Label Denoising Adversarial Network (LDAN) for Inverse Lighting of Faces

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*Equal contribution

Applications

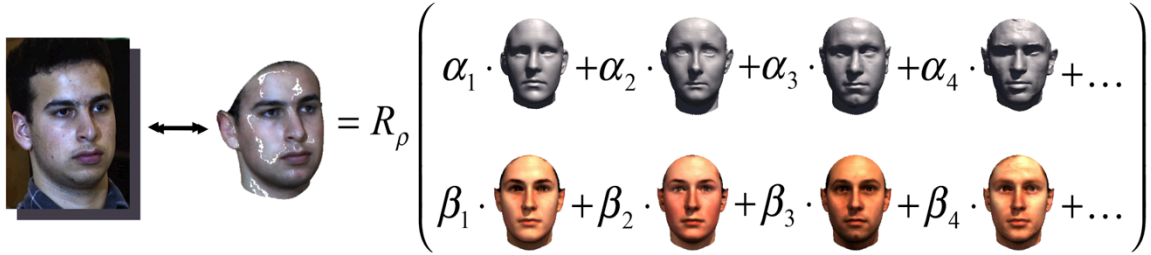
Lighting Transfer (Images from Zhixin Shu et.al., SIGGRAPH 2017):

Image Forensics:

→ Same lighting or not?

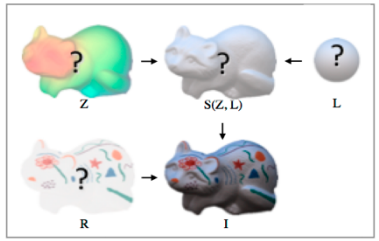
Prior Art in Lighting Estimation

3DMM Fitting (Blanz *et al.* SIGGRAPH 1999)



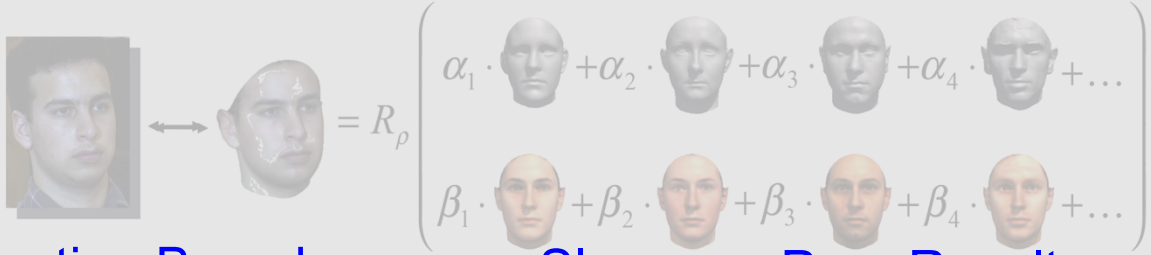
Intrinsic Image Decomposition (Barron *et al*. *PAMI 2015*)

$$\begin{array}{ll} \underset{Z,R,L}{\text{minimize}} & g(R) + f(Z) + h(L) \\ \text{subject to} & I = R + S(Z, L) \end{array}$$



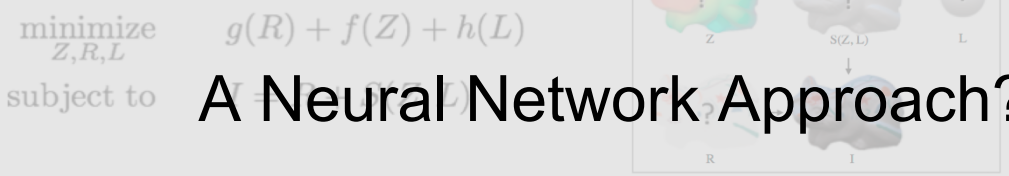
Prior Art in Lighting Estimation

3DMM Fitting (Blanz *et al.* SIGGRAPH 1999)



Optimization Based Slow Poor Results on Low-Res

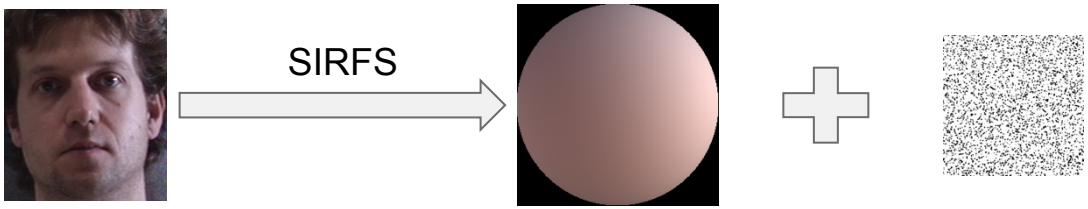
Intrinsic Image Decomposition (Barron *et al. PAMI 2015*)



