Image Processing

Girls Who Build

Fathom

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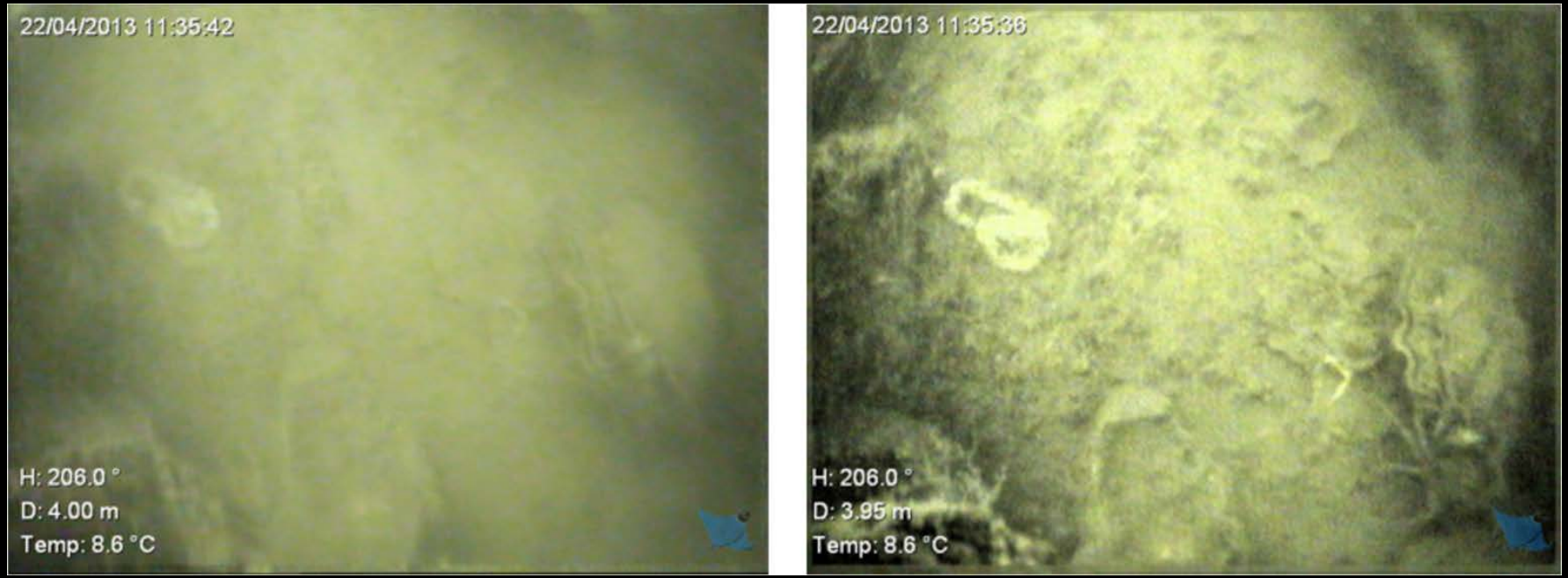
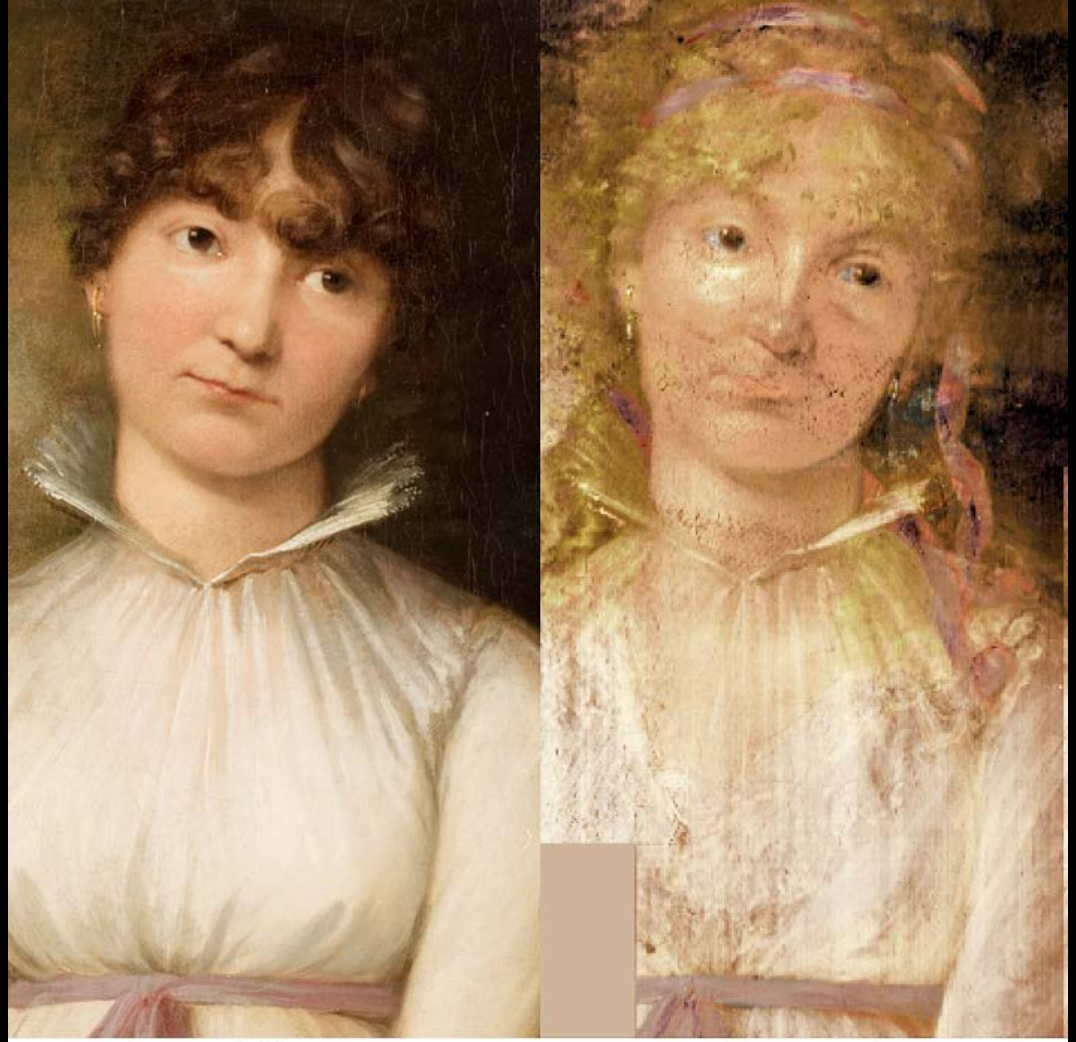
processing.org

