Two-Phase Kernel Estimation for Robust Motion Deblurring

Results and Comparison
(all with captured images)

Blurred Image

Fergus *et al.* [2]

Shan *et al.* [3]

Ours [1]

Running Time: < 2mins

Blurred Image

Fergus *et al.*

Shan *et al.*

Ours

Blurred Image

Fergus *et al.* [2]

Shan *et al.* [3]

Ours

Running Time: < 1min

Blurred Image

Fergus *et al.*

Shan *et al.*

Ours

Blurred Image

Fergus *et al.* [2]

Ours (kernel size 95x95)

Input

Fergus *et al.* [2]

Shan *et al.* [3]

Ours

Running Time: < 1min

Blurred image

Fergus *et al.*

Shan *et al.*

Ours

Input

Ours

Running Time: < 1min

Challenging Examples

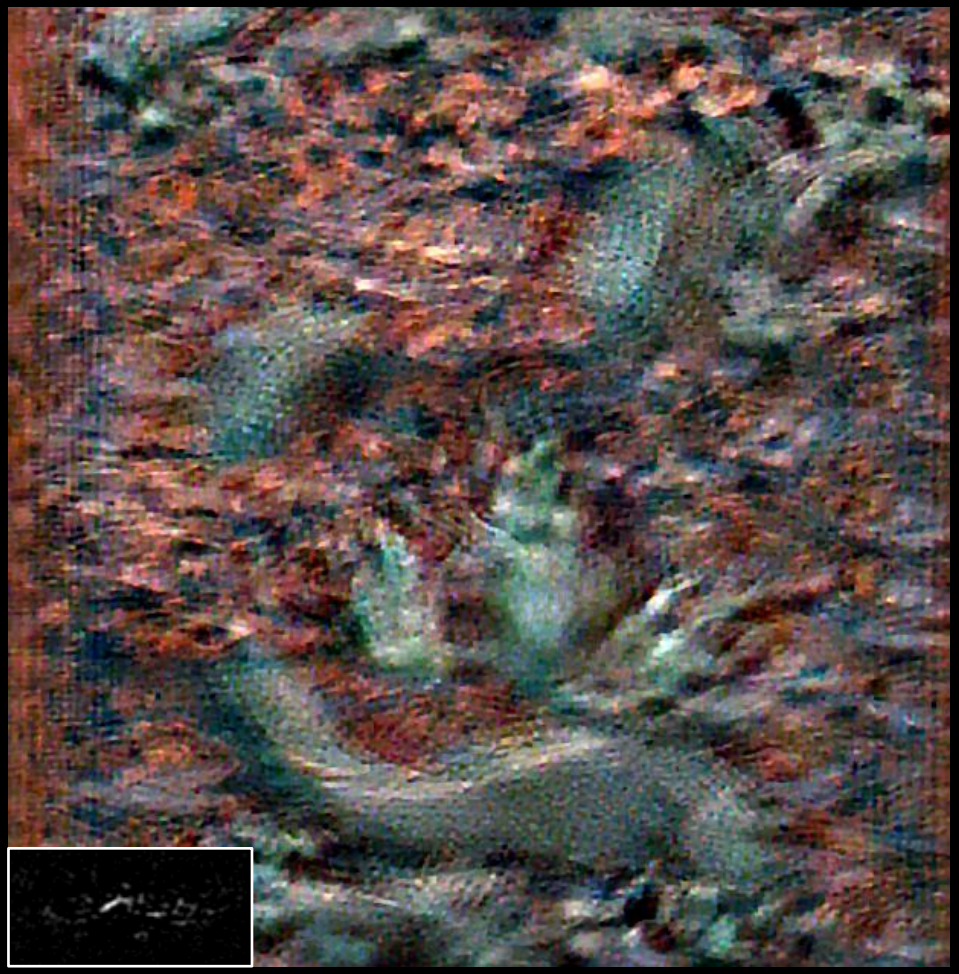
comparison for selective edge maps
(Denoted by M in the paper)

