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Automatic wavelet detrending benefits to the analysis of cardiac signals acquired in a moving wheelchair

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Abstract: Biomedical signals are customarily overlaid with interferences and noise, furthermore, baseline wandering is another significant drawback to their accurate interpretation, especially if the implementation platform is a wheelchair. The nonlinear processes which generate the physiologic signals, and the disturbances, regularly exclude, or limit, the usage of classical linear techniques, hence, among other options, wavelets have been used to decompose the signals. Unobtrusively acquired signals are prone to have important baseline fluctuations, namely contactless impedance plethysmogram, and ballistocardiogram, therefore making them apposite to detrending. Sensing hardware was embedded in a wheelchair to acquire these signals, given the valuable information provided about the cardiovascular system of the monitored subject. This work also reports the improvements achieved by automatic wavelet detrending application in the real-time processing of these signals. Although significant baseline wavering is acquired, important enhancements are swiftly computed without noteworthy error.

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Contents

I. Introduction

Unobtrusive assessment of the body's cardiovascular and respiratory activity is a goal of utmost significance in healthcare technology. Such development is important, for instance, to allow regular and user-friendly cardiovascular examination of the elder citizens, as well as the numerous citizens with special needs, namely the use of wheelchairs, by diabetics, and stroke victims.

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