Sound

Compressed Sensing Framework for Heart Sound Acquisition in Internet of Medical Things

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Abstract

For continuous monitoring of cardiovascular diseases, this article presents a novel framework for heart sound acquisition. The proposed approach uses compressed sensing for signal sampling, and a two-stage reconstruction is developed for reconstruction. The first stage aims to give a tentative recovered signal, on which a peak detection technique is developed to identify whether there is a peak in current segment and, if so, its location. With such information, an adaptive dictionary is selected for the second round reconstruction. Because the selected dictionary is adaptive to the morphology of current frame, the signal reconstruction performance is consequently promoted. Experiment results indicate that a satisfactory performance can be obtained when the frame length is 256 and the signal morphology is divided into 16 categories. Furthermore, the proposed algorithm is compared with a series of counterparts, and the results well demonstrate the advantages of our proposal, especially at high compression ratios.

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