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Prior information of image, including geometric prior and local/global image regularities, plays an important role in image processing and compressive sensing(CS). In this talk, we will discuss how to incorporate image priors into image denoising and reconstruction to enhance the performance significantly. We propose to efficiently balance noise removal and feature preservation using segmentation and more general geometry extraction transforms. Explained in nonlocal-means (NL-means) framework, we introduce mutual position function to ensure averaging is only taken over pixels in the same segmentation phase, and provide a convolution kernel and weight function selection scheme to further improve the performance. To address unreliable segmentation due to more excessive noise, we use a feature extraction transform that is more general than segmentation and less sensitive to noise. The proposed method comes with an automatic parameter selection scheme, and can be easily adapted for various types of noise, ranging from Gaussian, Poisson, Rician to Ultrasound noise etc. Effectiveness of gradient priors in boosting image reconstruction will also be briefly mentioned in the CS framework. (Received August 26, 2013)