
DCT Regularized Extreme Visual Recovery

Abstract:

Here we study the extreme visual recovery problem, in which over 90% of pixel values in a given image are missing. Existing low rank-based algorithms are only effective for recovering data with at most 90% missing values. Thus, we exploit visual data's smoothness property to help solve this challenging extreme visual recovery problem. Based on the discrete cosine transform (DCT), we propose a novel DCT regularizer that involves all pixels and produces smooth estimations in any view. Our theoretical analysis shows that the total variation regularizer, which only achieves local smoothness, is a special case of the proposed DCT regularizer. We also develop a new visual recovery algorithm by minimizing the DCT regularizer and nuclear norm to achieve a more visually pleasing estimation. Experimental results on a benchmark image data set demonstrate that the proposed approach is superior to the state-of-the-art methods in terms of peak signal-to-noise ratio and structural similarity.