Perceptual Deep Depth Super-Resolution Supplementary Material

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1. Additional evaluation details

In the literature on range image processing, the term *depth* is used to denote three different types of range data:

- *disparity*, presented in, *e.g.*, Middlebury dataset, *i.e.*, the difference in image location of a feature within two stereo images;
- *orthogonal depth*, presented in, *e.g.*, SUN-RGBD dataset, *i.e.*, the distance from a point in the 3D-space to the image plane;
- *perspective depth*, presented in, *e.g.*, low-resolution scans in ToFMark dataset, *i.e.*, the distance from a point in the 3D-space to the camera.

We use the term *depth map* to denote any data of this kind, however, in our experiments we evaluated each superresolution method on the range type that it was designed for. For evaluation of the disparity processing methods on the datasets that do not provide disparity maps, we calculated virtual disparity images with the baseline of 20 cm.

Here we describe the quality measures that we considered in addition to the ones discussed in the main text. We recall that we label the metrics that compare the depth values directly with subscript "d", and the visually-based metrics with subscript "v".

BadPix is the fraction of measurements with absolute deviation larger than a certain threshold τ

BadPix_d(
$$\tau | d_1, d_2$$
) = $\frac{1}{N} | \{ ij : |d_{1,ij} - d_{2,ij}| > \tau \} |,$

or the fraction of measurements with relative deviation larger than a threshold

BadPix_d(
$$\tau \% | d_1, d_2$$
) = $\frac{1}{N} | \{ ij : | \frac{d_{1,ij} - d_{2,ij}}{d_{2,ij}} | > \frac{\tau}{100} \} |,$

where d_1 and d_2 are the compared depth maps, ij represents individual pixels, and N is the number of pixels. We considered BadPix for depth map comparison with absolute thresholds of 1, 5, and 10 cm and relative thresholds of 1, 5, and 10%. We also considered this metric for comparison of depth map renderings with the absolute thresholds of 1, 5, and 10 each divided by 255 (which correspond to deviations by the respective numbers of shades of gray in 8-bit grayscale images).

Bumpiness, introduced in [4] for piece-wise planar regions and generalized in [3] for arbitrary smooth surfaces, is a measure of surface smoothness with respect to a reference. It is calculated as

Bumpiness_d(
$$d_1, d_2$$
) =
 $\frac{1}{N} \sum_{ij} \min(0.05, \|\mathbf{H}_{d_1 - d_2}(i, j)\|_{\mathbf{F}}) \cdot 100,$

where $\|\cdot\|_{\rm F}$ is Frobenius norm and ${\rm H}_f(i, j)$ is the Hessian matrix of the function f, calculated at point (i, j). We used the original implementation of this metric. Since this metric includes some parameter values, presumably, specific for the original evaluation dataset, we converted the depth maps to disparity using the camera intrinsics of this dataset.

We used the implementation of SSIM from *scikitimage* [8] and the original implementation of LPIPS from [10].

In addition to our RMSE_v we considered RMS difference of two rendered images without averaging over the basis renderings, *i.e.*, calculated for a single lighting condition. We denote this metric as RMSE_v^1 : for a light direction e and a pair of normal maps n_1, n_2 it is calculated as

$$\text{RMSE}_{\mathbf{v}}^{1}(d_{1}, d_{2}) = \sqrt{\frac{1}{N} \sum_{i,j} \|\boldsymbol{e} \cdot \boldsymbol{n}_{1,ij} - \boldsymbol{e} \cdot \boldsymbol{n}_{2,ij}\|_{2}^{2}}$$

2. Comparison of quality measures

In Figures 5-10 we compare the relations between different subsets of quality measures. We present pair-wise correlations of the metrics in the form of scatter plots in the lower half of the figure and Pearson and Spearman correlation coefficients in the upper half of the figure. For reference, on the diagonal of the figure we also include kernel density estimates of metric value distributions for each super-resolution method. The distributions for the modified methods DIP-v and MSG-v are represented with the dashed black and solid black curves respectively.

On the depth maps with missing measurements, the methods that do not inpaint the regions with the missing measurements (including MSG-v) sometimes produced severe outliers around these regions. To minimize the influence of such outliers on the results of the metric comparison, we limited the value of RMSE_d to a maximum of 0.5 meters. Among the collected super-resolved images, 8% exceeded this threshold.

For each metric, applied to rendered images, we gathered the values of this metric for four different light directions, as described in Section 5.2 of the main text. We then calculated two additional values, the worst and the average of these four. We label the respective versions of the metric with suffixes e_1 , e_2 , e_3 , e_4 , max and avg. For each metric, we found that these six versions are strongly correlated, as illustrated in Figures 5-7, so we further focused on the worst value of each metric.

We also found that different versions of RMSE_v^1 produce very similar results to our RMSE_v , as illustrated in Figure 5. It is consistent with the observation that if RMSE_v is bounded by a constant *C*, then for *any* choice of the light direction *e*, RMSE_v^1 is bounded by *C*, which can be easily seen from the fact that RMSE_v does not depend on the choice of the basis, so we can choose one of the basis light directions to be equal to *e*.

In Figure 8 we compare the metrics of different types: pixel-wise $RMSE_d$, $BadPix_d(5cm)$ and $BadPix_d(5\%)$ applied to depth directly; "worst" versions of pixel-wise $BadPix_v(5)$ and perceptual $DSSIM_v$ and $LPIPS_v$, applied to rendered images; geometrical Bumpiness_d and our $RMSE_v$. We found that all three pixel-wise metrics applied to depth directly demonstrate weak correlation with visual and geometrical metrics. Pixel-wise $BadPix_{y}(5)$ applied to rendered images, although strongly correlated with perceptual metrics, is inappropriate for gradient-based optimization. Additional comparison of pixel-wise $BadPix_d$ and $BadPix_v$ with different thresholds to perceptual $DSSIM_v$ and $LPIPS_v$ (Figures 9 and 10) leads to the same conclusions. Bumpiness_d is also strongly correlated with perceptual metrics but only measures local curvature deviation, while the visual appearance of 3D surface is determined by its local orientation.

3. Comparison of super-resolution methods

In Tables 2-9 we present the results of quantitative evaluation of super-resolution methods on the datasets SimGeo, ICL-NUIM and Middlebury for Box downsampling model and scaling factors of 4 and 8. In Table 1 we present the average values. $\rm RMSE_d$ is in millimeters, $\rm BadPix$ is in percents, $\rm DSSIM_v$, $\rm LPIPS_v$ and $\rm RMSE_v$ are in thousandths. For all visual metrics except $\rm RMSE_v$ the presented value is of the "worst" version. For all metrics the lower value corresponds to the better result. The best results are highlighted in bold and the second best results are underlined.

In addition to metric values, the last three columns of the tables contain the results of the informal perceptual study collected over approximately 250 subjects. In this study, for each scene from SimGeo, ICL-NUIM and Middlebury datasets subjects were shown the renderings of super-resolved depth maps, shuffled randomly, and were asked to choose the renderings, the most and second most similar to ground truth. The renderings calculated with the fourth light direction were used. The values in the columns "User, 1st", "User, 2nd", and "Top 2" represent the percentages of the subjects who chose the rendering of the superresolved depth map, produced by the method in the corresponding method, as the most similar, second most similar, or one of the two most similar to the ground truth respectively. We found that our $RMSE_v$ is mostly consistent with human judgements.

4. Training with MSE_v

Since optimization of MSE_v alone is an ill-posed problem, we used a regularization term that penalizes absolute depth deviation. We found that among different regularizers, including MSE_d , Lap_1 produces the best results. In general, we found that optimization leads to the best results if the terms are weighted in such way that geometrically corresponding depth error and angular normal error result in the same magnitudes of terms. The corresponding value of the weighing parameter w in Equation 4 of the main text is determined by the properties of the training data, such as depth map scaling or field of view of the camera.

5. Noisy depth measurements in the input

SimGeo, ICL-NUIM and Middlebury datasets were our primary evaluation sets, yielding the most pronounced outcomes, however, these datasets contain only noise-free scenes. As we were interested in evaluation of our approach on a diverse set of RGBD images, we included twelve scenes from SUN RGBD dataset and three scenes from ToFMark dataset that feature real-world noise patterns in our evaluation data. We observed that increased levels of noise are extremely harmful to all non over-smoothing methods, including those modified with our loss, as they fail

