Supplemental Document: A Novel Framework For Inverse Procedural Texture Modeling

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1 METHOD

1.1 Selection K for Style-based Sub-classes Clustering

We determine the number of clusters K by the gap statistic [Tibshirani et al. 2001]. The optimal number of clusters is smallest K such that $Gap(k) \geq Gap(k+1) - s_{k+1}$. We plot $\delta_k = Gap(k) - (Gap(k+1) - s_{k+1})$ versus the number of cluster K shown as Fig. (1) where the optimal Ks for our four classes of textures are 6, 5, 3 and 4 respectively.

1.2 Texture Auto-rescaling

Since directly applying unsupervised clustering on extracted deep features to find out style-based sub-classes will lead to scale bias, we eliminate this problem by rescaling all the real-world textures into the same scale. To identify the scale of a texture, we compute the normalized autocorrelation function (NACF) similar to [Pintus et al. 2015]. We can extract scale information from NACF map. In the main paper, we show the example of shingle textures. Fig. (2) shows more examples about brick textures and grass textures. The scale of brick textures can be detected using the same criterion as shingle textures, while the scale of grass textures can be estimated by the radius of central spot on the NACF map. We do not rescale stucco textures since the scale difference among stucco textures is less significant.

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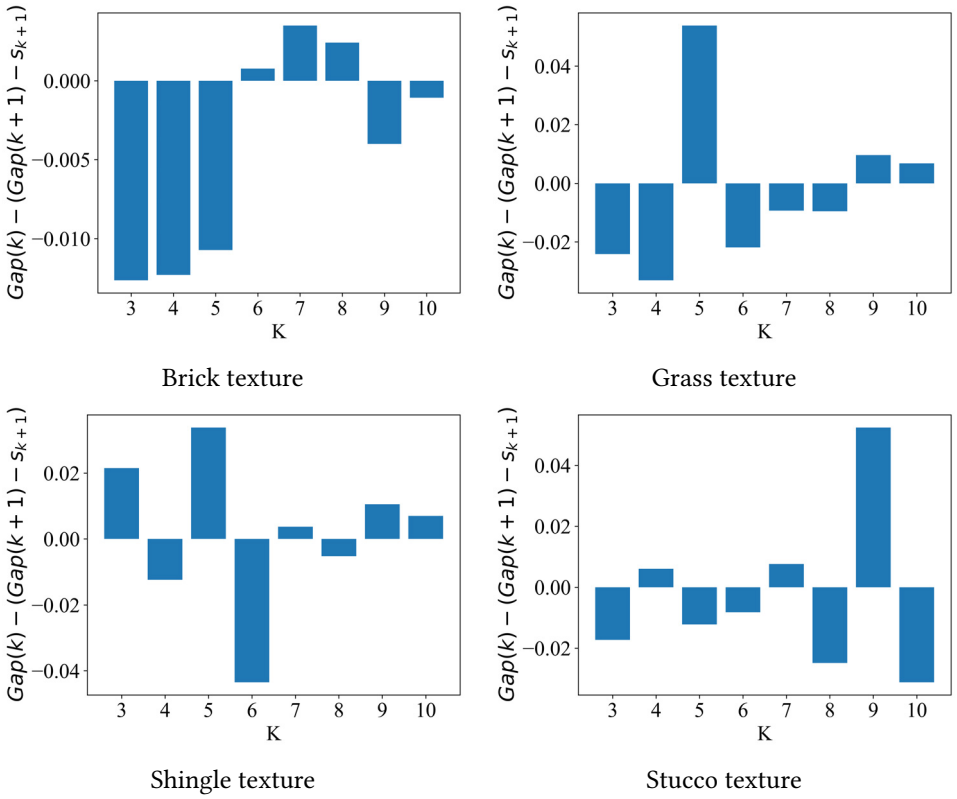
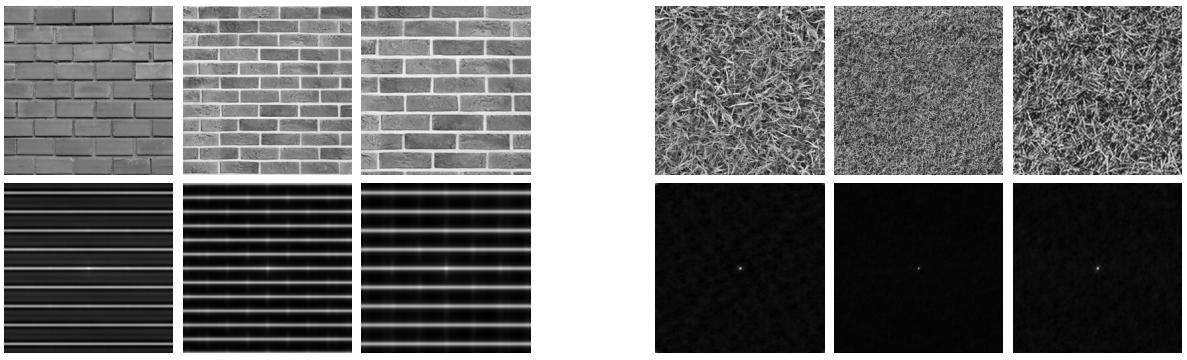


Fig. 1. Gap Statistic results. The choice of optimal K is determined by the smallest K such that $Gap(k)-(Gap(k+1)-s_{k+1}) > 0$.



(a) Brick Textures (Rescaled by 1.33x)

(b) Grass Textures (Rescaled by 2.33x)

Fig. 2. Auto-rescaling process for brick textures and grass textures. Grayscale texture images are displayed for better visualizing the scale difference.