Learning Representations for Automatic Colorization

Experiment Presentation - 09/21/16

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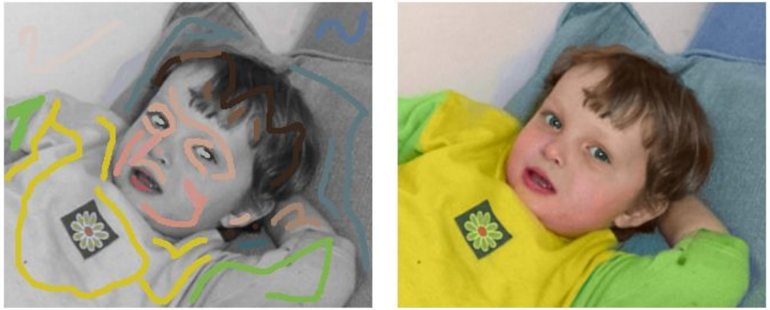
Introduction

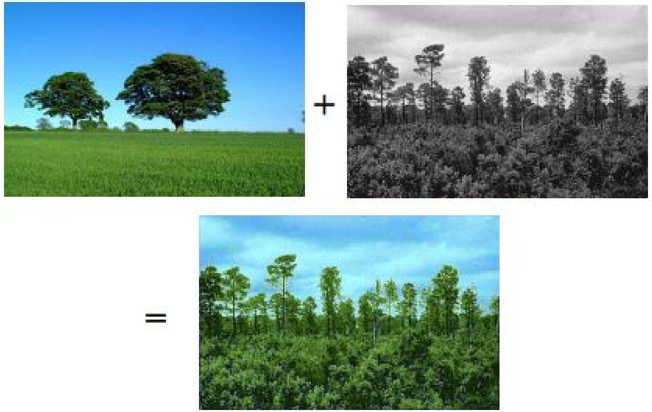
Colorization

Larsson et al. (2016)

Previous attempts: Transfer, Scribble

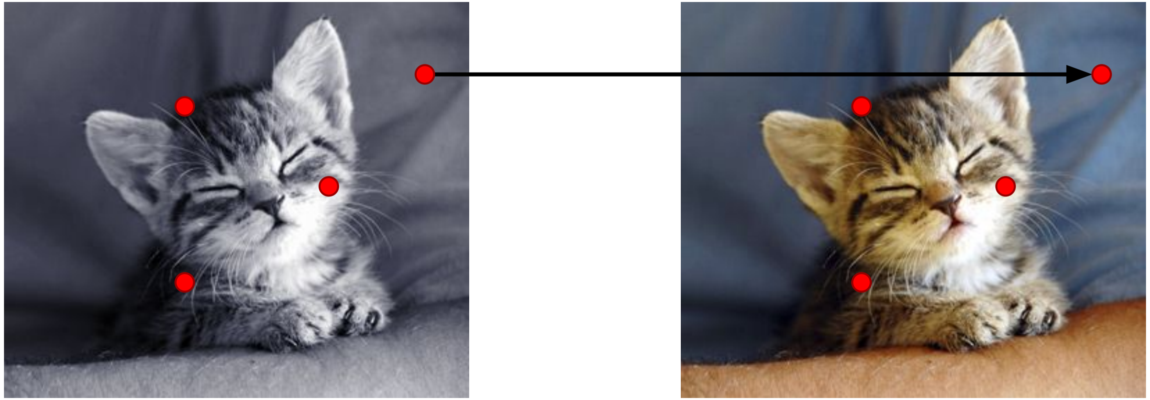


Levin et al. (2004)



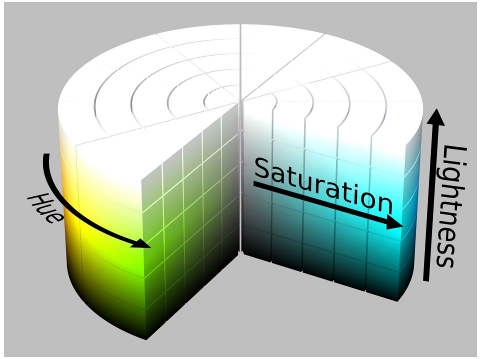
Wesch et al. (2002)

Idea



Thinkstock

Why HSL?

