

RealSense Depth Improvement

1. General Info

- a. Active Stereo Pipeline tested on intel RealSense D435
- b. Input: Left IR, Right IR, Projector on
- c. Resolution: 1280 x 720
- d. Runtime: 60 Hz
- e. Accuracy: 1/30th pixel
- f. Self-Supervised (using Deep Learning): i.e. trains itself on presented acquisition

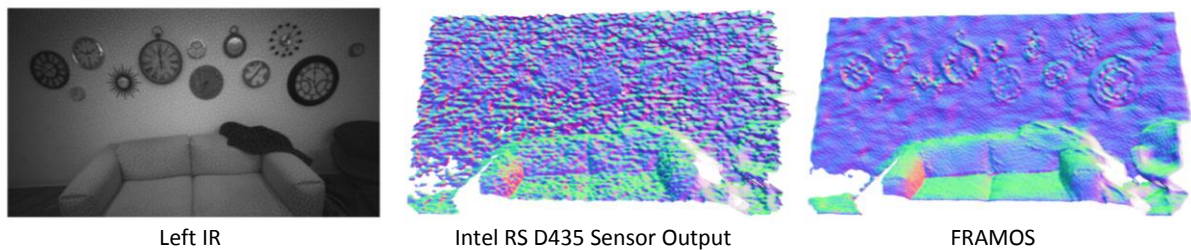
➔ Disparity Error drops from 0.2 pixels to 0.03 pixels!

2. Qualitative Results

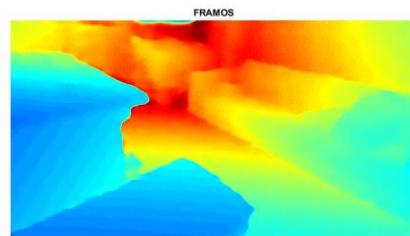
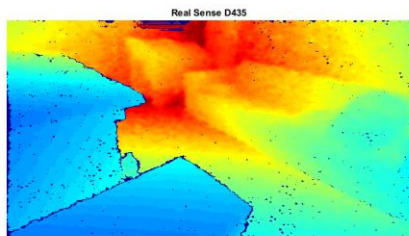
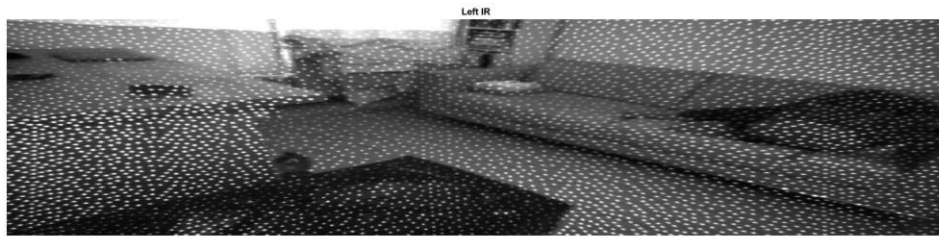
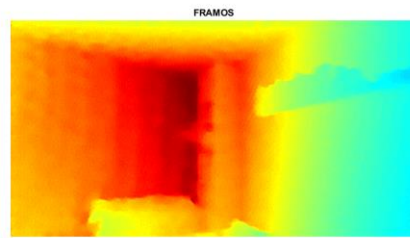
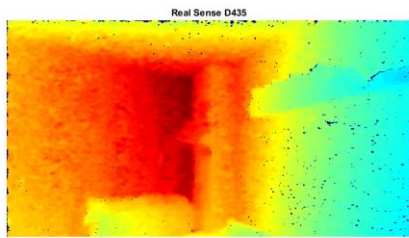
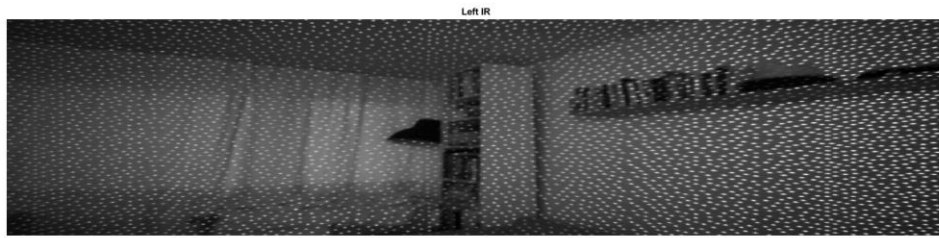
- a. Setup (color image not used)



