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FC-DCNN: A densely connected neural network for stereo estimation

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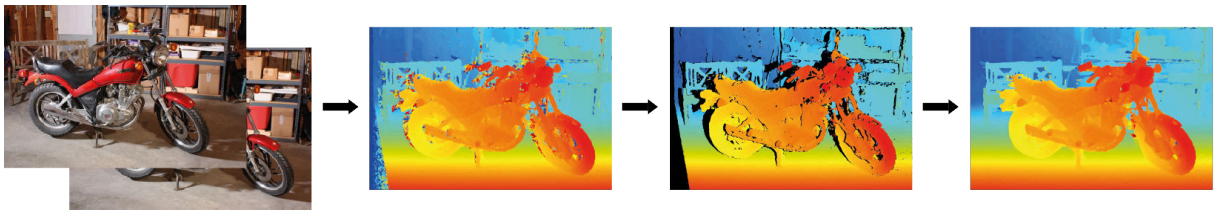
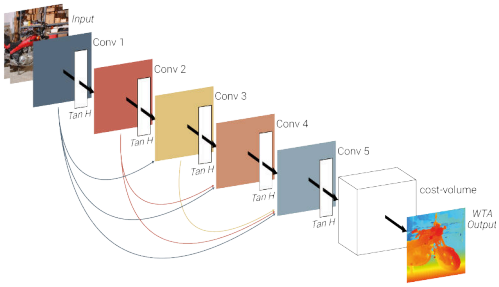


f.l.t.r: Input image pair, initial disparity map produced by network, sparse disparity map, final disparity map with updated values

Method

- hybrid stereo estimation method
- lightweight disparity estimation network
- own post-processing

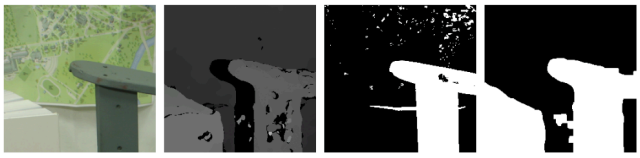


$$loss = ReLU(s_+ - s_- - 0.2)$$

- Network is trained using corresponding (s_+) and non corresponding (s_-) image patches extracted from the left and right image respectively

Method	Param
FC-DCNN (ours)	0.37M
MC-CNN-ACRT	0.5M
GC-Net	2.9M
PSMNet	3.5M

- Total trainable parameter comparison between our method and other popular stereo estimation networks.

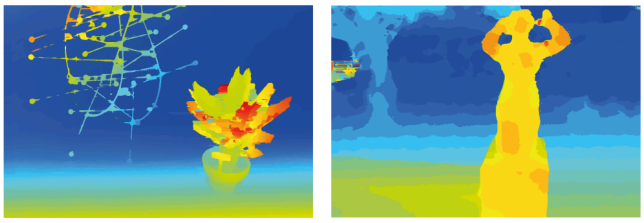


f.l.t.r: RGB patch, sparse disparity, foreground-background mask using RGB image, foreground-background mask using sparse disparity

- Sparse disparity map is taken as guide for watershed foreground-background segmentation
- This mask is used to update inconsistent points.

Results

- Qualitative results on test images



left: Middlebury, right: ETH3D

left: KITTI2012, right: KITTI2015

- Quantitative results

Method	5-PE	4-PE	3-PE	2-PE	1-PE	0.5-PE
Middlebury						
Ours	**-**	**11.2**	**-**	**17.9**	**36.8**	**65.3**
SGM (H)	-	12.2	-	18.4	31.1	54.4
iResNet	-	11.1	-	20.3	35.1	58.7
KITTI2012						
Ours	**3.08**	**3.68**	**4.72**	**7.79**	**-**	**-**
ATGV	3.33	3.99	5.02	7.08	-	-
SGM	3.56	4.38	5.76	8.66	-	-
KITTI2015						
Ours	**-**	**-**	**5.21**	**-**	**-**	**-**
SNCC	-	-	5.36	-	-	-
PASMnet	-	-	5.41	-	-	
ETH3D						
Ours	**-**	**3.38**	**-**	**5.77**	**10.41**	**24.12**
MeshStereo	-	2.61	-	5.78	11.52	22.27
LSM	-	4.58	-	7.38	14.01	29.98

For more information and all the source code visit:
https://github.com/thedodo/FC-DCNN