						Ave	erage	perfor	mance	on S	imGeo	dataset					
	RM	ISE_d	BadP	Pix _d (5cm)	BadP	$Pix_v(5)$	DSS	IM _v	LPI	PS_v	Bum	piness _d	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	55	79	4.1	7.9	23.2	38.3	197	301	320	427	0.70	0.98	193	234	0.5	7.8	8.3
SRfS [2]	61	88	7.5	14.3	74.2	77.1	711	729	869	865	1.48	1.69	311	328	0.0	0.0	0.0
EG [9]	53		2.2		33.1		168		306		0.54		136		0.2	3.9	4.2
PDN [6]	162	211	99.4	99.1	39.2	45 1	$\frac{100}{224}$	264	278	407	$\frac{0.01}{0.63}$	0.79	165	201	1.6	12.3	13.8
DG[1]	54	84	3.0	64	35.2	39.1	293	316	$\frac{270}{420}$	437	0.69	$\frac{0.75}{0.82}$	171	190	0.2	$\frac{12.5}{2.9}$	3.2
DIP [7]	52	59	8.5	12.5	90.5	92.0	887	880	893	915	2 21	2 77	395	475	0.6	0.9	1.5
MSG [5]	30	39	1.5	3 3	51.9	69.3	374	544	569	713	0.79	0.97	194	242	0.0	37	4.0
	22	41	1.7	2.2	40.7	67.1	212	401	524	509	0.75	0.97	1/7	174	0.4	50.4	67.9
MSC v	06	20	1.7	<u>2.5</u> 1.5	149.7	34.6	05	206	104	367	0.00	0.00	147	$\frac{174}{120}$	<u>0.5</u> 99 1	0.1	07.0
10130-0	90	49	0.7	1.5	14.2	34.0	35	200	154	307	0.54	0.40	"	149	00.1	9.1	91.2
						Aver	age pe	rform	ance of	on ICI	L-NUI	A dataset					
Bicubic	34	54	2.8	5.5	<u>59.3</u>	<u>64.2</u>	431	<u>490</u>	558	668	1.15	1.32	210	252	5.0	<u>28.3</u>	33.3
SRfS [2]	42	62	5.5	11.0	73.5	76.1	641	664	636	660	1.72	1.83	287	314	0.0	0.0	0.0
PDN [6]	135	165	93.8	82.9	66.2	70.2	480	509	623	650	<u>1.14</u>	1.24	237	264	2.6	10.5	13.1
DG [1]	36	58	4.3	6.4	64.4	65.5	497	505	663	689	1.28	1.32	234	259	0.6	5.5	6.1
DIP [7]	43	56	10.6	14.2	83.6	83.4	812	806	690	690	2.73	2.58	394	389	1.1	0.9	2.0
MSG [5]	<u>25</u>	36	<u>1.6</u>	<u>3.5</u>	64.1	69.0	489	557	<u>510</u>	<u>534</u>	1.27	1.46	210	255	1.1	7.2	8.3
DIP-v	28	$\underline{40}$	2.6	3.9	67.8	69.6	516	548	407	503	1.45	1.56	<u>209</u>	<u>236</u>	<u>9.6</u>	31.9	<u>41.4</u>
MSG-v	24	41	1.3	3.1	56.3	61.1	387	437	527	602	0.94	1.06	157	192	79.9	11.8	91.7
						Aver	age pe	rform	ance o	on Mie	ddlebui	y dataset	t				
Bicubic	843	1139	10.8	13.9	71.5	76.7	648	748	575	720	0.87	0.76	344	386	4.1	25.3	29.4
SRfS [2]	100	145	21.4	33.6	86.4	89.5	780	810	669	704	1.32	1.28	428	461	0.0	0.0	0.0
PDN [6]	173	225	85.3	76.5	83.4	86.4	744	790	653	711	1.38	1.67	405	467	9.9	28.1	37.9
DG [1]	266	330	15.0	24.5	81.8	84.1	765	784	728	740	1.54	1.73	421	442	0.7	10.6	11.3
DIP [7]	72	104	19.6	24.4	92.4	93.4	927	947	737	717	2.82	2.90	565	592	1.2	5.6	6.8
MSG [5]	228	426	10.8	13.1	81.8	87.2	774	858	649	696	1.96	2.19	477	525	0.2	1.6	1.8
DIP-v	56	87	6.4	10.6	83.1	87.4	728	821	506	568	1.34	1.56	353	409	72.3	18.2	90.5
MSG	00	100			72.2	70.0	100		(20	(00	1.00	1.25	276	421	10.0		
M30-v	90	133	7.3	9.2	13.3	/9.0	66 /	151	639	690	1.20	1.35	3/0	431	10.8	9.9	20.7
10150-0	90	133	<u>7.3</u> Avera	9.2	<u>73.3</u>	<u>79.0</u>	<u> 667</u> nes wi	<u>/5/</u> thout	639 missii	<u>690</u>	<u>1.20</u> asurem	1.35 ents (Sin	J/O nGeo	431 ICL-1	<u>10.8</u> NUIM Vin	9.9	20.7
	90 	I33	Avera	9.2 age perform	<u>73.3</u> ance on BadP	the scentric $\frac{79.0}{1}$	nes wi	thout	639 missii LPI	<u>690</u> 1g me	<u>1.20</u> asurem Bum	ents (Sin	nGeo,	431 ICL-N	<u>10.8</u> NUIM, Vin User 1st	9.9 tage) User 2nd	20.7
	RM x4	ISE _d	Avera	9.2 age perform Pix _d (5cm) x8	ance on BadP	$\frac{79.0}{1}$ the scentric risk (5)	nes wi DSS	$\frac{757}{\text{thout}}$	639 missii LPI x4	<u>690</u> ng me PS _v x8	1.20 asurem Bum x_4	ents (Sin piness _d x8	nGeo, RM	431 ICL-N SE _v x8	<u>10.8</u> NUIM, Vin User, 1st	9.9 tage) User, 2nd	Top 2
Bicubic	96 RM x4	ISE _d x8	7.3 Avera BadP x4 3.5	9.2 age perform $Pix_d(5cm)$ x8 6.9	$\frac{73.3}{\text{ance on}}$ BadP x4	$\frac{79.0}{1}$ the scent Pix _v (5) x8 53.3	$ \begin{array}{r} \underline{667} \\ \underline{667} \\ \underline{058} \\ \underline{058} \\ x4 \\ \underline{333} \\ \end{array} $	$\frac{757}{\text{thout}}$ IM_{v} x8 415	639 missin LPI x4	$\frac{690}{\text{ng mer}}$ $\frac{\text{Ng mer}}{\text{Ng mer}}$ $\frac{\text{Ng mer}}{\text{Ng mer}}$ $\frac{\text{Ng mer}}{\text{Ng mer}}$	1.20 asurem Bum x4	$\frac{1.35}{\text{ents (Sinpiness_d})}$	1376 nGeo, RM x4 206	431 ICL-N SE _v x8 248	<u>10.8</u> NUIM, Vin User, 1st x4 3.0	9.9 tage) User, 2nd x4 18.9	20.7 Top 2 x4
Bicubic SRfS [2]	96 RM x4 46 55	133 ISE _d x8 69 81	7.3 Avera BadP x4 3.5 7.3	9.2 age perform $Pix_d(5cm)$ x8 6.9 14.1	ance on BadP x4 43.7 74.6	$\frac{79.0}{1}$ the scentric the scentric transformation of tran	$ \begin{array}{r} \underline{667}\\ \underline{1000}\\ \underline{1000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\\underline{10000}\\$	<u>757</u> thout IM _v x8 415 701	639 missin LPI x4 <u>452</u> 743	$\frac{690}{\text{ng me}}$ $\frac{\text{ng me}}{\text{PS}_{v}}$ $\frac{x8}{561}$ 753	1.20 asurem Bum x4 0.97 1.60	$ \frac{1.35}{\text{ents (Sinpiness_d}} $ $ \frac{x8}{1.19} $ $ 1.75 $	nGeo, RM x4 206 303	431 ICL-N SE _v x8 248 326	10.8 NUIM, Vin User, 1st x4 3.0 0.0	$\begin{array}{r} 9.9 \\ \hline \text{tage} \\ \text{User, 2nd} \\ \hline \text{x4} \\ \hline 18.9 \\ \hline 0.0 \\ \end{array}$	Top 2 x4 21.9
Bicubic SRfS [2] PDN [6]	96 RM x4 46 55 148	133 ISE _d x8 69 81 187	7.3 Avera BadP x4 3.5 7.3 94.4	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90 1	$\begin{array}{r} \underline{73.3} \\ \text{ance on} \\ \text{BadP} \\ \underline{x4} \\ \underline{43.7} \\ 74.6 \\ 55.0 \\ \end{array}$	$\frac{79.0}{1}$ the scentra for	$ \begin{array}{r} \underline{667} \\ \underline{667} \\ \underline{1000} \\ $	$\frac{757}{\text{thout}}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$ $\frac{1}{1}$	639 missii LPI x4 <u>452</u> 743 482	$ \frac{690}{\text{ng mea}} $ $ \frac{\text{NS}_{v}}{\text{X8}} $ $ \overline{561} $ $ 753 $ $ 542 $	1.20 asurem Bum x4 0.97 1.60 0.93	$ \frac{1.35}{\text{ents (Sin}} $ $ \frac{\text{piness}_d}{\text{x8}} $ $ \frac{1.19}{1.75} $ 1.06	nGeo, RM x4 206 303 210	431 ICL-N SE _v x8 248 326 241	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9	$\begin{array}{r} 9.9\\ \hline tage)\\ \hline User, 2nd\\ x4\\ \hline 18.9\\ 0.0\\ 10.5\\ \end{array}$	Top 2 x4 21.9 0.0 12.4
Bicubic SRfS [2] PDN [6]	96 RM x4 46 55 148 47	133 ISE _d x8 69 81 187 73	7.3 Avera BadP x4 3.5 7.3 94.4 3.9	9.2 age perform $2ix_d(5cm)$ x8 6.9 14.1 90.1 6.7	$ \begin{array}{r} 73.3 \\ \text{ance on} \\ \text{BadP} \\ \text{x4} \\ \hline 43.7 \\ 74.6 \\ 55.0 \\ 52.1 \\ \end{array} $	$\frac{79.0}{1}$ the scentra for	<u>667</u> nes wi DSS x4 <u>333</u> 680 378 416	$ \frac{757}{\text{thout}} $ $ \frac{1}{1}M_{v} \times 8 $ $ \frac{415}{701} $ $ \frac{412}{430} $	639 missin LPI x4 <u>452</u> 743 482 561		$ \begin{array}{r r} \underline{1.20} \\ asurem \\ Bum \\ x4 \\ 0.97 \\ 1.60 \\ \underline{0.93} \\ 1.02 \\ \end{array} $	$ \begin{array}{r} 1.35 \\ ents (Simple states of the second states tates of the second states of the second state$	nGeo, RM x4 206 303 210 209	431 ICL-N SEv x8 248 326 241 230	<u>10.8</u> NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0	Top 2 x4 21.9 0.0 12.4 4.4
Bicubic SRfS [2] PDN [6] DG [1] DIP [7]	96 RM x4 46 55 148 47 50	133 ISE _d x8 69 81 187 73 62	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7	9.2 inge perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9	$\begin{array}{r c c c c c c c c c c c c c c c c c c c$	$ \frac{79.0}{1 \text{ the scen}} $ $ \frac{1}{2} \operatorname{ix}_{v}(5) \\ x8 \\ \overline{53.3} \\ 77.4 \\ 59.8 \\ 54.4 \\ 88 2 $	667 nes wi DSS x4 333 680 378 416 857	$ \frac{757}{\text{thout}} \frac{11}{\text{IM}_{v}} \frac{x8}{415} 701 \frac{412}{430} 853 $	639 missii LPI x4 452 743 482 561 801	<u>690</u> ng me. PS _v x8 561 753 <u>542</u> 584 808	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59	$ \begin{array}{r} 1.35 \\ ents (Simple set (Simpl$	376 nGeo, RM x4 206 303 210 209 414	431 ICL-N SEv x8 248 326 241 230 452	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8	Top 2 x4 21.9 0.0 12.4 4.4 1.7
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5]	96 RM x4 46 55 148 47 50 33	I33 ISEd x8 69 81 187 73 62 39	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7 1.7	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6	13.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8	$ \frac{79.0}{1 \text{ the scen}} $ $ \frac{1}{2} \text{ the scen} $ $ \frac{1}{2} \text{ ix}_{v}(5) $ $ \frac{x8}{53.3} $ $ \frac{53.3}{77.4} $ $ 59.8 $ $ 54.4 $ $ 88.2 $ $ 70.3 $	667 nes wi DSS x4 333 680 378 416 857 454	$\frac{757}{\text{thout}}$ $\frac{11}{\text{IM}_{v}}$ $\frac{x8}{415}$ 701 $\frac{412}{430}$ 853 569	639 missin LPI x4 452 743 482 561 801 547	690 ng me PS _v x8 561 753 <u>542</u> 584 808 622	I.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08	$ \begin{array}{r} 1.35 \\ ents (Simple states of the second states tates of the second states of the second state$	376 nGeo, RM x4 206 303 210 209 414 210	431 ICL-N SEv x8 248 326 241 230 452 258	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8	Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5]	96 RM x4 46 55 148 47 50 33 21	I33 ISEd x8 69 81 187 73 62 39 43	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2	9.2 nge perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8	$\frac{79.0}{100}$ t the scentration of the scentration	667 nes wi DSS x4 <u>333</u> 680 378 416 857 454	757 thout IMv x8 415 701 412 430 853 569 548	639 missin LPI x4 452 743 482 561 801 547	690 ng me PSv x8 561 753 542 584 808 622 560	I.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08	$ \begin{array}{r} 1.35 \\ ents (Simple scale sc$	376 nGeo, RM x4 206 303 210 209 414 210 101	431 ICL-N SEv x8 248 326 241 230 452 258 223	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55 \$ \$
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38	I33 ISE _d x8 69 81 187 73 62 39 43 38	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 11	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0	$\frac{79.0}{1}$ the scentric the scentric the scentric the scentric term of te	b67 nes wi DSS x4 333 680 378 416 857 454 444 264	$\frac{757}{11M_{v}}$ $\frac{11M_{v}}{x8}$ $\frac{415}{701}$ $\frac{412}{430}$ $\frac{412}{353}$ $\frac{569}{548}$ $\frac{346}{346}$	639 missin LPI x4 452 743 482 561 801 547 474 385	$\frac{690}{\text{pg me.}}$ $\frac{\text{pg me.}}{\text{pg me.}}$ $\frac{\text{rs}}{561}$ $\frac{561}{584}$ $\frac{542}{584}$ $\frac{622}{560}$ 501	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69	$ \begin{array}{r} 1.35 \\ \text{ents (Sin piness_d x8)} \\ 1.19 \\ 1.75 \\ 1.06 \\ 1.10 \\ 2.79 \\ 1.26 \\ 1.32 \\ 0.81 \\ \end{array} $	376 nGeo, RM x4 206 303 210 209 414 210 191 135	431 ICL-N SEv x8 248 326 241 230 452 258 223 169	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82 7	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45.5 10.9	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38	133 ISE _d x8 69 81 187 73 62 39 43 38	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 <u>3.3</u> 2.6	73.3 ance on BadP x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0	$\begin{array}{c} \underline{79.0} \\ \hline 1 \text{ the scentration} \\ \text{rise}_{v}(5) \\ x8 \\ \underline{53.3} \\ 77.4 \\ 59.8 \\ 54.4 \\ 88.2 \\ 70.3 \\ 69.9 \\ \underline{50.1} \\ \end{array}$	b67 nes wi DSS x4 333 680 378 416 857 454 444 264	$\frac{757}{100}$ thout 100v x8 415 701 412 430 853 569 548 346	639 missin LPI x4 452 743 482 561 801 547 474 385	690 ng me. PSv x8 561 753 542 584 808 622 560 501	1.20 asurem Bum x4 0.97 1.60 <u>0.93</u> 1.02 2.59 1.08 1.09 0.69	1.35 ents (Sin piness _d x8 1.19 1.75 <u>1.06</u> 1.10 2.79 1.26 1.32 0.81	376 nGeo, RM x4 206 303 210 209 414 210 191 135	431 ICL-1 SE _v x8 248 326 241 230 452 258 223 169	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45.5 10.9	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38	133 ISE _d x8 69 81 187 73 62 39 43 38	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 <u>3.3</u> 2.6 rage perform	73.3 ance on BadP x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0	$\begin{array}{c} \underline{79.0} \\ \hline 1 \text{ the scentration} \\ \hline 1 \text{ the scentration} \\ \hline 2 \text{ is }_{v}(5) \\ x8 \\ \hline 53.3 \\ \hline 77.4 \\ 59.8 \\ 54.4 \\ 88.2 \\ \hline 70.3 \\ 69.9 \\ \hline 50.1 \\ \hline \text{ on the scentration} \\ \hline \end{array}$	667 nes wi DSS x4 333 680 378 416 857 454 444 264	$\frac{757}{1100}$ thout IM _v x8 415 701 412 430 853 569 548 346 with m	639 missii LPI x4 452 743 482 561 801 547 474 385	690 ng me. PSv x8 561 753 542 584 808 622 560 501 meas	1.20 asurem Bum, x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69	$ \begin{array}{r} 1.35 \\ \text{ents (Sin piness_d)} \\ x8 \\ 1.19 \\ 1.75 \\ 1.06 \\ 1.10 \\ 2.79 \\ 1.26 \\ 1.32 \\ 0.81 \\ \text{tts (Midd)} \\ \end{array} $	376 nGeo, RM x4 206 303 210 209 414 210 191 135	431 ICL-1 SEv x8 248 326 241 230 452 258 223 169 y exclu	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45.5 10.9 gge)	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 33 31 38 972	133 ISE _d x8 69 81 187 73 62 39 43 38 1313 1313	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avea	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 2.6	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 mance c 71.6 74.6 74.6 55.0 52.1 87.6 59.8 60.8 38.0 mance c 71.6 26.0	$\begin{array}{c} \underline{79.0} \\ \hline 1 \text{ the scent} \\ \hline 2 \text{ ix}_{v}(5) \\ \underline{x8} \\ \underline{53.3} \\ 77.4 \\ 59.8 \\ 54.4 \\ 88.2 \\ 70.3 \\ 69.9 \\ \hline 50.1 \\ \hline 50.1 \\ \hline 70.6 \\ \hline 70.6$	b67 nes wi DSS x4 333 680 378 416 857 454 444 264 enes v 663	$\frac{757}{11}$ thout IM _v x8 415 701 412 430 853 569 548 346 765 765	639 missin LPI x4 452 743 482 561 801 547 474 385 issing 570	690 ng me. PSv x8 561 753 542 584 808 622 560 501 meas 718	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77	$\begin{array}{c} 1.35 \\ \hline 1.35 \\ \hline ents (Simple sd \\ x8 \\ \hline 1.19 \\ 1.75 \\ \hline 1.06 \\ \hline 1.10 \\ 2.79 \\ \hline 1.26 \\ \hline 1.32 \\ \hline 0.81 \\ \hline tts (Mide \\ 0.61 \\ \hline 0.61 \\ \hline \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Illeburg 358	431 ICL-N SEv x8 248 326 241 230 452 258 223 169 y exclu 400	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.2	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45.5 10.9 <u>24.7</u> <u>24.7</u> <u>2.27</u>	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 100	133 ISEd x8 69 81 187 73 62 39 43 38	7.3 Avera BadP x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avee 11.8 22.2	9.2 age perform $Pix_d(5cm)$ x8 6.9 14.1 90.1 6.7 15.9 3.6 <u>3.3</u> 2.6 Tage perform 14.7 33.8	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9	$\begin{array}{c} 79.0 \\ \hline 1 \text{ the scent}\\ \hline 2 \text{ is }_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 4 \\ 5 \\ 9 \\ 8 \\ 5 \\ 4 \\ 8 \\ 8 \\ 2 \\ 7 \\ 0 \\ 3 \\ 6 \\ 9 \\ 9 \\ \hline 5 \\ 0 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$	b67 nes wi DSS x4 333 680 378 416 857 454 444 264 enes v 663 790	757 thout IMv x8 415 701 412 430 853 569 548 346 with m 765 820	639 missin LPI x4 452 743 482 561 801 547 474 385 issing 570 676	690 ng me. PSv x8 561 753 542 584 808 622 560 501 meas 718 716	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26	$\begin{array}{c} 1.35 \\ \hline 1.35 \\ \hline ents (Simple sd \\ x8 \\ \hline 1.19 \\ 1.75 \\ \hline 1.06 \\ \hline 1.10 \\ 2.79 \\ \hline 1.26 \\ \hline 1.32 \\ \hline 0.81 \\ \hline mts (Midd \\ \hline 0.61 \\ \hline 1.21 \\ \hline 1.5 \\ \hline \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Illeburg 358 441	431 ICL-N SEv x8 248 326 241 230 452 258 223 169 y exclu 400 474	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 1.15	9.9 tage) User, 2nd x4 <u>18.9</u> 0.0 10.5 4.0 0.8 5.8 45.5 10.9 uge) <u>24.7</u> 0.0	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 10.0
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178	133 ISEd x8 69 81 187 73 62 39 43 38	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 88.3	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 <u>3.3</u> 2.6 rage perform 14.7 33.8 76.1 76.1	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5	$\begin{array}{c} 79.0 \\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x8 \\ \hline 53.3 \\ 77.4 \\ 59.8 \\ 54.4 \\ 88.2 \\ 70.3 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 0 \text{ nn the sc} \\ \hline 76.6 \\ 89.8 \\ 86.6 \\ \hline \end{array}$	b607 nes wi DSS x4 333 680 378 416 857 454 444 264 eness v 663 790 757	$\frac{757}{11M_{\rm v}}$ $\frac{11M_{\rm v}}{x8}$ $\frac{415}{701}$ $\frac{412}{430}$ $\frac{412}{853}$ $\frac{569}{548}$ $\frac{346}{765}$ $\frac{820}{803}$ $\frac{803}{803}$	639 missin LPI x4 452 743 482 561 801 547 474 385 issing 570 676 644	690 ng me. PSv x8 561 753 542 584 808 622 560 501 meas 718 716 713	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline mts (Midc \\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ \hline \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Illeburg 358 441 419	431 ICL-N SEv x8 248 326 241 230 452 258 223 169 y exclu 400 474 487	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1]	98 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298	133 ISE _d x8 69 81 187 73 62 39 43 38 1313 145 234 367	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 88.3 16.3	9.2 nge perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 <u>3.3</u> 2.6 rage perform 14.7 33.8 76.1 26.9	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance of 71.3 86.9 83.5 82.2	$\begin{array}{c} 79.0 \\ \hline 1 \text{ the scent}\\ \hline 2 \text{ is }_{v}(5) \\ \hline x8 \\ \hline 53.3 \\ 77.4 \\ 59.8 \\ 54.4 \\ 88.2 \\ 70.3 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 0 \text{ nt he sc} \\ \hline 76.6 \\ 89.8 \\ 86.6 \\ 84.7 \\ \hline x8.7 \\ \hline 84.7 \\ \hline x8.7 \\ \hline 84.7 \\ \hline x8.7 \\ x8.7 \\ \hline x8.7 \\ x8.7 $	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 781	ISI thout IMv x8 415 701 412 430 853 569 548 346 765 820 803 803	6.39 missinisi LPI x4 452 743 482 561 801 547 474 385 issing 570 676 644 716	690 ig me PSv x8 561 753 542 584 808 622 560 501 meass 718 713 724	1.20 asurem Bum x4 0.97 1.60 <u>0.93</u> 1.02 2.59 1.08 1.09 0.69 urement 0.77 1.26 1.36 1.55	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline mts (Midc \\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ \hline \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Illeburg 358 441 419 442	431 ICL-N SEv 248 326 241 230 452 258 223 169 y excht 400 474 487 465	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u>	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 18.8	9.2 age perform Yix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2	$\begin{array}{c} \hline 19.0 \\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 4 \\ 5 \\ 9 \\ 8 \\ 5 \\ 4 \\ 4 \\ 8 \\ 8 \\ 6 \\ 9 \\ 8 \\ 8 \\ 6 \\ 6 \\ 8 \\ 4 \\ 7 \\ 9 \\ 3 \\ 3 \\ \end{array}$	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 790 757 781 923	ISI thout IMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943	639 missing LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708	690 ng me. PSv x8 561 753 542 584 808 622 560 501 meas 718 713 724 691	1.20 asurem Bum x4 0.97 1.60 <u>0.93</u> 1.02 2.59 1.08 1.09 0.69 uremet 0.77 1.26 1.36 1.55 2.62	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline ms (Midc \\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ 2.68\\ \end{array}$	376 aGeo, RM x4 206 303 210 209 414 210 191 135 Ileburg 358 441 419 442 549	431 ICL-N SEv 248 326 241 230 452 258 223 169 9 v exclu 400 474 487 465 577	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2 6.4	Z0.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 18.8 12.1	9.2 age perform Yixd(5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0	$\begin{array}{c} \hline 79.0 \\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 4 \\ 5 \\ 9 \\ 8 \\ 5 \\ 4 \\ 4 \\ 8 \\ 8 \\ 6 \\ 9 \\ 8 \\ 8 \\ 6 \\ 6 \\ 8 \\ 4 \\ 7 \\ 9 \\ 3 \\ 3 \\ 8 \\ 7 \\ 7 \\ \end{array}$	b6/ mes wi DSS x4 333 680 378 416 857 454 444 264 790 757 781 923 785	ISI thout IMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943 870	639 missing LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673	690 ng me PSv x8 561 753 542 584 808 622 560 501 meas 718 716 713 724 691 711	1.20 asurem Bum x4 0.97 1.60 <u>0.93</u> 1.02 2.59 1.08 1.09 0.69 urement 0.77 1.26 1.36 1.55 2.62 2.02	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ 2.68\\ 2.24\\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 414 358 441 419 442 549 507	431 ICL-N SEv 248 326 241 230 452 258 223 169 9 v exclu 400 474 487 465 577 552	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 adding Vinta 3.8 0.0 11.5 0.9 1.2 0.2	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2 6.4 0.2	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259 58	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 11.8 22.2 18.8 12.1 7.1	$\begin{array}{r} \textbf{9.2} \\ \textbf{age perform} \\ \textbf{2ix}_{d}(5cm) \\ \textbf{x8} \\ \hline \textbf{6.9} \\ \textbf{14.1} \\ \textbf{90.1} \\ \textbf{6.7} \\ \textbf{15.9} \\ \textbf{3.6} \\ \hline \textbf{3.3} \\ \textbf{2.6} \\ \hline \textbf{2.6} \\ \hline \textbf{2.6} \\ \hline \textbf{2.6} \\ \textbf{20.7} \\ \textbf{14.1} \\ \hline \textbf{11.4} \\ \hline \textbf{11.4} \\ \hline \end{array}$	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7	$\begin{array}{c} \hline 19.0 \\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\$	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 enes v 663 790 757 781 923 785 716	ISI thout IIMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943 870 811	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673 494	690 690 ng me: x8 561 753 542 584 808 622 560 501 meas 718 713 724 691 711 550 550	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremet 0.77 1.26 1.36 1.55 2.62 2.02 1.23	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ 2.68\\ 2.24\\ \hline 1.41\\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Illeburg 358 441 419 442 549 507 354	431 ICL-N SEv x8 248 326 241 230 452 258 223 169 y exclu 400 474 487 465 577 552 405	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 adding Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1	$\begin{array}{r} 9.9\\ \hline 9.9\\ \hline tage)\\ \hline User, 2nd\\ x4\\ \hline 18.9\\ 0.0\\ 10.5\\ 4.0\\ 0.8\\ 5.8\\ \hline 45.5\\ 10.9\\ \hline 24.7\\ 0.0\\ \hline 32.8\\ 12.2\\ 6.4\\ 0.2\\ \hline 13.8\\ \hline \end{array}$	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259 58 107	133 ISEd x8 69 81 187 73 62 39 43 38	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 11.8 22.2 18.8 12.1 7.1 <u>8.1</u>	$\begin{array}{r} \textbf{9.2} \\ \textbf{age perform} \\ \textbf{2ix}_{d}(5cm) \\ \textbf{x8} \\ \hline \textbf{6.9} \\ \textbf{14.1} \\ \textbf{90.1} \\ \textbf{6.7} \\ \textbf{15.9} \\ \textbf{3.6} \\ \hline \textbf{3.3} \\ \textbf{2.6} \\ \hline \textbf{2.6} \\ \hline \textbf{7age perform} \\ \textbf{14.7} \\ \textbf{33.8} \\ \textbf{76.1} \\ \textbf{26.9} \\ \textbf{20.7} \\ \textbf{14.1} \\ \hline \textbf{11.4} \\ \textbf{9.8} \\ \end{array}$	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7 73.6	$\begin{array}{c} \hline 79.0 \\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\$	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 781 923 785 716 688	ISI thout IIMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943 870 811 776	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673 494 634	BS0 B ng me: x8 561 753 542 584 808 622 560 501 meass 718 713 724 691 711 550 688	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremen 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ 2.68\\ 2.24\\ \hline 1.41\\ \hline 1.34\\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 358 441 419 442 549 507 354 404	431 ICL-N ICL-SEv x8 248 326 241 230 452 223 169 y excluded 474 487 465 577 552 405 457 577 552 405 458	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2 6.4 0.2 13.8 8.8	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP [7] MSG [5] DIP-v MSG-v	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259 58 107	133 ISEd x8 69 81 187 73 62 39 43 38	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 <u>1.7</u> 2.2 1.1 Avera 11.8 22.2 1.1 Avera 16.3 18.8 12.1 7.1 <u>8.1</u>	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 <u>11.4</u> 9.8	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7 73.6 Average	$\begin{array}{c} 79.0 \\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 4 \\ 5 \\ 9 \\ 8 \\ 5 \\ 4 \\ 4 \\ 8 \\ 8 \\ 6 \\ 9 \\ 9 \\ 5 \\ 6 \\ 9 \\ 8 \\ 8 \\ 6 \\ 6 \\ 8 \\ 4 \\ 7 \\ 9 \\ 3 \\ 3 \\ 8 \\ 7 \\ 7 \\ 8 \\ 7 \\ 2 \\ 7 \\ 9 \\ 2 \\ 7 \\ 9 \\ 2 \\ 7 \\ 9 \\ 2 \\ 7 \\ 9 \\ 2 \\ 7 \\ 9 \\ 2 \\ 7 \\ 9 \\ 7 \\ 7 \\ 9 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7$	b67 nes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 781 923 785 716 688 667	ISI thout IIMv x8 415 701 412 430 853 569 548 346 765 803 943 870 811 776 nce or	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673 494 634	B90 B90 ng me: x8 561 753 542 584 808 622 560 501 meass 718 712 691 711 550 688 620 600 10	1.20 asurem Bum x4 0.97 1.60 <u>0.93</u> 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36 1.55 2.62 2.02 1.23 <u>1.19</u> CL-NU	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline ents (Sin piness_d \\ x8\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ \hline 1.26\\ \hline 1.32\\ \hline 0.81\\ \hline 0.61\\ \hline 1.21\\ \hline 1.69\\ 1.76\\ 2.68\\ 2.24\\ \hline 1.41\\ \hline 1.34\\ \hline W, Mid\\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 358 441 419 412 549 507 354 404	431 ICL-N ICL-SEv x8 248 326 241 230 452 223 169 y excluded 474 487 465 5777 5522 405 457 5577 552 405 458 yy	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2 6.4 0.2 13.8 8.8	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259 58 107 339	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 462	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avera 11.8 22.2 18.8 12.1 7.1 8.1 6.1	9.2 age perform Yix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 9.8 9.3	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7 73.6 Aver 52.4	$\begin{array}{r} \hline 79.0 \\ \hline 1000000000000000000000000000000000$	b6/ nes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 781 923 785 716 688 6ormaa 437	ISI thout IIMv x8 415 701 412 430 853 569 548 346 rots 803 943 870 811 776 nce or 525	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673 494 634 Sim(489	B90 B90 ng me: x8 561 753 542 584 808 622 560 501 meass 718 713 724 691 711 550 688 6co, I0 611	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91	$\begin{array}{r} 1.35 \\ \hline 1.35 \\ \hline ents (Sin piness_d \\ x8 \\ \hline 1.19 \\ 1.75 \\ \hline 1.06 \\ \hline 1.10 \\ 2.79 \\ \hline 1.26 \\ \hline 1.32 \\ \hline 0.81 \\ \hline 0.81 \\ \hline 0.61 \\ \hline 1.21 \\ \hline 1.69 \\ 1.76 \\ 2.68 \\ 2.24 \\ \hline 1.41 \\ \hline 1.34 \\ \hline 11M, Mid \\ \hline 1.00 \\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 358 441 419 412 549 507 354 404 dlebun 254	431 ICL-N ICL-SEv x8 248 326 241 230 452 223 169 y excluded 445 5777 552 405 457 577 552 405 457 577 552 405 458 y 296	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 age) 24.7 0.0 32.8 12.2 6.4 0.2 13.8 8.8	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 <u>55.8</u> 93.6 28.5 0.0 <u>44.3</u> 13.1 7.7 0.5 93.9 10.1
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 <u>72</u> 259 58 107 339 69	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 462 101	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avera 11.8 22.2 88.3 16.3 18.8 12.1 6.1 12.0	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 11.4 9.8 9.3 20.3	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7 73.6 Aver 52.4 78.5	$\begin{array}{r} \hline 79.0 \\ \hline 1 \text{ the scent} \\ \hline 1 \text{ the scent} \\ \hline 2 \text{ ix}_{v}(5) \\ \hline x \\ \hline 5 \\ 5 \\ 5 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\ 7 \\$	b6/ mes wi DSS x4 333 680 378 416 857 454 444 264 enes v 663 790 757 781 923 785 716 688 format 437 715	ISI thout IIMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943 870 811 776 nce or 525 738	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 708 673 494 634 494 634 1 Sim(489 722	B90 B90 ng me: x8 561 753 542 584 808 622 560 501 meass 718 713 724 691 711 550 688 Geo, Id 611 741 741	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremen 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.50	$\begin{array}{r} 1.35 \\ \hline 1.35 \\ \hline ents (Sin piness_d \\ x8 \\ \hline 1.19 \\ 1.75 \\ \hline 1.06 \\ \hline 1.10 \\ 2.79 \\ \hline 1.26 \\ \hline 1.32 \\ \hline 0.81 \\ \hline 0.81 \\ \hline 0.61 \\ \hline 1.21 \\ \hline 1.69 \\ 1.76 \\ 2.68 \\ 2.24 \\ \hline 1.41 \\ \hline 1.34 \\ \hline 1.00 \\ \hline 1.58 \\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 358 441 419 442 549 507 354 404 dlebuu 254 347	431 ICL-N SEv x8 248 326 241 230 452 258 223 169 9 exch 400 474 487 465 577 552 405 458 y 296 372	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0	$\begin{array}{r} 9.9\\ \hline 9.9\\ \hline tage)\\ \hline User, 2nd\\ x4\\ \hline 18.9\\ 0.0\\ 10.5\\ 4.0\\ 0.8\\ 5.8\\ \hline 45.5\\ 10.9\\ \hline 24.7\\ 0.0\\ \hline 32.8\\ 12.2\\ 6.4\\ 0.2\\ \hline 13.8\\ 8.8\\ \hline \hline \\ \hline 20.7\\ 0.0\\ \hline \end{array}$	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6]	96 R.M. x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 72 259 58 107 339 69 157	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 462 101 202	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avera 11.8 22.2 88.3 16.3 18.8 12.1 6.1 12.0 92.4	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 9.8 9.3 20.3 85.7	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.0 82.7 73.6 Avea 52.4 78.5 64.0	$\begin{array}{r} 79.0\\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{\vee}(5)\\ \hline x \\ \hline 5 \\ 5 \\ 77.4\\ \hline 59.8\\ 54.4\\ \hline 85.4\\ \hline 70.3\\ \hline 69.9\\ \hline 50.1\\ \hline 69.9\\ \hline 50.1\\ \hline 69.9\\ \hline 50.1\\ \hline 89.8\\ 86.6\\ 84.7\\ \hline 93.3\\ 87.7\\ \hline 87.2\\ \hline 79.2\\ \hline \hline 79.2\\ \hline \hline 79.2\\ \hline \hline 60.6\\ \hline 81.3\\ 68.2\\ \hline \end{array}$	b6/ b5/ nes wi DSS x4 333 680 378 416 857 454 444 264 264 923 757 785 716 688 6688 6ormaa 437 715 498	ISI thout IIMv x8 415 701 412 430 853 569 548 346 vith m 765 803 943 870 811 776 738 536	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 716 673 673 673 494 634 803 9722 533	690 690 ng me: x8 561 753 542 584 808 622 560 501 meas 718 713 724 691 711 550 688 Geo, Iu 611 741 596	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.50 1.07	$\begin{array}{c} 1.35\\ \hline 1.35\\ \hline \text{ents} (\text{Sim}\\ \text{piness}_{\text{d}}\\ \hline \textbf{x8}\\ \hline 1.19\\ 1.75\\ \hline 1.06\\ \hline 1.10\\ 2.79\\ 1.26\\ \hline 1.32\\ \hline \textbf{0.81}\\ \hline 1.32\\ \hline \textbf{0.81}\\ \hline \textbf{0.61}\\ \hline 1.26\\ \hline 2.68\\ 2.24\\ \hline 1.41\\ \hline 1.34\\ \hline \textbf{IM, Mid}\\ \hline \hline \underline{1.00}\\ 1.58\\ 1.26\\ \end{array}$	376 nGeo, RM x4 206 303 210 209 414 210 191 135 441 419 507 354 404 dlebur 254 340	431 ICL-N SE _v x8 248 248 248 241 230 452 258 223 169 474 487 455 552 405 458 457 552 405 458 457 552 296 372 319	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 adding Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0 5.0	$\begin{array}{r} 9.9\\ \hline 9.9\\ \hline tage)\\ \hline User, 2nd\\ x4\\ \hline 18.9\\ 0.0\\ 10.5\\ 4.0\\ 0.8\\ 5.8\\ \hline 45.5\\ 10.9\\ \hline 24.7\\ 0.0\\ \hline 32.8\\ 12.2\\ 6.4\\ 0.2\\ \hline 13.8\\ 8.8\\ \hline \hline \\ \hline 20.7\\ 0.0\\ 17.5\\ \hline \end{array}$	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0 22.5
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DIP [7] MSG [2] PDN [6] DIP [7]	96 RM x4 46 55 148 47 50 <u>33</u> 31 38 972 100 178 298 72 259 58 107 339 69 157 126	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 145 462 101 202 166	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avee 11.8 22.2 88.3 16.3 18.8 12.1 7.1 8.1 6.1 12.0 92.4 7.8	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 11.4 9.8 9.3 20.3 85.7 13.1	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 82.2 92.2 82.7 73.6 Aver 52.4 78.5 64.0 61.6	$\begin{array}{r} 79.0\\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 1 \text{ the scent}\\ \hline 2 \text{ ix}_{\vee}(5)\\ \hline x \\ 8 \\ \hline 5 \\ 77.4\\ \hline 59.8\\ \hline 54.4\\ 88.2\\ \hline 70.3\\ \hline 69.9\\ \hline 50.1\\ \hline 50.1\\ \hline 50.1\\ \hline 50.1\\ \hline 60.9\\ \hline 89.8\\ 86.6\\ 84.7\\ 93.3\\ 87.7\\ \hline 87.2\\ \hline 79.2\\ \hline 79.2\\ \hline 79.2\\ \hline 60.6\\ 81.3\\ 68.2\\ 64.0\\ \end{array}$	b6/ b mes wi DSS x4 333 680 378 416 857 454 444 264 264 790 757 781 923 785 716 688 663 667 715 715 715 498 531	$\begin{array}{c} \underline{151} \\ \underline{151} \\ \underline{151} \\ \underline{151} \\ \underline{110} \\ 110$	6.39 missis LPI x4 452 743 482 561 801 547 474 474 474 474 474 708 673 676 673 494 634 85im0 489 722 533 610	690 690 ng me x8 561 753 542 584 808 622 560 501 meas 718 718 713 714 550 688 600, Iu 617 741 596 628	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 0.69 uremet 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.07 1.19	1.33 ents (Simple Sd piness _d x8 1.19 1.75 <u>1.06</u> 1.10 2.79 1.26 1.32 0.81 nts (Midd <u>0.61</u> <u>1.21</u> 1.69 1.76 2.68 2.24 1.41 1.34 IIM, Mid <u>1.00</u> 1.58 1.26 1.31	376 nGeo, RM x4 206 303 210 209 414 210 191 135 414 419 442 549 507 354 404 dlebur 254 347 276 283	431 ICL-N SE _v x8 248 326 241 230 452 258 223 169 9 v exclu 474 487 405 552 405 458 y 296 372 319 305	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0 5.0 0.5	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 32.8 12.2 6.4 0.2 13.8 8.8 20.7 0.0 17.5 6.6	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0 22.5 7.1
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7]	96 RM x4 46 55 148 47 50 33 31 38 972 100 178 298 72 259 58 107 339 69 157 126 57	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 202 166 75	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avee 11.8 22.2 88.3 16.3 18.8 12.1 6.1 12.0 92.4 7.8 13.3	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 11.4 9.8 9.3 20.3 85.7 13.1 17.4	$\begin{array}{c c} 73.3 \\ \hline 73.3 \\ \hline ance on \\ \hline BadF \\ x4 \\ \hline 43.7 \\ 74.6 \\ 55.0 \\ 52.1 \\ 87.6 \\ 59.8 \\ \hline 60.8 \\ 38.0 \\ \hline 71.3 \\ 86.9 \\ 83.5 \\ 82.2 \\ 92.2 \\ 82.0 \\ \hline 82.7 \\ \hline 73.6 \\ \hline Aven \\ \hline 52.4 \\ 78.5 \\ 64.0 \\ 61.6 \\ 89.1 \\ \hline \end{array}$	$\begin{array}{r} 79.0 \\ \hline 88.2 \\ \hline 77.4 \\ \hline 59.8 \\ \hline 54.4 \\ \hline 88.2 \\ \hline 70.3 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 50.1 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 89.8 \\ \hline 86.6 \\ \hline 84.7 \\ \hline 93.3 \\ \hline 87.7 \\ \hline 87.2 \\ \hline 79.2 \\ \hline \hline 79.2 \\ \hline \hline 79.2 \\ \hline \hline 79.2 \\ \hline 60.6 \\ \hline 81.3 \\ \hline 68.2 \\ \hline 64.0 \\ \hline 89.8 \\ \hline \end{array}$	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 715 716 688 531 878	$\begin{array}{c} \underline{151} \\ \underline{151} \\ \underline{151} \\ \underline{110} \\ \underline{110} \\ \underline{110} \\ \underline{112} \\ \underline{415} \\ \overline{701} \\ \underline{412} \\ \underline{415} \\ \overline{701} \\ \underline{412} \\ \underline{415} \\ \overline{701} \\ \underline{415} \\ \underline{556} \\ \underline{556} \\ \underline{516} \\ 516$	6.39 missis LPI x4 452 743 482 561 801 547 474 474 385 570 676 673 676 673 676 673 494 634 5 33 610 771	690 690 ng me. x8 561 753 542 584 808 622 560 501 meas 718 718 713 712 691 713 724 691 711 550 688 620 601 741 5596 628 771	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremet 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.50 1.07 1.19 2.60	1.35 ents (Simple Sd piness _d x8 1.19 1.75 1.06 1.10 2.79 1.26 1.32 0.81 1ts (Mide 2.68 2.24 1.41 1.69 1.76 2.68 2.24 1.41 1.58 1.26 1.31 2.76	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Ilebur, 358 441 419 442 549 507 354 404 dlebur 254 347 276 283 457	431 ICL-N SE _v x8 248 326 241 230 452 258 223 169 9 v exclu 474 487 552 2552 490 478 487 79 296 372 305 491	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0 5.0 0.5 1.0	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 32.8 12.2 6.4 0.2 13.8 8.8 20.7 0.0 17.5 6.6 2.6	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0 22.5 7.1 3.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5]	96 RM x4 46 55 148 47 50 33 31 38 972 100 178 298 72 259 58 107 339 69 157 126 57 104	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 202 166 75 181	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avea 11.8 22.2 88.3 16.3 18.8 12.1 6.1 12.0 92.4 7.8 13.3 5.0	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 11.4 9.8 9.3 20.3 85.7 13.1 17.4 6.9	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 mance c 71.3 86.9 83.5 92.2 82.0 82.7 73.6 Aver 54.0 61.6 89.1 66.8	$\begin{array}{r} 79.0 \\ \hline 88.2 \\ \hline 77.4 \\ \hline 59.8 \\ \hline 54.4 \\ \hline 88.2 \\ \hline 70.3 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 50.1 \\ \hline 69.9 \\ \hline 50.1 \\ \hline 89.8 \\ \hline 86.6 \\ \hline 84.7 \\ \hline 93.3 \\ \hline 87.7 \\ \hline 87.2 \\ \hline 79.2 \\ \hline \hline 79.2 \\ \hline \hline 79.2 \\ \hline \hline 79.2 \\ \hline 60.6 \\ \hline 81.3 \\ \hline 68.2 \\ \hline 64.0 \\ \hline 89.8 \\ \hline 75.8 \\ \hline \end{array}$	b6/ b6/ mes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 785 716 688 688 688 688 571 498 531 878 559 59	$\begin{array}{c} \underline{151} \\ \underline{151} \\ \underline{151} \\ \underline{151} \\ \underline{110} \\ \underline{110} \\ \underline{110} \\ \underline{112} \\ \underline{415} \\ \underline{701} \\ \underline{412} \\ \underline{415} \\ \underline{701} \\ \underline{415} \\ \underline{556} \\ \underline{556} \\ \underline{556} \\ \underline{516} \\ 516$	6.39 missis LPI x4 452 743 482 561 801 547 474 474 385 570 676 673 676 673 676 673 494 634 9 708 673 494 634 9 722 533 610 771 587	690 690 ng me. x8 561 753 542 584 808 622 560 501 meas 718 718 713 724 691 688 600, Id 611 750 628 711 596 628 771 650	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.50 1.07 1.19 2.60 1.37	1.35 ents (Simple Sd piness _d x8 1.19 1.75 1.06 1.10 2.79 1.26 1.32 0.81 tts (Midd 2.68 2.24 1.41 1.69 1.76 2.68 2.24 1.41 1.34 IM, Mid 1.58 1.26 1.31 2.76 1.57	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Ilebur, 358 441 419 442 549 507 354 404 dlebur 254 347 276 283 457 304	431 ICL-N SE _v x8 248 326 241 230 452 258 223 169 y exclut 400 474 487 552 240 552 405 458 79 296 372 319 355	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0 5.0 0.5 1.0 0.5	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 32.8 12.2 6.4 0.2 13.8 8.8 20.7 0.0 17.5 6.6 2.6 4.0	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0 22.5 7.1 3.6 4.6
Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v MSG-v Bicubic SRfS [2] PDN [6] DG [1] DIP [7] MSG [5] DIP-v	96 RM x4 46 55 148 47 50 33 31 38 972 100 178 298 72 259 58 107 339 69 157 126 57 104 40	133 ISEd x8 69 81 187 73 62 39 43 38 1313 145 234 367 102 488 91 145 202 166 75 181 58	7.3 Avera BadF x4 3.5 7.3 94.4 3.9 10.7 1.7 2.2 1.1 Avea 11.8 22.2 88.3 16.3 18.8 12.1 6.1 12.0 92.4 7.8 13.3 5.0 3.8	9.2 age perform Pix _d (5cm) x8 6.9 14.1 90.1 6.7 15.9 3.6 3.3 2.6 rage perform 14.7 33.8 76.1 26.9 20.7 14.1 11.4 9.8 9.3 20.3 85.7 13.1 17.4 6.9 5.9	73.3 ance on BadF x4 43.7 74.6 55.0 52.1 87.6 59.8 60.8 38.0 nance c 71.3 86.9 83.5 92.2 82.0 82.7 73.6 Aver 54.0 61.6 89.1 66.8 67.7	$\begin{array}{c} 79.0\\ \hline 1 \text{ the scert}\\ \hline 1 \text{ the scert}\\ \hline 1 \text{ the scert}\\ \hline 2 \text{ ix}_{\vee}(5)\\ \hline x \\ 8 \\ 54.4\\ 8 \\ 54.4\\ 88.2\\ \hline 70.3\\ \hline 69.9\\ \hline 50.1\\ \hline 50.1\\ \hline 93.3\\ 86.6\\ 84.7\\ 93.3\\ 87.7\\ \hline 87.2\\ \hline 79.2\\ \hline 79.2\\ \hline 79.2\\ \hline 79.2\\ \hline 60.6\\ 81.3\\ 68.2\\ 64.0\\ 89.8\\ 75.8\\ \hline 75.4\\ \hline \end{array}$	b67 mes wi DSS x4 333 680 378 416 857 454 444 264 663 790 757 715 716 688 6531 878 559 530	151 thout IM _v x8 415 701 412 430 853 569 548 346 vith m 765 803 803 803 803 811 7766 525 738 536 548 881 664 631	6.39 missis LPI x4 452 743 482 561 801 547 474 385 570 676 644 708 673 494 634 722 533 610 771 587 481	690 690 ng me. x8 561 753 542 584 808 622 560 501 meas 718 718 713 724 691 6688 600, Id 611 741 596 628 771 650 557 557	1.20 asurem Bum x4 0.97 1.60 0.93 1.02 2.59 1.08 1.09 0.69 uremer 0.77 1.26 1.36 1.55 2.62 2.02 1.23 1.19 CL-NU 0.91 1.50 1.07 1.19 2.60 1.37 1.14	1.35 ents (Simple Sd piness _d x8 1.19 1.75 1.06 1.10 2.79 1.26 1.32 0.81 tts (Mide 0.61 1.21 1.69 1.76 2.68 2.24 1.41 1.34	376 nGeo, RM x4 206 303 210 209 414 210 191 135 Ilebur, 358 441 419 442 549 507 354 404 dlebur 254 347 276 283 457 304 242	431 ICL-N SE _v x8 248 326 241 230 452 258 223 169 y exclut 400 474 487 552 405 455 27 296 372 319 305 491 350 280	10.8 NUIM, Vin User, 1st x4 3.0 0.0 1.9 0.4 0.8 0.7 10.2 82.7 ading Vinta 3.8 0.0 11.5 0.9 1.2 0.2 80.1 1.3 3.3 0.0 5.0 0.5 1.0 0.5 32.3	9.9 tage) User, 2nd x4 18.9 0.0 10.5 4.0 0.8 5.8 45.5 10.9 32.8 12.2 6.4 0.2 13.8 8.8 20.7 0.0 17.5 6.6 2.6 4.0	20.7 Top 2 x4 21.9 0.0 12.4 4.4 1.7 6.4 55.8 93.6 28.5 0.0 44.3 13.1 7.7 0.5 93.9 10.1 24.0 0.0 22.5 7.1 3.6 4.6 67.8

Table 1: Quantitative evaluation summary. The best result is in bold, the second best in underlined.



Figure 1: $\times 4$ super-resolution results produced by the original MSG and MSG-V with our loss, both trained on noisy data. The upper two samples contain synthetic noise, while the lower three from ToFMark dataset represent real noisy ToF measurements. Best viewed in large scale.

to produce reasonable super-resolution results, as illustrated in Figures 3-4. To demonstrate that this is not a limitation of our approach, in Figure 1 we present the super-resolution results produced by modified and unmodified versions of MSG, trained on the data with synthetic multiplicative gaussian noise.

6. Different downsampling models

In Figure 2 we present the results for different downsampling models, used for calculation of low-resolution input. We found that the visual quality remains high when the downsampling model used during training and that of the input match; if this is not the case, the quality deteriorates, as expected.



Figure 2: ×4 super-resolution results for different input downsampling models produced by DIP-V with a matching downsampling model, DIP-V with Nearest Neighbor downsampling model and MSG-V with Box downsampling model. Best viewed in large scale.



Figure 3: x4 super-resolution results on a Kinect v2 RGBD scan from SUN RGBD dataset. Each visualization is labeled in the bottom left corner. Ground truth is in the 2nd column, DIP-v is in the third from the right, MSG-v in the last one.



Figure 4: x4 super-resolution results on "Devil" from ToFMark dataset. Each visualization is labeled in the bottom left corner. Ground truth is in the 2nd column, DIP-v is in the third from the right, MSG-v in the last one.



Figure 5: Comparison of different versions of $RMSE_v^1$ metric and $RMSE_v$ metric. Best viewed in large scale and in color.



Figure 6: Comparison of different versions of DSSIM_v metric. Best viewed in large scale and in color.



Figure 7: Comparison of different versions of LPIPS_{v} metric. Best viewed in large scale and in color.



Figure 8: Comparison of metrics of different types. Best viewed in large scale and in color.



Figure 9: Comparison of different pixel-wise metrics applied to depth directly and perceptual metrics. Best viewed in large scale and in color.



Figure 10: Comparison of different pixel-wise metrics applied to rendered images and perceptual metrics. Best viewed in large scale and in color.

							(Cube, I	high-fre	quency	texture						
	RM	SE_d	BadP	$ix_d(5cm)$	BadF	$Pix_v(5)$	DSS	$\mathrm{SIM}_{\mathrm{v}}$	LPI	PS_v	Bum	$piness_d$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	44	63	2.7	5.2	15.0	27.3	131	204	287	<u>395</u>	0.43	0.61	160	188	0.7	<u>13.2</u>	14.0
SRfS [2]	52	75	6.2	12.1	89.2	80.3	934	818	1036	938	1.73	1.67	361	339	0.0	0.0	0.0
EG [<mark>9</mark>]	43		1.2		25.4		<u>113</u>		<u>214</u>		0.35		<u>105</u>		0.7	9.6	10.3
PDN [6]	164	219	99.6	99.4	27.5	<u>29.5</u>	156	186	250	368	0.39	0.49	145	171	0.7	4.4	5.1
DG [1]	44	67	1.9	4.2	26.4	30.1	218	240	411	437	0.44	0.55	139	159	0.7	7.4	8.1
DIP [7]	45	48	6.4	8.5	93.5	92.5	963	947	906	918	2.98	2.50	530	494	0.0	0.7	0.7
MSG [5]	<u>29</u>	38	1.0	2.6	60.1	77.9	445	653	687	877	0.79	0.98	176	233	0.0	0.0	0.0
DIP-v	26	<u>36</u>	0.8	1.6	56.2	60.8	352	413	613	653	0.64	0.89	146	162	<u>5.9</u>	58.1	<u>64.0</u>
MSG-v	102	20	0.3	0.7	9.3	51.0	70	316	179	676	0.20	0.39	77	125	91.2	6.6	97.8
								(Cube, n	o textur	e						
Bicubic	44	63	2.7	5.2	15.0	27.3	131	204	287	395	0.43	0.61	160	188	0.0	5.9	5.9
SRfS [2]	43	63	2.1	4.5	53.4	51.7	516	476	754	728	0.67	0.89	219	228	0.0	0.0	0.0
EG [<mark>9</mark>]	43		1.2		25.4		128		282		0.35		105		0.0	2.9	2.9
PDN [6]	164	219	99.6	99.4	26.3	29.3	162	<u>185</u>	314	<u>353</u>	0.38	0.49	145	171	0.7	4.4	5.1
DG [1]	44	67	1.9	4.2	26.4	30.1	218	240	411	437	0.44	0.55	139	159	0.0	2.2	2.2
DIP [7]	72	56	23.2	17.3	94.3	99.1	912	980	1026	1133	2.05	4.22	434	683	0.0	0.7	0.7
MSG [5]	29	<u>26</u>	1.0	1.7	30.7	49.8	199	314	509	642	0.42	0.47	157	171	0.0	<u>6.6</u>	6.6
DIP-v	26	35	0.8	1.4	15.1	45.4	<u>95</u>	237	347	478	0.28	0.35	111	107	<u>1.5</u>	76.5	<u>77.9</u>
MSG-v	9	19	0.3	0.4	6.0	13.0	50	73	141	213	0.17	0.21	77	82	97.8	0.7	98.5

Table 2: Quantitative evaluation on "Cube" with different RGBs from SimGeo dataset. The best result is in bold, the second best is underlined.

						S	phere	and cy	linder, l	nigh-fre	quency	texture					
	RM	SE_d	BadP	$ix_d(5cm)$	BadF	$Pix_v(5)$	DSS	IM_{v}	LPI	PS_v	Bum	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	57	82	4.1	8.1	20.1	<u>36.7</u>	189	294	313	<u>420</u>	0.67	0.98	189	234	0.0	0.7	0.7
SRfS [2]	70	102	12.1	24.6	91.9	91.8	887	865	1025	1008	2.43	2.41	417	403	0.0	0.0	0.0
EG [9]	55		2.4		30.4		<u>143</u>		326		<u>0.50</u>		<u>130</u>		0.0	1.5	1.5
PDN [6]	157	197	99.3	98.9	40.7	54.1	198	242	<u>295</u>	461	0.60	<u>0.77</u>	150	187	1.5	9.6	11.0
DG [1]	56	87	3.2	6.3	30.9	35.2	265	<u>285</u>	372	386	0.66	<u>0.77</u>	166	180	0.0	1.5	1.5
DIP [7]	46	69	3.9	27.2	97.0	99.2	965	975	1062	1014	4.01	4.80	548	696	1.5	2.9	4.4
MSG [5]	<u>41</u>	<u>41</u>	1.4	3.6	72.6	85.6	626	820	859	960	0.98	1.43	229	314	0.0	0.0	0.0
DIP-v	28	43	<u>1.2</u>	2.4	69.2	86.0	560	850	766	832	0.56	1.45	142	242	32.4	52.9	<u>85.3</u>
MSG-v	99	37	0.6	2.0	14.3	53.0	94	334	267	583	0.29	0.55	96	164	64.7	<u>30.9</u>	95.6
							S	phere	and cyli	nder, no	o textur	e					
Bicubic	57	82	4.1	8.1	20.2	36.8	189	294	325	437	0.67	0.98	190	233	0.0	0.7	0.7
SRfS [2]	59	85	4.6	8.6	51.4	70.8	430	619	657	766	0.77	1.25	193	256	0.0	0.0	0.0
EG [<mark>9</mark>]	56		2.4		30.9		160		383		0.50		128		0.0	1.5	1.5
PDN [6]	157	197	99.3	98.9	38.0	44.1	202	218	294	<u>386</u>	0.58	0.76	150	186	5.9	<u>17.6</u>	23.5
DG [1]	57	87	3.2	6.4	31.0	<u>35.3</u>	265	284	396	409	0.66	0.78	165	180	0.7	2.2	2.9
DIP [7]	49	56	5.0	5.5	85.6	81.6	856	662	927	723	1.01	0.96	244	249	1.5	0.0	1.5
MSG [5]	40	<u>37</u>	<u>1.4</u>	3.1	45.6	64.5	288	444	509	610	0.65	0.76	183	218	0.7	0.7	1.5
DIP-v	35	39	1.4	1.8	41.0	72.6	210	523	517	643	0.47	0.70	130	141	<u>9.6</u>	64.7	74.3
MSG-v	14	27	0.7	1.3	8.5	18.0	77	93	174	200	0.27	0.32	96	110	81.6	12.5	94.1
						S	phere	and cy	linder,	low-free	quency	texture					
Bicubic	57	82	4.1	8.1	20.1	36.7	189	294	313	420	0.67	0.98	189	234	0.0	2.2	2.2
SRfS [2]	62	91	6.8	14.9	74.9	81.0	691	738	961	956	1.38	1.65	311	335	0.0	0.0	0.0
EG [<mark>9</mark>]	54		2.4		30.4		160		377		0.50		129		<u>0.7</u>	7.4	8.1
PDN [6]	157	197	99.3	98.9	37.9	44.5	202	219	<u>299</u>	397	0.58	0.76	150	186	0.7	36.0	36.8
DG [1]	56	87	3.2	6.3	30.9	35.2	265	285	372	<u>386</u>	0.66	0.77	166	180	0.0	3.7	3.7
DIP [7]	49	52	8.0	4.9	85.5	84.7	796	812	821	924	1.19	1.18	267	250	0.0	0.0	0.0
MSG [5]	41	<u>41</u>	<u>1.3</u>	3.0	39.6	66.2	264	458	493	612	0.64	0.74	181	213	0.0	1.5	1.5
DIP-v	38	42	1.7	2.2	48.0	60.4	238	351	456	516	0.50	0.61	128	152	0.7	47.8	48.5
MSG-v	16	26	0.7	1.2	8.5	17.5	76	92	156	181	0.27	0.31	97	100	97.8	1.5	99.3

Table 3: Quantitative evaluation on "Sphere and cylinder" with different RGBs from SimGeo dataset. The best result is in bold, the second best is underlined.

									Lu	ıcy							
	RM	SE_d	BadP	$ix_d(5cm)$	BadF	$Pix_v(5)$	DSS	$\mathrm{SIM}_{\mathrm{v}}$	LPI	PS_v	Bum	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	72	103	6.8	13.0	48.8	<u>65.0</u>	<u>355</u>	519	398	497	1.37	1.74	267	328	<u>2.2</u>	<u>24.3</u>	26.5
SRfS [2]	82	113	13.2	20.8	84.6	87.1	811	857	781	792	1.90	2.28	367	407	0.0	0.0	0.0
EG [9]	69		3.5		56.2		357		426		<u>1.05</u>		220		0.0	0.7	0.7
PDN [6]	173	234	99.0	98.8	64.9	68.9	456	535	368	480	1.24	1.47	251	303	0.0	1.5	1.5
DG [1]	69	108	4.9	11.0	65.5	68.6	523	562	558	565	1.28	1.50	249	281	0.0	0.7	0.7
DIP [7]	<u>53</u>	75	4.7	11.4	87.4	95.2	827	908	615	778	2.02	2.93	344	478	0.7	0.7	1.5
MSG [5]	54	<u>53</u>	<u>2.7</u>	5.4	62.9	71.7	444	577	480	578	1.30	1.42	259	306	1.5	13.2	14.7
DIP-v	44	55	4.6	<u>4.4</u>	69.0	77.5	421	574	446	<u>468</u>	1.15	1.27	223	<u>239</u>	0.0	56.6	<u>56.6</u>
MSG-v	74	47	1.6	3.7	38.8	55.0	205	325	251	348	0.82	0.96	156	195	95.6	2.2	97.8

Table 4: Quantitative evaluation on "Lucy" from SimGeo dataset. The best result is in bold, the second best is underlined.

									Pair	nting							
	RM	SE_d	BadP	$ix_d(5cm)$	BadF	$\operatorname{Pix}_{v}(5)$	DSS	$\mathrm{SIM}_{\mathrm{v}}$	LPI	PS_v	Bump	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	28	47	2.5	5.6	<u>57.1</u>	64.1	<u>423</u>	514	544	649	0.95	1.15	213	265	4.4	47.8	52.2
SRfS [2]	39	60	6.5	15.9	78.4	81.2	707	722	612	661	1.47	1.55	308	337	0.0	0.0	0.0
EG [9]	36		3.1		61.9		481		720		0.94		231		0.0	3.7	3.7
PDN [6]	151	215	99.3	99.2	65.2	70.2	488	532	669	709	<u>0.89</u>	1.01	237	275	<u>4.4</u>	10.3	14.7
DG [1]	31	49	2.4	5.5	61.9	<u>63.9</u>	503	<u>506</u>	678	700	1.08	1.13	232	272	0.7	3.7	4.4
DIP [7]	30	37	4.0	4.7	80.4	79.5	802	766	630	612	2.18	1.82	362	341	0.0	0.0	0.0
MSG [5]	<u>21</u>	29	1.2	2.2	63.7	67.9	495	570	<u>475</u>	507	0.97	1.12	203	243	2.2	5.1	7.4
DIP-v	22	32	2.3	3.2	70.1	70.3	567	564	386	501	1.07	1.12	210	239	2.9	<u>21.3</u>	24.3
MSG-v	17	34	0.9	1.8	51.4	58.0	354	410	532	607	0.67	0.77	142	170	85.3	8.1	93.4
									Sc	ofa							
Bicubic	38	58	1.8	3.6	75.4	77.0	566	616	704	764	2.12	2.33	212	250	3.7	15.4	19.1
SRfS [2]	39	58	2.0	3.5	82.3	88.1	715	832	631	743	2.97	3.45	310	405	0.0	0.0	0.0
EG [9]	42		2.5		79.0		598		767		2.28		213		0.0	8.8	8.8
PDN [6]	86	91	71.0	70.8	83.3	83.0	641	658	784	763	2.40	2.50	260	264	0.7	3.7	4.4
DG [1]	41	63	3.2	4.4	77.7	77.9	624	632	823	855	2.30	2.33	255	263	0.0	5.1	5.1
DIP [7]	45	57	7.1	12.7	93.1	94.0	928	946	758	738	3.91	3.99	518	560	0.0	0.0	0.0
MSG [5]	27	36	1.2	2.3	80.6	85.7	718	791	<u>606</u>	<u>610</u>	2.71	3.22	254	316	0.0	0.7	0.7
DIP-v	27	<u>43</u>	0.9	2.0	79.1	82.5	645	718	414	585	2.67	3.07	215	266	19.1	47.8	66.9
MSG-v	<u>35</u>	44	0.7	1.6	74.0	75.7	537	585	710	759	1.96	2.10	165	196	76.5	<u>18.4</u>	94.9
									Pl	ant							
Bicubic	38	58	3.7	6.4	75.9	79.9	<u>562</u>	<u>610</u>	688	763	1.58	1.79	249	290	1.5	<u>22.1</u>	23.5
SRfS [2]	46	65	5.8	9.5	82.9	85.0	658	692	632	649	1.96	2.13	280	309	0.0	0.0	0.0
EG [9]	43		4.5		82.2		568		677		1.64		255		0.0	0.7	0.7
PDN [6]	88	89	94.5	37.8	79.5	82.5	574	612	659	699	<u>1.46</u>	1.60	269	305	4.4	7.4	11.8
DG [1]	40	63	3.9	6.7	79.5	81.1	611	622	745	785	1.67	1.70	268	291	2.2	11.0	13.2
DIP [7]	38	47	6.9	6.1	93.9	92.8	919	880	764	723	4.33	3.95	490	437	0.0	0.7	0.7
MSG [5]	<u>31</u>	<u>44</u>	<u>2.3</u>	3.7	78.0	81.8	571	645	<u>582</u>	495	1.62	1.84	234	285	0.0	11.8	11.8
DIP-v	<u>31</u>	40	4.7	4.8	83.5	84.1	694	707	463	555	2.25	2.21	262	276	11.0	33.1	44.1
MSG-v	27	<u>44</u>	1.8	<u>3.9</u>	74.3	77.8	524	575	639	720	1.31	1.47	194	236	80.9	13.2	94.1

Table 5: Quantitative evaluation on RGBD frames from ICL-NUIM "Living Room" sequence. The best result is in bold, the second best is underlined.

									Of	fice							
	RM	SE_d	BadP	$\operatorname{ix}_{d}(5\mathrm{cm})$	BadF	$Pix_v(5)$	DSS	$\mathrm{SIM}_{\mathrm{v}}$	LPI	PS_v	Bum	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	47	80	4.0	7.8	24.4	34.1	216	285	412	594	0.81	0.95	208	254	19.9	44.1	64.0
SRfS [2]	49	89	5.8	14.4	53.4	54.4	595	593	690	636	1.71	1.66	298	302	0.0	0.0	0.0
PDN [6]	185	185	99.3	90.5	36.5	50.2	250	294	457	518	<u>0.76</u>	<u>0.92</u>	234	272	0.7	3.7	4.4
DG [1]	49	85	9.0	11.9	36.5	37.6	319	330	534	571	1.03	1.05	240	266	0.0	0.7	0.7
DIP [7]	76	109	30.3	48.2	72.1	73.9	726	819	690	797	2.45	2.70	372	408	1.5	1.5	2.9
MSG [5]	<u>35</u>	48	<u>2.4</u>	<u>6.8</u>	35.4	44.5	263	360	415	543	0.83	0.95	<u>199</u>	247	2.2	3.7	5.9
DIP-v	40	65	3.8	7.4	45.4	47.9	311	352	414	504	1.08	1.18	205	235	17.6	25.0	42.6
MSG-v	32	<u>65</u>	1.9	5.3	19.3	29.6	157	224	313	432	0.59	0.72	151	198	58.1	21.3	79.4
									Coat	rack							
Bicubic	<u>13</u>	20	1.5	3.0	73.1	75.3	<u>507</u>	539	537	651	0.54	0.60	171	196	0.0	19.1	19.1
SRfS [2]	24	28	3.8	5.4	82.3	80.5	672	556	650	612	0.83	0.57	237	203	0.0	0.0	0.0
EG [9]	13		1.2		77.8		541		550		0.55		186		0.7	7.4	8.1
PDN [6]	140	191	99.6	99.9	77.1	78.0	544	557	621	631	0.48	0.50	178	193	<u>5.1</u>	28.7	33.8
DG [1]	13	20	1.4	3.2	74.4	75.6	530	532	593	621	0.54	0.58	166	201	0.0	9.6	9.6
DIP [7]	15	24	1.9	3.5	85.5	85.4	766	701	625	624	1.15	0.97	256	246	4.4	2.2	6.6
MSG [5]	11	17	<u>0.9</u>	1.6	73.3	76.1	522	546	523	<u>554</u>	0.51	0.55	<u>165</u>	189	2.2	16.2	18.4
DIP-v	<u>13</u>	17	1.8	2.0	75.2	75.5	543	542	422	463	0.62	0.60	171	181	0.7	12.5	13.2
MSG-v	11	<u>18</u>	0.8	2.2	71.4	74.2	482	502	<u>516</u>	563	0.42	0.48	136	161	86.8	4.4	91.2
									Disp	olays							
Bicubic	41	63	3.2	6.4	49.9	<u>54.9</u>	<u>315</u>	374	460	585	0.92	1.08	208	256	0.7	21.3	22.1
SRfS [2]	53	75	9.0	17.3	61.9	67.3	500	591	599	659	1.35	1.60	288	328	0.0	0.0	0.0
EG [9]	46		5.9		66.7		388		587		0.94		216		0.0	2.9	2.9
PDN [6]	159	220	99.2	99.0	55.4	57.2	381	403	547	580	<u>0.85</u>	0.95	242	275	0.0	9.6	9.6
DG [1]	43	66	5.8	6.7	56.5	56.7	395	406	606	601	1.06	1.10	243	265	0.7	2.9	3.7
DIP [7]	52	60	13.4	9.7	76.9	74.6	732	724	672	645	2.36	2.06	365	344	0.7	0.7	1.5
MSG [5]	26	42	<u>1.7</u>	4.4	53.9	58.0	367	430	461	<u>493</u>	0.97	1.08	204	251	0.0	5.9	5.9
DIP-v	32	45	2.4	4.0	53.7	57.6	336	407	344	409	1.00	1.18	<u>191</u>	221	<u>5.9</u>	51.5	<u>57.4</u>
MSG-v	23	<u>43</u>	1.4	3.5	47.2	51.0	271	324	<u>451</u>	531	0.69	0.80	152	190	91.9	5.1	97.1

Table 6: Quantitative evaluation on RGBD frames from ICL-NUIM "Office Room" sequence. The best result is in bold, the second best is underlined.

									Vint	age							
	RM	ISE_d	BadP	$ix_d(5cm)$	BadF	$\operatorname{ix}_{\mathbf{v}}(5)$	DSS	IM_{v}	LPI	PS_v	Bum	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	67	98	4.6	9.0	<u>72.8</u>	77.3	558	<u>649</u>	602	729	1.51	1.64	<u>258</u>	302	5.9	<u>28.7</u>	34.6
SRfS [2]	101	145	16.8	32.3	83.7	87.2	721	749	631	<u>634</u>	1.64	1.68	346	382	0.0	0.0	0.0
PDN [6]	140	174	67.6	79.0	82.3	85.7	663	714	706	700	1.51	1.57	319	350	0.0	0.0	0.0
DG [1]	72	107	7.1	10.4	79.4	80.1	666	669	796	840	1.50	1.52	290	<u>300</u>	0.0	0.7	0.7
DIP [7]	74	117	24.8	46.9	93.6	94.2	953	965	910	872	4.01	4.16	656	687	0.7	0.7	1.5
MSG [5]	<u>41</u>	59	3.2	6.8	80.6	84.6	708	785	510	610	1.62	1.85	292	364	0.0	9.6	9.6
DIP-v	42	67	<u>2.7</u>	5.9	85.2	88.8	804	884	<u>579</u>	674	1.94	2.48	343	435	25.7	44.1	<u>69.9</u>
MSG-v	33	<u>65</u>	2.5	5.9	71.4	<u>77.6</u>	536	643	670	702	1.29	1.43	211	268	67.6	16.2	83.8
									Recy	cle							
Bicubic	587	880	9.2	16.6	70.6	78.6	575	721	474	576	1.23	1.17	329	398	0.0	<u>11.0</u>	11.0
SRfS [2]	47	72	10.2	22.1	86.1	88.8	715	772	610	623	1.68	1.81	376	410	0.0	0.0	0.0
PDN [<mark>6</mark>]	95	128	90.5	79.8	84.0	85.7	635	701	523	589	1.66	2.18	364	457	0.0	6.6	6.6
DG [1]	39	82	<u>3.4</u>	11.7	81.6	83.6	696	<u>719</u>	602	617	1.75	1.99	<u>328</u>	<u>383</u>	<u>2.9</u>	65.4	<u>68.4</u>
DIP [7]	<u>29</u>	<u>45</u>	3.9	9.3	91.0	91.8	871	923	576	605	2.95	3.31	434	500	1.5	5.9	7.4
MSG [5]	106	1182	5.8	11.9	82.8	89.6	741	869	624	661	2.60	3.01	485	550	0.7	0.0	0.7
DIP-v	20	34	1.5	4.2	78.9	85.0	575	735	388	485	1.56	1.86	273	332	94.9	3.7	98.5
MSG-v	51	76	3.9	<u>7.9</u>	<u>73.9</u>	82.1	<u>603</u>	737	520	<u>564</u>	1.66	2.02	368	473	0.0	7.4	7.4

Table 7: Quantitative evaluation on samples with small number of missing measurements from Middlebury dataset. The best result is in bold, the second best is underlined.

									Umbr	ella							
	RM	SE_d	BadP	$\operatorname{ix}_{d}(5\mathrm{cm})$	BadF	$Pix_v(5)$	DSS	IM_{v}	LPI	PS_v	Bum	$piness_d$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	1013	1507	6.9	12.1	77.7	80.9	749	837	747	886	0.60	0.60	323	380	<u>5.9</u>	35.3	41.2
SRfS [2]	148	217	19.4	35.5	87.5	90.8	843	853	797	831	0.71	0.78	397	443	0.0	0.0	0.0
PDN [6]	220	287	94.9	89.1	86.6	88.1	799	828	847	882	0.79	1.13	367	452	3.7	<u>22.8</u>	26.5
DG [1]	365	507	9.1	20.3	84.6	87.3	846	878	781	856	0.92	1.36	399	457	0.0	0.7	0.7
DIP [7]	138	<u>145</u>	48.5	21.6	90.5	93.2	915	953	737	<u>722</u>	1.19	1.65	467	528	2.9	16.2	19.1
MSG [5]	292	555	7.4	12.4	84.3	88.1	834	896	<u>678</u>	787	1.27	1.47	442	496	0.0	0.7	0.7
DIP-v	91	129	3.4	5.7	83.4	85.3	796	854	604	598	0.67	0.79	318	352	82.4	8.1	90.4
MSG-v	<u>129</u>	218	<u>5.2</u>	<u>9.7</u>	<u>79.1</u>	<u>82.3</u>	<u>778</u>	842	800	890	0.72	0.89	348	427	5.1	16.2	21.3
								(Classro	om1							
Bicubic	966	1371	6.7	9.0	75.8	78.3	636	728	<u>581</u>	784	0.41	0.30	268	295	12.5	37.5	50.0
SRfS [2]	135	202	18.5	28.5	82.6	85.7	761	781	718	756	0.62	0.62	332	363	0.0	0.0	0.0
PDN [6]	239	324	96.0	91.0	81.5	82.9	739	759	751	807	0.62	0.76	279	342	<u>16.9</u>	<u>26.5</u>	43.4
DG [1]	307	503	8.8	16.8	82.0	82.7	743	762	766	812	0.74	0.87	313	337	0.0	1.5	1.5
DIP [7]	<u>96</u>	145	17.0	22.4	94.4	94.6	956	952	789	751	1.94	2.12	540	557	0.0	1.5	1.5
MSG [5]	297	408	7.3	10.0	81.2	83.8	723	810	626	<u>604</u>	0.90	1.01	351	391	0.0	0.7	0.7
DIP-v	69	117	4.1	9.3	81.0	86.0	700	789	516	537	0.64	0.86	266	327	64.0	18.4	82.4
MSG-v	127	203	<u>5.4</u>	8.4	<u>76.9</u>	<u>79.4</u>	<u>678</u>	<u>735</u>	739	803	<u>0.60</u>	0.64	283	330	2.2	11.8	14.0

Table 8: Quantitative evaluation on samples with small number of missing measurements from Middlebury dataset. The best result is in bold, the second best is underlined.

									Playre	oom							
	RM	SE_d	BadP	$ix_d(5cm)$	BadF	$Pix_v(5)$	DSS	IM_{v}	LPI	PS_v	Bum	$_{\rm d}$	RM	SE_v	User, 1st	User, 2nd	Top 2
	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x8	x4	x4	x4
Bicubic	1263	1744	14.4	20.4	72.0	76.9	684	783	509	675	0.80	0.52	386	441	0.0	2.2	2.2
SRfS [2]	97	151	26.9	42.1	88.1	91.2	802	829	663	715	1.24	1.08	493	540	0.0	0.0	0.0
PDN [6]	181	253	85.0	69.7	86.3	89.2	820	862	583	656	1.54	1.88	472	543	<u>25.7</u>	61.8	<u>87.5</u>
DG [1]	425	133	22.4	25.0	85.4	86.0	845	826	779	691	1.96	1.63	519	469	1.5	2.2	3.7
DIP [7]	<u>58</u>	<u>91</u>	18.4	20.0	93.0	93.2	941	937	647	<u>612</u>	3.09	2.86	602	592	1.5	2.9	4.4
MSG [5]	433	349	16.1	22.3	85.8	89.9	855	911	685	705	2.51	2.74	576	616	0.0	0.0	0.0
DIP-v	49	83	5.4	12.2	83.8	88.5	728	847	459	530	1.29	1.52	357	433	70.6	27.2	97.8
MSG-v	112	166	<u>9.4</u>	<u>15.5</u>	<u>75.2</u>	80.1	<u>721</u>	<u>810</u>	565	615	1.46	1.67	453	510	0.0	3.7	3.7
									Backp	back							
Bicubic	985	1078	14.3	11.5	62.7	69.4	639	730	<u>564</u>	692	0.60	0.45	392	424	2.2	34.6	36.8
SRfS [2]	69	83	18.9	25.5	89.9	89.9	831	847	630	651	1.37	1.26	500	505	0.0	0.0	0.0
PDN [6]	173	207	81.6	65.2	80.4	85.4	770	820	609	719	1.59	1.96	519	553	<u>3.7</u>	37.5	<u>41.2</u>
DG [1]	325	465	26.5	39.9	77.0	82.0	765	808	650	696	1.62	2.07	529	545	0.7	2.9	3.7
DIP [7]	41	<u>67</u>	8.2	17.9	93.2	94.5	943	984	766	692	3.36	2.95	639	645	1.5	11.8	13.2
MSG [5]	211	170	15.1	10.4	76.5	86.9	762	856	671	723	2.11	2.31	577	609	0.7	0.0	0.7
DIP-v	38	62	6.2	12.9	82.5	88.7	677	768	457	496	1.31	1.43	409	448	90.4	5.1	95.6
MSG-v	113	89	10.8	5.9	<u>65.3</u>	<u>72.5</u>	<u>663</u>	<u>752</u>	577	<u>635</u>	<u>1.07</u>	<u>1.15</u>	462	480	0.0	5.9	5.9
									Jadep	lant							
Bicubic	1017	1297	19.3	18.4	68.8	75.7	695	788	545	696	0.97	0.62	449	464	2.3	27.7	30.0
SRfS [2]	105	143	39.5	48.9	87.2	92.7	787	839	637	719	1.96	1.70	551	583	0.0	0.0	0.0
PDN [6]	161	205	81.8	62.0	82.4	88.0	778	849	551	<u>625</u>	1.95	2.20	512	572	<u>19.1</u>	41.4	<u>60.5</u>
DG [1]	326	512	27.8	47.6	82.6	86.8	791	823	718	670	2.28	2.66	567	601	0.0	0.5	0.5
DIP [7]	70	121	<u>16.7</u>	32.8	91.2	92.3	913	911	735	764	3.19	3.21	615	638	0.0	0.5	0.5
MSG [5]	216	263	21.1	17.8	81.5	87.6	796	880	751	783	2.73	2.90	614	649	0.0	0.0	0.0
DIP-v	84	121	21.8	24.0	86.6	89.5	820	870	542	654	1.92	1.99	503	535	78.2	20.5	98.6
MSG-v	109	117	13.9	11.2	<u>71.0</u>	<u>79.0</u>	688	781	605	622	<u>1.61</u>	1.66	507	<u>529</u>	0.5	8.2	8.6

Table 9: Quantitative evaluation on samples with large number of missing measurements from Middlebury dataset. The best result is in bold, the second best is underlined.

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