Supplementary Material

Sparse Spatio-spectral Representation for
Hyperspectral Image Super-Resolution
ECCV 2014
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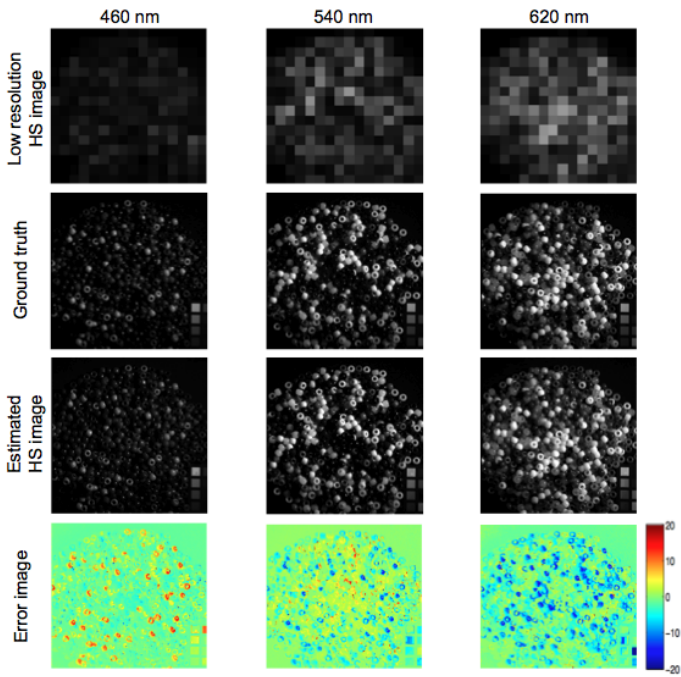The University of Western Australia

1 Results on CAVE database

Results of the proposed approach on the complete CAVE database [1] are given in Table 1. The table shows the RMSE values of the estimated super-resolution hyperspectral image for each available image of the database. We have used the following definition of the RMSE:

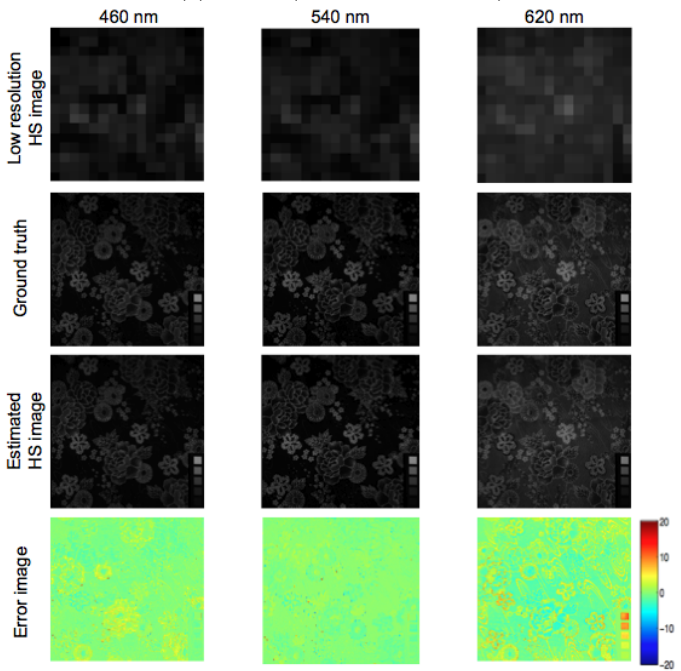$$RMSE = \sqrt{\frac{||\bar{\mathbf{S}} - \hat{\bar{\mathbf{S}}}||_2^2}{MNL}} \tag{1}$$

Table 1: Results of the proposed approach on CAVE database [1]: The RMSE values are given for all the available images, in the range of 8 bit images. The images are named according to [1]. For the rows highlighted in blue, we also provide the spectral images below. The spectral images for the rows highlighted in green have already been provided in the submitted paper.

| Sr. #	Image name	RMSE	Sr. #	Image name	RMSE
1	Balloons	2.3	16	Faces	2.2
2	Beads	6.1	17	Photo and face	2.2
3	CD	7.5	18	Hairs	2.1
4	Cloth	4.0	19	Oil painting	4.0
5	Clay	1.9	20	Paints	6.9
6	Egyptian Statue	2.1	21	Water color	4.0
7	Feathers	4.1	22	Beers	2.2
8	Flowers	4.7	23	Jelly beans	5.8
9	Glass tiles	4.1	24	Lemon slices	2.9
10	Chart and stuffed toys	3.7	25	Lemons	2.7
11	Pompoms	4.4	26	Peppers	3.0
12	Sponges	2.3	27	Strawberries	3.7
13	Thread spools	5.0	28	Sushi	3.2
14	Stuffed toys	5.1	29	Tomatoes	2.4
15	Super balls	3.2	30	Yellow peppers	2.3

Fig. 1a - 1f show the spectral images from the CAVE database. The results are given for the images shown in Fig. 2 of the submitted paper. We do not include the images for 'Painting' and 'Peppers', which are already given in the paper. Each figure shows the spectral images at 460, 540 and 620 nm. The first row of each figure shows the input low resolution hyperspectral image. The second row shows the ground truth image for the estimated super-resolution hyperspectral image, which is shown in the third row. The last row shows the difference between the ground truth and the estimated image, where the scale is in the range of 8 bit images.
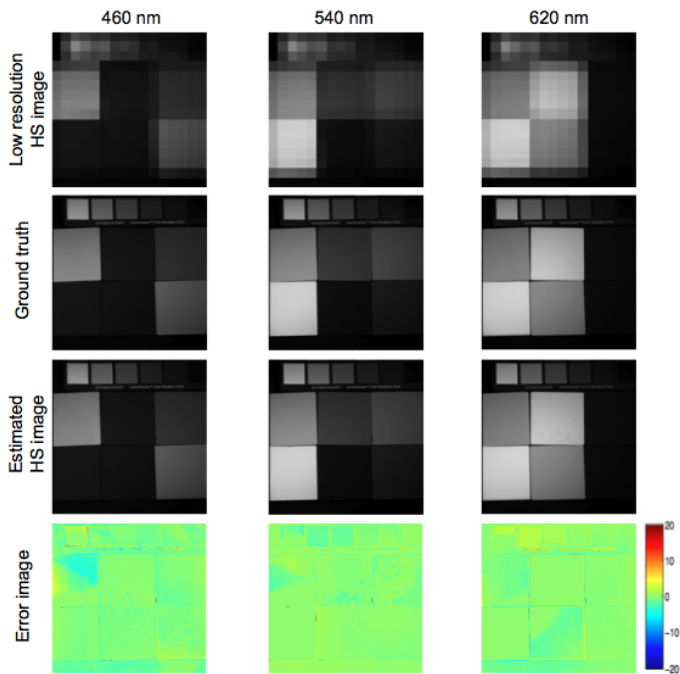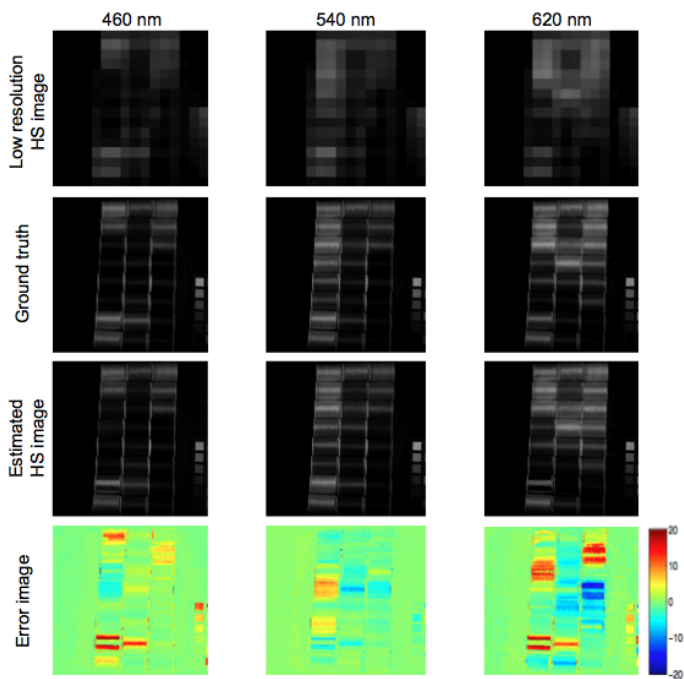
(a) Beads (Sr. # 2 in Table 1)
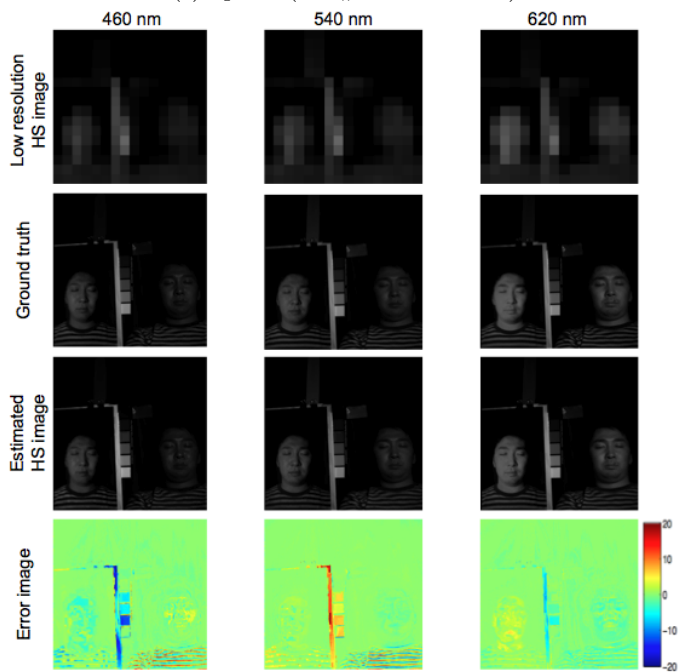