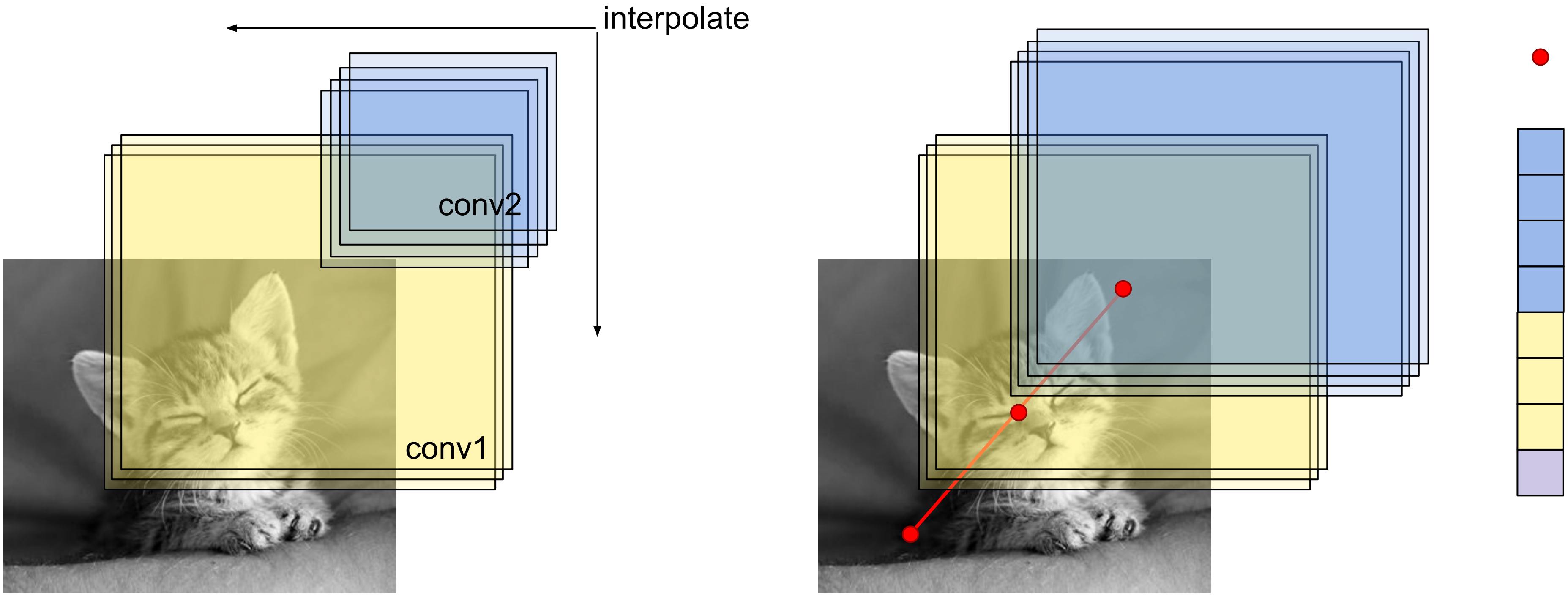


Wiki User:SharkD

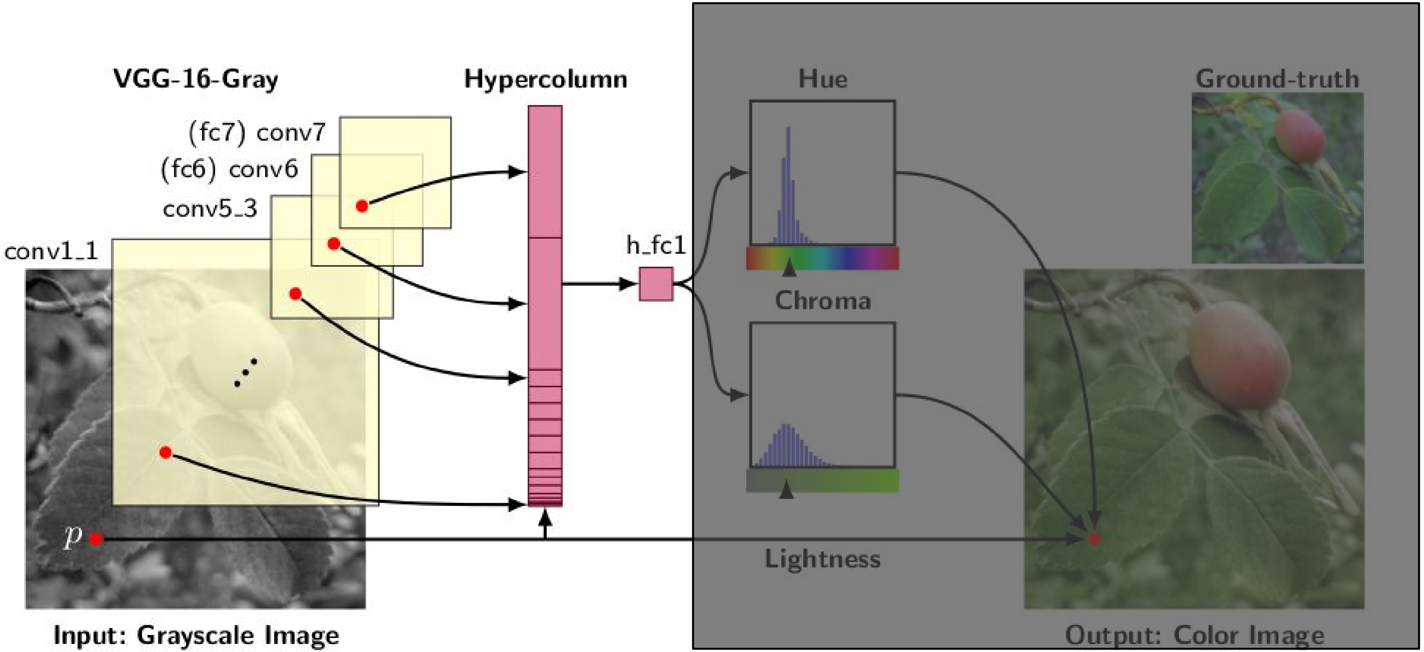
Predict the color histogram for each pixel

