



UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386



Towards Multimodal Depth Estimation from Light Fields

Titus Leistner, Radek Mackowiak, Lynton Ardizzone, Ullrich Köthe, Carsten Rother

Introduction

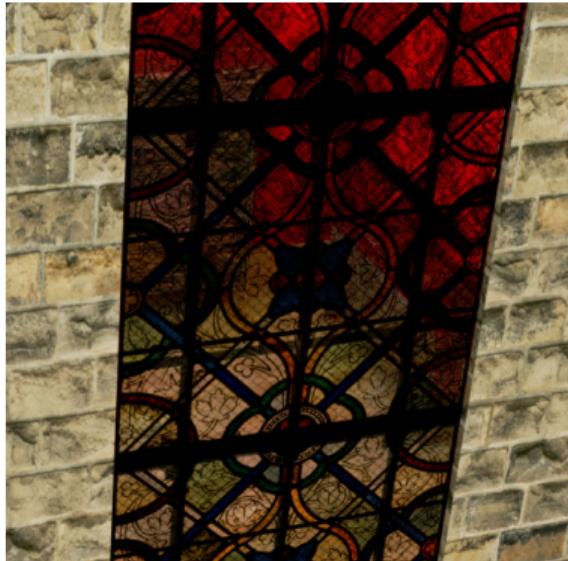
Introduction



Depth edges [1]

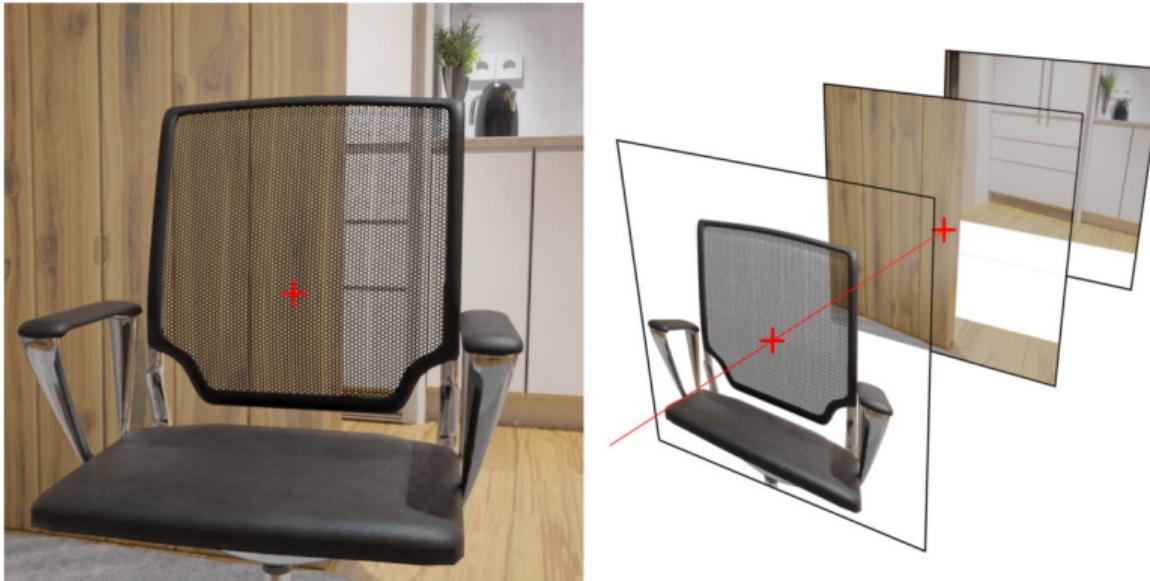


Reflections [1]