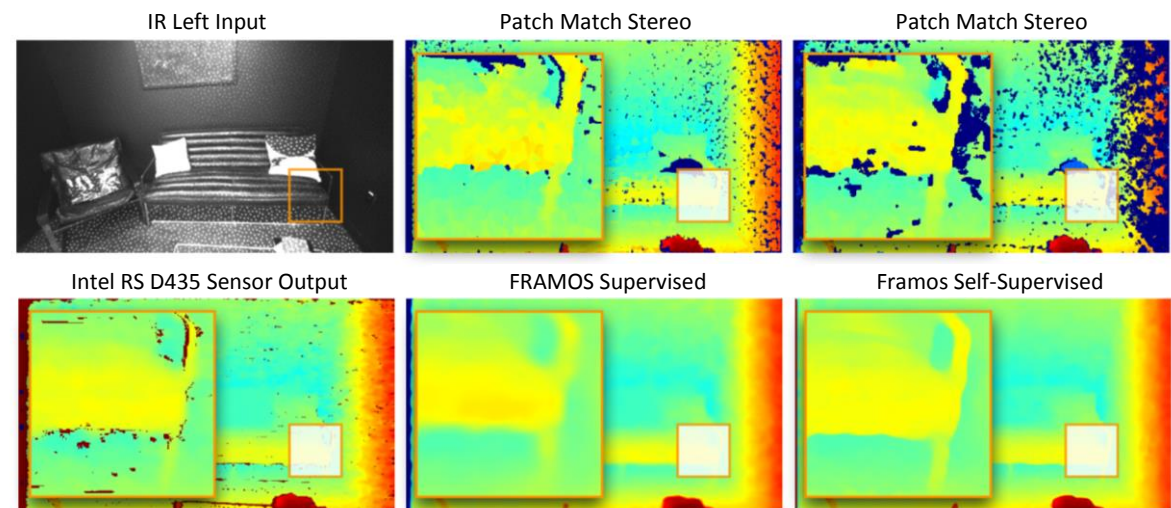
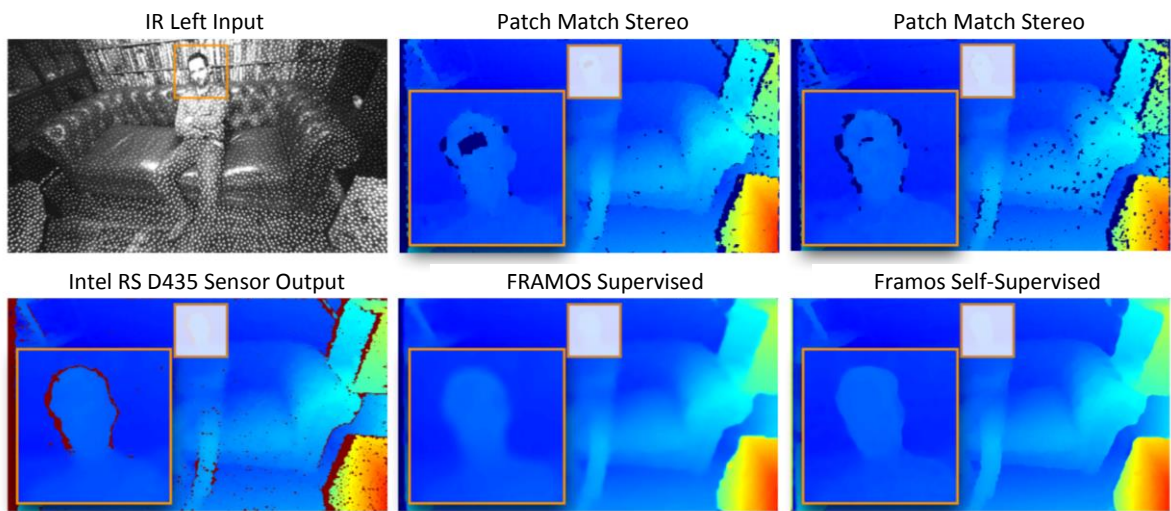
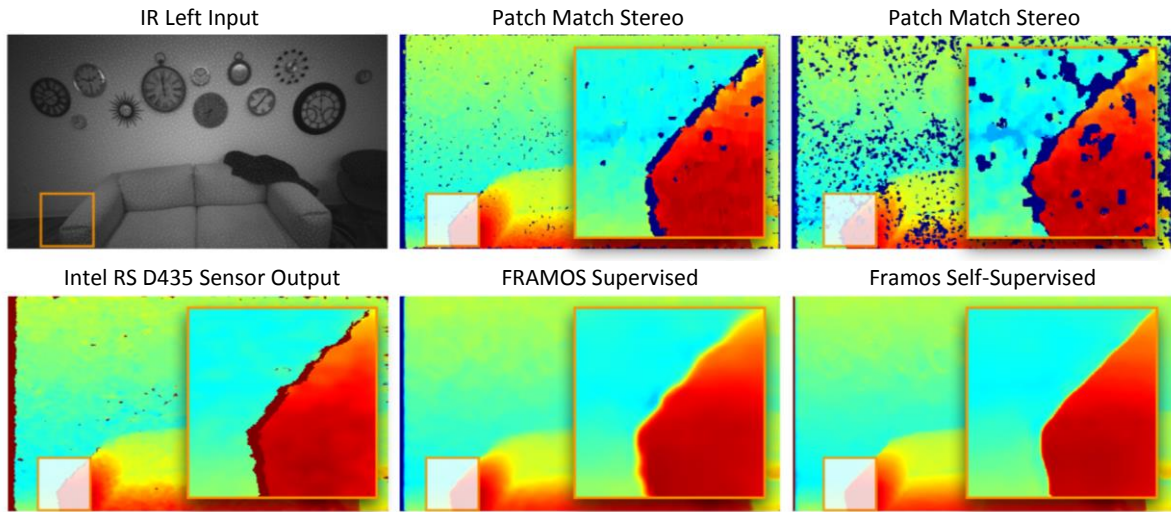
- b. Surface Normals