Model

Representing a pixel - Image hypercolumn



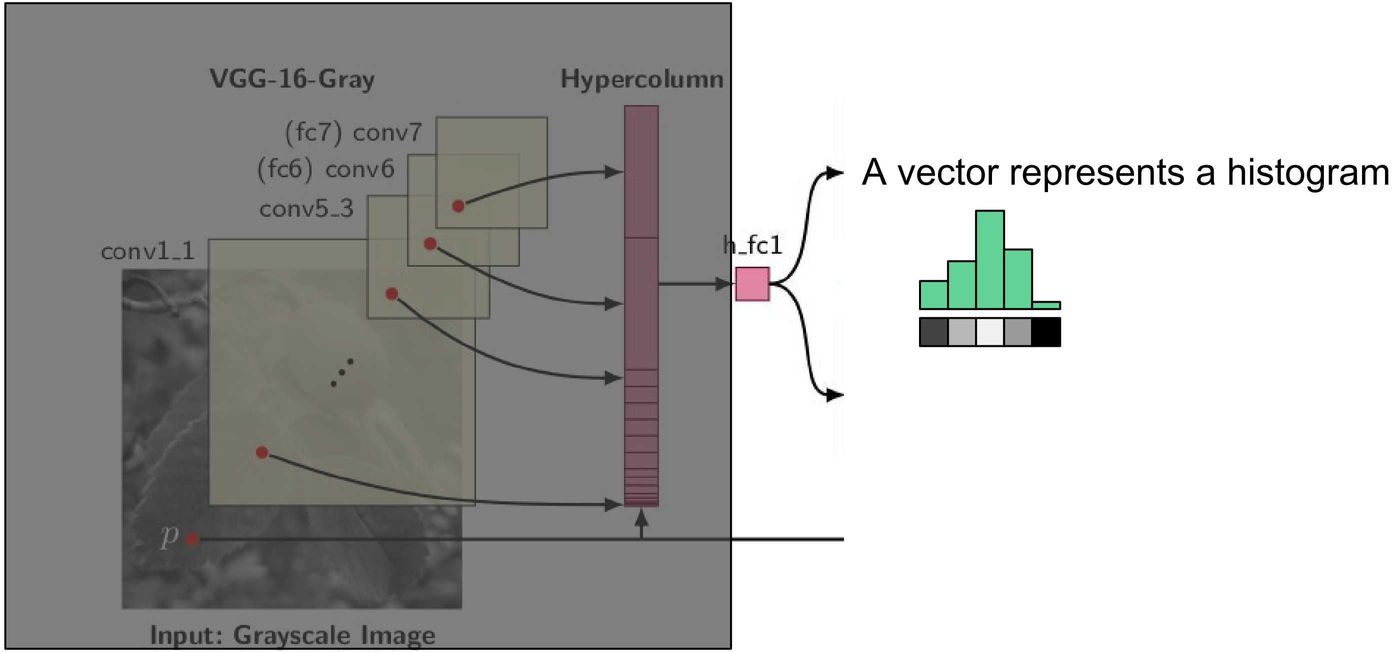
Model