Blurred Patch

Patch cropped from

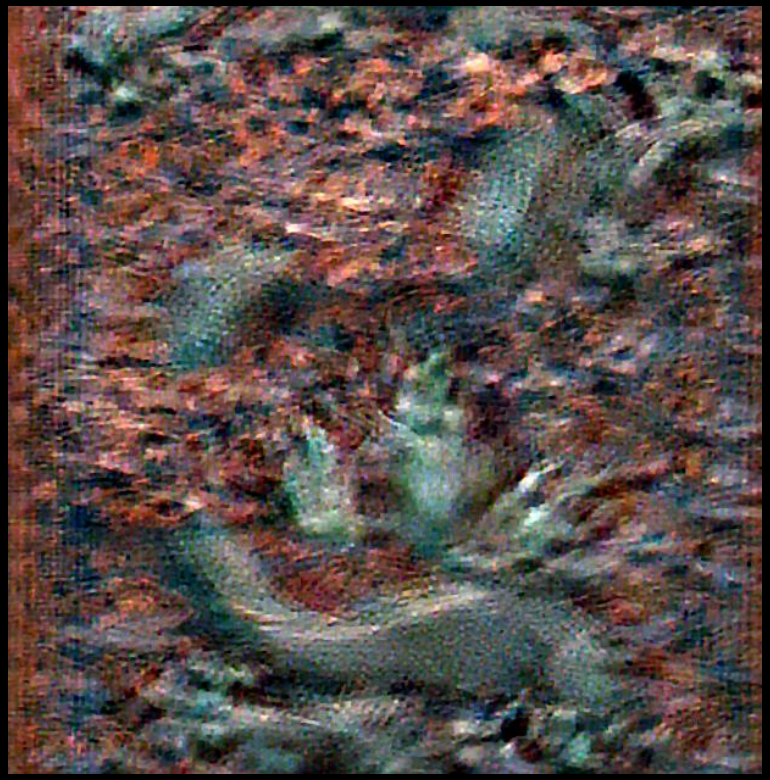
L. Yuan, J. Sun, L. Quan and H.Y. Shum. “Image Deblurring with Blurred/Noisy Image Pairs”, SIGGRAPH 2007

Without Selective Edge Map



With Selective Edge Map

ksize	115x55
gamma	2.2
wtscale	**0.2**
wtdeconv	2e-2
wtderinging	2
denoise	0



Without M

With M

Blurred Patch

Without Selective Edge Map

With Selective Edge Map

ksize	55x95
gamma	2.2
wtscale	**0.55**
wtdeconv	2e-2
wtderinging	0
denoise	0

Without M

With M

Blurred Patch

Without Selective Edge Map

With Selective Edge Map

ksize	55x95
gamma	2.2
wtscale	**0.3**
wtdeconv	2e-2
wtderinging	1
denoise	0

Without M

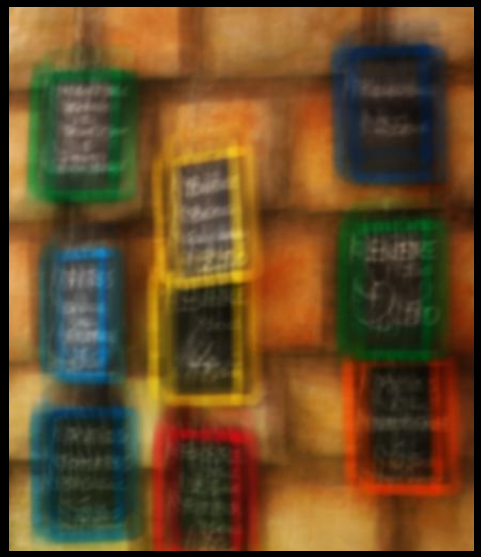
With M

Blurred Patch

Without Selective Edge Map

With Selective Edge Map

ksize	55x55
gamma	1
wtscale	**0.2**
wtdeconv	1e-2
wtderinging	0
denoise	0



Without M

With M

Other Examples

ksize	31x31
gamma	2.2
wtscale	0.7
wtdeconv	4e-2
wtderinging	0
denoise	1

Fergus *et al.* [2]

Ours

ksize	49x49
gamma	2.2
wtscale	0.7
wtdeconv	2e-2
wtderinging	1
denoise	0

Fergus *et al.* [2]

Ours

ksize	31x31
gamma	1
wtscale	0.7
wtdeconv	1e-2
wtderinging	1
denoise	0

Shan *et al.* [3]

Ours

ksize	31x31
gamma	1
wtscale	0.7
wtdeconv	1.7e-3
wtderinging	1
denoise	0

Shan *et al.* [3]

