Fast Guided Global Interpolation for Depth and Motion (Supplementary Material)

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Description

This supplementary material includes the additional results not included in the main paper due to the page limit. The list of items included are:

1. More visual comparisons of depth upsampling on the synthetic ToF dataset [1] (extension of Fig. 6 of the main paper).
2. More visual comparisons of depth upsampling on the ToFMark real dataset [2] (extension of Fig. 7 of the main paper).
3. More visual comparisons of optical flow interpolation on the Sintel dataset [3] (extension of Fig. 8 of the main paper).
4. Screenshot of the MPI Sintel optical flow benchmark [4] – clean pass.
5. Screenshot of the MPI Sintel optical flow benchmark [4] – final pass.

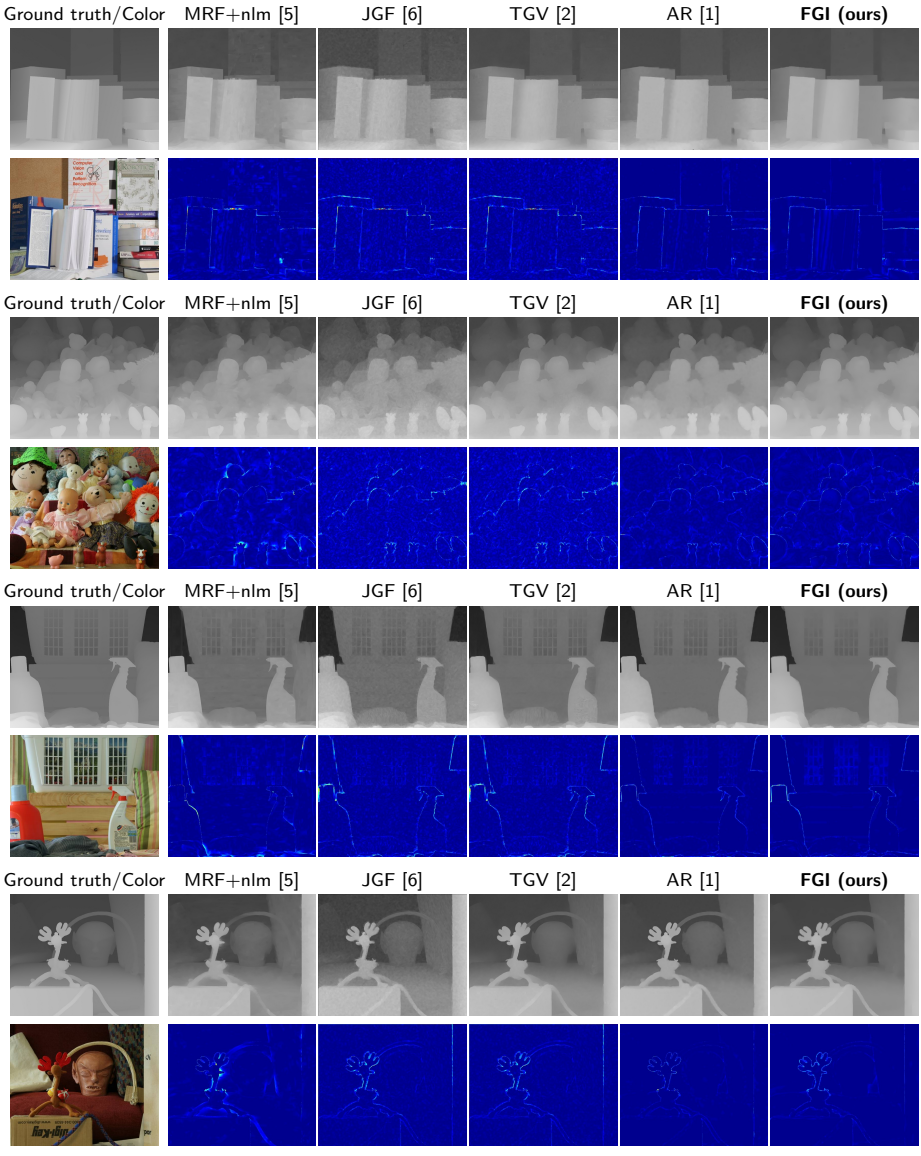

Fig. 1. Visual comparison on 8× upsampling of *Books*, *Dolls*, *Laundry* and *Reindeer* from the synthetic ToF dataset [1].

