

Learnable-Pattern Scanning Based Deep Compressed Imaging

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Abstract

We present a new deep compressed imaging modality by scanning a learned illumination pattern on the sample and detecting the signal with a single-pixel detector. This new imaging modality allows a compressed sampling of the object, and thus a high imaging speed. The object is reconstructed through a deep neural network inspired by compressed sensing algorithm. We optimize the illumination pattern and the image reconstruction network by training an end-to-end auto-encoder framework. Comparing with the conventional single-pixel camera and point-scanning imaging system, we accomplish a high-speed imaging with a reduced light dosage, while preserving a high imaging quality.

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