

Sparse Coding Minimizing ℓ_0 : Image Inpainting, IRLS, MOD Dictionary Learning

Learning Sparse Representations For Image and Signal
Models

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May 10th 2023

Image Inpainting



(a) Masked-Image

(b) Inpainted-Image

Image Formation Model

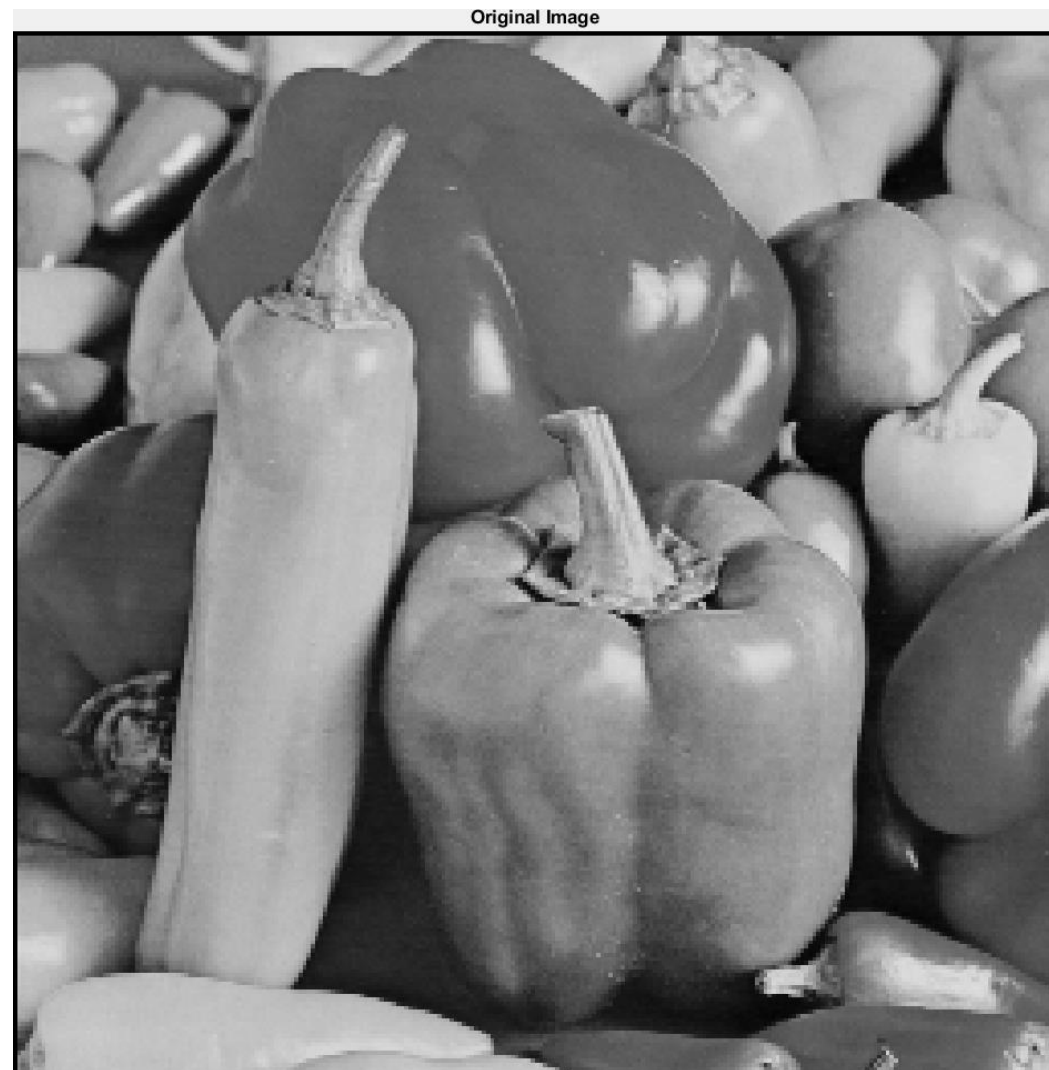
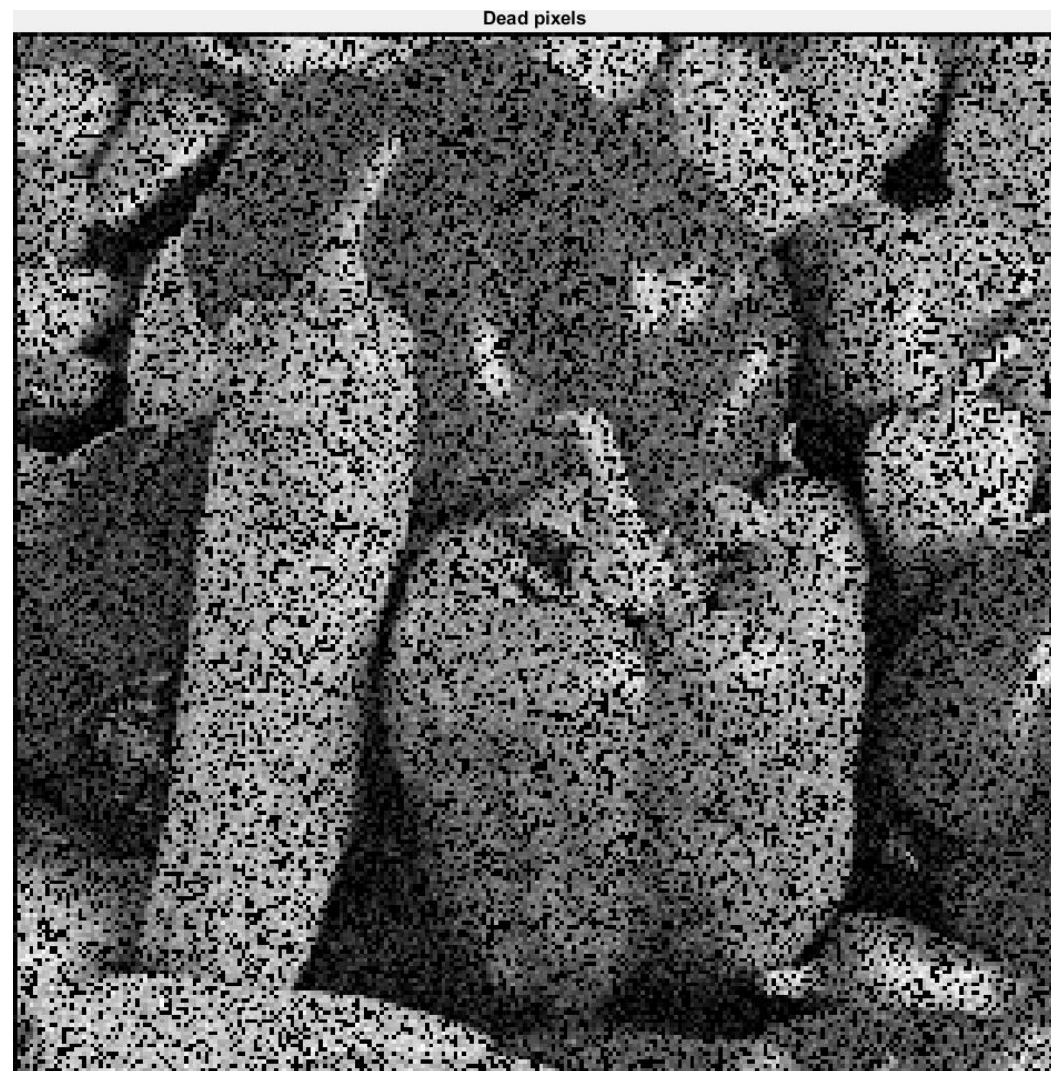


