Denoising results comparison in the manuscript (same ref. # here)

- The proposed HSI BAT approach (**BAT**)
- Modified Curvature (**CUR**)
  - Yezzi, 1998 [12]
- Non-local Mean algorithm (**NON**)
  - Buades et al., 2005 [19]
- CB TV (**CBTV**)
  - Chan et al., 2001 [26]
- Vector Diffusion (**VEC**)
  - Tschumperle and Deriche, 2005 [3]
- Noiseware™ (**NOI**) [29]

  - For each example, (a) and (b) are the noisy photos (high ISO photos) and ground truth (low ISO photos). The displayed images (c) - (h) are the results sorted by the optimal PSNR (MSE) values with the above approaches.

Indoor images taken under a controlled environment*

- Taken by a Canon 350D and a 400D
- Ground truth (low ISO photos): ISO = 100
- Noisy photos (high ISO photos): ISO = 1600

* The ground truth photos are obtained with a carefully calibrated indoor setup to maintain the consistence of lighting between two photo captures. The photo scene contains only static objects to avoid any motion blur. Only shutter speed is adjusted to maintain the same exposure. Aperture is kept fixed to preserve the same depth of field in both low and high ISO photos.

(a) High ISO
PSNR (db):
31.94
MSE:
41.59

(b) Low ISO

(c) BAT
PSNR (db):
34.49
MSE:
23.12

(d) CBTV
PSNR (db):
34.38
MSE:
23.71

(e) NOI
PSNR (db):
34.27
MSE:
24.31

(f) CUR
PSNR (db):
34.16
MSE:
24.92

(g) NON
PSNR (db):
33.95
MSE:
26.2

(h) VEC
PSNR (db):
33.81
MSE:
27.06

a). High ISO
PSNR (db):
32.15
MSE:
39.66

(b) Low ISO

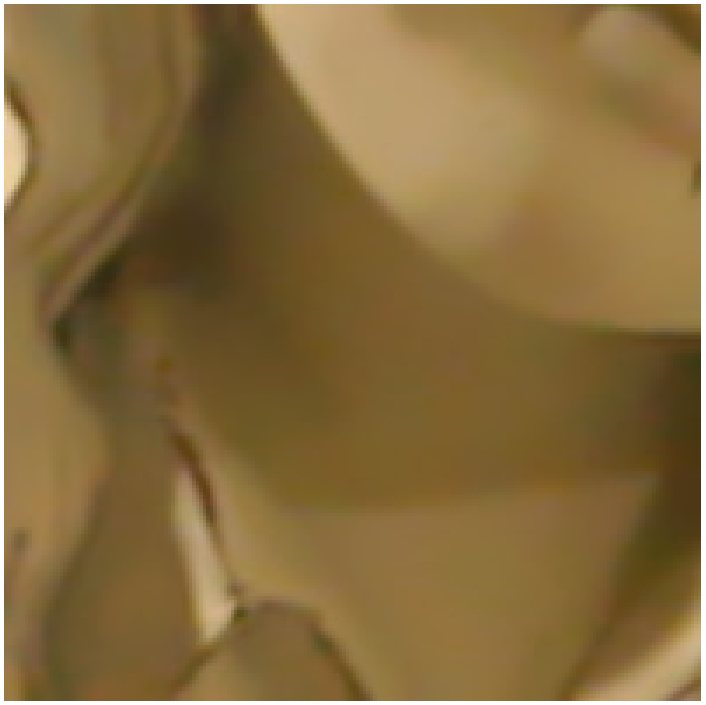
(c) NOI
PSNR (db):
35.69
MSE:
17.54

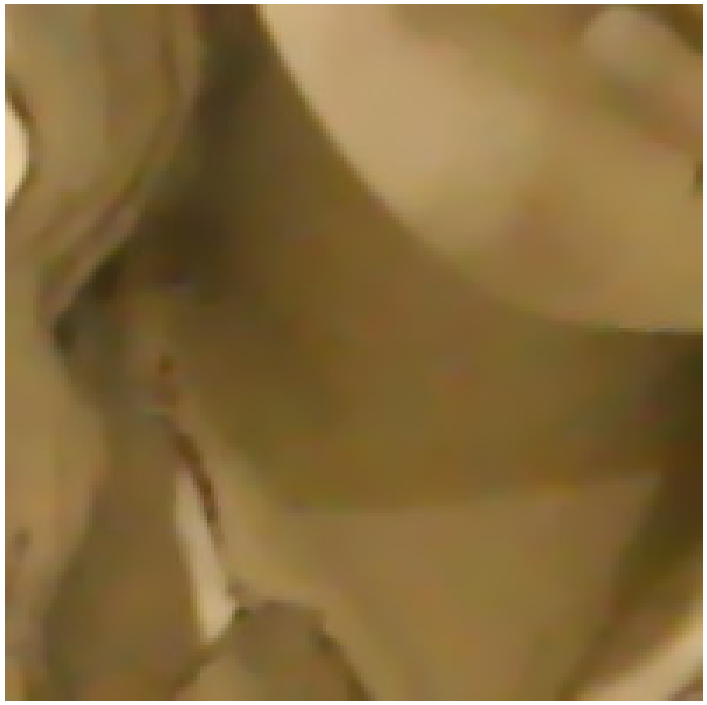
(d) BAT
PSNR (db):
