

Photogrammetry



**3D reconstruction using
Bundler and PMVS2**

<http://files.neonascent.net/photogrammetry-guide.pdf>

Setup

1. Get the software needed :

MeshLab from http://downloads.sourceforge.net/meshlab/MeshLab_v123a.exe

Bundler Photogrammetry Package from <http://files.neonascent.net/SFM.zip>

2. Install MeshLab

3. Extract SFM.zip to c:\

4. Make sure you really did extract everything to c:\SFM – your examples folder should be at c:\SFM\examples NOT c:\SFM\SFM\ examples

Sparse Point-Cloud reconstruction

1. Add your images to a new folder in c:\SFM\examples\
2. Copy MakeList.bat into new folder and run to create list.txt (list of images)
3. Copy sparseRecon64.bat into new folder and run it (if you are using a 32-bit system, copy and use the file "sparseRecon32 - SLOW - only use without 64.bat")

(This will take a while)
(If it crashes at this point, reduce the number or size of images)

Camera Type Setup

Bundler needs to know some details about your camera. It has a database of information for well-known cameras, but you may need to add your to it. If you see the message "[Couldn't find CCD width for camera ...]" when running Bundler, you will need to add your camera CCD width.

1. Add you camera CCD details to \SFM\bin\extract_focal.pl file

```
%ccd_widths = (  
YOUR_CAMERA => X.X,  
"SunplusMM Spca1528" => 3.6, #1/4"  
"SONY DSLR-A100" => 23.700, #1.8" APS-C CCD
```

This information can be found online.

2. If your images do not have any EXIF data attached (for example if you extracted them from video), you can use the script EXIFwrite.vbs to add this information. Run EXIFwrite.vbs in your image directory, and enter the details EXACTLY as they appear in the extract_focal.pl file, including identical case.

<http://files.neonascend.net/photogrammetry-guide.pdf>

Dense Point-Cloud reconstruction

1. Copy *denseRecon_batch.bat* and *denseRecon.vbs* into new folder and run *denseRecon.vbs*

2. Enter the configuration values. Use the recommended first time.

The process may take some time. At the end there should be one or more .ply files in (your image folder)\pmvs\models

You can open them in MeshLab and examine them.

Mesh reconstruction

1. Once you have one or more dense point-cloud .ply files, open the first in MeshLab
2. Open any others as Layers, and select the layer button to view the layer stack.
3. Select the “...” button on the layer tab and select “Flatten Visible Layers”, and make sure “delete layers” is unchecked.
4. Select “Filters → Sampling → Vertex Attribute Transfer” and transfer both colour and normals from the layers to the new “Merged Mesh”, with the Max Distance Search percentage to 0.010
5. Select the “Merged Mesh” in the Layer stack
6. Select “Filters → Point Set → Surface Reconstruction: Poisson” and use either 6, 6, 1, 1 for a quick test, or 11, 6, 1, 1 for a highly detailed mesh. Experiment with different values of Octree depth, but beware that the larger it is the longer it will take.
7. Save your mesh as an STL file ready for printing.