is about right for this sort of picture. **Hugin** will choose points automatically, but this is not recommended as

it might choose the boat or a cloud. Repeat for the other pairs.



Figure 3: Preview

- 6 Click on the **Optimiser** tab. Click on the **Optimise now!** button and wait a few second for **Hugin** to complete its optimisation. Towards the left of the upper toolbar is a screen icon representing **Panorama preview**; click on this and a new window appears. In the new window, click on **Update** and you should see Fig. 3. This is how **Hugin** proposes to stitch the panorama. Notice how it distorts the images to give the correct perspective. At this point, I often return and readjust the **Set Anchor Image** screen and repeat the optimisation (leave the control points alone).
- 7 Choose the **Stitcher** tab to access that screen. Choose: **Equirectangular**, **nona** and **tiff** in the various options. Tick the **soft blending** box, this removes the visible joins which appear in Fig. 3. Choose the pixel size of the panorama, the "optimal" size is usually far to big. I chose 8000 pixels horizontally, but choose something smaller (say 3000) for a start. Finally, click the **Stitch now!** button. Go and have a cup of tea as this will take a while.

Finishing up

You should now have a tiff corresponding to the panorama previewed in Fig. 3 but at a higher resolution and with nicely blended boundaries. Read this into your favourite program (I use Gimp, but PS is fine) and crop off the rough edges. I was left with the problem that the boat had moved from the first to the second picture giving me one and a half boats in the final picture – clone tool to the rescue.

As well as printing, the panoramas can be displayed as **movies**. (www.lightspacewater.net/Panoramas) A lot of relevant information is gathered at the **Pan-oTools wiki**. (www.panotools.info)