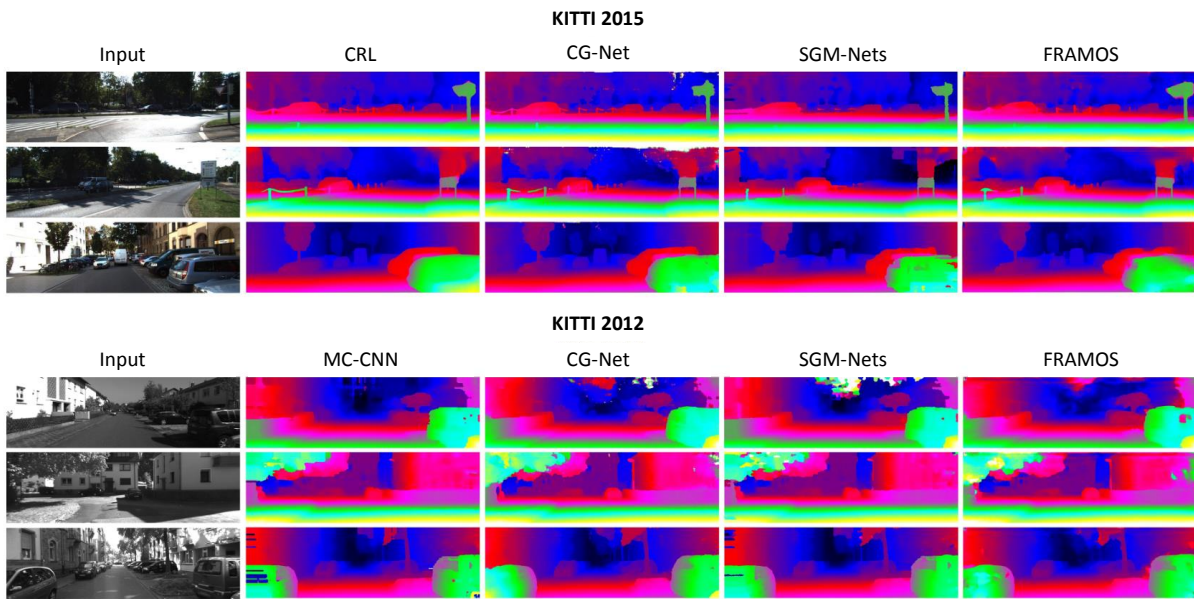
c. Direct Comparison against native Sensor Output



