Compressed sensing for sparsified scanning electron microscopy images in the transform domain
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Abstract:
Compressed sensing (CS) was introduced in 2006; the main goal of CS is to reduce the required number of samples for overwhelming reconstruction of the input data. In some cases, CS can achieve complete reconstruction of input data using number of samples less than Shannon’s limit. Therefore, CS has been exploited in magnetic resonance imaging (MRI) in order to shorten the imaging sessions. It is being proposed in this research that we apply the compressed sensing on scanning electron microscopes images, because such images have large sizes and, hence, difficult to restore and send electronically. CS has the ability to reduce images sizes without compromising their quality or clarity. By neglecting the excessive unnecessary data samples that add only to the fine details, we can significantly reduce the image size without losing any important information.

Electron microscopes image are usually dense image. However, by applying appropriate transforms such as DCT transform or wavelet transform, we can convert it to sparse image with large number of zero and close to zero samples. Most of these samples are unrelated to the important information and features of the image. Therefore, they can be simply ignored and keep only the important samples.

References:
