Computer Vision; Image Transformation; Optical Flow and Depth Estimation

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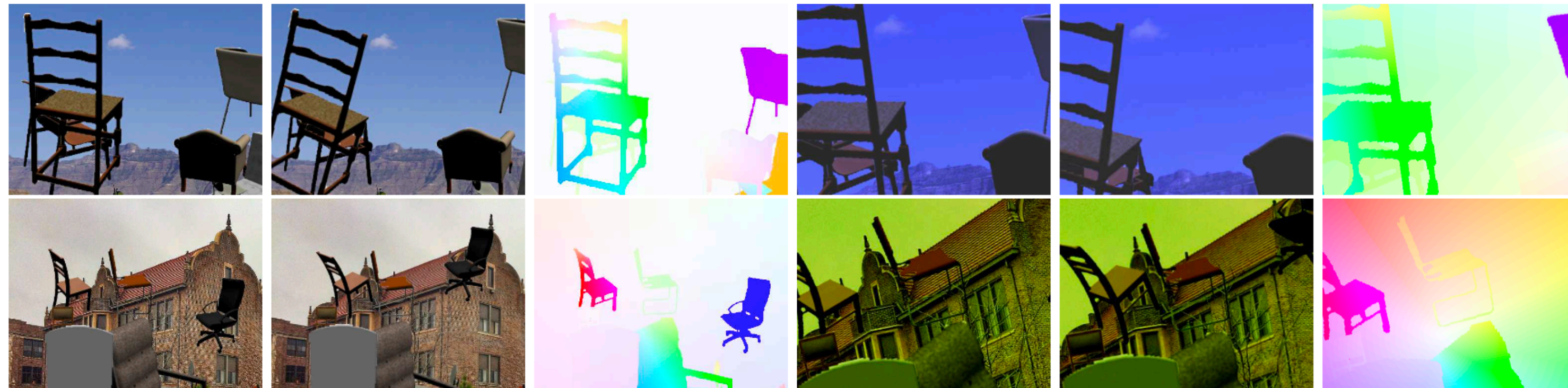
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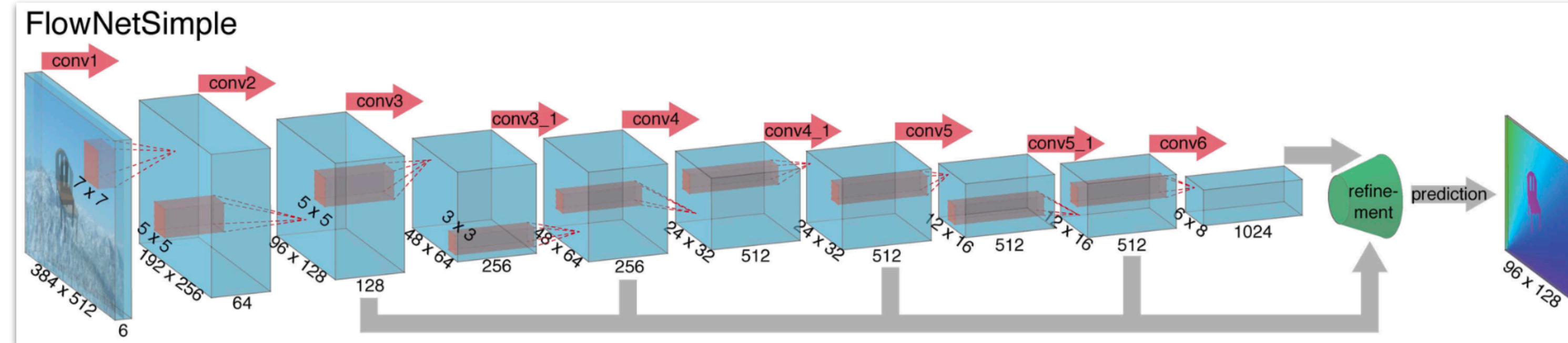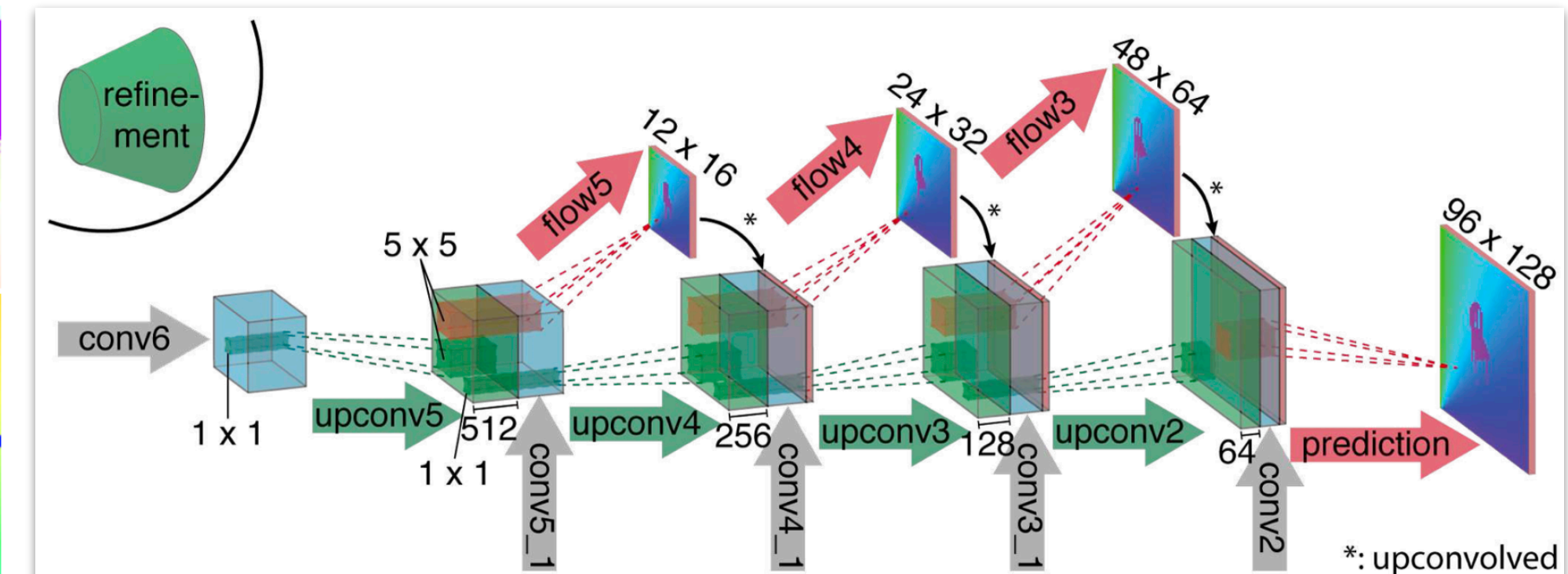# FlowNet: Learning Optical Flow with Convolutional Networks

