DeepMVS: Learning Multi-View Stereopsis

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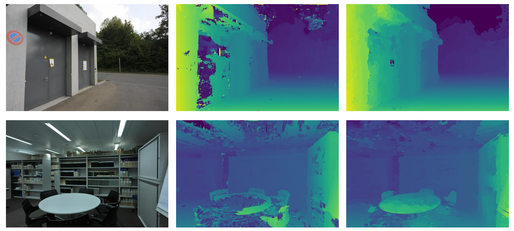
Code available!
http://bit.ly/deepmvs

Problem

Challenges

- Poorly textured regions
- Reflective surfaces
- Thin structures

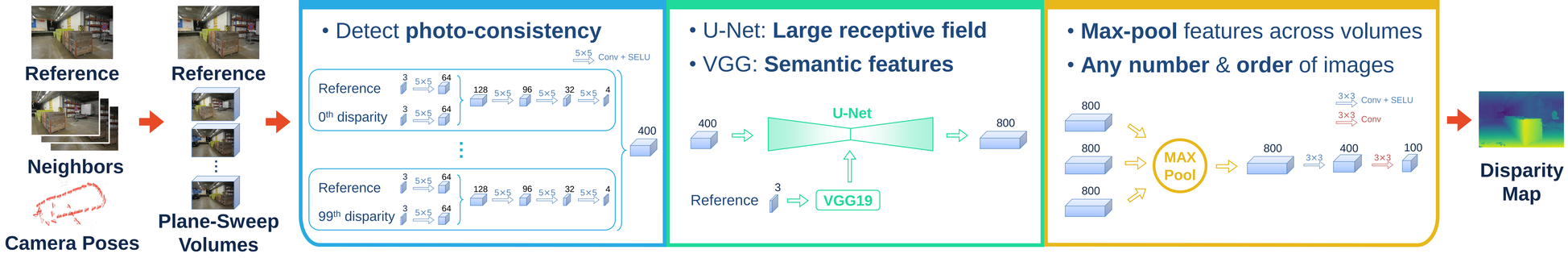


[1] J. L. Schonberger, E. Zheng, M. Pollefeys, and J.-M. Frahm. Pixelwise view selection for unstructured multi-view stereo. In *ECCV*, 2016.

Contributions

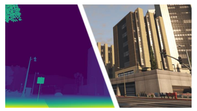
- ConvNet for multi-view stereo
- Arbitrary numbers of input images
- Accurate disparity estimation

Method



MVS-Synth Dataset

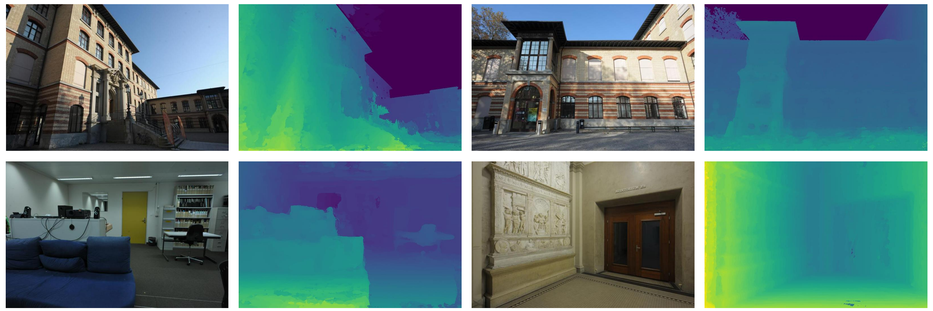
- 12,000 images from GTA V
- Realistic, complete & accurate
- Improve disparity estimation



- Problems of existing datasets

	Real-World Datasets	Synthetic Datasets
Pros	Represent the real world	Cheap Complete & Accurate
Cons	Expensive Incomplete & Inaccurate	Unrealistic

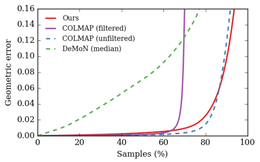
Results

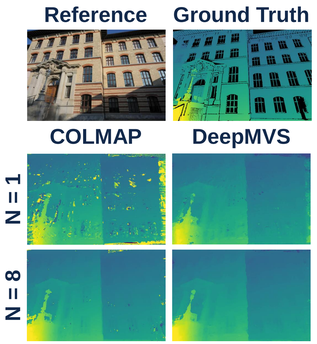


Quantitative comparisons on ETH3D Dataset

Algorithm	Completeness	Geometric error	Photometric error
DeMoN (median)	100%	0.201	0.367
COLMAP (filtered)	71%	0.007	0.178
COLMAP (unfiltered)	100%	0.046	**0.218**
DeepMVS	100%	**0.036**	0.224

Geo. error distribution





Geo. error for N = 1 – 8