Grafica 3D per i beni culturali: Photosynth Toolkit

Lezione 13: 3 Maggio 2013

Image-based 3D Reconstruction

- ☐ Advantages:
  - ■ Automatic
  - ■ Fast (relatively to manual built)
  - ■ Good scalability (both small and huge model can be acquired)
  - ■ Non-expert users can create his/her 3D model.
  - ■ Cheap!
- ☐ Disadvantages:
  - ■ Accuracy (not so accurate)
  - ■ Not all the objects can be acquired

Photosynth Toolkit

- ☐ This toolkit is produced by a small community of photographers.
- ☐ http://www.visual-experiments.com/demos/photosynthtoolkit/

- ☐ It uses the code which was released by two different research projects: Photosynth (the heir of PhotoTourism) and PMVS.
- ☐ MeshLab is indicated as the "official" tool for the processing of the 3D data!

Photosynth Toolkit

- ☐ The input of the toolkit is a web address of the reconstruction provided by Photosynth

- ☐ To use Photosynth: sign in, download the upload tool, upload the images, go and have a look at the corresponding page.

Photosynth Toolkit

- To use the Photosynth toolkit:
- 1) Create a folder for the data
- 2) Download Synth: use the photosynth URL
- 3) Put images in distort folder: just do that! Skip the "Watch PhotoSynth output2 step
- 3) Prepare For PMVS2 : use the photosynt URL. A launch .bat file is created
- 4) Prepare For CMVS : use the photosynt URL. A launch .bat file is created
- 5) Launch the reconstruction (PMVS2 or CMVS). The final result will be a .ply file in models subdir

Photosynth Toolkit

- The options for PMVS are well explained at
- http://grail.cs.washington.edu/software/pmvs/documentation.html
- But the most important parameters are:
- *Level: the subsampling rate of images: (0=full resolution)*
- *Csize: density of reconstruction (the lower the denser)*
- *minImageNum: min number of images sharing a point in 3D (similar to count in Arc3D)*
- *CPU: support for multi-core systems*

Photosynth Toolkit

- ☐ PMVS reconstruction will create a pmvs_options.txt.ply file in the pmvs/models folder

- ☐ CMVS reconstruction will create several pmvs_options.txt.ply file in the pmvs/models folder. You need to load all of them in the same MeshLab context, and then apply a Flatten Visible Layers filter. Remember to check the "keep unreferences vertices" options, or everything will be removed!

Photosynth Toolkit: final comments

- ☐ Photosynth is more robust tha Arc3D in reconstruction, but since it's not fully integrated in MeshLab, you have less control on the production of the model

- ☐ The points produced by PMVS are a bit more "sparse" than Arc3D, but if you play with the parameters maybe you can improve the results

- ☐ The reconstruction is fully local, so it's necessary to have adequate hardware…

Next in line...

Next lesson:

- Dense Stereo Matching: using MeshLab

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