35.66
MSE:
17.67

(e) CUR
PSNR (db): 35.6
MSE: 17.91

(f) CBTV
PSNR (db): 35.6
MSE: 17.92

(g) NON
PSNR (db): 35.48
MSE: 18.39





(h) VEC
PSNR (db): 35.06
MSE: 20.26

(a) High ISO
PSNR (db):
28.25
MSE:
97.26

(b)
Low ISO

(c) BAT
PSNR (db):
30.91
MSE:
52.67

(d) CUR
PSNR (db):
29.71
MSE:
69.45

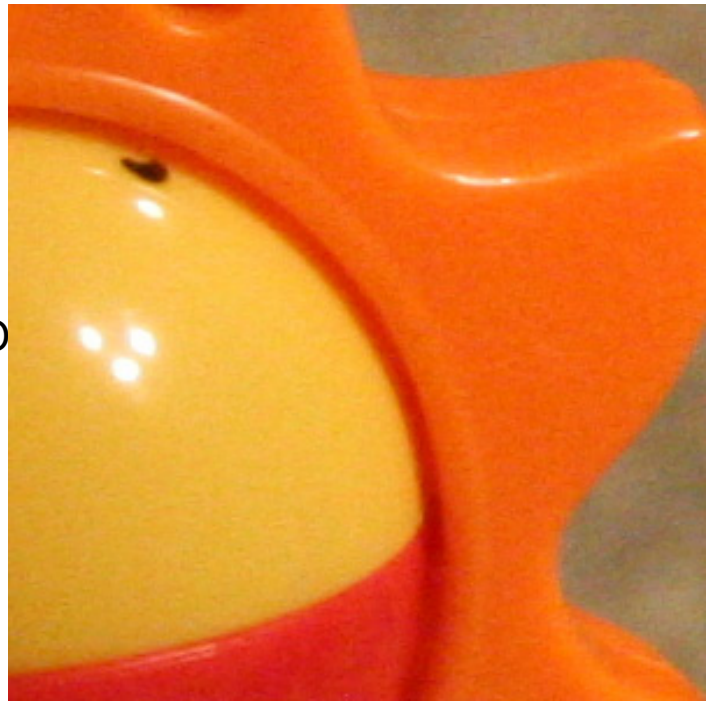
(e) NON
PSNR (db):
29.62
MSE:
71.04

(f) VEC
PSNR (db):
29.59
MSE:
71.52

(g) CBTV
PSNR (db):
29.54
MSE:
72.24

(h) NOI
PSNR (db):
29.25
MSE:
77.25

(a) High ISO
PSNR (db):
28.84
MSE:
84.99



(b) Low ISO

(c) BAT
PSNR (db):
30.62
MSE:
56.39

(d) NON
PSNR (db):
30.27
MSE:
61.04

(e) CUR
PSNR (db): 30.23
MSE: 61.66

(f) VEC
PSNR (db): 30.19
MSE: 62.23

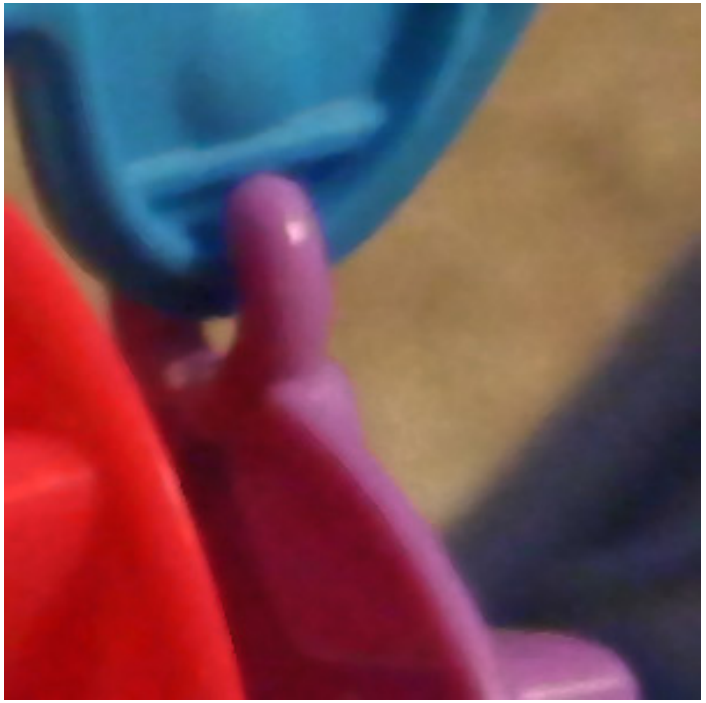
(g) CBTV
PSNR (db): 29.84
MSE: 67.33

(h) NOI
PSNR (db): 29.46
MSE: 73.58