(b) Cloth (Sr. # 4 in Table 1)
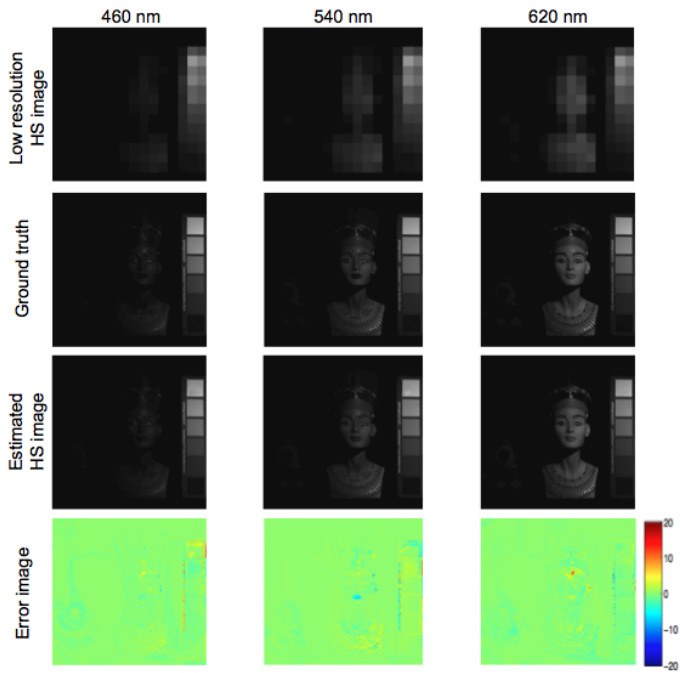
(c) Statue (Sr. # 6 in Table 1)

(d) Sponges (Sr. # 12 in Table 1)

(e) Spools (Sr. # 13 in Table 1)

(f) Photos (Sr. # 17 in Table 1)

2   Results of Harvard database

Results of the proposed approach on the complete Harvard database [2] are given in Table 2. The table shows the RMSE value of the estimated super-resolution hyperspectral image for each image in the database.

