

Total Variation Wavelet Inpainting

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In this talk, I will present a recent work (collaborated with Tony Chan (UCLA) and Jackie Shen (Minnesota)) on image inpainting in wavelet domain. The problem is closely related to the classical image inpainting, with the difference being that the inpainting regions that we are interested in are in the wavelet domain, that brings new challenges to the reconstructions, as there is no geometrically well defined inpainting region in the pixel domain, and the damage is inhomogeneous. We propose new variational models, especially total variation minimization in conjunction with wavelets for the image inpainting problems in the wavelet domain. The models lead to PDE's, which are Euler-Lagrange equations of the variational formulations, in the wavelet domain and can be solved numerically. The proposed models can have effective and automatic control over geometric features of the inpainted images including sharp edges, even in the presence of substantial loss of wavelet coefficients, including in the low frequencies.