



# MULTI-SCALE COMPRESSED SENSING BASED ON SPLIT AUGMENTED LAGRANGIAN SHRINKAGE ALGORITHM FOR IMAGE SUPER-RESOLUTION RECONSTRUCTION

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*Submitted: Dec. 16, 2015*

*Accepted: Mar. 21, 2016*

*Published: June 1, 2016*

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*Abstract- This paper proposes a multi-scale compressed sensing algorithm in shearlet domain by exploiting discrete Shearlet transform which can optimally represent the images with edges. An image is decomposed by shearlet. The compressed sensing is deployed in each of the directional sub-bands of high frequency scales. And inverse measurement matrix is modified by the upsampling operator to enhance the resolution of image. In addition, the original image reconstructed by compressed sensing based on super-resolution can produce the low subbands with high frequency. And an split augmented lagrangian shrinkage algorithm is exploited for compressed sensing image reconstruction , which can improve reconstruction image quality and convergence rate. Experimental results has shown that the proposed method can reconstruct the image with less iterative time by using fewer samples, improve the computational efficiency as well as achieve the images with high quality.*

**Index terms:** multi-scale compressed sensing, discrete Shearlet transform, super-resolution reconstruction algorithm, measurement matrix.