Table 2: Results of the proposed approach on Harvard database [2]: The RMSE values are given for all the available images, in the range of 8 bit images. The names of the images are according to [2]. Below, we also provide the spectral images for the rows highlighted in blue.

| Sr. No.	Image name	RMSE	Sr. No.	Image name	RMSE
1	Img1	1.2	26	Imgd3	1.7
2	Img2	3.4	27	Imgd4	2.4
3	Imga1	1.7	28	Imgd7	2.1
4	Imga2	1.1	29	Imgd8	2.5
5	Imga5	0.6	30	Imgd9	8.4
6	Imga6	3.2	31	Imge0	1.6
7	Imga7	3.0	32	Imge1	6.1
8	Imgb0	2.0	33	Imge2	3.1
9	Imgb1	1.9	34	Imge3	10.3
10	Imgb2	1.6	35	Imge4	0.7
11	Imgb3	4.1	36	Imge5	1.2
12	Imgb4	5.7	37	Imge6	2.5
13	Imgb5	0.9	38	Imge7	1.4
14	Imgb6	3.7	39	Imgf1	4.5
15	Imgb7	9.9	40	Imgf2	1.7
16	Imgb8	5.9	41	Imgf3	2.2
17	Imgb9	2.3	42	Imgf4	1.2
18	Imgc1	1.9	43	Imgf5	0.7
19	Imgc2	2.8	44	Imgf6	1.3
20	Imgc4	1.0	45	Imgf7	2.0
21	Imgc5	6.1	46	Imgf8	1.5
22	Imgc7	1.7	47	Imgh0	3.3
23	Imgc8	4.2	48	Imgh1	1.3
24	Imgc9	4.3	49	Imgh2	1.0
25	Imgd2	2.7	50	Imgh3	0.5