What do you think of when you hear image processing?

Image processing is analyzing and manipulating an image through code.

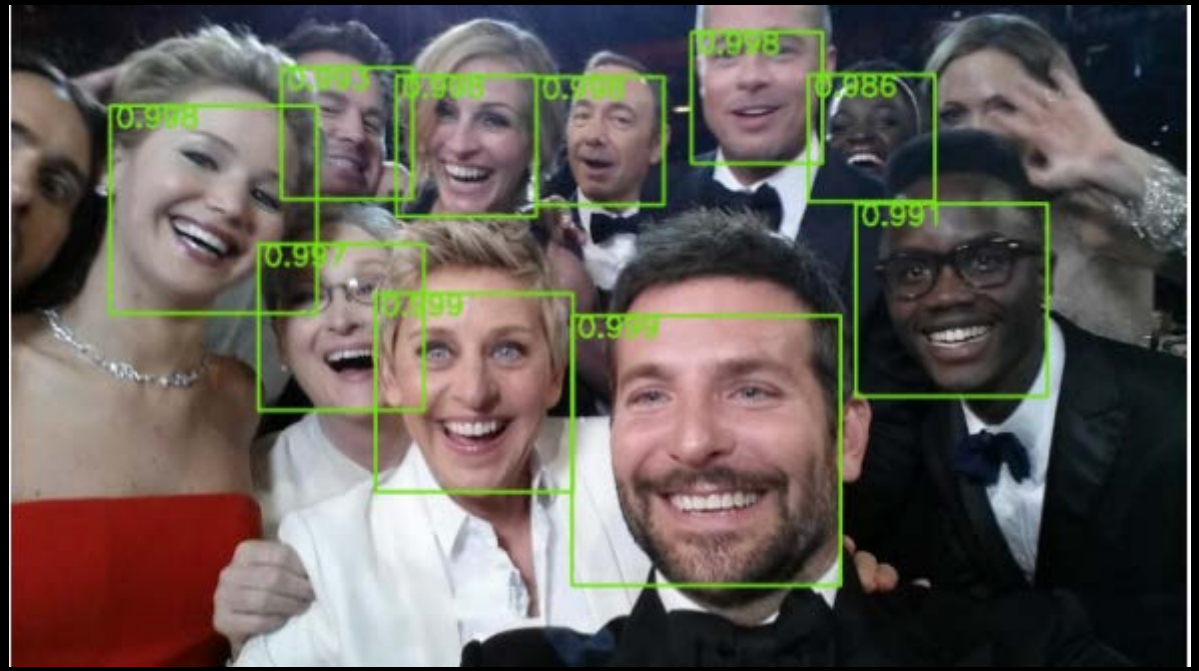
Using math + computer science, we can analyze, enhance and distort images for all kinds of uses.