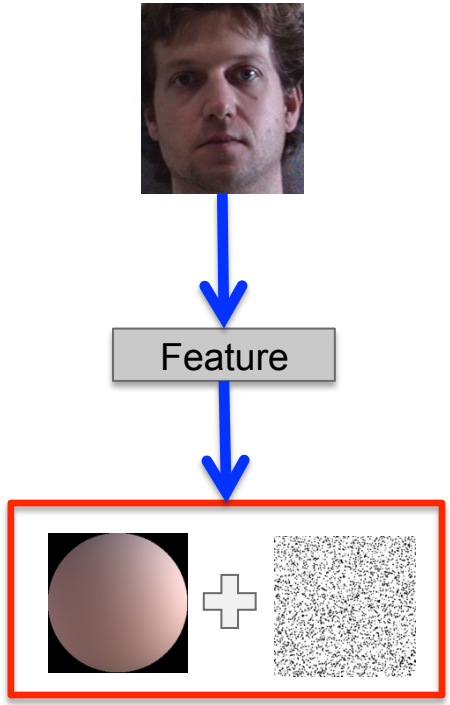
A Neural Network Approach?

Label Denoising Adversarial Network

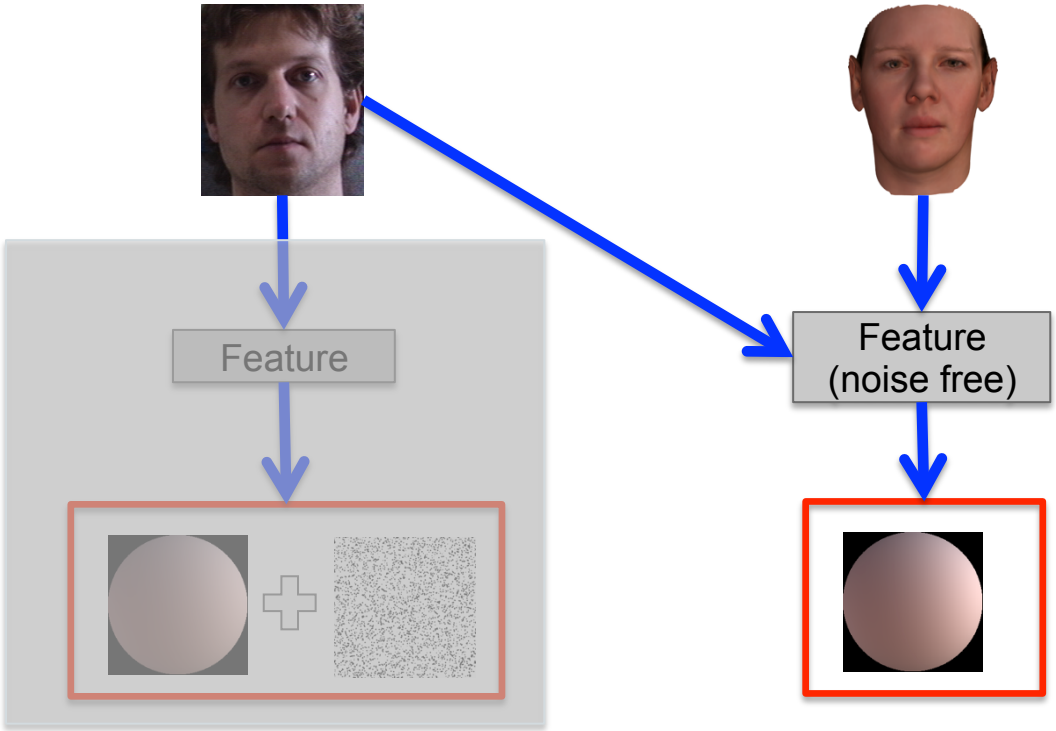
Use SIRFS (Barron *et al.* PAMI 2015) for “noisy labels”