(a) High ISO
PSNR (db):
30.59
MSE:
56.75

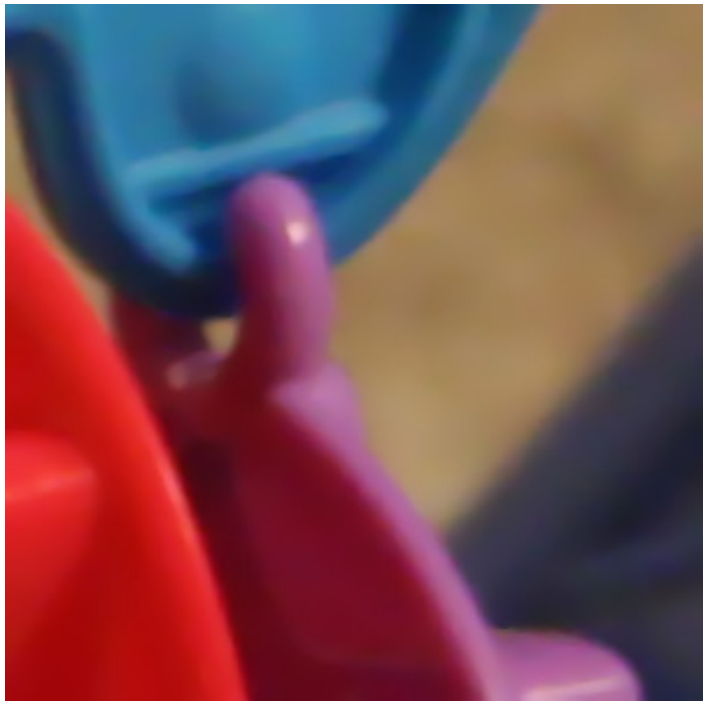
(b) Low ISO

(c) BAT
PSNR (db):
33.68
MSE:
27.85



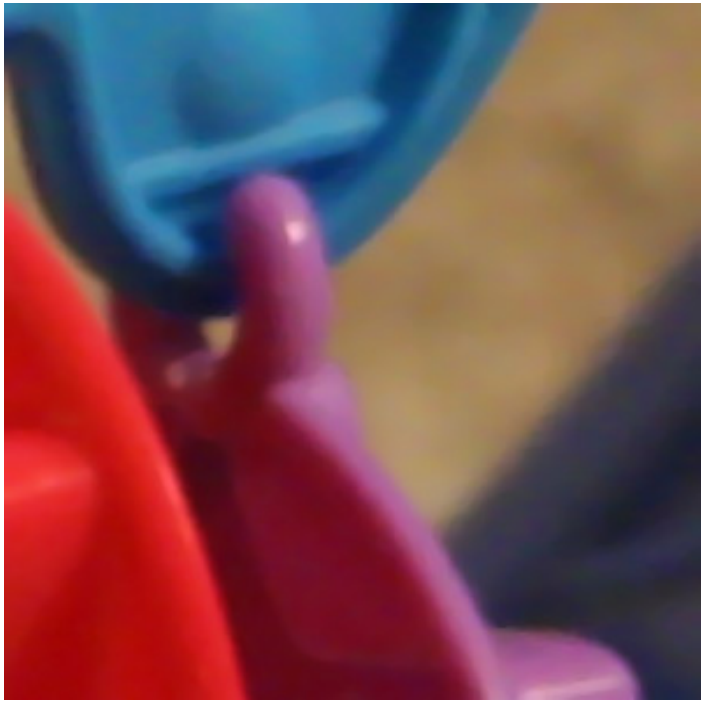
(d) NON
PSNR (db):
33.39
MSE:
29.8

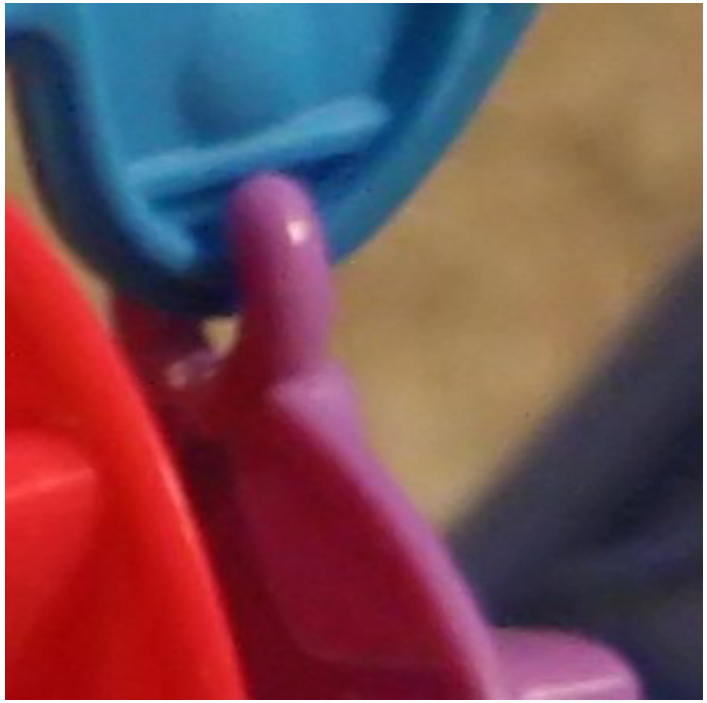
(e) CUR
PSNR (db):
33.18
MSE:
31.3



(f) VEC
PSNR (db):
33.1
MSE:
31.82

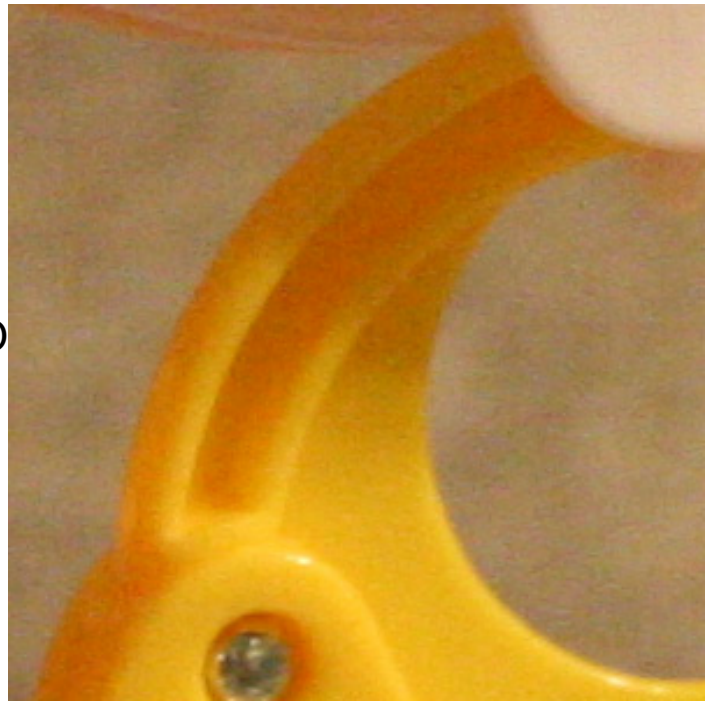
(g) CBTV
PSNR (db):
32.77
MSE:
34.37





(h) NOI
PSNR (db):
32.27
MSE:
38.54

(a) High ISO
PSNR (db):
31.26
MSE:
48.69



(b) Low ISO

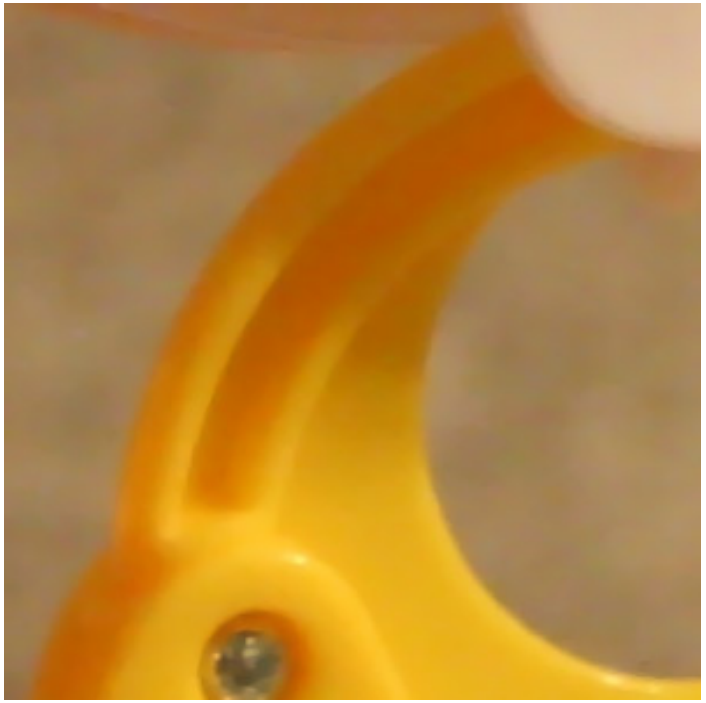
(c) BAT
PSNR (db):
36.03
MSE:
16.2

(d) NON
PSNR (db):
33.99
MSE:
25.92

(e) CUR
PSNR (db):
33.91
MSE:
26.42

(f) VEC
PSNR (db):
33.82
MSE:
26.97

(g) CBTV
PSNR (db):
33.45
MSE:
29.38



(h) NOI
PSNR (db):
32.96
MSE:
32.88

(a) High ISO
PSNR (db):
31.81
