Large-scale 3D Modeling from Crowdsourced Data

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Data Association

- **Streaming Connected Component Discovery**
  https://github.com/jheinly/streaming_connected_component_discovery

- **COLMAP** (Open Source, Freeware)
  https://colmap.github.io/

Incremental SfM

- **Bundler** (Open Source, Freeware)
  http://www.cs.cornell.edu/~snavely/bundler/
- **VisualSfM** (Closed Source, Freeware)
  http://ccwu.me/vsfm/
- **COLMAP** (Open Source, Freeware)
  https://colmap.github.io/

Global SfM

- **Theia** (Open Source, Freeware)
  http://www.theia-sfm.org/

- **OpenMVG** (Open Source, Freeware)
  https://github.com/openMVG/openMVG

Bundle adjustment

- **Ceres Solver** (Open Source, Freeware)
  http://ceres-solver.org/

- **PBA** (Open Source, Freeware)
  https://grail.cs.washington.edu/projects/mcba/

- **SSBA** (Open Source, Freeware)
  https://github.com/chzach/SSBA

Multi-View Stereo and Fusion

- **COLMAP** (Open Source, Freeware)
  https://colmap.github.io/
- **CMVS/PMVS** (Open Source, Freeware)
  https://www.di.ens.fr/cmvs
  https://www.di.ens.fr/pmvs
- **CMP-MVS** (Closed Source, Freeware)
  http://ptak.felk.cvut.cz/sfmservice/websfm.pl?menu=cmpmvs
- **Gipuma** (Open Source, Freeware)
  https://hithub.com/kysucix/gipuma
- **OpenMVS** (Open Source, Freeware)
  https://github.com/cdcseacave/openmvs

Benchmarks

- **"Tanks and Temples: Benchmarking Large-Scale Scene Reconstruction"**
  A. Knapitsch, J. Park, Q. Zhou, V. Koltun. SIGGRAPH 2017.
  https://www.tanksandtemples.org/
- **"A Multi-View Stereo Benchmark with High-Resolution Images and Multi-Camera Videos"**
  T. Schöps, J. L. Schönberger, S. Galliani, T. Sattler, K. Schindler, M. Pollefeys, A. Geiger. CVPR 2017.
  http://www.eth3d.net/
- **"Experimental Comparison of Open Source Vision-Based State Estimation Algorithms"**
  Quattrini et al. ISER 2016.

References

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- S. Agarwal, Y. Furukawa, N. Snavely, I. Simon, B. Curless, S. M. Seitz, and R. Szeliski. “Building Rome in a Day.” Comm. ACM, 2011
- J.-M. Frahm, P. Fite-Georgel, D. Gallup, T. Johnson, R. Raguram, C. Wu, Y.-H. Jen, E. Dunn, B. Clipp, S. Lazebnik, and M. Pollefeys. “Building Rome on a cloudless day.” ECCV 2010
- J.-M. Frahm, M. Pollefeys, S. Lazebnik, C. Zach, D. Gallup, B. Clipp, R. Raguram, C. Wu, T. Johnson. "Fast Robust Large-scale Mapping from Video and Internet Photo Collections", In special issue "100 years of ISPRS" of the ISPRS Journal of Photogrammetry and Remote Sensing.
- D. Gallup, M. Pollefeys, J.-M. Frahm. "3D Reconstruction using an n-LayerHeightmap", DAGM 2010.
- J. Heinly, J. L. Schönberger, E. Dunn, J.-M. Frahm, “Reconstructing the World* in Six Days *(As Captured by the Yahoo 100 Million Image Dataset)“, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015
- X. Li, C. Wu, C. Zach, S. Lazebnik, J.-M. Frahm. “Modeling and Recognition of Landmark Image“. ECCV 2008
- R. Raguram, C. Wu, J.-M. Frahm, and S. Lazebnik. “Modeling and Recognition of Landmark Image Collections Using Iconic Scene Graphs.” IJCV, 2011
- J.L. Schönberger, J.-M. Frahm. "Structure-from-Motion Revisited", CVPR 2016.
- J.L. Schönberger, F. Radenovic, O. Chum, J.-M. Frahm. "From Single Image Query to Detailed 3D Reconstruction", CVPR 2015.
- J.L. Schönberger, E. Zheng, M. Pollefeys, J.-M. Frahm. "Pixelwise View Selection for Unstructured Multi-View Stereo", ECCV 2016.
- N. Snavely, S. M. Seitz, and R. Szeliski. “Photo Tourism: Exploring image collections in 3D.” SIGGRAPH, 2006
- N.Snavely, S. M Seitz, and R. Szeliski. “Modeling the world from internet photo collections.” IJCV, 2008
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- C. Sweeney, V. Fragoso, T. Hollerer, M. Turk. “Large Scale SfM with the Distributed Camera Model”, 3DV 2016.
- E. Zheng, E. Dunn, V. Jojic, J.-M. Frahm. "PatchMatch Based Joint View Selection and Depthmap Estimation", CVPR 2014.

Website and Slides

- https://demuc.de/tutorials/cvpr2017

Questions?

Thank you!


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