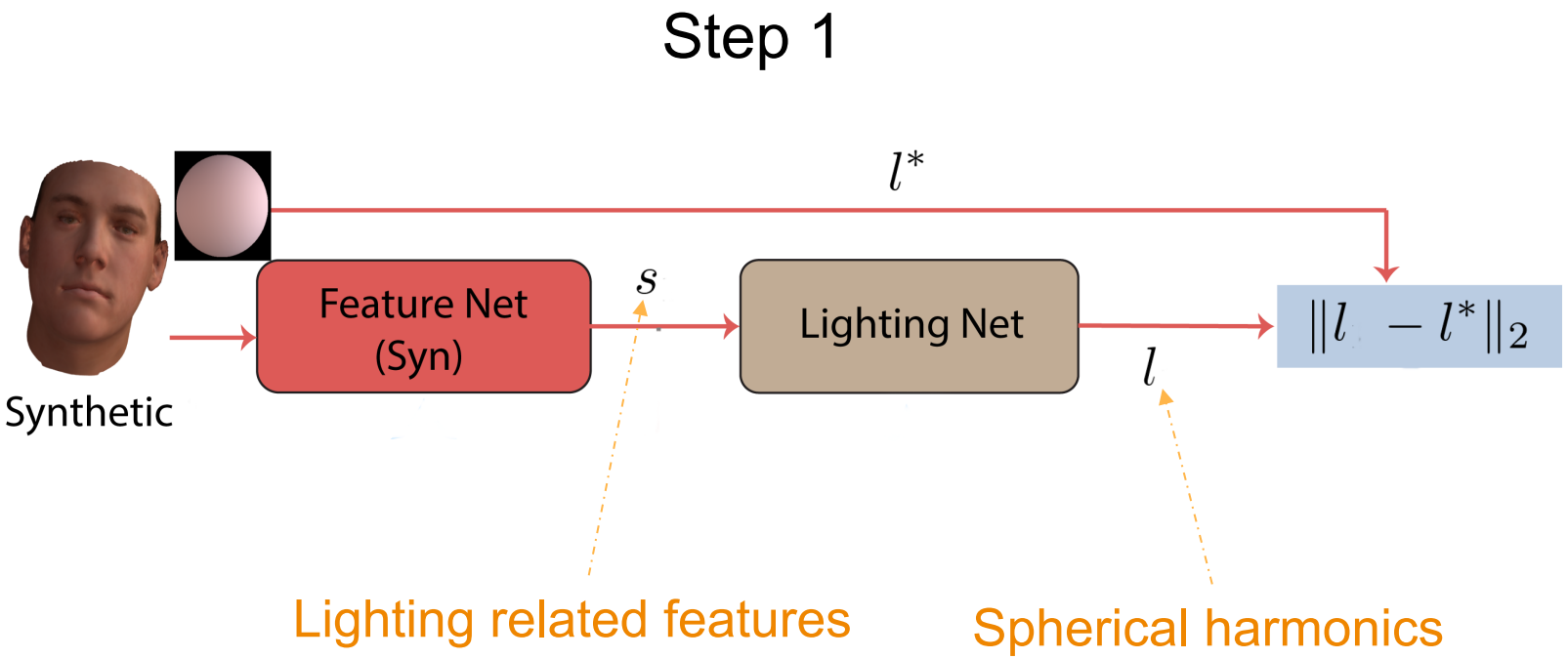
Synthetic Data to “Denoise” the Labels



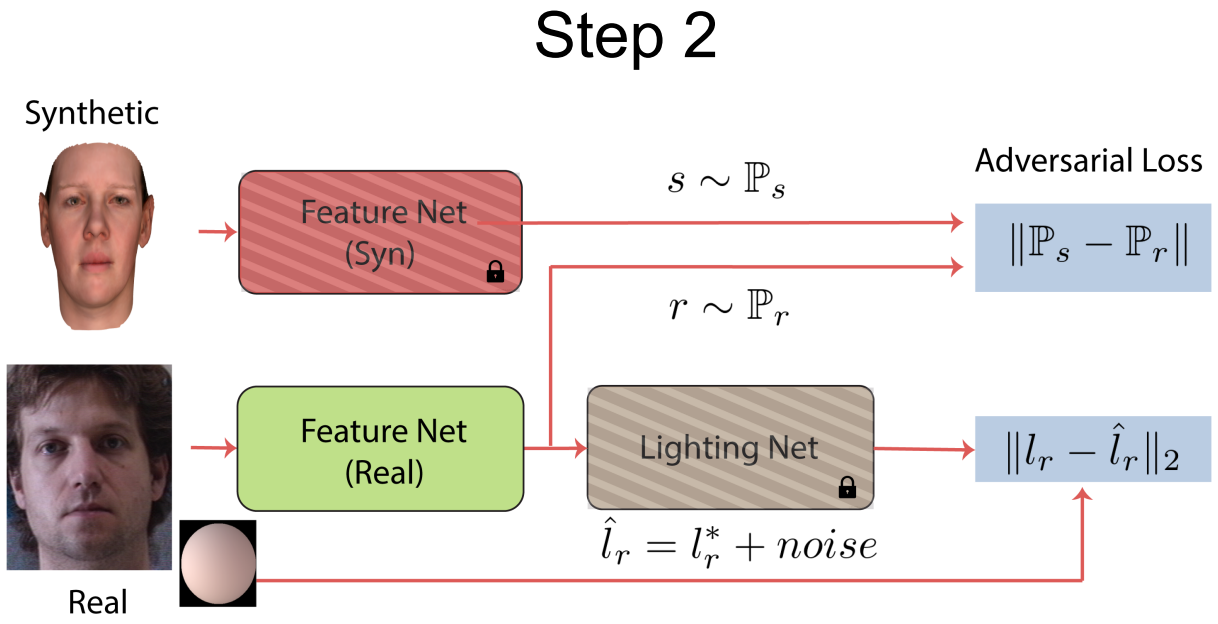
Synthetic Data to “Denoise” the Labels



Label Denoising Adversarial Network



