

Sparse Edge Encoder for Natural Images

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Inspired by the diffusive reflection for natural imaging, we proposed Sparse Edge Encoder(SEE) to represent the correlation between local neighboring pixels for the natural images, the corresponding image charges representation points out the singularities that violate the fundamental assumption, provides the pixel hierarchy within a natural image. The experiments show that great enhancements(larger than 200%) of Hoyer Sparseness are show up after the SEE operation for different natural images. We also demonstrate successful experiments for dimension reduction that reconstruct images with PSNR value around 30dB by less than 35% total pixels, indicating that useful information compressed to the image charges which mainly appear at the edges only, the distribution of image charges are the key components to affect the image data in pixel representation. To demonstrate this property, an interesting experiment for anomaly detection based on SEE is presented, which shows that texture information is extracted by the distribution of bulk charges.

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