

An Approach to Reconstructing Lost Cardiac Signals using Pattern Matching and Neural Networks via Related Cardiac Information

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An approach to reconstruct the missing signals by pattern matching and neural networks is proposed in this paper for The Physionet Challenge 2010, Mind the Gap. The hypothesis used in this approach in the reconstruction of the missing signals is that the different cardiac signals originating from the same heart should exhibit the same signs of stress acting upon it. The level of stress in the different cardiac signals can and may vary. Based on the hypothesis, the last 30 seconds of data in all the available channels should exhibit the same signs of stress as the missing 30 seconds. Hence the last 30 seconds would serve as labels to be pattern-matched against prior signals in its own respective channel. This pattern matching is for the purpose of searching for similar precursors in the data. The neural network is built via pattern matching and cross-reference scoring of data set A. Reconstruction of the missing signal in data set B and C is based on its own prior signal data and using the trained neural network to determine the most likely segment for the missing segment. The initial 11 submissions have given results of 0.9529 for event 2 and 0.0475 for event 1 for the reconstruction of ECG channels in data set B. In the next few months up to September, more research would be done to maximize the results for event 1 without or minimal compromise to the results for event 2.