

Review: Image Fusion with Guided Filtering

Élie Michel

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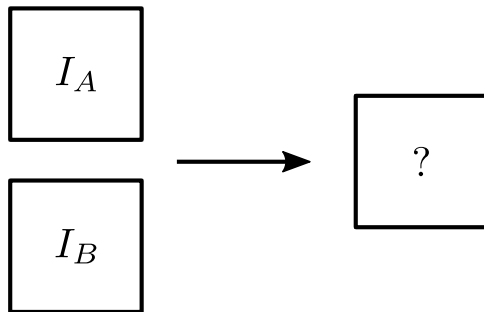
- 1 Guided Filter Fusion
- 2 Examples
 - Fly
 - The Crane and the Turtle
 - Bookshelf
 - Screen reflexion
- 3 Limitations
- 4 Implementation
- 5 Integration to node-based workflow
- 6 Integration to node-based workflow

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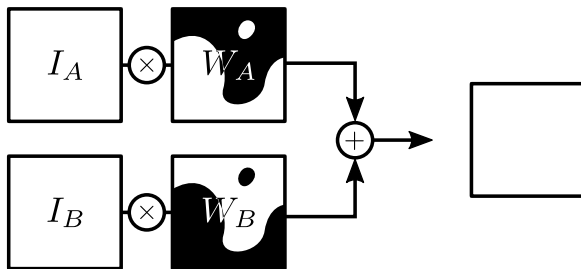
Guided Filter Fusion

Basic image fusion



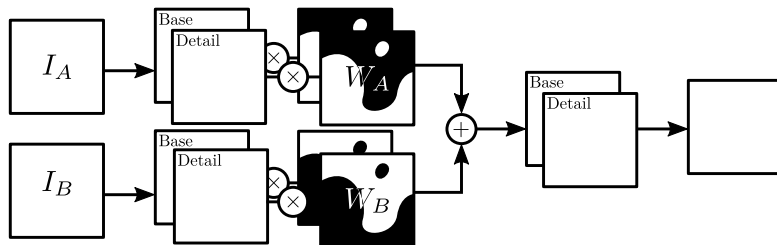
Guided Filter Fusion

Weighted image fusion



Guided Filter Fusion

Multilevel weighted image fusion



Guided Filter Fusion

Weight map construction

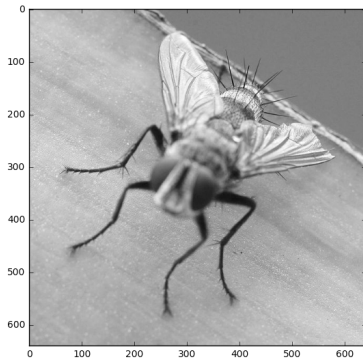
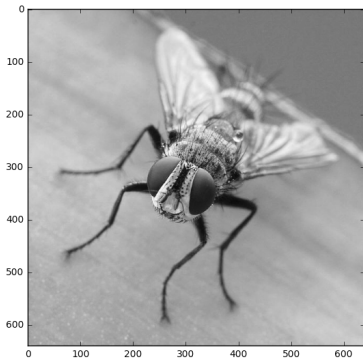
- Saliency map
- Guided Filter

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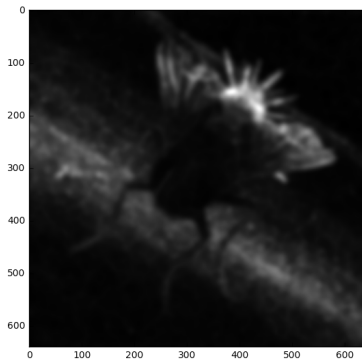
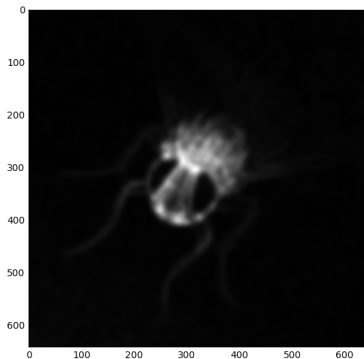
Example 1 : Fly

