Reflectance Adaptive Filtering Improves Intrinsic Image Estimation

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The Intrinsic Images Problem
Decompose single image into its reflectance and shading layers

\textbf{Reflectance:} Physical property of objects, invariant under different lighting conditions.

\textbf{Shading:} Separates scene illumination: number, location, and color of the light sources, light occlusion by geometry, etc.

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\textbf{Intrinsic Images in the Wild (IIW)}
5230 Flickr images having each about 100 pairwise relative reflectance judgments from humans \cite{Ishikawa2015}.

\textbf{Direct CNN Prediction}
Novel loss function for training, the WHDR-Hinge loss

\textbf{Pixelwise Reflectance Prediction}
Insight: 1x1 convolutions work just as well as bigger kernels

\textbf{Results}

Guided filtering \cite{Ishikawa2015} is very fast, but a reflectance prediction as input and a guidance image is needed. We are working on speeding the most expensive latter part up.

\textbf{References:
1.} Tekflowers et al. "Intrinsic Images in the Wild" [SIGGRAPH 2015]
3. Tekflowers et al. "Digital photography with Retinex and flash image pairs" [SIGGRAPH 2016]