Larsson et al. (2016)

Model

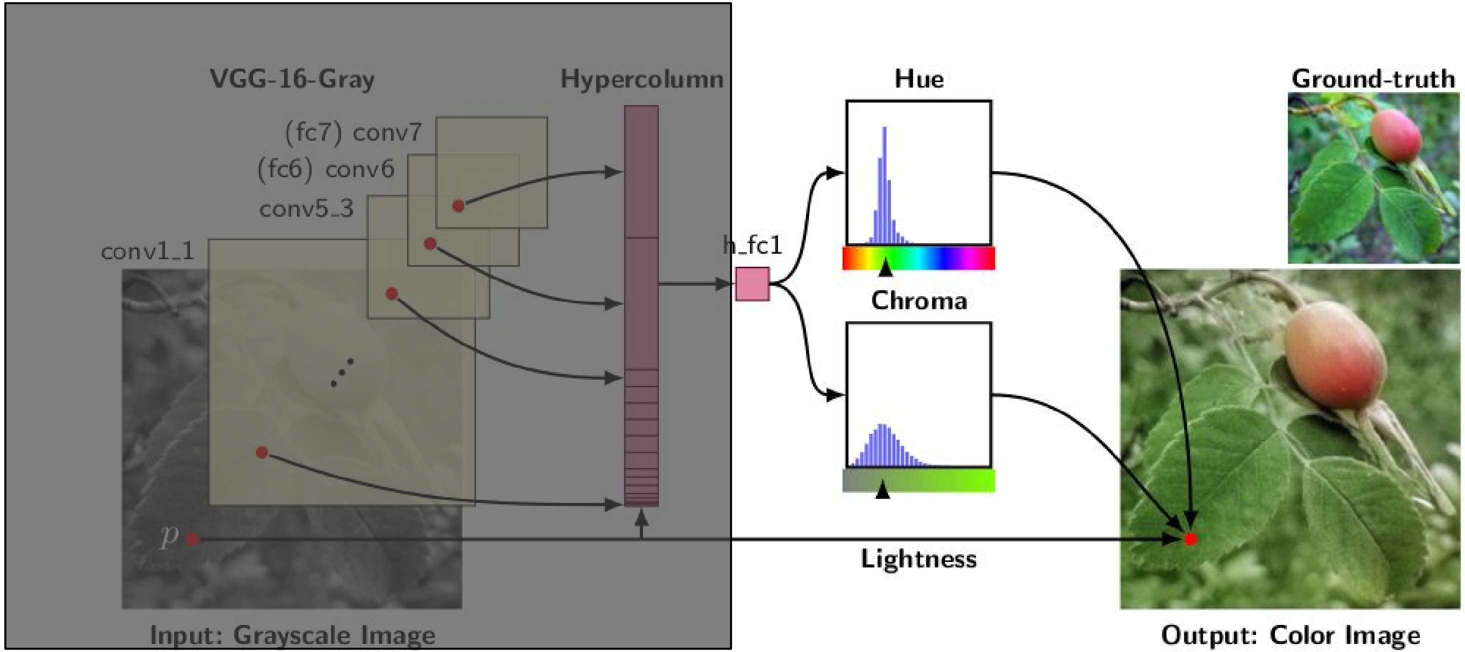
Image hypercolumn features : pre-trained VGG