Input image



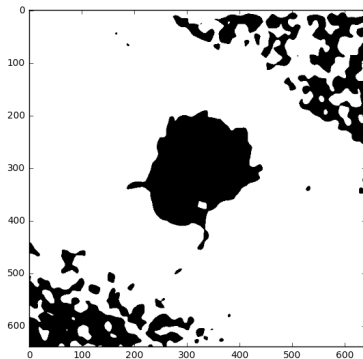
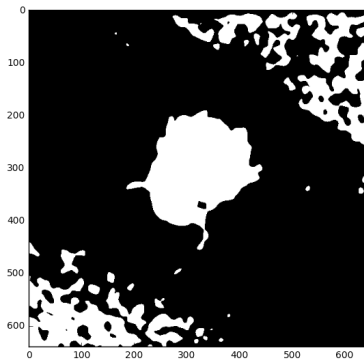
Example 1 : Fly

Saliency maps



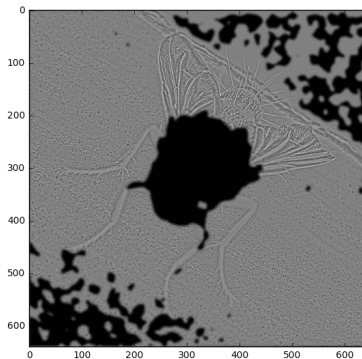
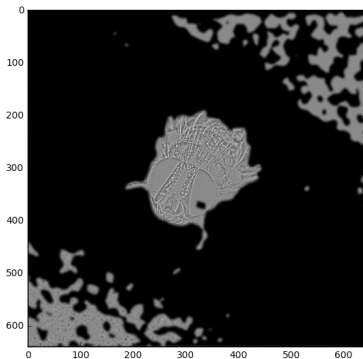
Example 1 : Fly