Fig. 1g - 1n show the spectral images for the Harvard database. The results are given for the images shown in Fig. 2 of the submitted paper.
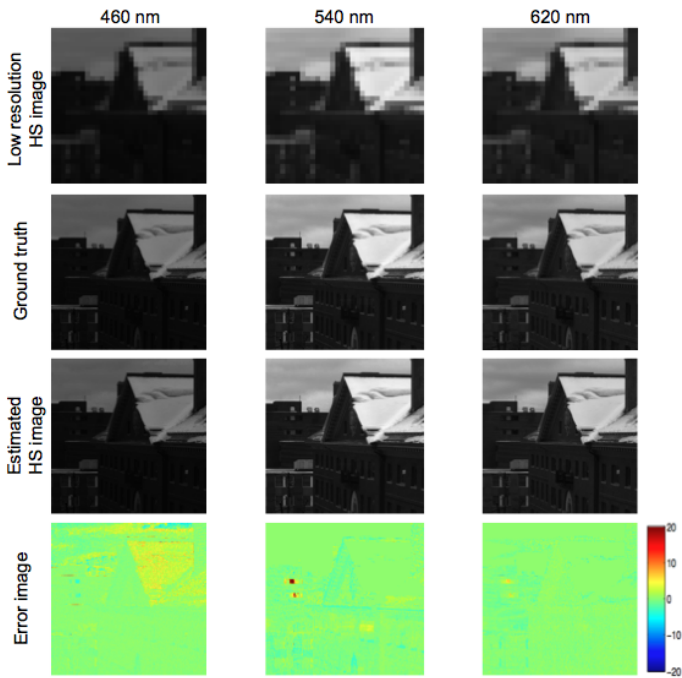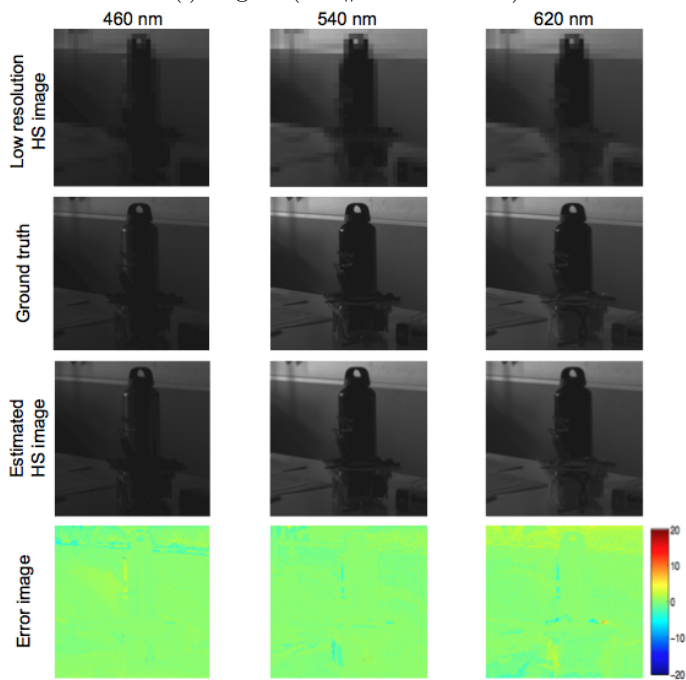