MSE:
42.84

(b) Low ISO

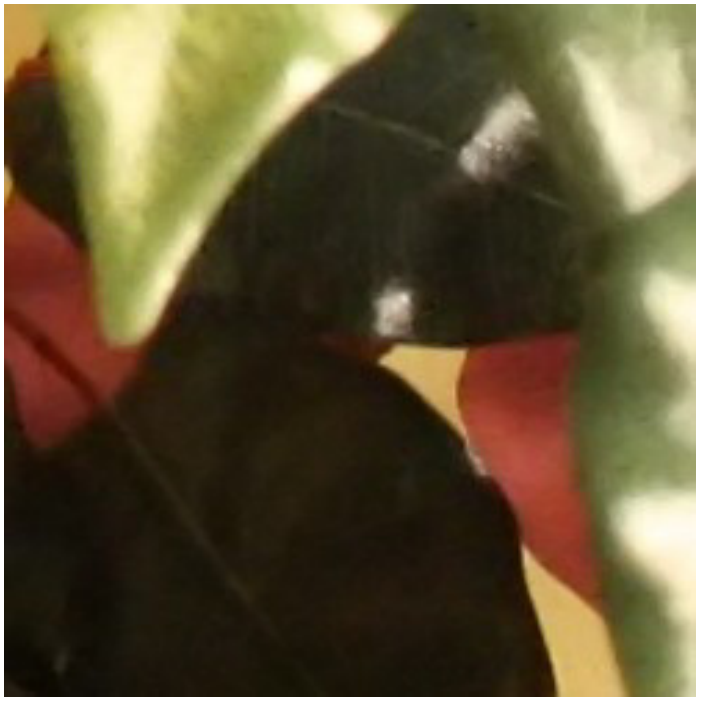
(c) NON
PSNR (db):
33.94
MSE:
26.22

(d) CUR
PSNR (db):
33.86
MSE:
26.76

(e) VEC
PSNR (db):
33.6
MSE:
28.36

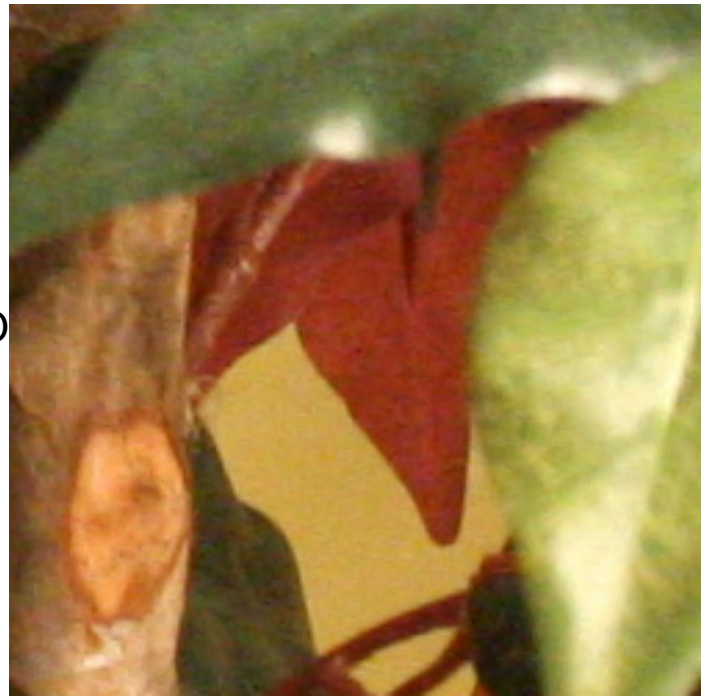
(f) BAT
PSNR (db):
33.54
MSE:
28.76

(g) CBTV
PSNR (db):
33.53
MSE:
28.83



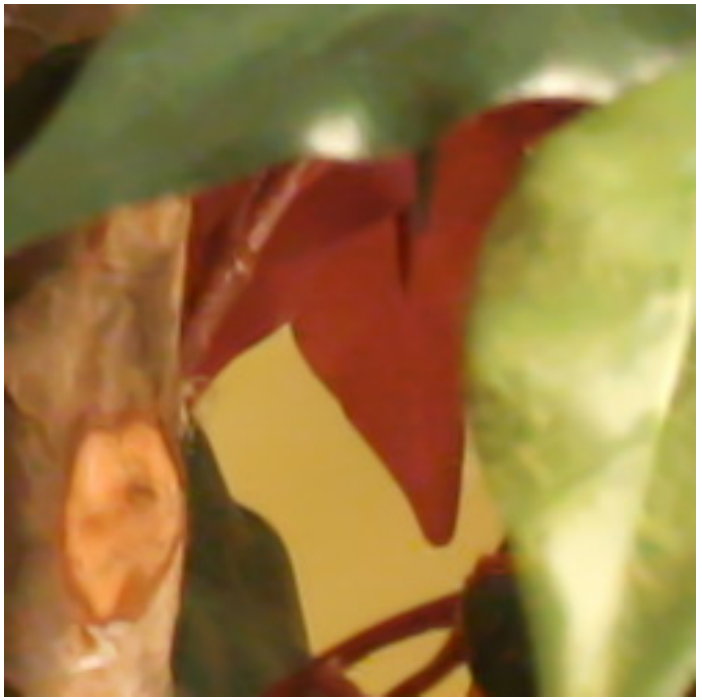
(h) NOI
PSNR (db):
33.53
MSE:
28.85

(a) High ISO
PSNR (db):
31.44
MSE:
46.71



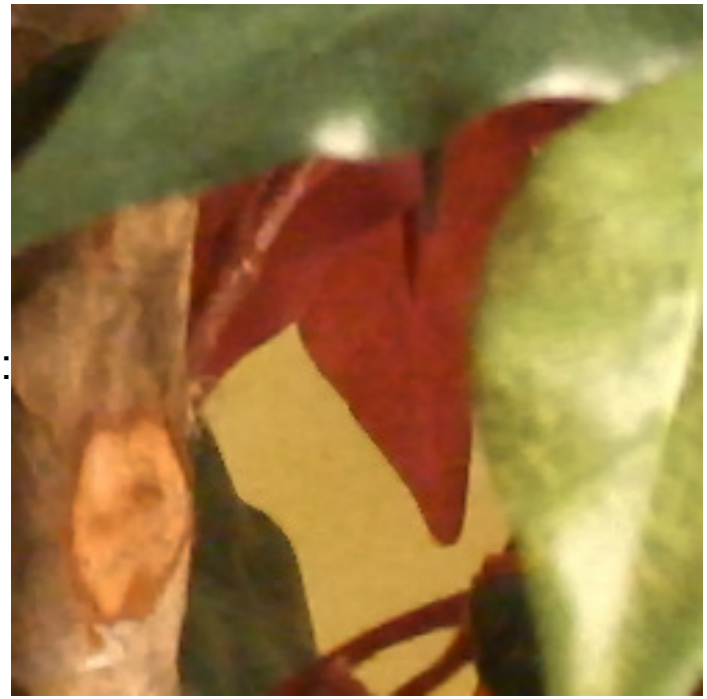
(b) Low ISO

(c) CUR
PSNR (db):
33.15
MSE:
31.51



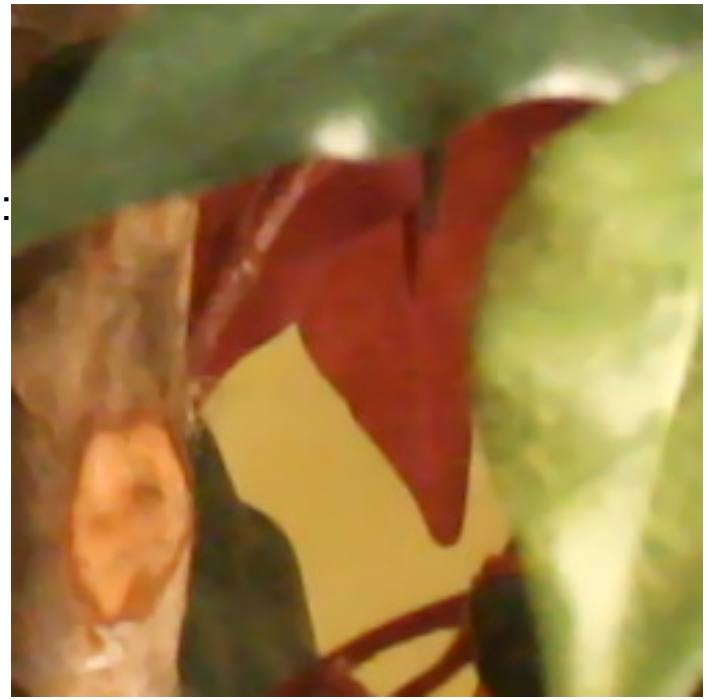
(d) NON
PSNR (db):
33.08
MSE:
31.96

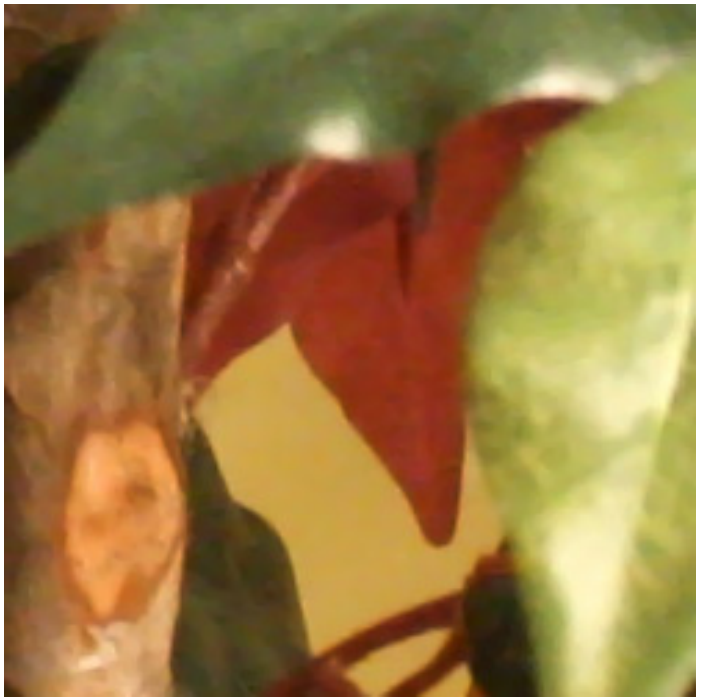
(e) BAT
PSNR (db):
33.02
MSE:
32.44



(f) NOI
PSNR (db):
33.02
MSE:
32.46

(g) VEC
PSNR (db):
32.81
MSE:
34.03





(h) CBTV
PSNR (db):
32.74
MSE:
34.63

(a) High ISO
PSNR (db):
