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T-Wave End Detection Using Neural Networks and Support Vector Machines

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Abstract

Background and Objective: This paper studies a new approach for detecting the end of the T-wave in the electrocardiogram (ECG) using Neural Networks and Support Vector Machines. **Methods:** Both, Multilayer Perceptron (MLP) neural networks and Fixed-Size Least-Squares Support Vector Machines (FS-LSSVM) were used as regression algorithms to determine the end of the T-wave. Different strategies for selecting the training set such as random selection, k-means, robust clustering and maximum quadratic (Rényi) entropy were evaluated. Individual parameters were tuned for each method during training and the results are given for the evaluation set. A comparison between MLP and FS-LSSVM approaches was performed. Finally, a fair comparison of the FS-LSSVM method with other state-of-the-art algorithms for detecting the end of the T-wave was included. **Results:** The experimental results show that FS-LSSVM approaches are more suitable as regression algorithms than MLP neural networks. Despite the small training sets used, the FS-LSSVM methods outperformed the state-of-the-art techniques. **Conclusion:** FS-LSSVM can be successfully used as a T-wave end detection algorithm in ECG even with small training set sizes.

Keywords: ECG, T-Wave end, Neural Networks, FS-LSSVM

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