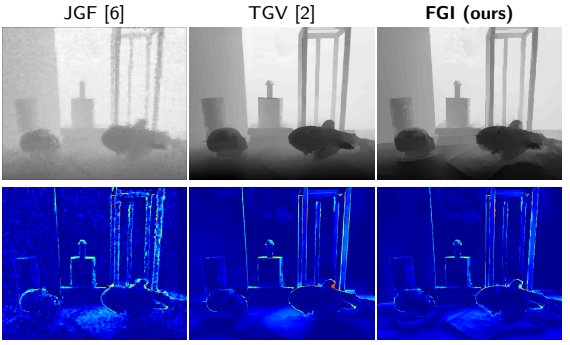

Fig. 2. Visual comparison on depth upsampling of *Shark* from the ToFMark real datasets [2].

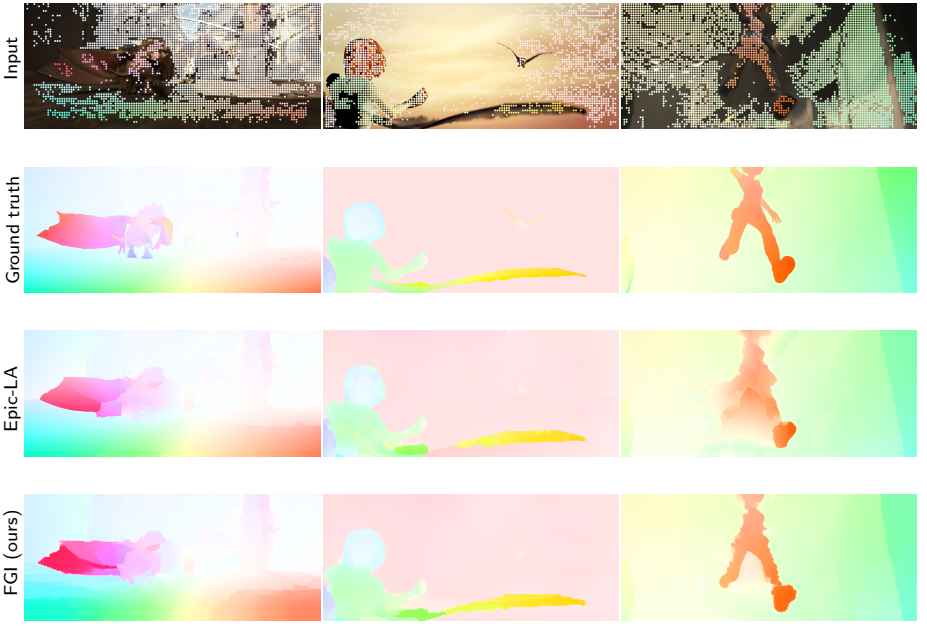

Fig. 3. Optical flow fields interpolated by Epic-LA [7] and our FGI on the MPI Sintel datasets [3] .

Final Clean

	EPE all	EPE matched	EPE unmatched	d0-10	d10-60	d60-140	s0-10	s10-40	s40+	
GroundTruth [1]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Visualize Results
CPM-Flow [2]	3.557	1.189	22.889	3.032	0.973	0.613	0.592	2.064	21.900	Visualize Results
DiscreteFlow [3]	3.567	1.108	23.626	3.398	0.799	0.446	0.703	2.277	20.906	Visualize Results
FlowFields [4]	3.748	1.056	25.700	2.784	0.878	0.570	0.546	2.110	23.602	Visualize Results
FullFlow [5]	3.789	1.505	22.429	2.605	1.057	1.420	1.598	2.147	18.679	Visualize Results
EpicFlow [6]	4.115	1.360	26.595	3.660	1.079	0.599	0.712	2.117	25.859	Visualize Results
GlobalPatchCollider [7]	4.134	1.432	26.179	3.914	1.268	0.554	0.613	2.232	26.222	Visualize Results
PH-Flow [8]	4.388	1.714	26.202	3.612	1.713	0.834	0.590	2.430	27.997	Visualize Results
FGI [9]	4.664	1.540	30.110	3.771	1.336	0.850	0.669	2.310	30.185	Visualize Results
AggregFlow [10]	4.754	1.694	29.685	3.705	1.603	0.981	0.650	2.251	31.184	Visualize Results
DeepFlow2 [11]	4.891	1.403	33.317	3.714	1.119	0.626	0.800	2.210	31.690	Visualize Results
TF+OFM [12]	4.917	1.874	29.735	3.676	1.689	1.309	0.839	2.349	31.391	Visualize Results
FALDOI [13]	4.927	1.542	32.535	3.307	1.318	0.885	1.047	2.647	29.719	Visualize Results
Deep+R [14]	5.041	1.481	34.047	3.710	1.102	0.722	0.929	2.333	31.999	Visualize Results
SBFlow [15]	5.081	1.333	35.661	3.438	1.186	0.657	0.645	2.323	33.790	Visualize Results
SPM-BP [16]	5.202	1.815	32.839	4.008	1.704	1.179	0.643	2.576	34.214	Visualize Results