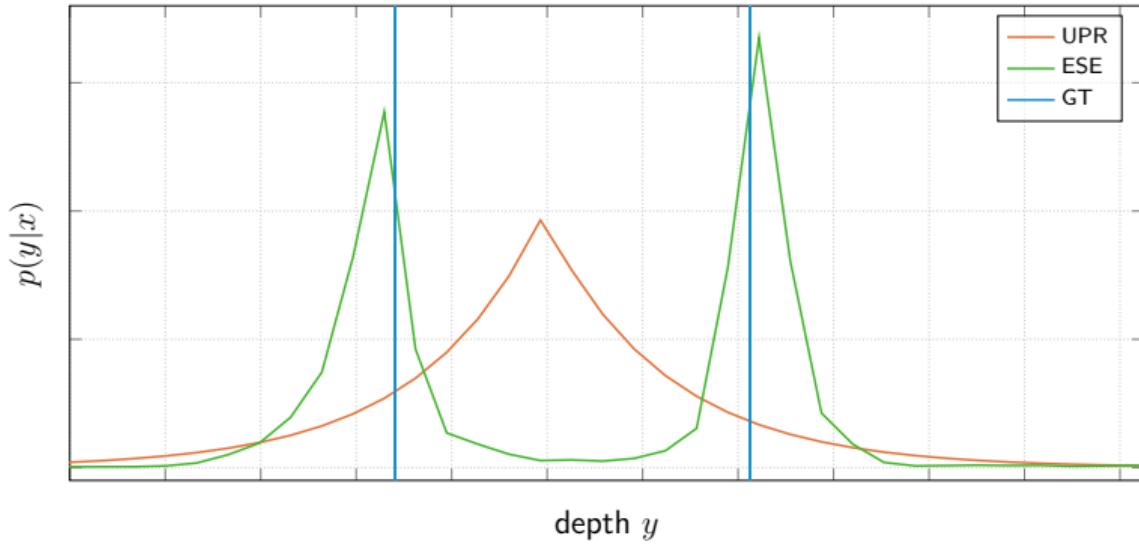
Transparency

Introduction



Pixel with two valid depth modes

Introduction



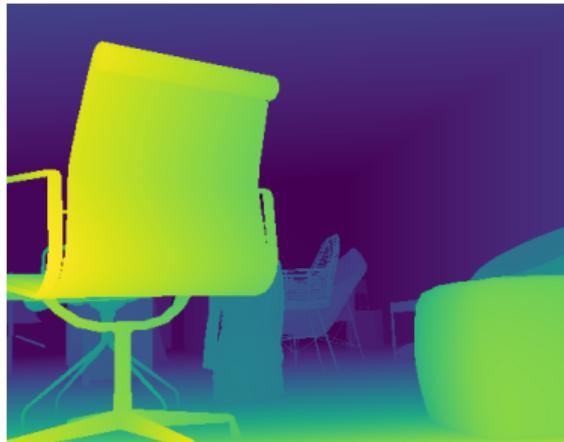
Depth posterior prediction using different methods