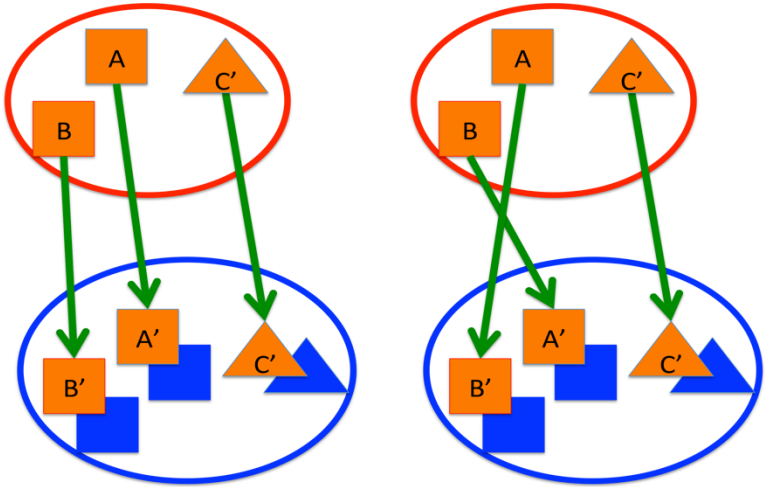
Label Denoising Adversarial Network



Label Denoising Adversarial Network

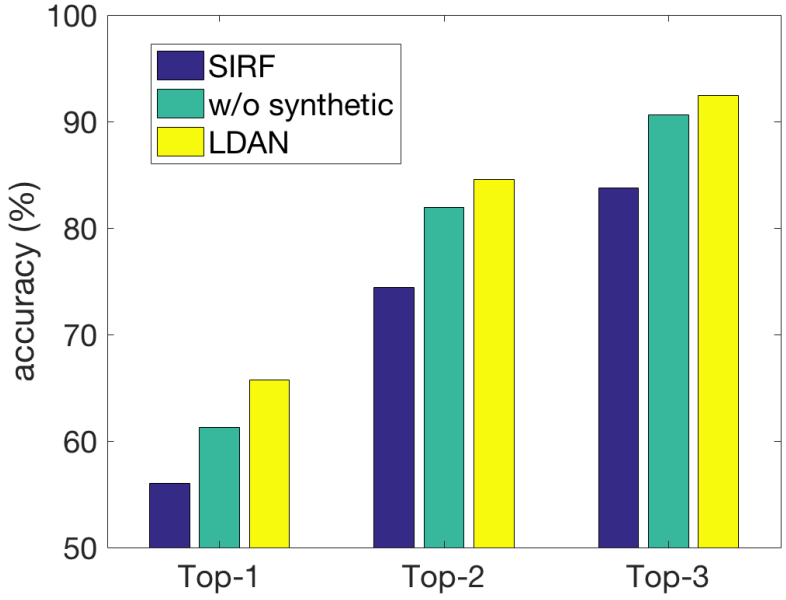
Toy example of mapping features of real faces to features of synthetic faces