31.98
MSE:
41.19

(b) Low ISO

(c) NOI
PSNR (db):
33.69
MSE:
27.81

(d) BAT
PSNR (db):
33.68
MSE:
27.87

(e) CBTV
PSNR (db):
33.57
MSE:
28.6

(f) CUR
PSNR (db):
33.49
MSE:
29.08

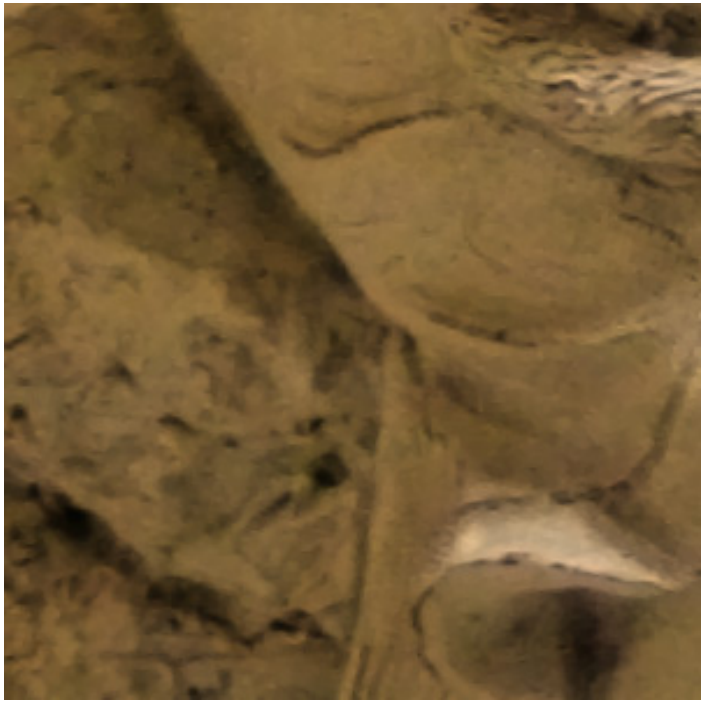
(g) NON
PSNR (db):
33.39
MSE:
29.82

(h) VEC
PSNR (db):
33.14
MSE:
31.52

(a) High ISO
PSNR (db):
30.53
MSE:
57.49

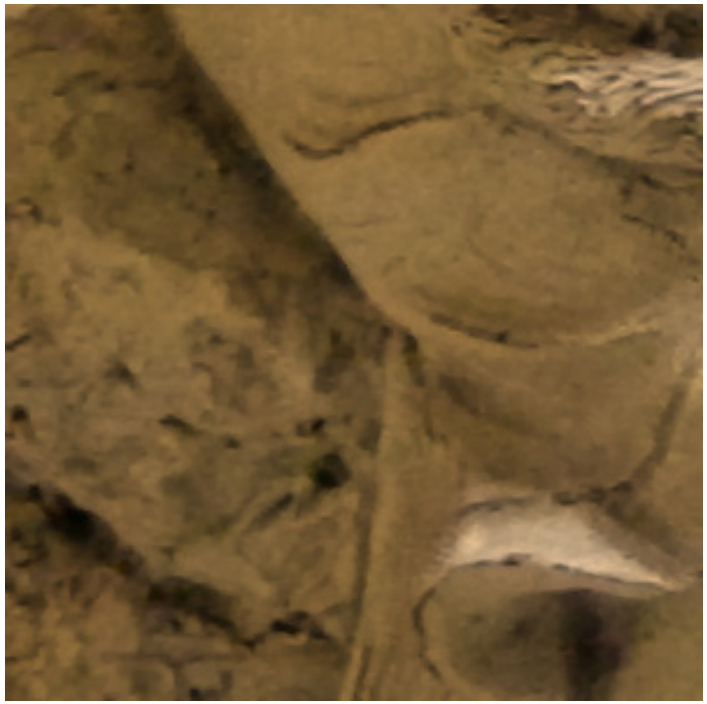
(b) Low ISO

(c) NOI
PSNR (db):
32.08
MSE:
40.25



(d) CBTV
PSNR (db):
32.04
MSE:
40.68

(e) BAT
PSNR (db):
31.64
MSE:
44.57



(f) CUR
PSNR (db):
31.49
MSE:
46.16

(g) NON
PSNR (db):
31.44
MSE:
46.63

(h) VEC
PSNR (db):
31.15
MSE:
49.91

The average of PSNR and MSE of the 10 previous results

	PSNR (db)	MSE
High ISO	30.88	55.72
BAT	33.33	32.75
CUR	32.88	36.52
NON	32.86	36.7
CBTV	32.75	37.77
VEC	32.63	38.37
NOI	32.62	39.35

