Abstract—The objective of this study was to develop an HTGA with a single Gaussian function to model a P-wave, and to find the optimal feature solution for P-wave morphology by minimizing the normalized root-mean-squared-error (NRMSE) performance index.

Introduction

The objective of this study was to develop an HTGA with a single Gaussian function to model a P-wave, and to find the optimal feature solution for P-wave morphology by minimizing the normalized root-mean-squared-error (NRMSE) performance index.

Materials and methods

This study was approved by the Institutional Review Board of National Yang-Ming University Hospital (NYMUH No. 2017A016). The subjects were six patients treated for paroxysmal AF at National Yang-Ming University Hospital, Yilan, Taiwan. In all patients, diagnosis of AF was supported by documented results for ECG or 24-hour Holter monitoring. The HTGA can be used to solve the optimization problem.

Results and discussion

Conclusions

Experimental results show that the proposed HTGA obtains a good fit to the actual P-wave. In experimental applications of the HTGA for modeling the P-wave in AF patients, the HTGA consistently obtained lower NRMSE values compared to NLSA. The experiments show that the HTGA has potential applications in medical decision support systems and for early identification of patients at risk for AF.

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