



# Video Denoising Using Sparse and Redundant Representations

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**Abstract:** The quality of video sequences is often reduced by noise, usually assumed white and Gaussian, being superimposed on the sequence. When denoising image sequences, rather than a single image, the temporal dimension can be used for gaining in better denoising performance, as well as in the algorithms' speed. Such correlations are further strengthened with a motion compensation process, for which a Fourier domain noise-robust cross correlation algorithm is proposed for motion estimation. This algorithm relies on sparse and redundant representations of small patches in the images. Three different extensions are offered, and all are tested and found to lead to substantial benefits both in denoising quality and algorithm complexity, compared to running the single image algorithm sequentially.

**Keywords:** Cross Correlation (CC), Motion estimation, K-SVD, OMP, Sparse representations, Video denoising.