Larsson et al. (2016)

Model

Image hypercolumn features : pre-trained VGG



Larsson et al. (2016)

Why just two predictions?

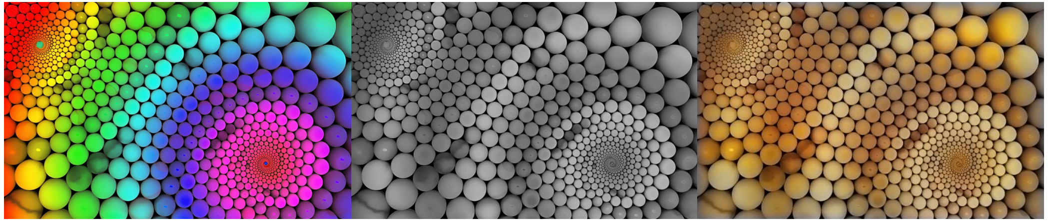
Lightness information already present

$$\boxed{L = \frac{R+B+G}{3}}$$

$$\widetilde{H} = \frac{B - \frac{1}{2}(R+G)}{L+\epsilon}$$

$$\widetilde{S} = \frac{R-G}{L+\epsilon}$$

Results



Larsson et al. (2016)

Demo: http://colorize.ttic.edu/

Results

Why is this important?

Larsson et al. (2016)

