

Short-time fourier transform with the window size fixed in the frequency domain

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Abstract-

The Short-Time Fourier Transform (STFT) is widely used to convert signals from the time domain into a time-frequency representation. This representation has well-known limitations regarding time-frequency resolution. In this paper we use the basic concept of the Short-Time Fourier Transform, but fix the window size in the frequency domain instead of in the time domain. This approach is simpler than similar existing methods, such as adaptive STFT and multi-resolution STFT, and in particular it requires neither the band-pass filter banks of multi-resolution techniques, nor the evaluation of local signal characteristics of adaptive techniques. Three case studies are analyzed and the results show that the proposed method allows better identification of signal components compared to standard STFT, multi-resolution STFT and Adaptive Optimal-Kernel Time Frequency Representation, although the method is not computationally efficient in its present form. Some synthetic and real world signals are used to demonstrate the effectiveness of the proposed technique.

Index Terms- Short-time Fourier transform; Time-frequency domain; Window size; Multi-resolution; Electrocardiogram

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