Dataset Generation

Dataset Generation



Exemplary scene



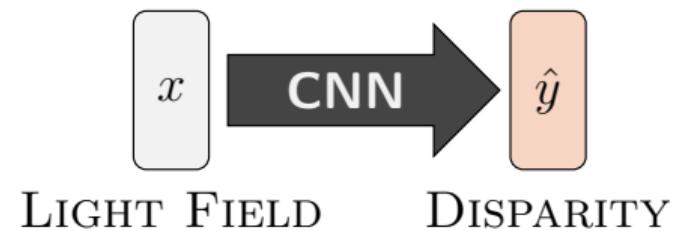
First depth



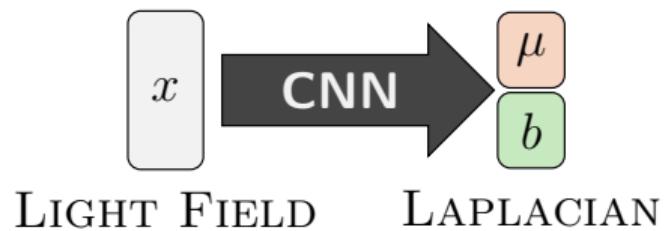
Second depth

Network Architectures

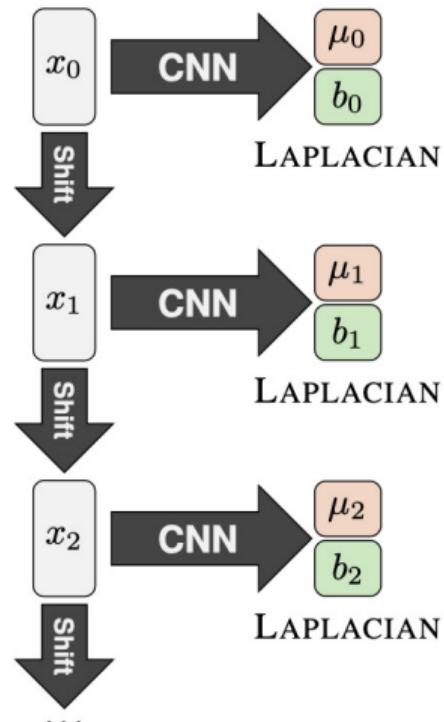
Network Architectures — Baseline



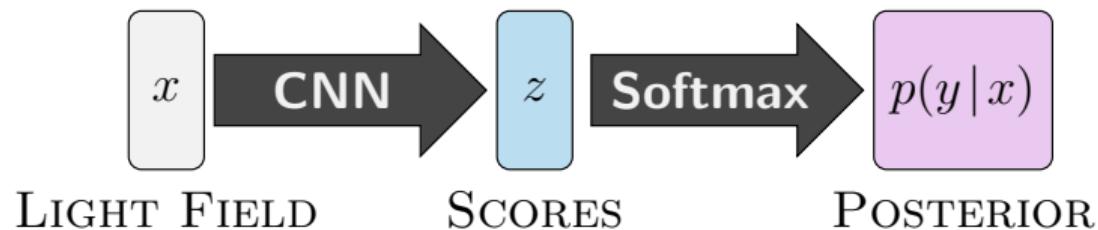
Network Architectures — Unimodal Posterior Regression