d. Detailed comparison against other pipelines – Indoor

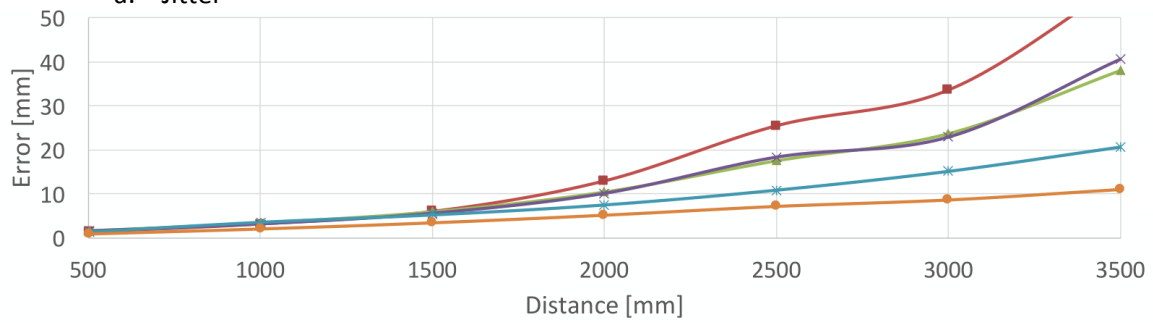


e. Detailed comparison against other pipelines – Outdoor

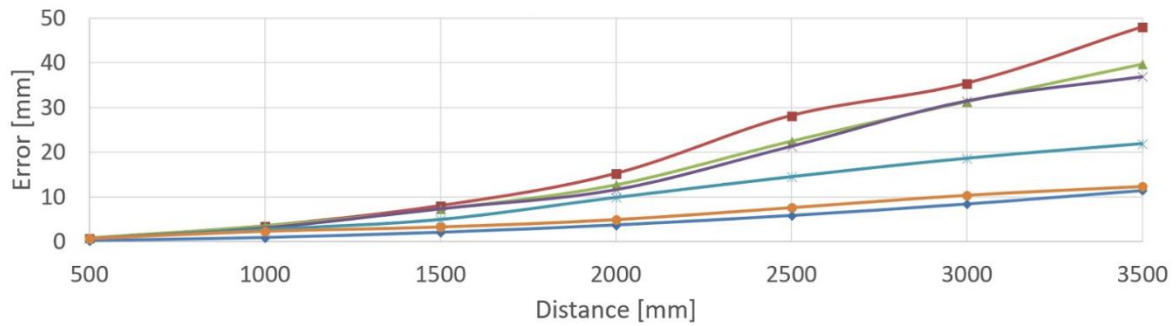


3. Quantitative Results

a. Jitter



b. Bias



◆ Theoretical 0.03px precision

■ Intel RS D435 Sensor Output

▲ HashMatch

✕ PatchMatch Stereo

* Godard et al.

● FRAMOS

c. Runtime comparison against other methods

➔ Runs at 60 Hz on Nvidia Titan X

	D1-bg	D1-fg	D1-all	Runtime
FRAMOS	4.30	7.45	4.83	0.015s
CRL	2.48	3.59	2.67	0.5s
CG-Net Full	2.21	6.16	2.87	0.9s
MC-CNN	2.89	8.88	3.89	67s
SGM-Net	2.66	8.64	3.66	67s

d. More results under preparation