Image Inpainting



Assignment

Image Inpainting Enforcing Sparsity

Denoising via Sparse Coding

Take the setup of Assignment 3 (denoising via DCT)

- Load the dictionary provided (learned from natural images)
 - Add a constant atom and avoid average subtraction
- Replace the analysis and the thresholding of patch s_i with the sparse coding using the OMP with respect to the inpainted dictionary $P_i D$. Use as a threshold for residual

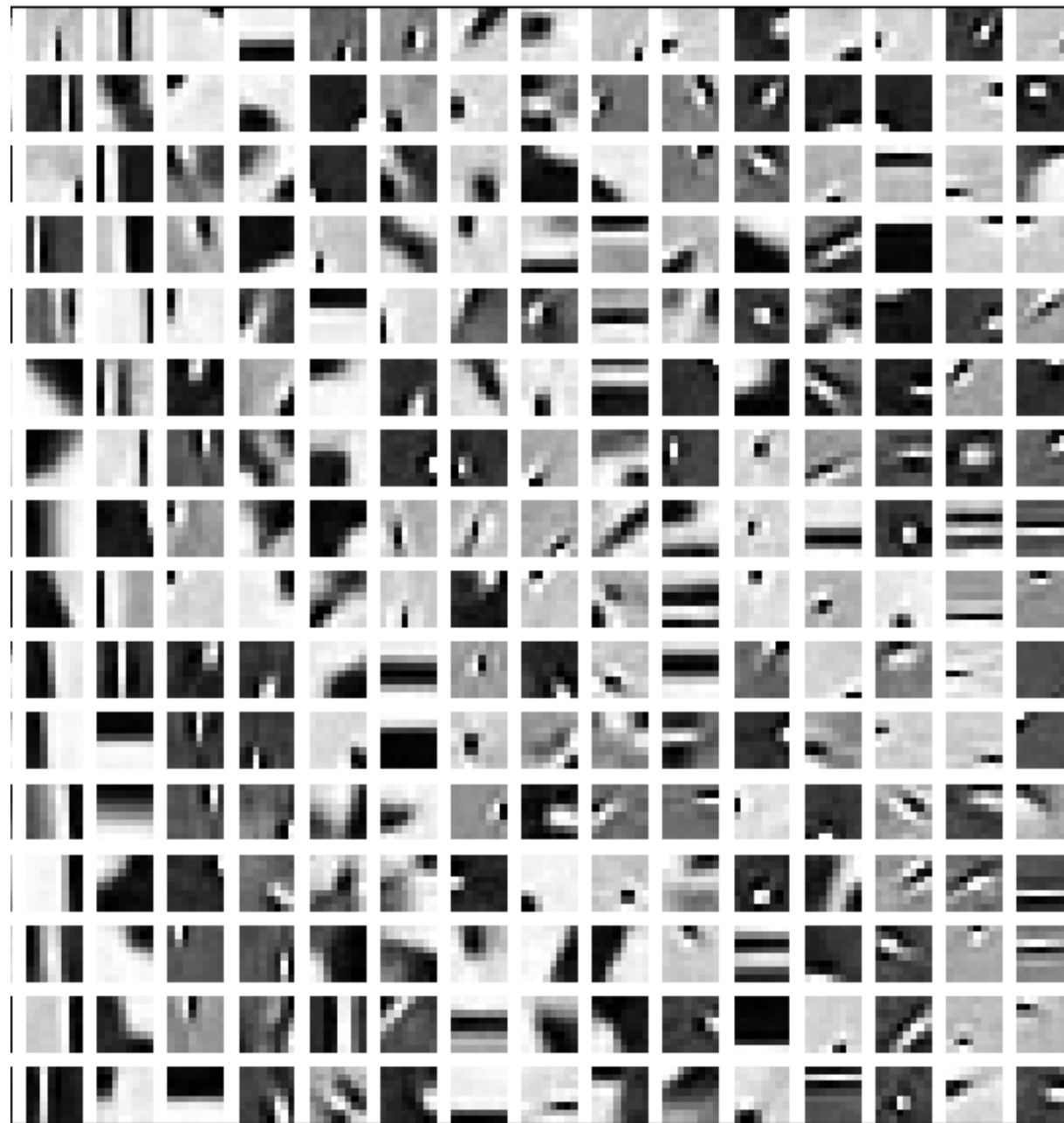
$$\delta_i = 1.15 \cdot p \cdot \sigma \cdot \sqrt{\frac{p^2 - m}{p^2}}$$

being m the number of zero entries in s_i

- Perform the synthesis of each patch using the original dictionary D

The Dictionary from KSVD

+ remember to add a constant atom!



Other Assignments

Other Assignments (see codes provided)

Implement MOD Dictionary Learning

Implement sparse coding based on IRLS