- Classification: both are the same
- Regression: only one is correct

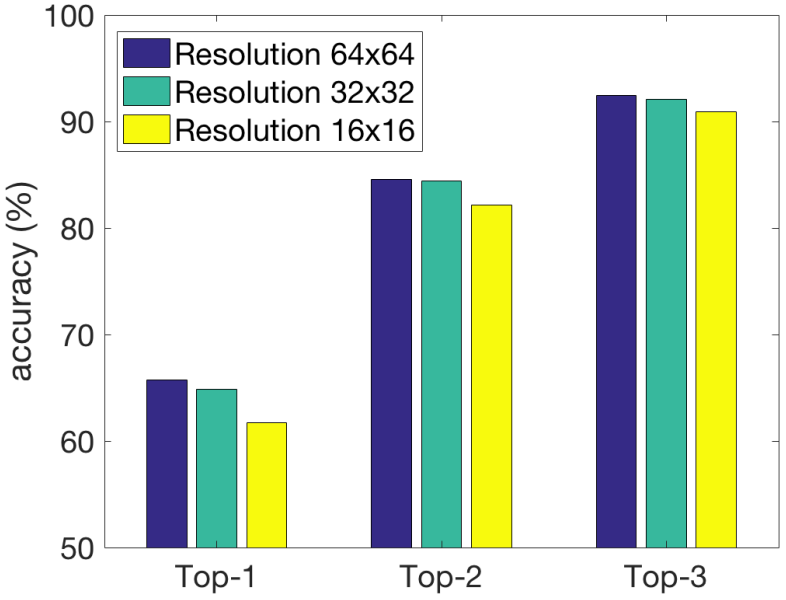


Lighting Classification Result on MultiPIE

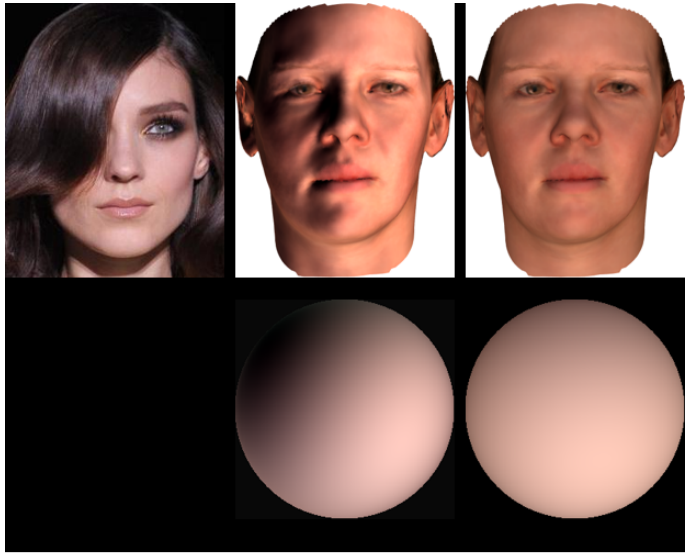
Comparison with Baseline



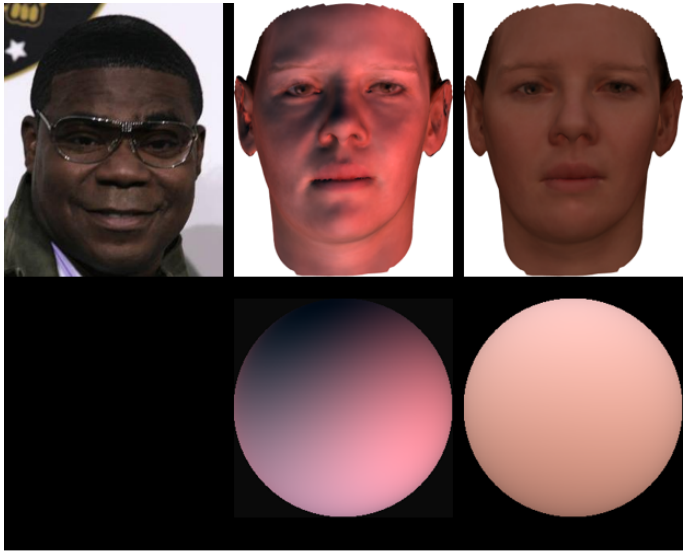
Low-Res Robustness



Qualitative Result



SIRFS LDAN



SIRFS LDAN

Comments?
Questions?

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