Given a dataset consisting of image pairs and ground truth flows, train a network to predict the x-y flow fields directly from the images.

Flying Chairs Dataset   Data Augmentation   upconv: unpooling + conv

FlowNetSimple

	Frame pairs	Frames with ground truth	Ground truth density per frame
Middlebury	72	8	100%
KITTI	194	194	∽50%
Sintel	1,041	1,041	100%
Flying Chairs	22,872	22,872	100%

Images   Ground truth   FlowNetS

Method	Sintel Clean train	Sintel Clean test	Sintel Final train	Sintel Final test	KITTI train	KITTI test	Middlebury train AEE	Middlebury train AAE	Middlebury test AEE	Middlebury test AAE	Chairs test	Time (sec) CPU	Time (sec) GPU
EpicFlow [30]	2.27	4.12	3.57	6.29	3.47	3.8	0.31	3.24	0.39	3.55	2.94	16	-
DeepFlow [35]	3.19	5.38	4.40	7.21	4.58	5.8	0.21	3.04	0.42	4.22	3.53	17	-
EPPM [3]	-	6.49	-	8.38	-	9.2	-	-	0.33	3.36	-	-	0.2
LDOF [6]	4.19	7.56	6.28	9.12	13.73	12.4	0.45	4.97	0.56	4.55	3.47	65	2.5
FlowNetS	4.50	7.42	5.45	8.43	8.26	-	1.09	13.28	-	-	2.71	-	0.08
FlowNetS+v	3.66	6.45	4.76	7.67	6.50	-	0.33	3.87	-	-	2.86	-	1.05
FlowNetS+ft	(3.66)	6.96	(4.44)	7.76	7.52	9.1	0.98	15.20	-	-	3.04	-	0.08
FlowNetS+ft+v	(2.97)	6.16	(4.07)	7.22	6.07	7.6	0.32	3.84	0.47	4.58	3.03	-	1.05

End Point Error (EPE) Loss: Euclidean distance between the predicted flow vector and the ground truth, averaged over all pixels

Dosovitskiy, Alexey, et al. "Flownet: Learning optical flow with convolutional networks." *Proceedings of the IEEE international conference on computer vision.* 2015.

Questions?