

Gradient Domain Imaging

Applications

Submitted by:

Dolniak, Oliver / 220678 / Informatik Dip

Klaghstan, Merza / 323179 / Informatik MA

Tutor: Mathias Eitz

TU Berlin

Department of Computer Graphics

Winter Semester 2010-2011

Applications

- Different categories of applications
 1. Per pixel
 2. Corresponding gradients in 2 images
 3. Corresponding gradients in multiple images
 4. Combining gradients among seams

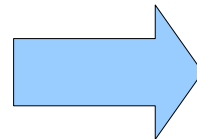
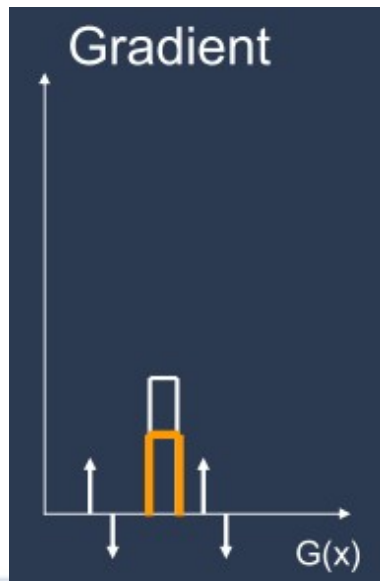
Applications

- Different categories of applications
 1. Per pixel
 2. Corresponding gradients in 2 images
 3. Corresponding gradients in multiple images
 4. Combining gradients among seams

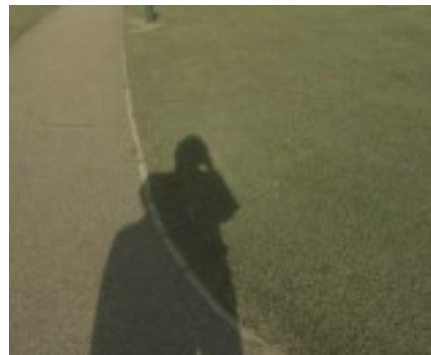
HDR Imaging tone mapping



- Tone map X bit image for 8 bit Display
- Attenuate high gradients



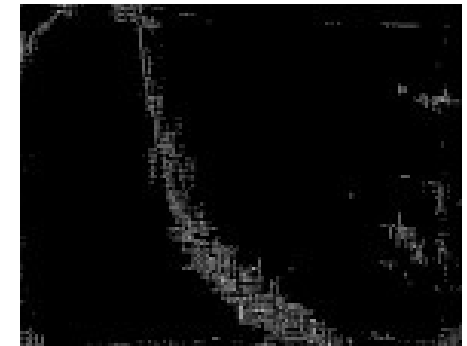
Shadow removal



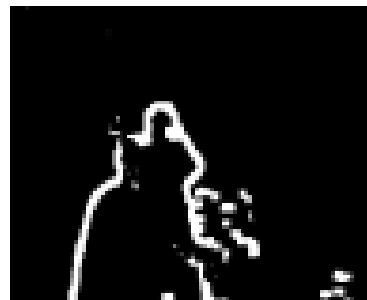
Original Image



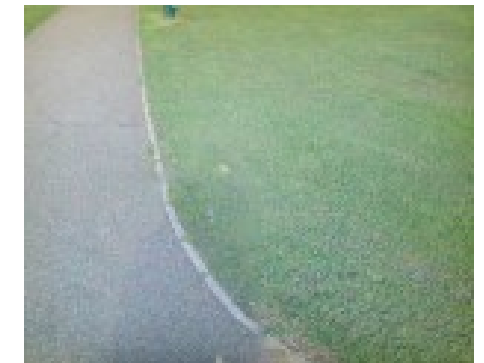
Edge map



Illumination
invariant Image



Shadow edges



Poisson matting

- Extract foreground from background

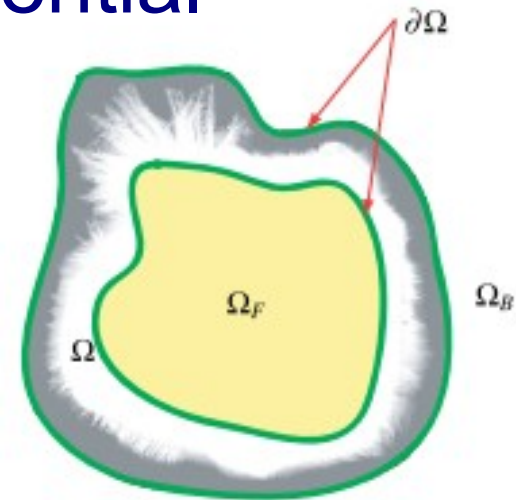


- Image $I(x,y)$ can be extracted from BG image $B(x,y)$, and FG image $F(x,y)$ with its alpha matte $a(x,y)$ by the matting equation :