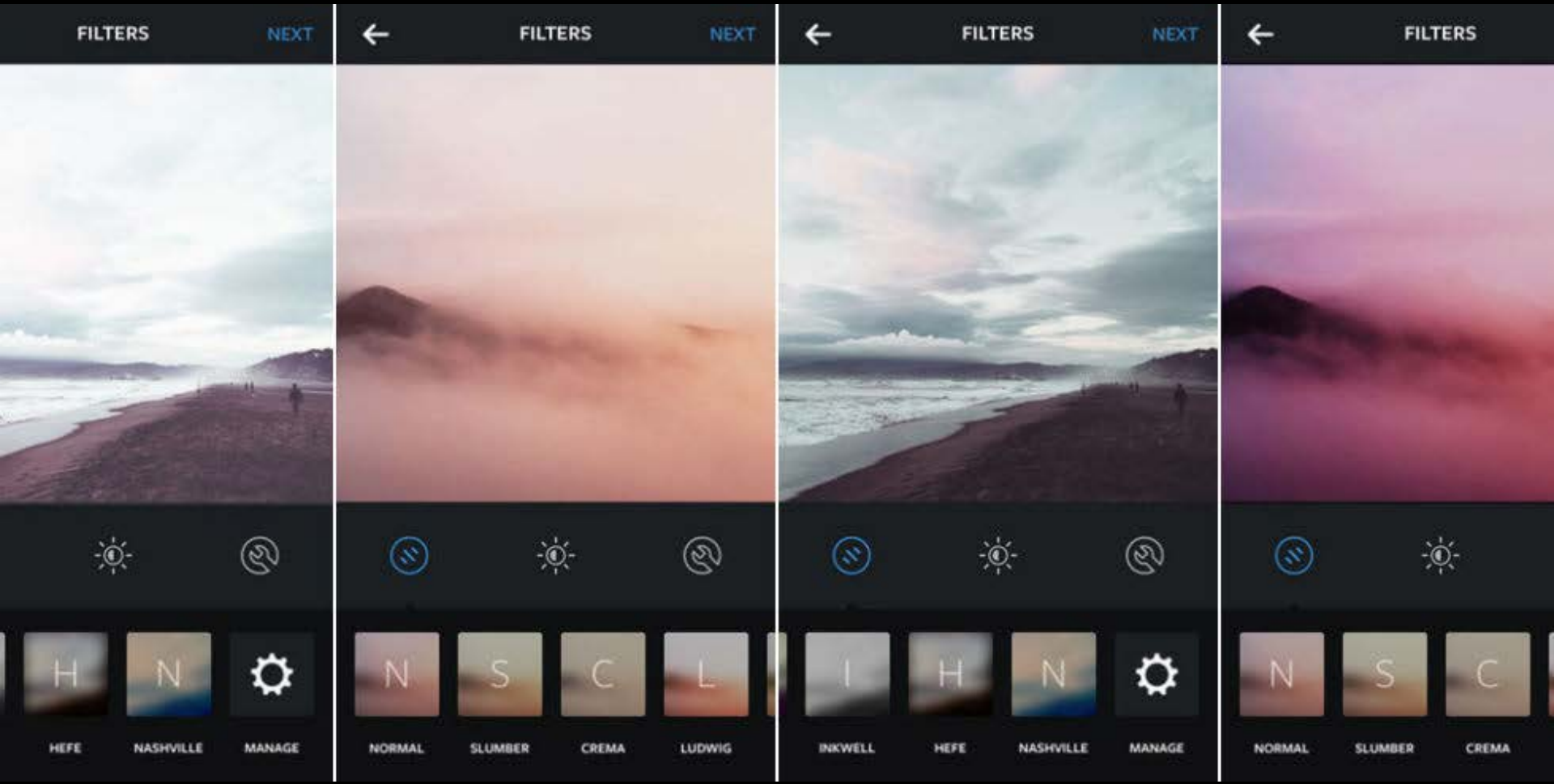




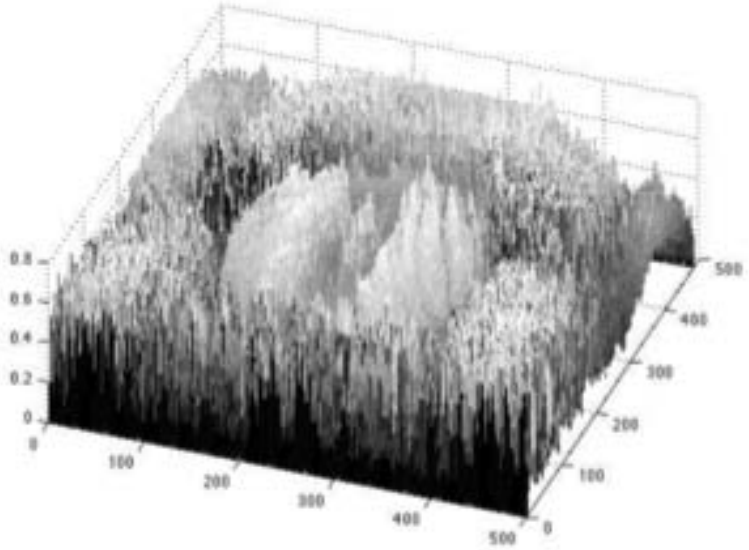
Surface Reconstructed

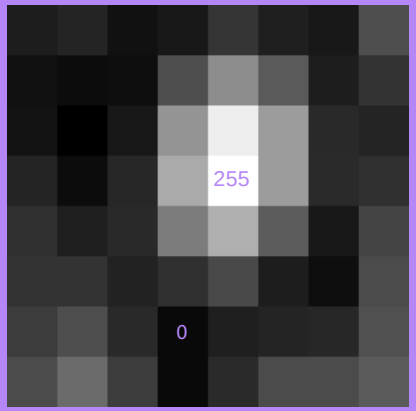
Image via NASA (X-ray: NASA/CXC/SAO/J.DePasquale; IR: NASA/JPL-Caltech; Optical: NASA/STScI). CC BY-NC.