Outdoor photos without ground truth

- Taken by a Sony CyberShot P72 and a S650

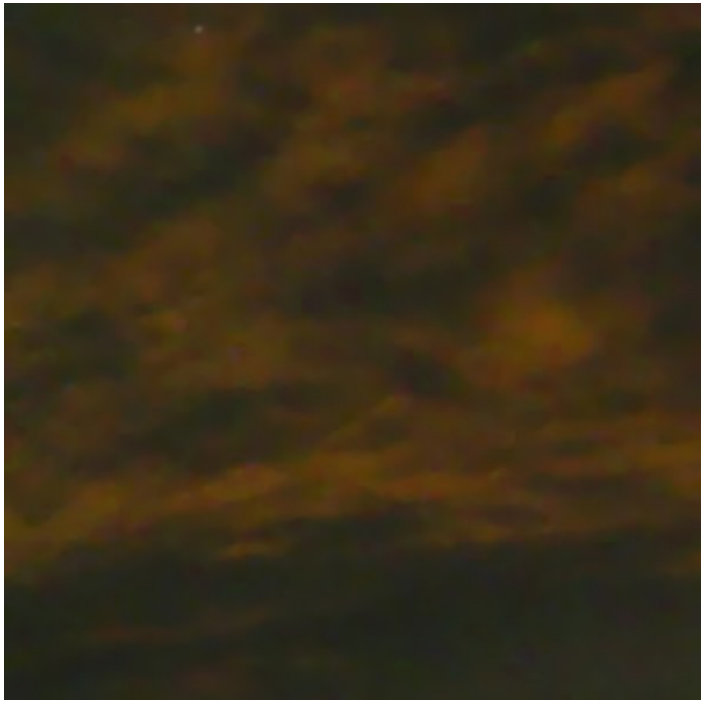
(a)
Input image

(b) BAT

(c) CUR

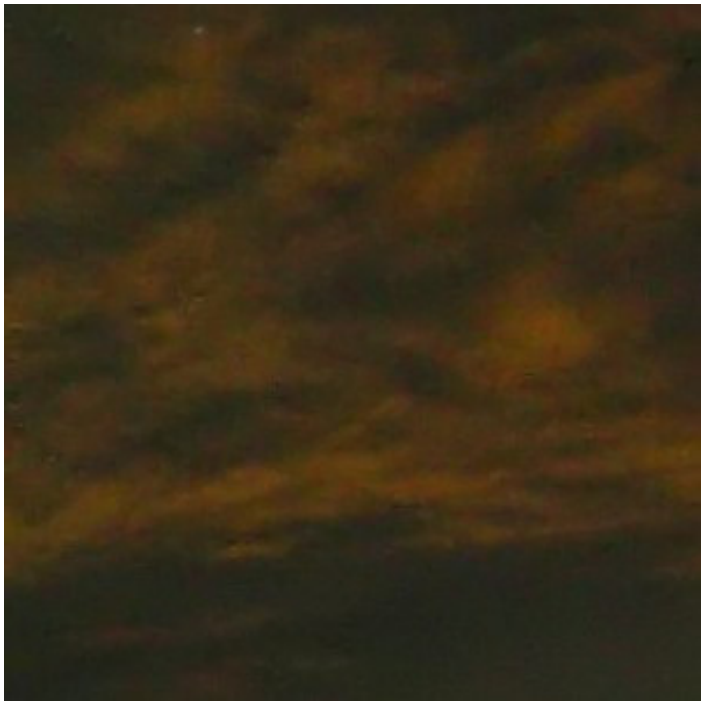
(d) NON

(e) CBTV



(f) VEC

(g) NOI



(a)
Input image

(b) BAT

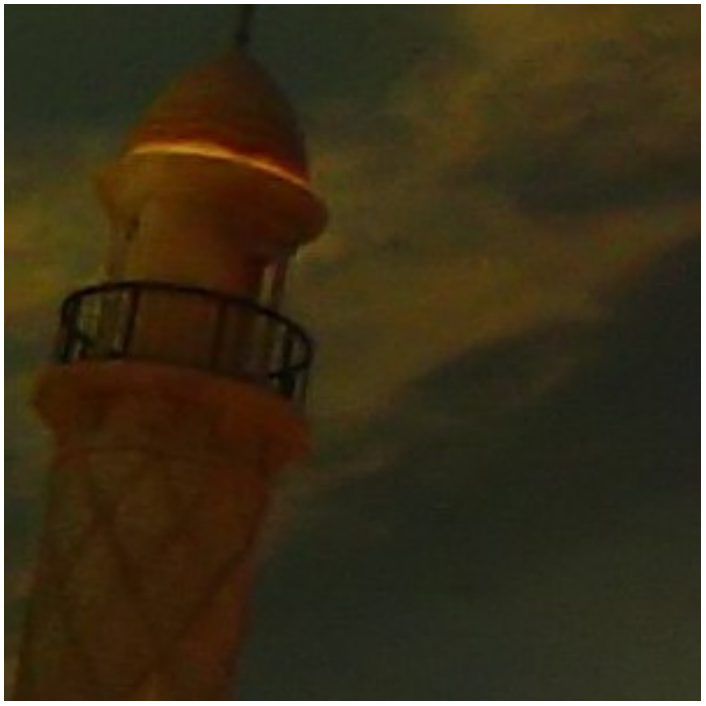
(c) CUR

(d) NON

(e) CBTV

(f) VEC

(g) NOI



(a)
Input image

(b) BAT

(c) CUR