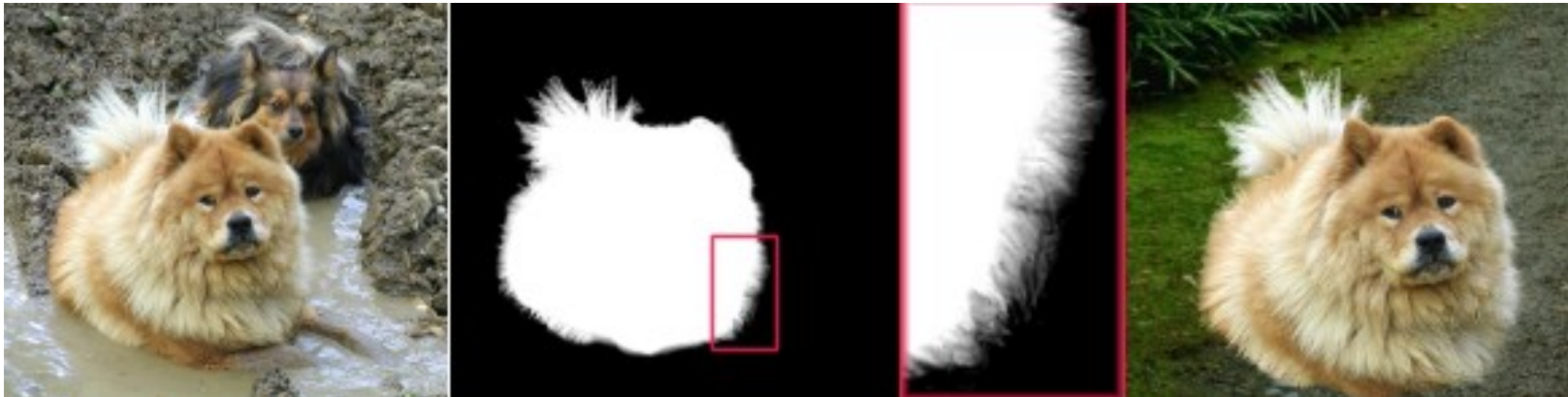
$$I = aF + (1-a)B$$

Poisson matting

- Interaction by the user is essential
 - Definitely BG
 - Definitely FG
 - Unknown region



- Iteratively, perfect results can be obtained



Applications

- Different categorization of applications
 1. Per pixel
 2. Corresponding gradients in 2 images
 3. Corresponding gradients in multiple images
 4. Combining gradients among seams