Argmax of saliency masks



Example 1 : Fly

Filtered masks



Example 1 : Fly

Colored output



Example 2 : The Crane and the Turtle

Image 1



Example 2 : The Crane and the Turtle

Image 2



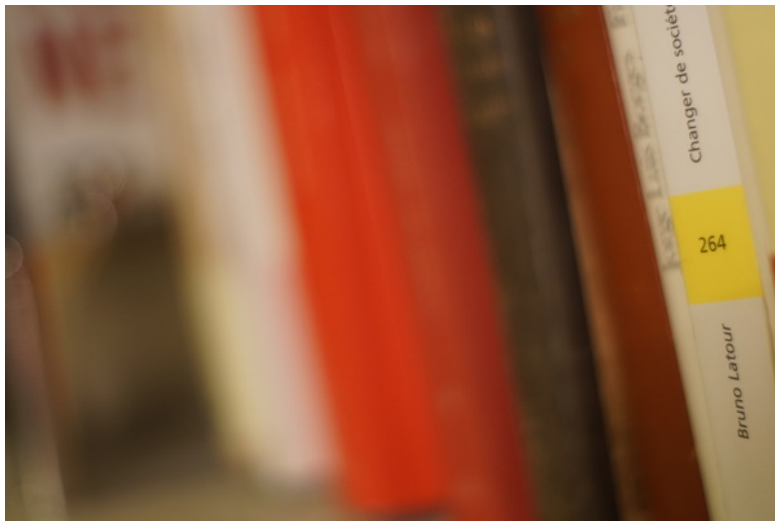
Example 2 : The Crane and the Turtle

Result



Example 3 : Bookshelf

Image 1



Example 3 : Bookshelf

Image 2



Example 3 : Bookshelf

Image 3



Example 3 : Bookshelf

Image 4



Example 3 : Bookshelf

Image 5



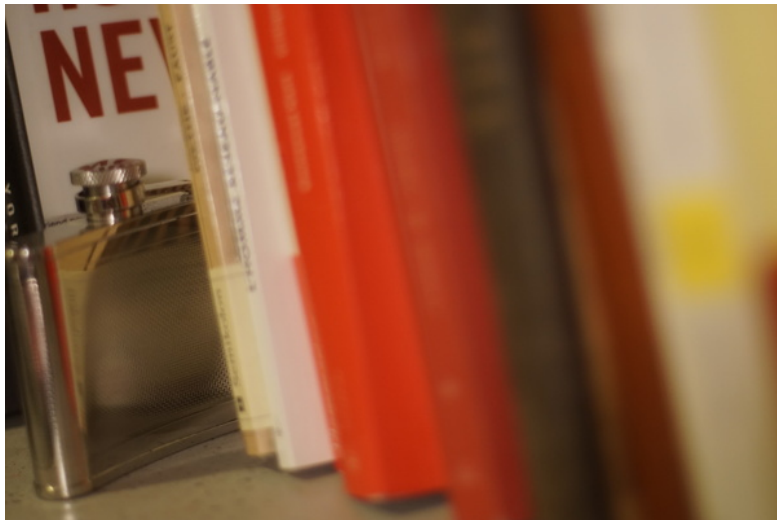
Example 3 : Bookshelf

Image 6



Example 3 : Bookshelf

Image 7



Example 3 : Bookshelf

Result of 1+2



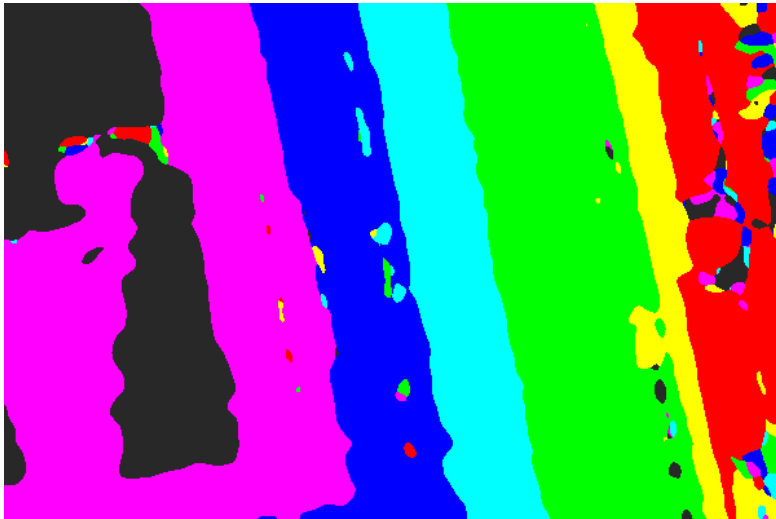
Example 3 : Bookshelf

Result of full merging



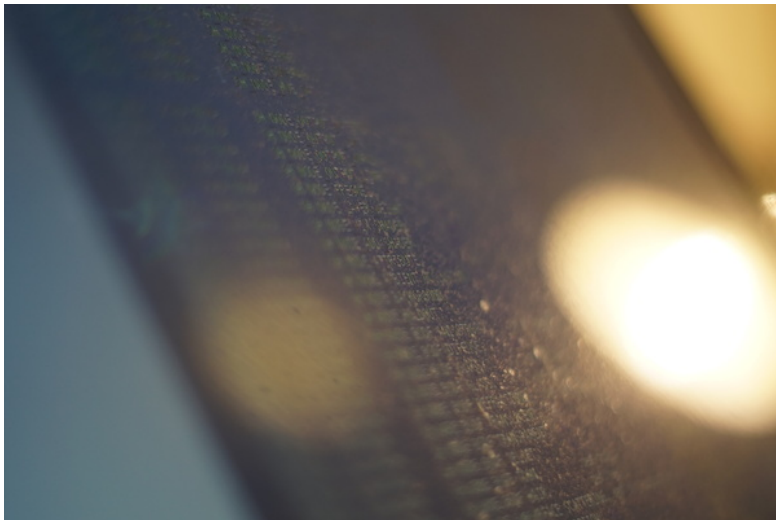
Example 3 : Bookshelf

Merging mask



Example 4 : Screen reflexion

Image 1



Example 4 : Screen reflexion

Image 2



Example 4 : Screen reflexion

Image 3



Example 4 : Screen reflexion

Image 4



Example 4 : Screen reflexion

Result

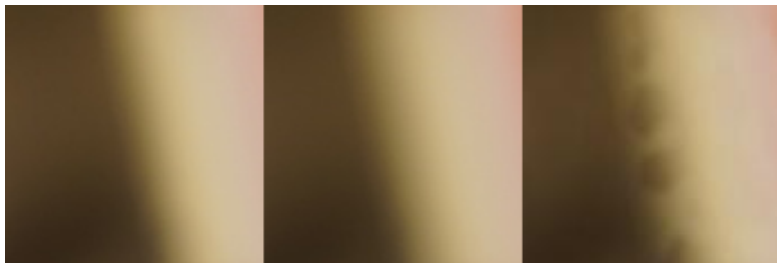


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Limitations

Indecision in blurry areas



Limitations

Misalignment



Limitations

Noise highlight



Limitations

Light change



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Implementation

Python implementation

Python 3, using only numpy/scipy :

```
from fusion import imread, cGFF, imwrite
```

```
A = imread("A.jpg")
```

```
B = imread("B.jpg")
```

```
C = imread("C.jpg")
```

```
fused = cGFF([A, B, C])
```

```
imwrite("fused.jpg", fused)
```

