

K-SVD:

Sparse coding:

Solve greedy

$$x_i \approx \arg \min_{x_i} \|y_i - Dx_i\| \quad \forall i$$

s.t. $nnz(x_i)$ constrained.

yield X

Dictionary update:

Assign

$$(d_k, x_{idx_k}) \leftarrow (u^*, \Sigma v^*) \quad \forall k$$

where $u^*, \Sigma, v^* = (U, \Sigma, V)_{\sigma=\sigma_{\max}}$

and $idx_k = \{j : X_{(k,j)} \neq 0\}$.

yield (D, X)