HDR tone mapping using bilateral filtering

Reference material from
Durand and Dorsey
http://people.csail.mit.edu/fredo/PUBLI/Siggraph2002/

Theory

reduce contrast the low frequencies of the image while keeping the details (high frequencies).

Algorithm

intensity = (20*R + 40*G + 1*B) / 61

[r,g,b] = [R,G,B] / intensity

logIntensity = log10(intensity)

logBase = Bilateral(logIntensity)

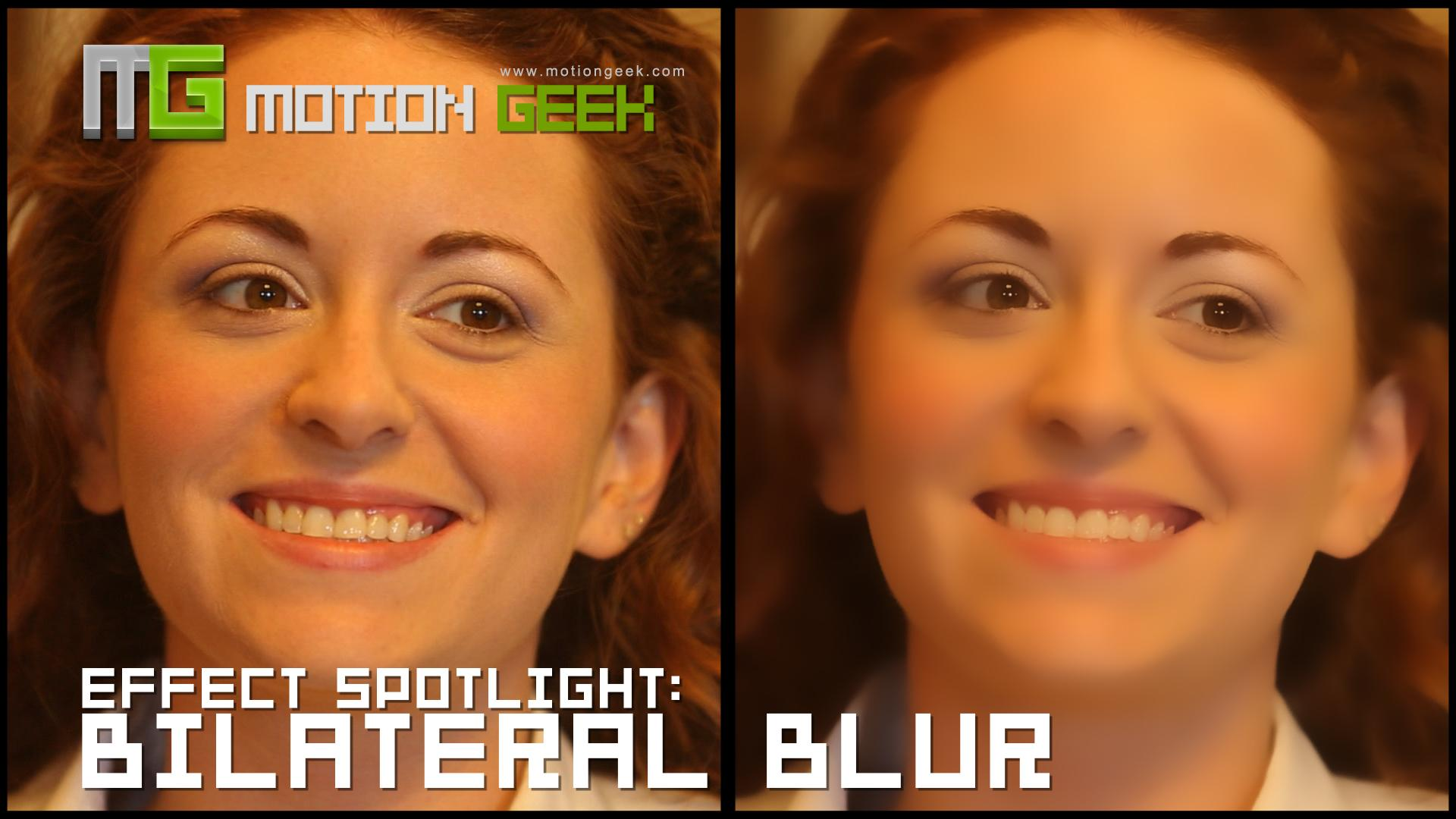
logDetail = logIntensity - logBase

logOutputIntensity = compress(logBase) + logDetail

outRGB = [r,g,b] * pow(10, logOutputIntensity)

Bilateral blur

- Blur, but not across edges.
- Like a gaussian blur with an extra weight for the intensity.
- Non linear -> not separable in theory, will lead to artifacts.


www.motiongeek.com
MOTION GEEK
EFFECT SPOTLIGHT:
BILATERAL BLUR

Base contrast compression

Suggested:

targetContrast/(max(logBase)) - min(logBase)))

targetContrast = log10(5)

Possible to use reinhard or other global tonemap operator to compress the contrast base.

Implementation

Input:

1 - 4: Tonemap function

1) Durand & Dorsey (bilateral)

2) Reinhard (global)

3) Filmic Games ‘Uncharted 2’ - Tonemap (global)

4) Durand & Dorsey with the compression used in 3, (bilateral)

S) Toggle Separable

Mouse scroll:

Control detail level, $\alpha = [0, 1]$

logOutputIntensity = compress(logBase) + α * logDetail