

PhysioNet/CinC Challenge

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This work proposes a wavelet scheme to reconstruct missing data in physiologic signals that have been removed from multiparameter recordings of patients in intensive care units. The key idea consists of the decomposition of the signal into two components, approximation and detail, through wavelet transform. In the case of the signal with missing data is an ECG (ECG*), it is taken advantage of the fact that there are two other ECG signals in the record. In a first phase, a section of the ECG* signal before the prediction period is modeled as a combination of the approximation and detail coefficients of the other two ECG in the same period. Then, the determined model parameters are used to reconstruct the missing ECG* data, based on the combination of the other two ECG signals available in the forecast period. In the case of the signal to be reconstructed is not an ECG (ABP, RESP), two auxiliary signal sections are generated in order to apply the same strategy described above. Firstly, a segment of the signal before the missing period is considered as a template. Then, using a wavelet coefficients correlation approach, the two sections of the remaining signal that best match the template, constitute the referred auxiliary sections. The approximation and detail coefficients of these sections are used to model the template. Finally, the determined model parameters, together with the 30 seconds after the sections, are employed to reconstruct the missing signal. Applied to all records of set A, this strategy provided results of 45% and 56%, for scores 1 and 2, respectively. For all records of set B, results were of 46% and 54%, for scores 1 and 2, respectively. Although these preliminary results are promising, future work will consist in the optimization of the parameters involved in the proposed strategy.