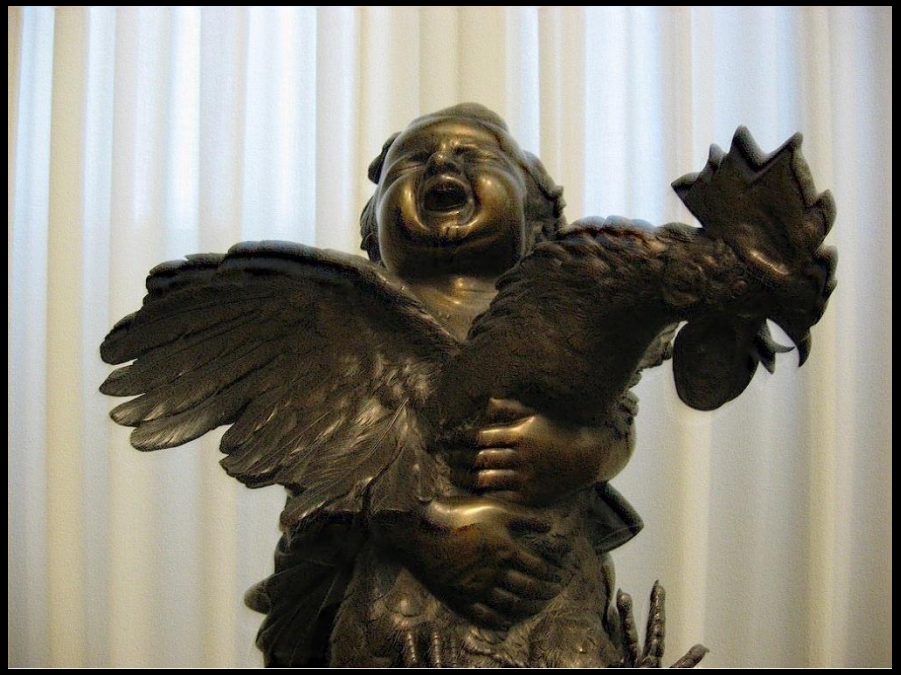
Ours

ksize	31x31
gamma	2.2
wtscale	0.7
wtdeconv	2e-2
wtderinging	5
denoise	0

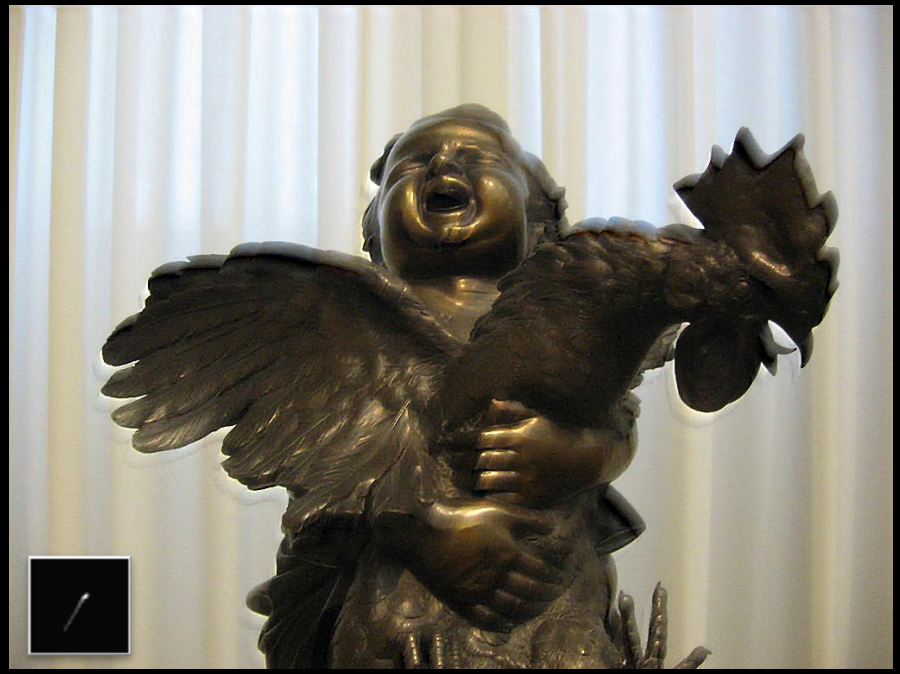
Shan *et al.* [3]

