De-noising of Left Ventricular Myocardial Boundaries in Magnetic Resonance Images

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ABSTRACT

Magnetic Resonance Imaging (MRI) is one of the most powerful radiological tools for diagnosis. MRI system is noninvasive and also provides the clear image to diagnosis the measuring of endocardial border and epicardial border in Left Ventricular. Detection of endocardial and epicardial borders of Left Ventricule can provide effective data for diagnose the heart disease such as Cardiomegalia and myocardial infarction. Because dynamic organs generate a huge number image production form MRI, it takes a long time to identify by using the manual tracing method. An effective computer aided diagnostic system is essential to maintain quality and reduce operating costs. By combining Wavelet-based images enhancement algorithm and dynamic programming based border detection algorithm, the endocardial and epicardial borders in Left Ventricule can be automatically measured. However, the detected borders are not smooth. Because the actual myocardial wall is smooth, the ideal borders should be smoothly closed curve. The purpose of this research is to apply digital filter to de-noise the automatically detected borders, which increases the accuracy of measurements. In this thesis, a wavelet-based de-noising technique and least-mean-square adaptive filter to de-noise the endocardial and epicardial borders. Experimental results show that the wavelet-based technique provides better performance than least-mean-square adaptive filter.

Keywords : Magnetic Resonance Images ; Wavelet-based De-noising ; Border Detection ; Digital Filter ; Least-Mean-Square Adaptive Filter

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