Experiment

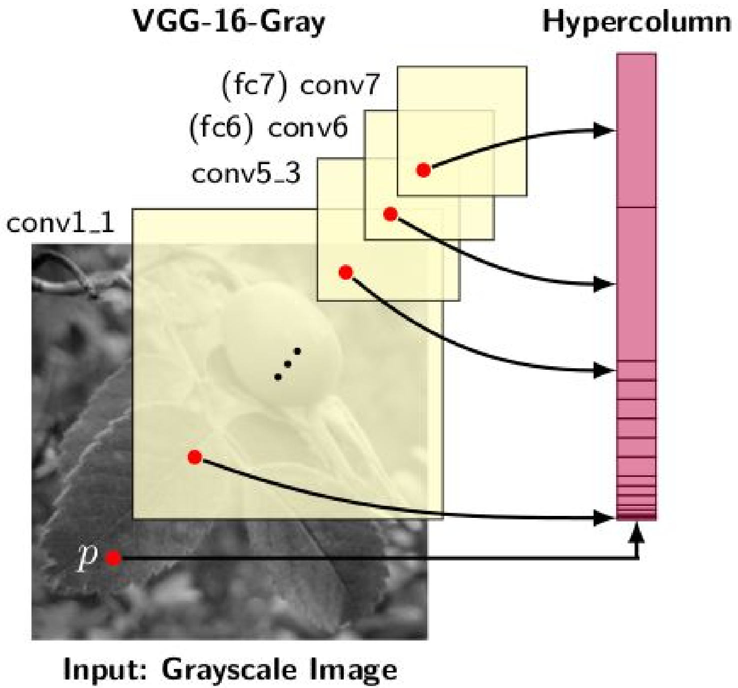
Experiment - Foreground Consistency



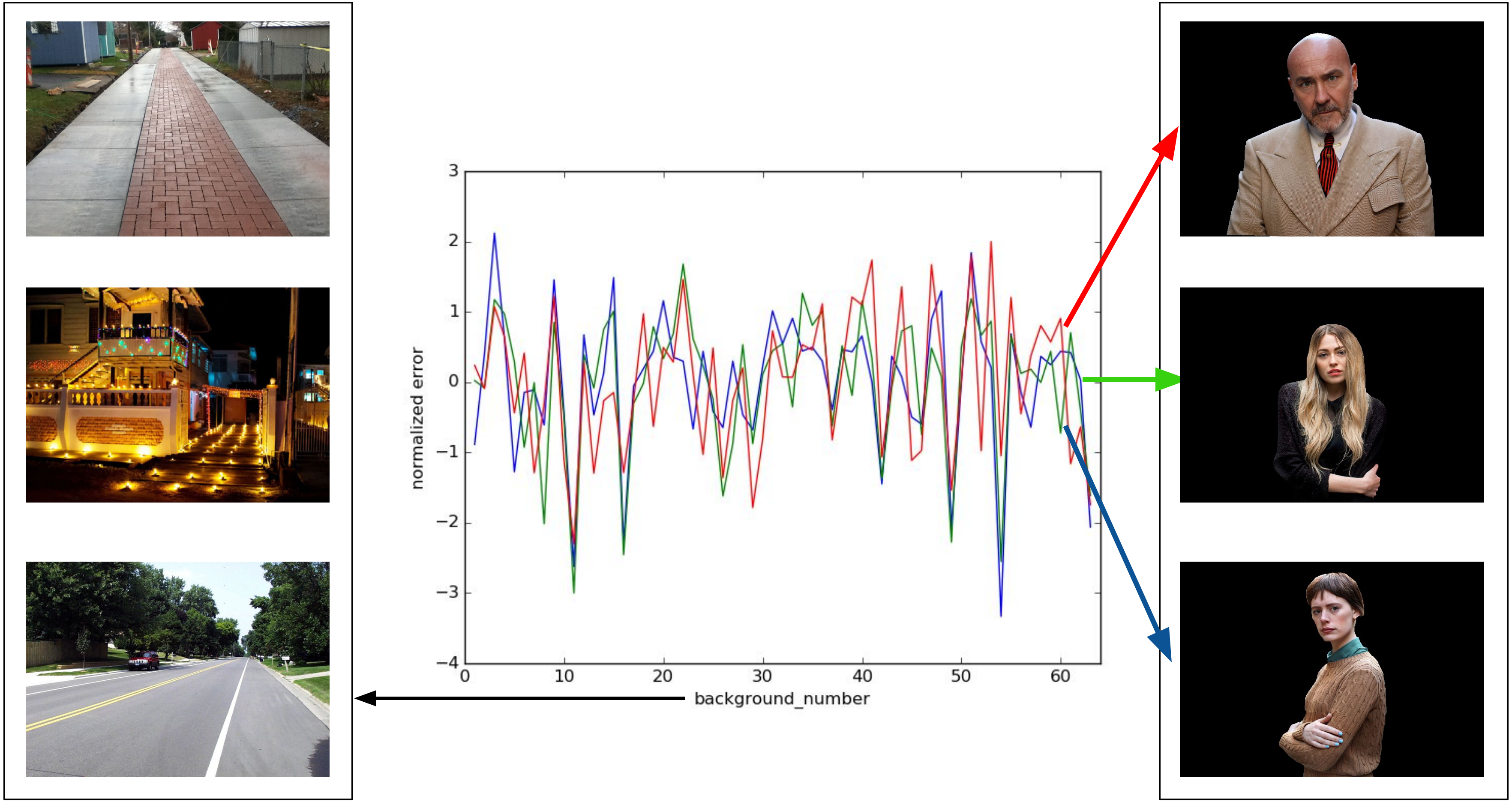
Photo credit: Peter Zelewski

Not the best colorization we've seen...


