A New Framework for ECG Signal Modeling and Compression Based on Compressed Sensing Theory

Authors : Siavash Eftekharifar, Tohid Yousefi Rezaii, Mahdi Shamsi

Abstract : The purpose of this paper is to exploit compressed sensing (CS) method in order to model and compress the electrocardiogram (ECG) signals at a high compression ratio. In order to obtain a sparse representation of the ECG signals, first a suitable basis matrix with Gaussian kernels, which are shown to nicely fit the ECG signals, is constructed. Then the sparse model is extracted by applying some optimization technique. Finally, the CS theory is utilized to obtain a compressed version of the sparse signal. Reconstruction of the ECG signal from the compressed version is also done to prove the reliability of the algorithm. At this stage, a greedy optimization technique is used to reconstruct the ECG signal and the Mean Square Error (MSE) is calculated to evaluate the precision of the proposed compression method.
Keywords : compressed sensing, ECG compression, Gaussian kernel, sparse representation
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