

Decolorization

CVFX @ NTHU

5 March 2015

Decolorization

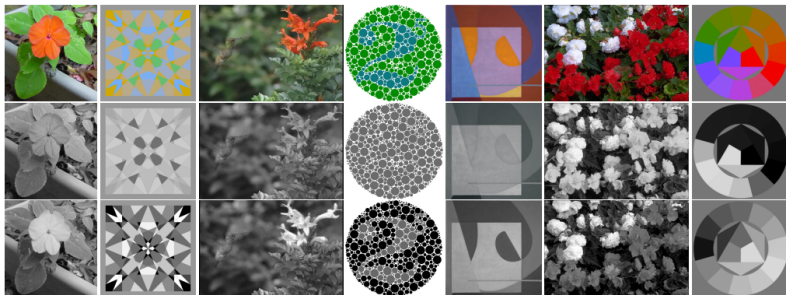
“Decolorization: Is `rgb2gray()` Out?” by Song et al.

- ▶ Convert a color image to a grayscale one
- ▶ Preserving contrast

The paper

Decolorization: Is `rgb2gray()` Out?

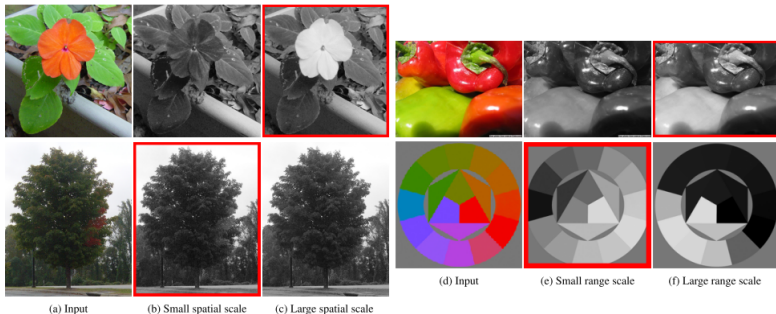
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Iso-luminant



Choosing suitable scales for contrast preserving?



RGB2GRAY conversion model

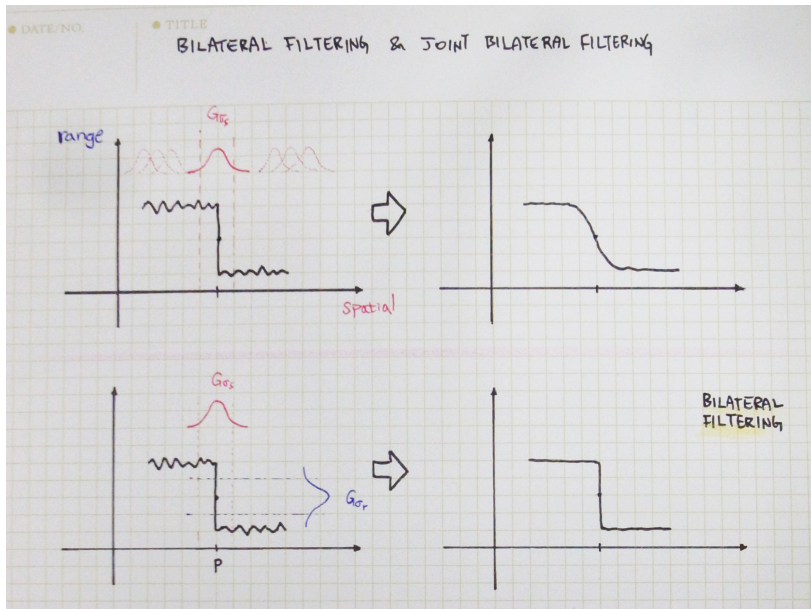
$$g = w_r I_r + w_g I_g + w_b I_b \quad (1)$$

$$\text{s.t. } w_r + w_g + w_b = 1, \quad (2)$$

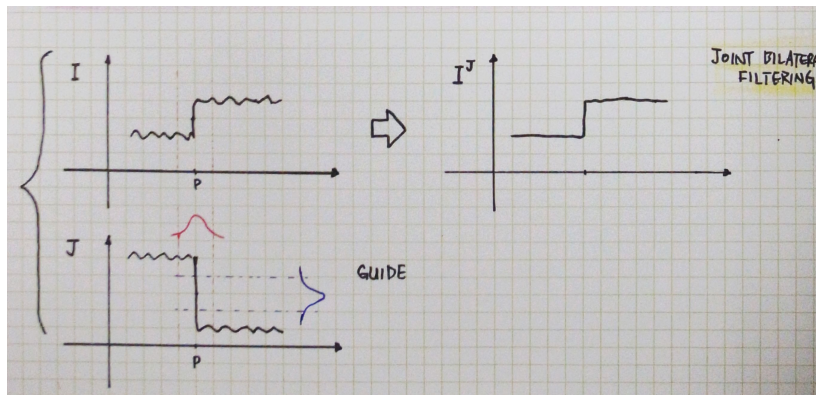
$$w_r \geq 0, w_g \geq 0, w_b \geq 0. \quad (3)$$

`rgb2gray()`: $w_r = 0.2989$, $w_g = 0.5870$, $w_b = 0.1140$

Bilateral filtering



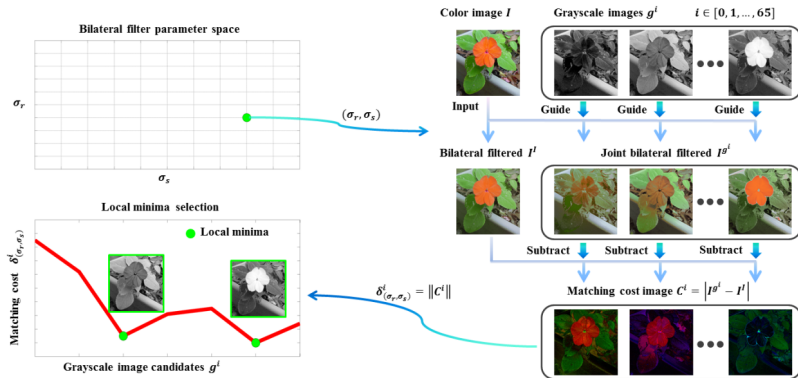
Joint bilateral filtering



Joint bilateral filtering

$$I^J(\mathbf{p}) = \frac{\sum_{\mathbf{q} \in \Omega_p} G_{\sigma_s}(\|\mathbf{p} - \mathbf{q}\|) G_{\sigma_r}(\|\mathbf{J}(\mathbf{p}) - \mathbf{J}(\mathbf{q})\|) I(\mathbf{q})}{\sum_{\mathbf{q} \in \Omega_p} G_{\sigma_s}(\|\mathbf{p} - \mathbf{q}\|) G_{\sigma_r}(\|\mathbf{J}(\mathbf{p}) - \mathbf{J}(\mathbf{q})\|)} \quad (4)$$

Local minima voting



Experiment