Source of inconsistency?

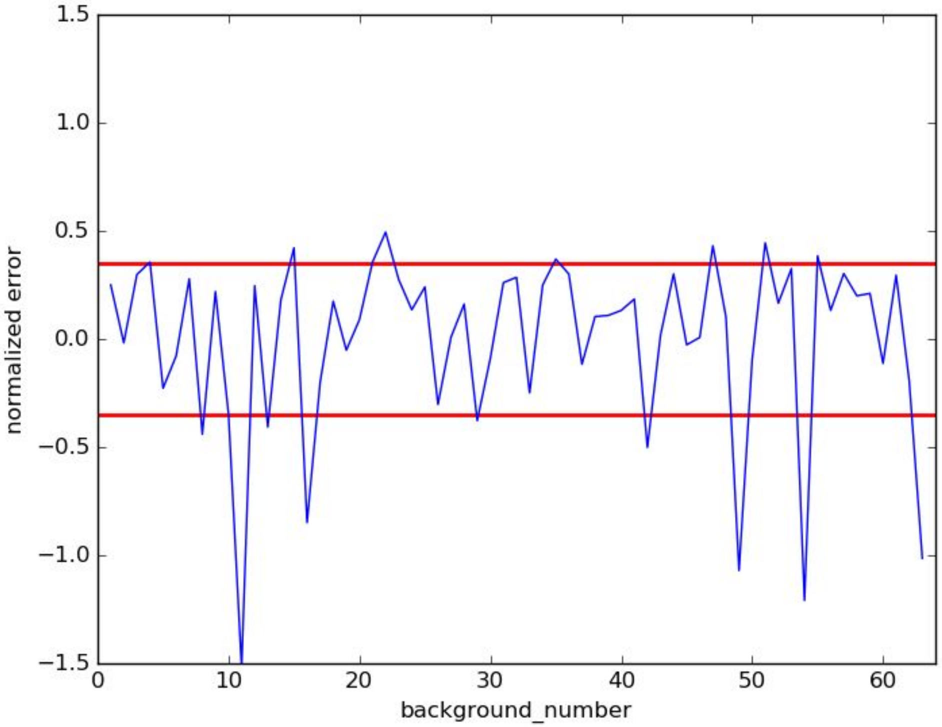



TOBACCO



normalized error
background_number
3
2
1
0
−1
−2
−3
−4
0
10
20
30
40
50
60

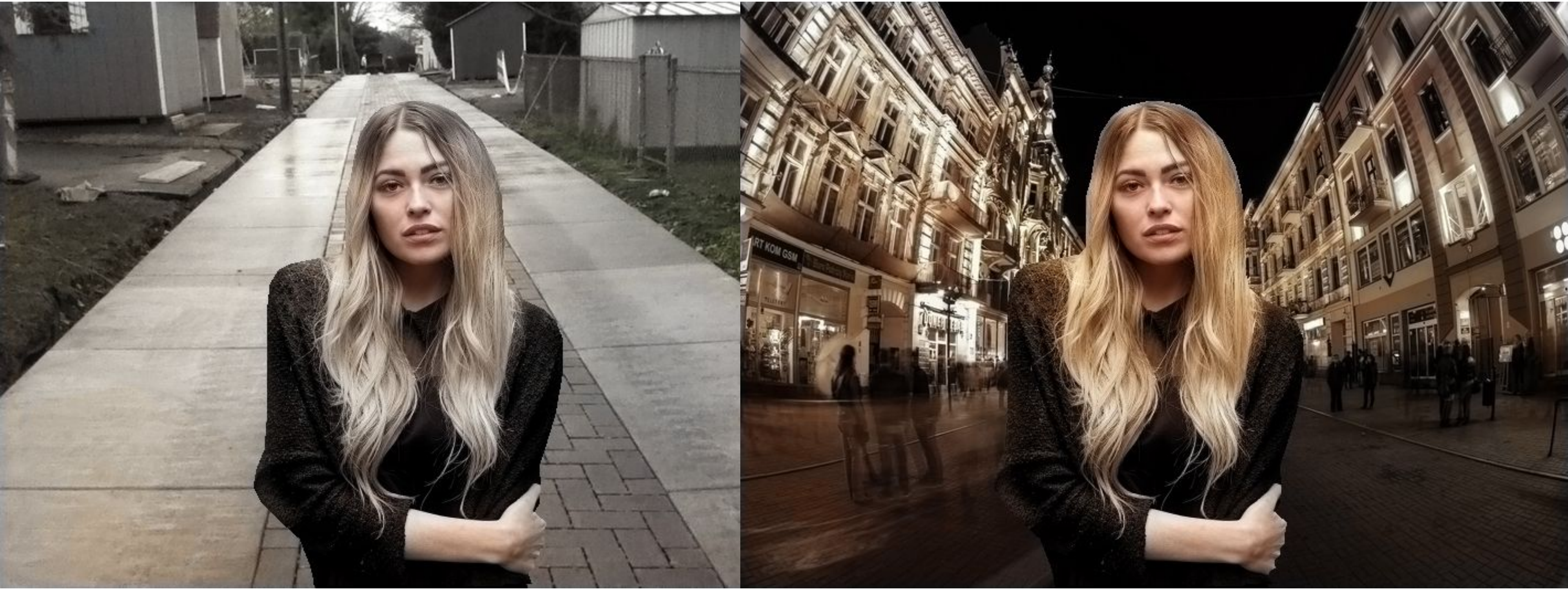
- Averaged over 15 models
- Errors for 64 backgrounds



Background class 1

Background class 2

Qualitative Analysis



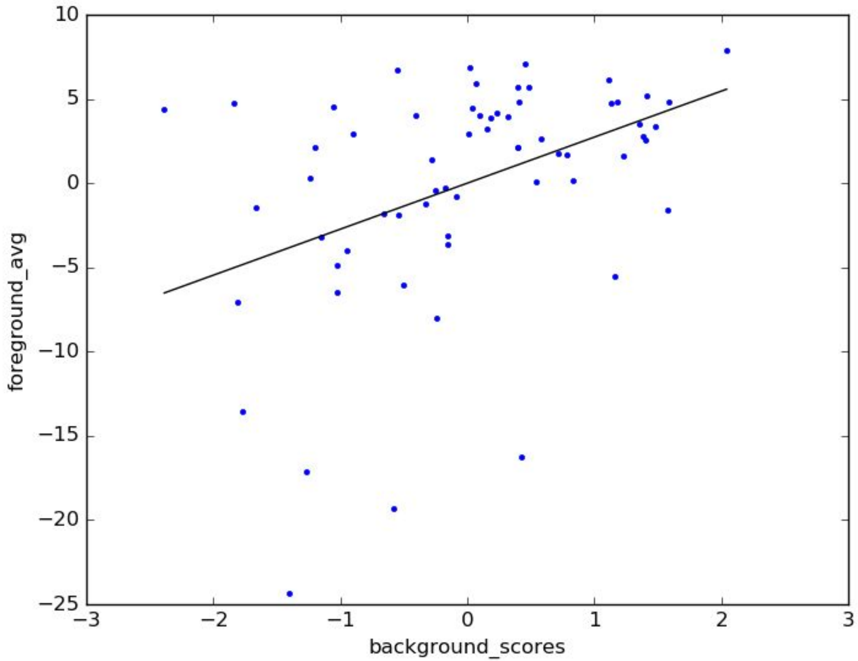
Qualitative Analysis

Qualitative Analysis

Do colorization errors in the background trickle down to the foreground?

Ans: Not too much, sorry.

R = 0.414



Summary

- Background coloring influences foreground coloring to some extent

- Hypercolumn features = extra background information

- Low L scenes contribute less to the top of the hypercolumn than the foreground?

Demo

http://colorize.ttic.edu/

Thank you