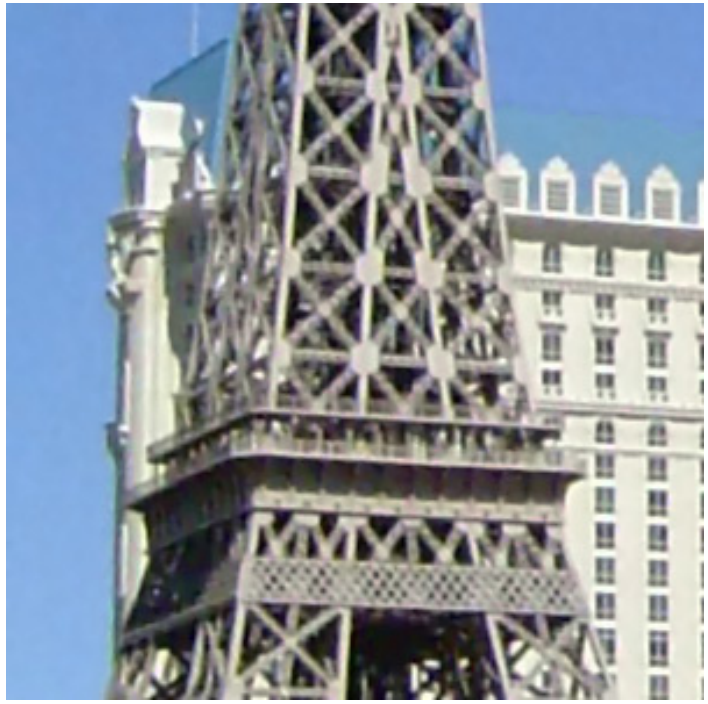
(d) NON

(e) CBTV

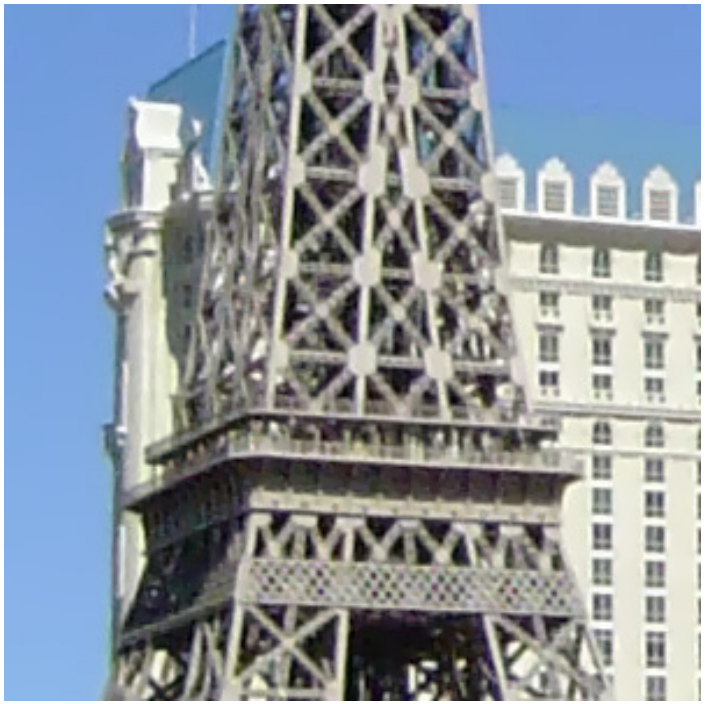
(f) VEC

(g) NOI

(a)
Input image



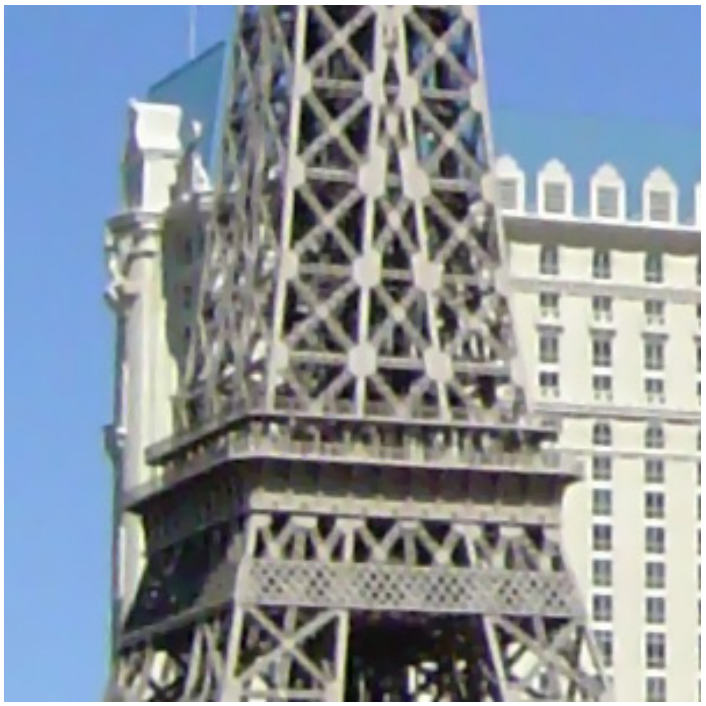
(b) BAT

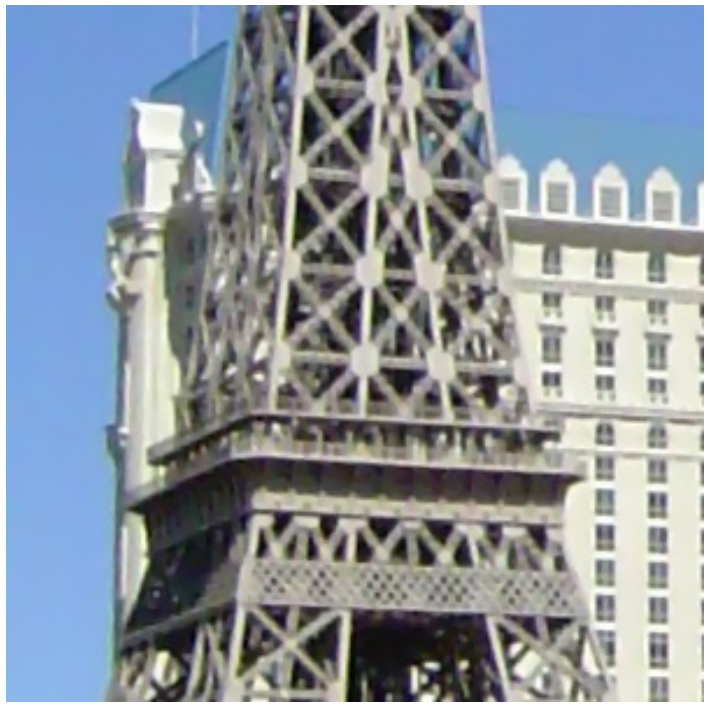


(c) CUR

(d) NON

(e) CBTV





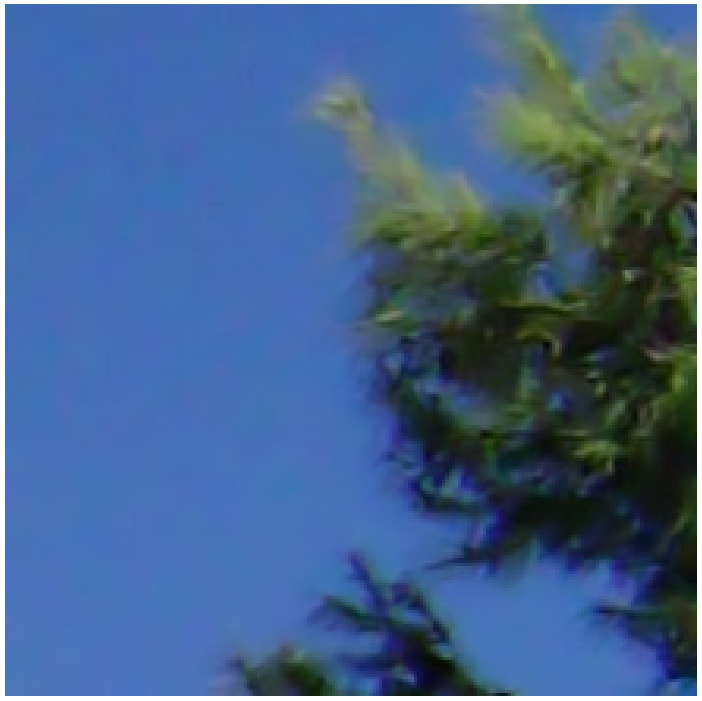
(f) VEC

(g) NOI

(a)
Input image

(b) BAT

(c) CUR



(d) NON

(e) CBTV

(f) VEC

(g) NOI