Implementation

Notebook

```
In [31]: from imagerie import *  
from scipy.misc import toimage, imsave  
from scipy.ndimage.filters import laplace  
from scipy.ndimage import uniform_filter, gaussian_filter  
%matplotlib inline  
plt.rcParams['figure.figsize'] = (14, 8)
```

```
In [11]: flyfront = imread("fly-front.jpg")  
flyback = imread("fly-back.jpg")  
flyref = imread("fly-reference.jpg")
```

```
In [12]: fig = plt.figure()  
fig.add_subplot(1,3,1)  
plt.imshow(flyfront)  
fig.add_subplot(1,3,2)  
plt.imshow(flyback)  
fig.add_subplot(1,3,3)  
plt.imshow(flyref)
```

```
Out[12]: <matplotlib.image.AxesImage at 0x7f04e2f0e978>
```

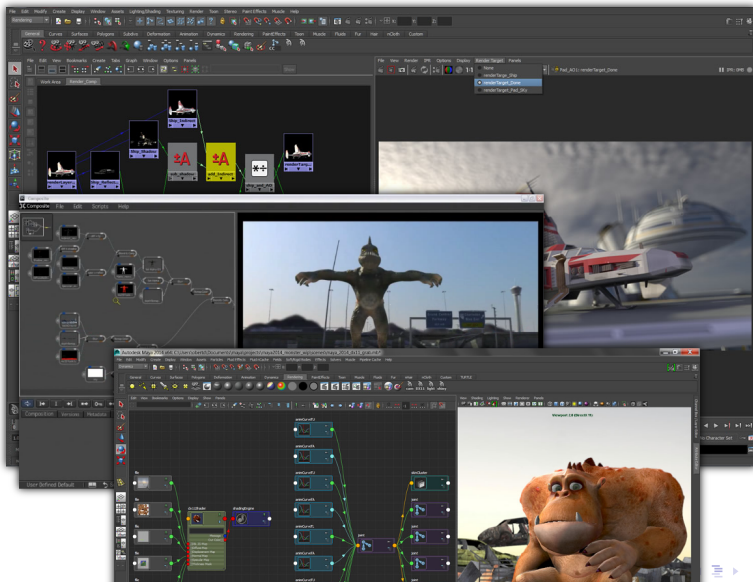


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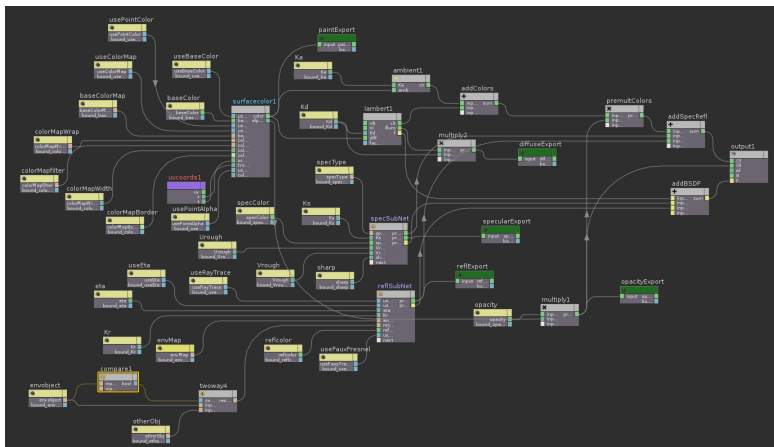
Integration to node-based workflow