Fig. 4. Average endpoint error (EPE all) ranking on the MPI Sintel benchmark [4] – clean pass (captured on *Mar. 10th, 2016*). Our FGI ranks 8/63.

Final Clean

	EPE all	EPE matched	EPE unmatched	d0-10	d10-60	d60-140	s0-10	s10-40	s40+	
GroundTruth [1]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Visualize Results
SBFlow [2]	5.461	1.739	35.803	4.071	1.553	0.919	0.928	2.909	34.131	Visualize Results
FlowFields [3]	5.810	2.621	31.799	4.851	2.232	1.682	1.157	3.739	33.890	Visualize Results
FullFlow [4]	5.859	2.777	30.965	4.823	2.354	2.144	1.185	3.770	34.084	Visualize Results
CPM-Flow [5]	5.960	2.990	30.177	5.038	2.419	2.143	1.155	3.755	35.136	Visualize Results
GlobalPatchCollider [6]	6.040	2.938	31.309	5.310	2.624	1.824	1.102	3.589	36.455	Visualize Results
DiscreteFlow [7]	6.077	2.937	31.685	5.106	2.459	1.945	1.074	3.832	36.339	Visualize Results
EpicFlow [8]	6.285	3.060	32.564	5.205	2.611	2.216	1.135	3.727	38.021	Visualize Results
FGI [9]	6.607	3.101	35.158	5.432	2.970	2.131	1.152	3.986	39.985	Visualize Results
TF+OFM [10]	6.727	3.388	33.929	5.544	3.238	2.551	1.512	3.765	39.761	Visualize Results
Deep+R [11]	6.769	2.996	37.494	5.182	2.770	2.064	1.157	3.837	41.687	Visualize Results
PatchBatch-CENT+SD [12]	6.783	3.507	33.498	6.080	3.408	2.103	0.725	3.064	45.858	Visualize Results
DeepFlow2 [13]	6.928	3.093	38.166	5.207	2.819	2.144	1.182	3.859	42.854	Visualize Results
SparseFlowFused [14]	7.189	3.286	38.977	5.567	3.098	2.159	1.275	3.963	44.319	Visualize Results
DeepFlow [15]	7.212	3.336	38.781	5.650	3.144	2.208	1.284	4.107	44.118	Visualize Results
FlowNetS+ft+v [16]	7.218	3.752	35.445	6.439	3.635	2.292	1.358	4.609	42.571	Visualize Results

Fig. 5. Average endpoint error (EPE all) ranking on the MPI Sintel benchmark [4] – final pass (captured on *Mar. 10th, 2016*). Our FGI ranks 8/63.

References

1. Yang, J., Ye, X., Li, K., Hou, C., Wang, Y.: Color-guided depth recovery from rgb-d data using an adaptive autoregressive model. TIP **23**(8) (2014) 3443–3458
2. Ferstl, D., Reinbacher, C., Ranftl, R., Rüther, M., Bischof, H.: Image guided depth upsampling using anisotropic total generalized variation. In: ICCV. (2013)
3. Butler, D.J., Wulff, J., Stanley, G.B., Black, M.J.: A naturalistic open source movie for optical flow evaluation. In: ECCV. (2012)
4. http://sintel.is.tue.mpg.de/results.
5. Park, J., Kim, H., Tai, Y.W., Brown, M.S., Kweon, I.: High quality depth map upsampling for 3d-tof cameras. In: ICCV. (2011)
6. Liu, M.Y., Tuzel, O., Taguchi, Y.: Joint geodesic upsampling of depth images. In: CVPR. (2013)
7. Revaud, J., Weinzaepfel, P., Harchaoui, Z., Schmid, C.: Epicflow: Edge-preserving interpolation of correspondences for optical flow. In: CVPR. (2015)