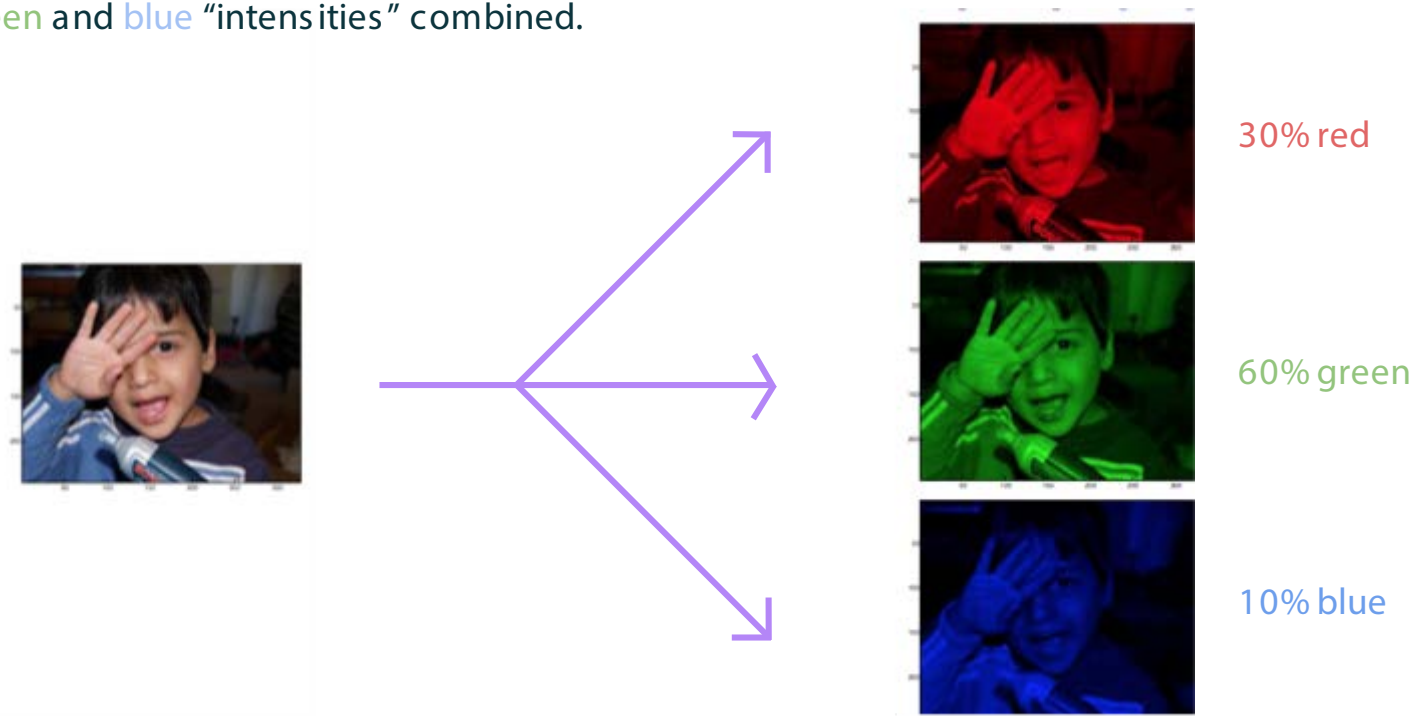


Color on the computer




255
0

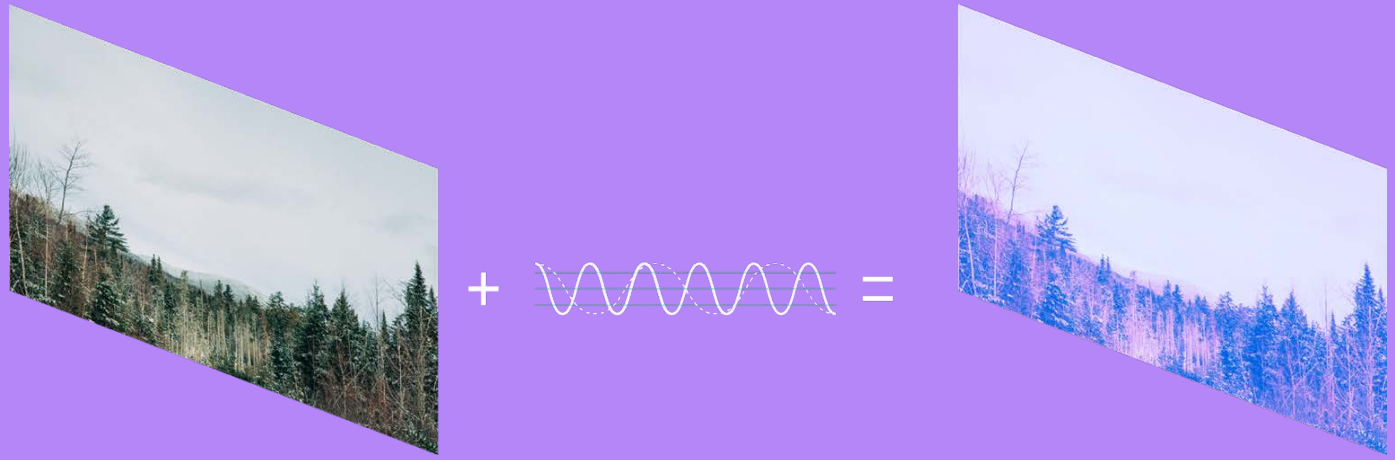
A color image can be represented as a percentage of the red, green and blue "intensities" combined.



A color image can also be represented as a set of hue, value, and saturation (HSB) values.

Shift across hue, but not saturation or value

Let’s make filters of our own!



Blend mode	Formula
Darken	min(Target,Blend)
Multiply	Target * Blend
Color Burn	1 - (1-Target) / Blend
Linear Burn	Target + Blend - 1
Lighten	max(Target,Blend)
Screen	1 - (1-Target) * (1-Blend)
Color Dodge	Target / (1-Blend)
Linear Dodge	Target + Blend
Overlay	(Target > 0.5) * (1 - (1-2*(Target-0.5)) * (1-Blend)) + (Target <= 0.5) * ((2*Target) * Blend)

Blend mode	Formula
Soft Light	(Blend > 0.5) * (1 - (1-Target) * (1-(Blend-0.5))) + (Blend <= 0.5) * (Target * (Blend+0.5))
Hard Light	(Blend > 0.5) * (1 - (1-Target) * (1-2*(Blend-0.5))) + (Blend <= 0.5) * (Target * (2*Blend))
Vivid Light	(Blend > 0.5) * (1 - (1-Target) / (2*(Blend-0.5))) + (Blend <= 0.5) * (Target / (1-2*Blend))
Linear Light	(Blend > 0.5) * (Target + 2*(Blend-0.5)) + (Blend <= 0.5) * (Target + 2*Blend - 1)
Pin Light	(Blend > 0.5) * (max(Target,2*(Blend-0.5))) + (Blend <= 0.5) * (min(Target,2*Blend)))
Difference	| Target - Blend |
Exclusion	0.5 - 2*(Target-0.5)*(Blend-0.5)

Source: http://goo.gl/L4rBRb

Resource: Girls Who Build Cameras

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