Node in Maya



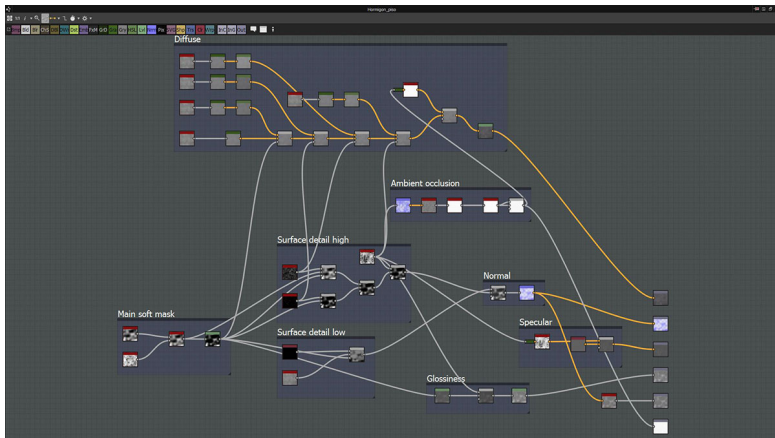
Integration to node-based workflow

Node in Houdini



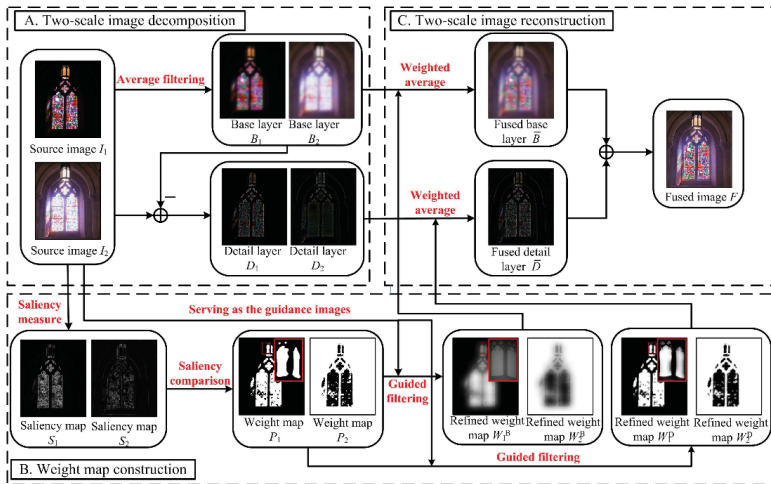
Integration to node-based workflow

Node in Substance



Integration to node-based workflow

Node-based representation of GFF



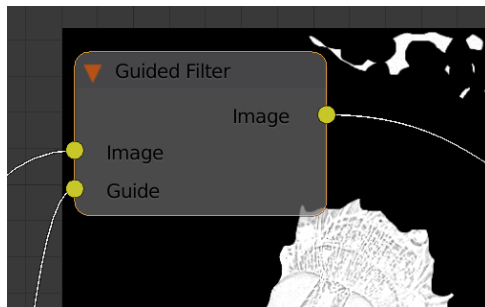
Integration to node-based workflow

Blender compositing nodes

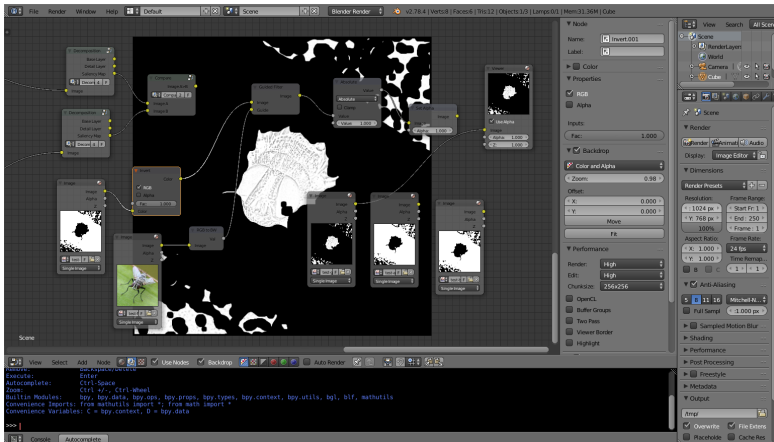


Integration to node-based workflow

Guided Filter for Blender

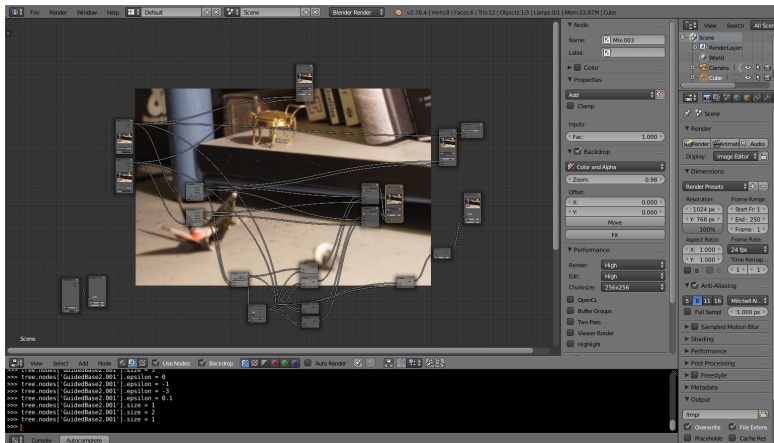


GFF in Blender



Integration to node-based workflow

GFF in Blender



Thank you !

Questions ?