Network Architectures — EPI-Shift-Ensemble

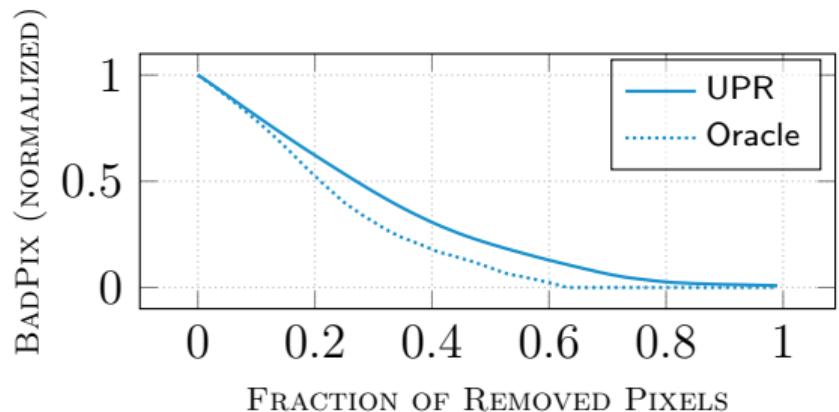


Network Architectures — Discrete Posterior Prediction

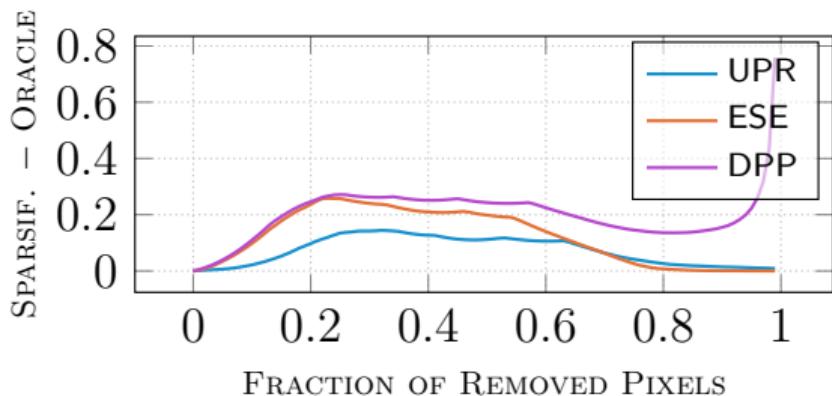


Experiments

Experiments



Sparsification curve

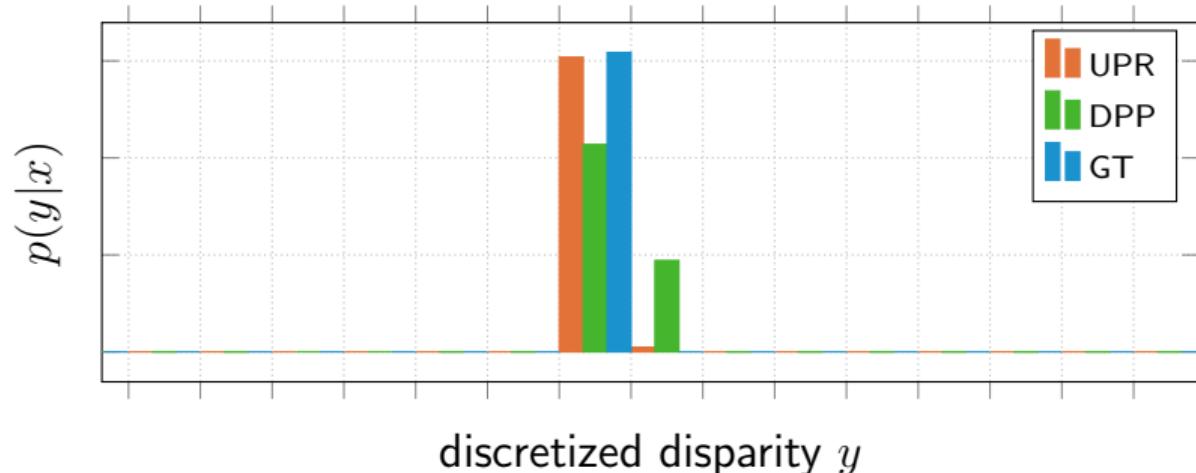


Sparsification Error for all methods

Experiments

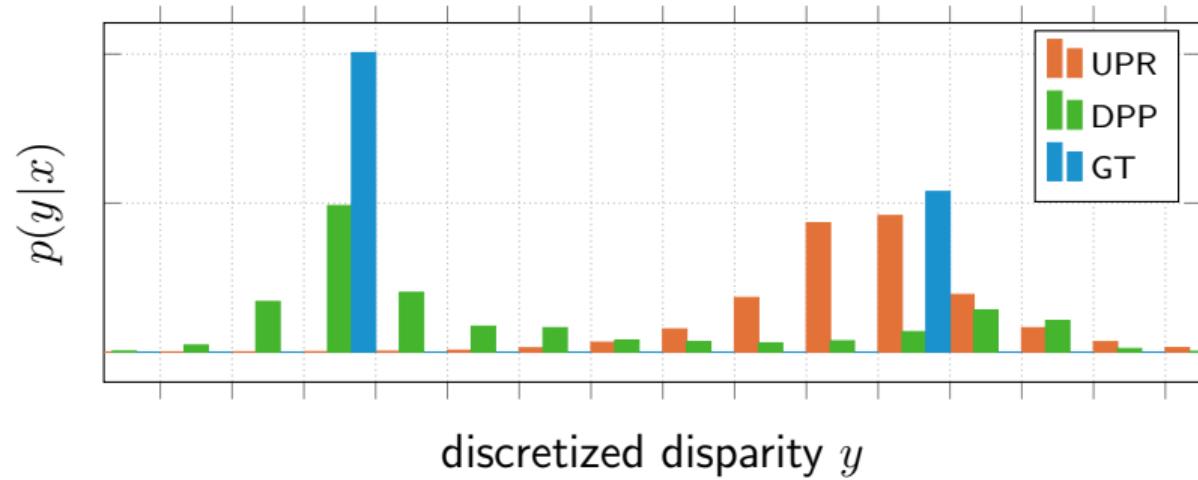
Method	Unimodal Metrics		KL Divergence			AuSE ↓	Time ↓ (in sec)
	MSE ↓	BadPix ↓	Unimodal ↓	Multimodal ↓	Overall ↓		
BASE (uni)	0.374	0.229	4.720	7.876	5.421	-	2.188
BASE (multi)	0.563	0.307	5.259	8.514	6.025	-	2.211
UPR (uni)	0.439	0.235	1.719	3.381	1.879	0.071	2.260
UPR (multi)	0.676	0.285	1.987	3.156	2.114	0.072	2.287
ESE (uni)	1.269	0.223	4.164	3.628	4.160	0.099	17.492
ESE (multi)	1.850	0.229	4.283	3.719	4.277	0.121	16.902
DPP (uni)	0.765	0.209	1.631	3.057	1.734	0.272	4.348
DPP (multi)	0.686	0.231	1.824	2.987	1.914	0.197	4.382