Reflection removal



Ambient image



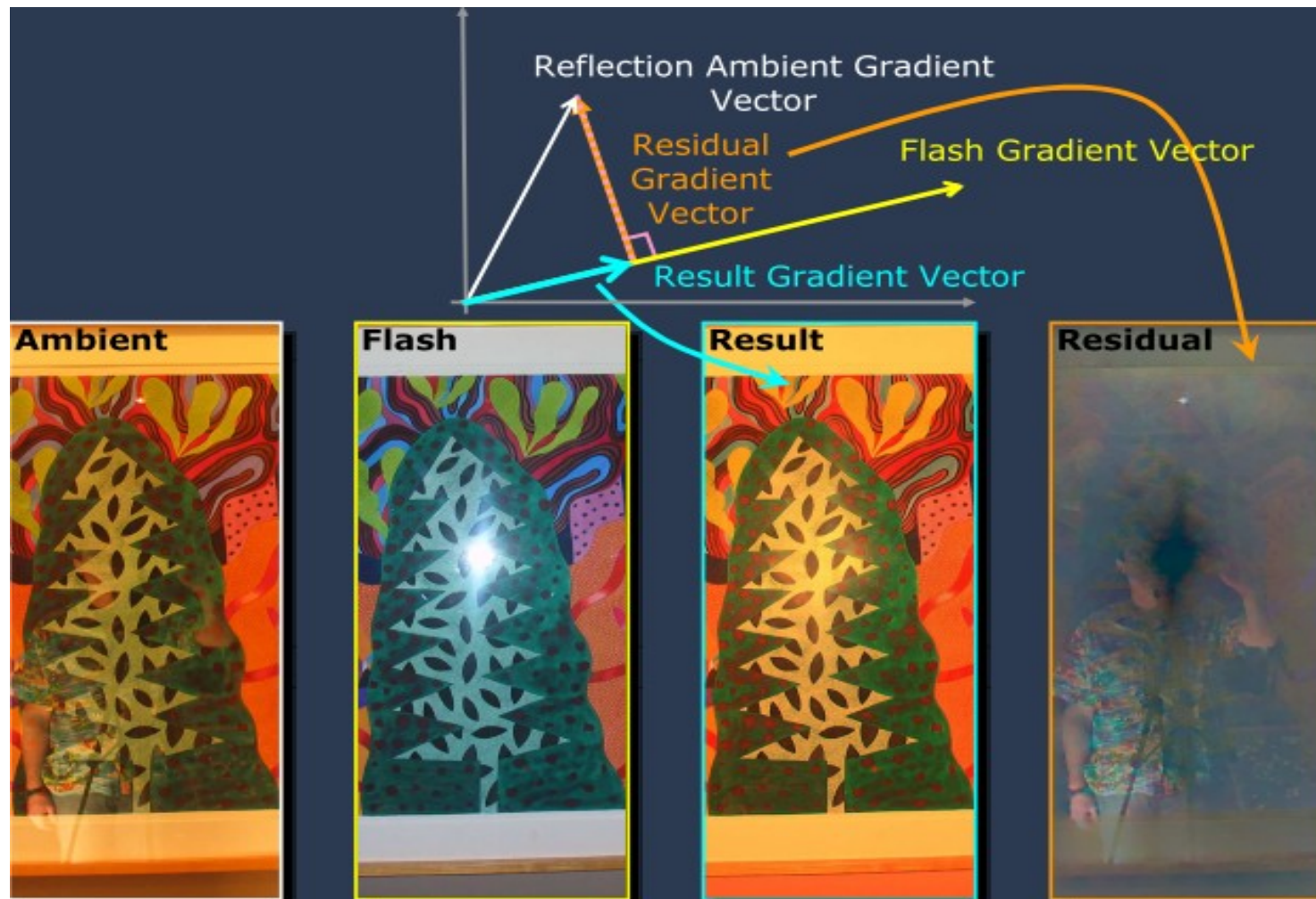
Flash image



Result

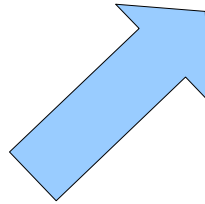
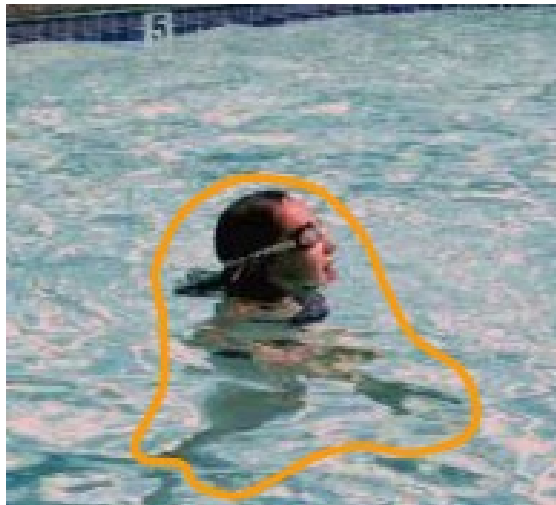
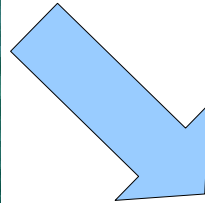
Reflection removal

- How is this gonna be achieved ?!



Composition

- Copying gradients instead of pixels



Applications

- Different categorization of applications
 1. Per pixel
 2. Corresponding gradients in 2 images
 3. Corresponding gradients in multiple images
 4. Combining gradients among seams

Specularity Reduction in Active Illumination

- Multiple images with same viewpoint, varying illumination



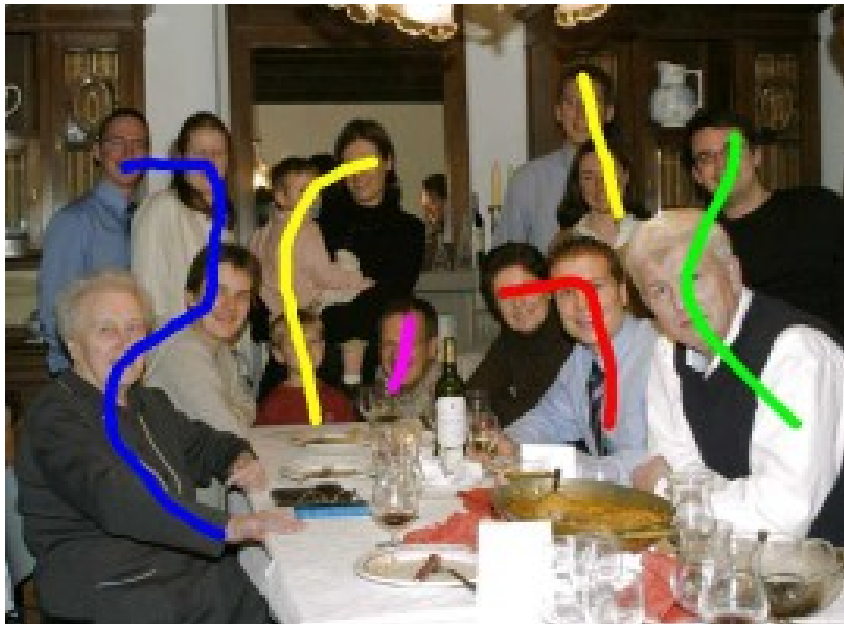
Applications

- Different categorization of applications
 1. Per pixel
 2. Corresponding gradients in 2 images
 3. Corresponding gradients in multiple images
 4. Combining gradients among seams

Digital Photo-montage



Digital Photo-montage



User defines brush strokes



Computed labeling

Thank you :)

Any questions ???!

References:

Agrawal A. and Raskar R. 2007. *Gradient Domain Manipulation Techniques in Vision and Graphics*

Sun J., Jia J., Tang C. and Shum H. 2004. *Poisson Matting*

www.wikipedia.org