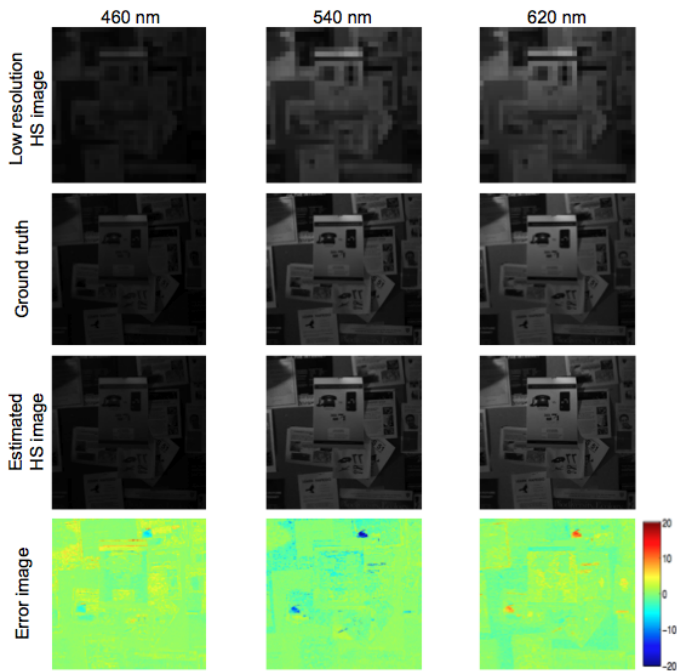
(g) Img 1 (Sr. # 1 in Table 2)
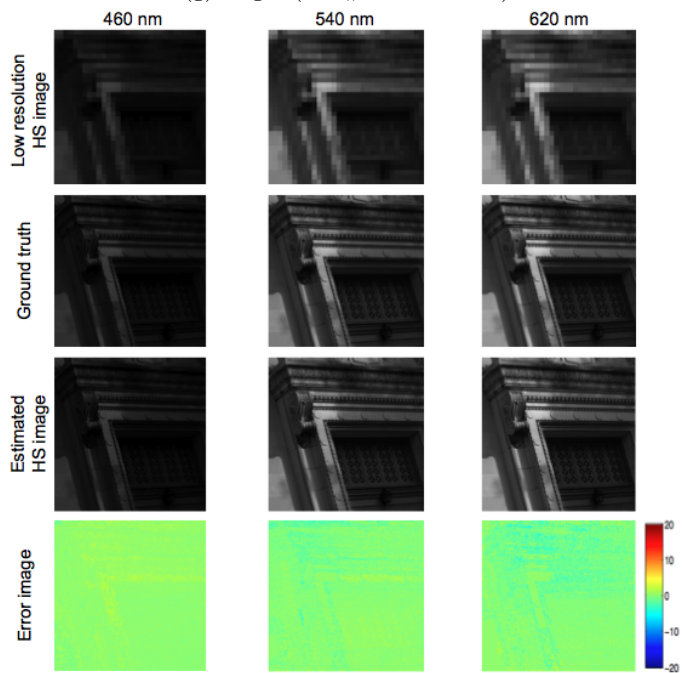
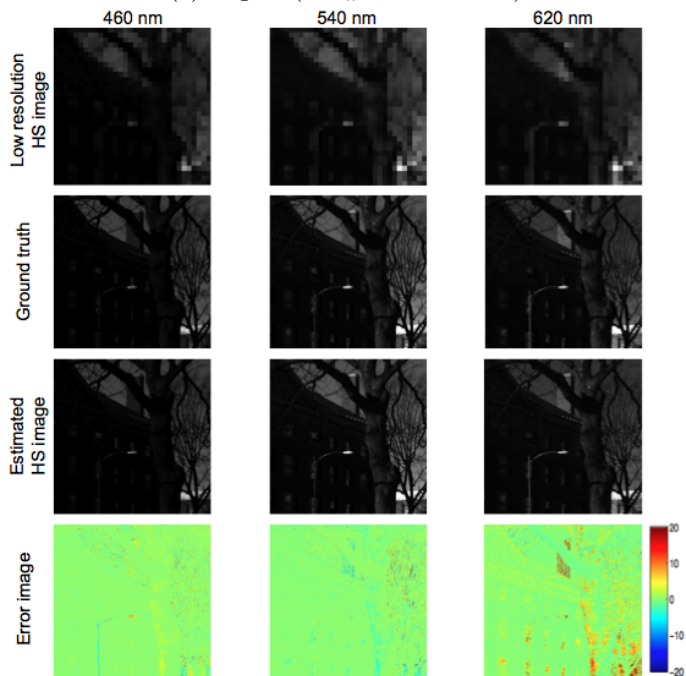(h) Img b5 (Sr. # 13 in Table 2)