Experiments



pixel (red cross) contains a single depth mode

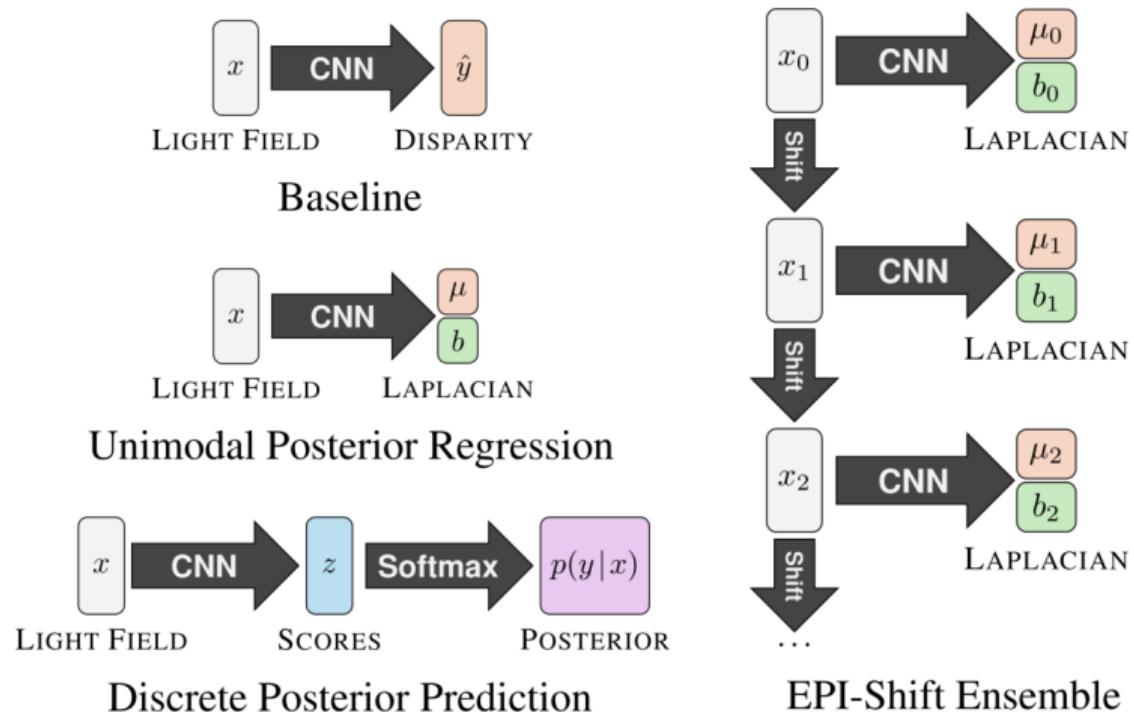
Experiments



pixel (red cross) contains two depth modes

Summary

Summary



Thanks for watching!

References I

- [1] K. Honauer, O. Johannsen, D. Kondermann, and B. Goldluecke. A dataset and evaluation methodology for depth estimation on 4d light fields. In *Asian Conference on Computer Vision*, pages 19–34. Springer, 2016.