Ours

ksize	47x47
gamma	2.2
wtscale	0.7
wtdeconv	4e-2
wtderinging	0
denoise	1



Cho and Lee [4]



Ours

ksize	61x43
gamma	2.2
wtscale	0.7
wtdeconv	1e-2
wtderinging	1
denoise	0

Cho and Lee [4]

Ours

ksize	35x35
gamma	1
wtscale	0.7
wtdeconv	3e-2
wtderinging	0
denoise	1

Comparison on the dataset of Levin *et al.*

http://www.wisdom.weizmann.ac.il/~levina/papers/LevinEtalCVPR09Data.rar

The top right parameters are used for all examples

Our results are even sharper than the given ground truth images

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

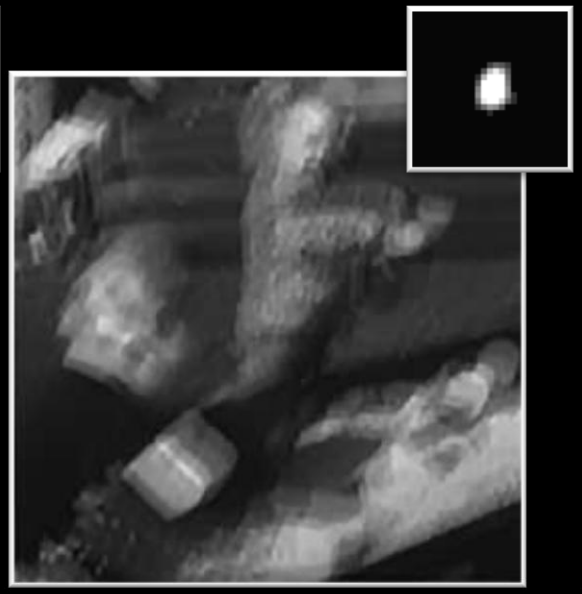
Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*



Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

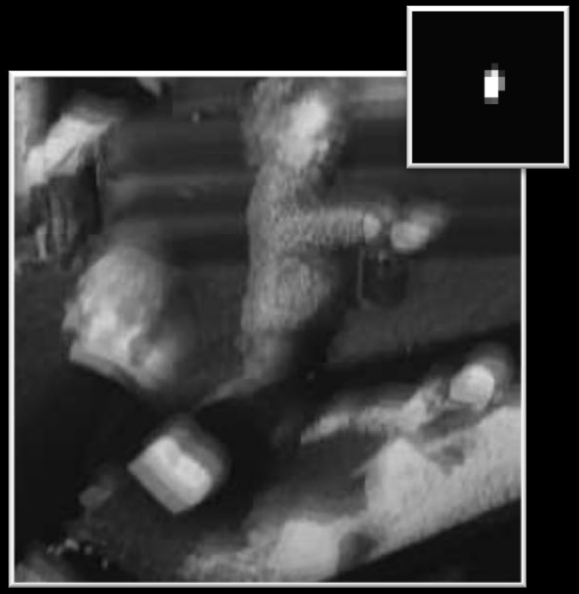
Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*



Shan *et al.*

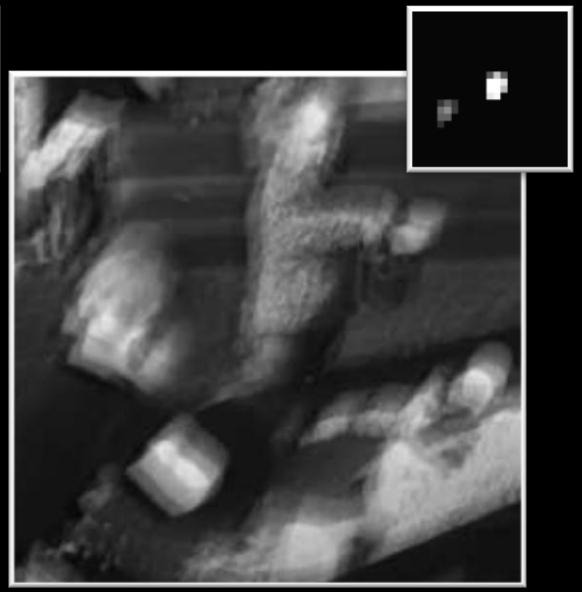
Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*



Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

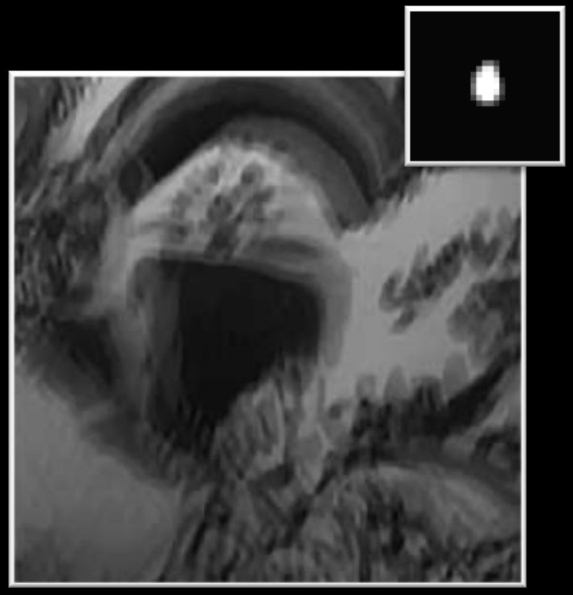
Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*



Shan *et al.*

Ours

input

Ground truth latent image

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

input

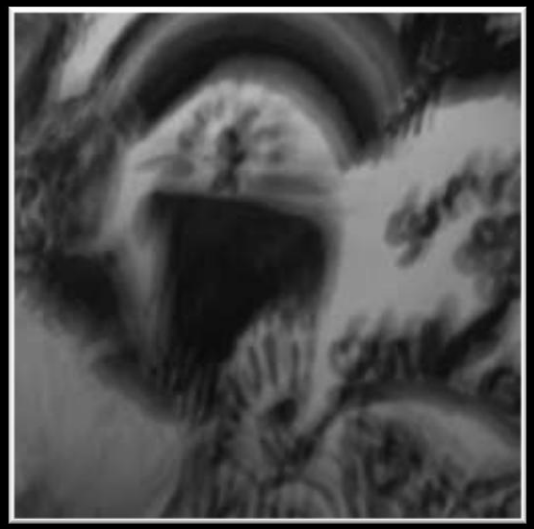
Ground truth

Ground truth kernel

Fergus *et al.*

Shan *et al.*

Ours

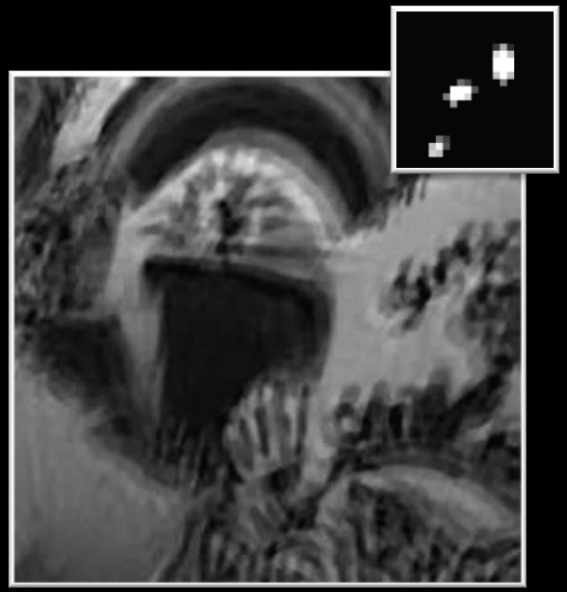


input

Ground truth

Ground truth kernel

Fergus *et al.*



Shan *et al.*

Ours

Reference

[1] L. Xu and J. Jia “Two-Phase Kernel Estimation for Robust Motion Deblurring”, ECCV 2010.
(http://www.cse.cuhk.edu.hk/~leojia/projects/robust_deblur/index.html)

[2] R. Fergus, B. Singh, A. Hertzmann, S.T. Roweis, and W.T. Freeman, “Removing camera shake from a single photograph”, SIGGRAPH 2006.

[3] Q. Shan, J. Jia, and A. Agarwala “High-quality motion deblurring from a single image”, SIGGRAPH 2008.

[4] S. Cho and S. Lee, “Fast motion deblurring”, SIGGRAPH ASIA 2009.

The End