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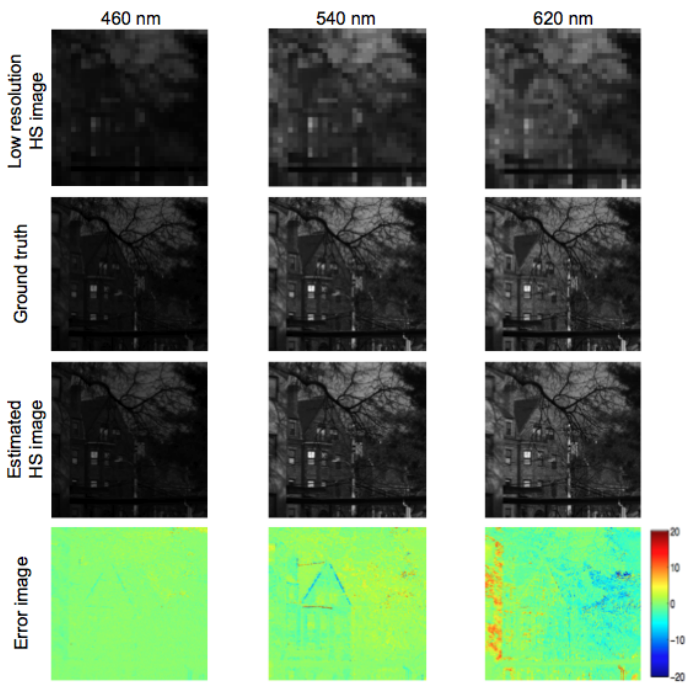
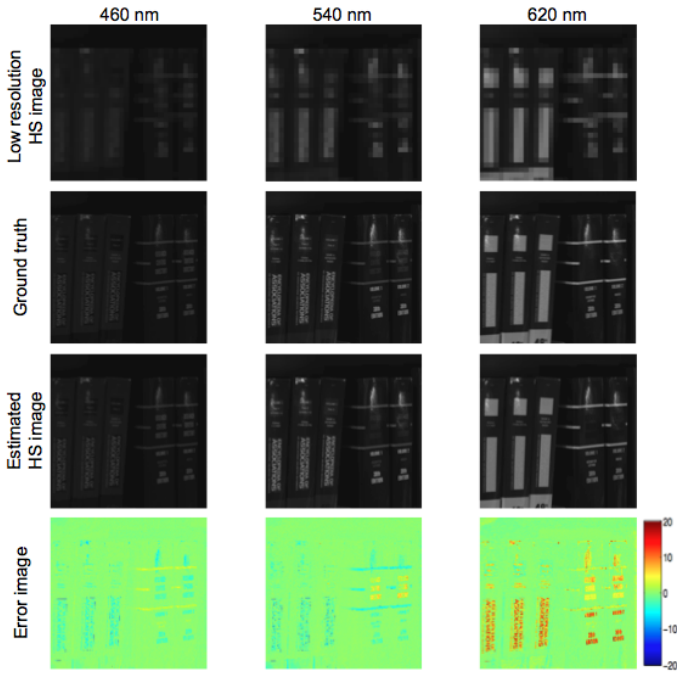(i) Img b8 (Sr. # 16 in Table 2)
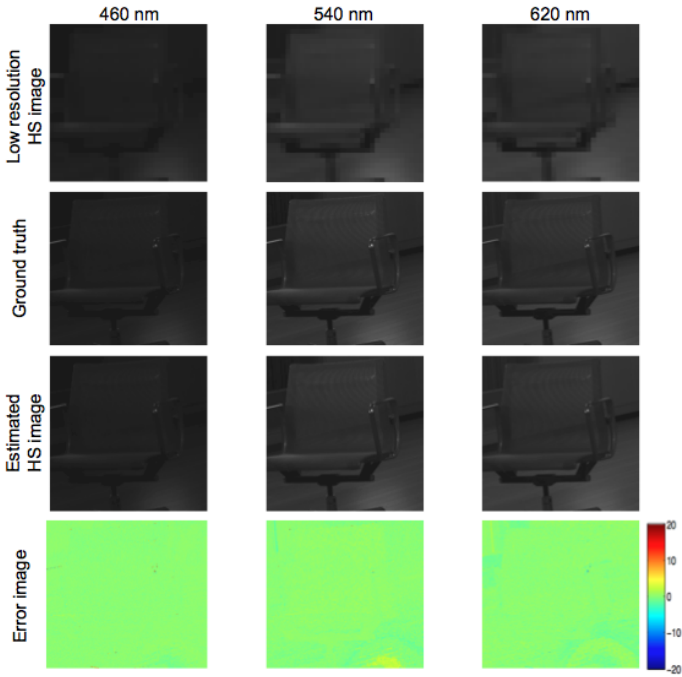

(j) Img d4 (Sr. # 24 in Table 2)

(k) Img d7 (Sr. # 28 in Table 2)

(l) Img f2 (Sr. # 40 in Table 2)

(m) Img h2 (Sr. # 49 in Table 2)

(n) Img h3 (Sr. # 50 in Table 2)

References

[1] Yasuma, F., Mitsunaga, T., Iso, D., Nayar, S.: Generalized assorted pixel camera: Post-capture control of resolution, dynamic range and spectrum. Technical report (Nov 2008)

[2] Chakrabarti, A., Zickler, T.: Statistics of real-world hyperspectral images. In: IEEE Conf. on Computer Vision and Pattern Recognition (CVPR). (2011) 193–200