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## Adaptive Time-Frequency Resolution for Analysis and Processing of Audio

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### ABSTRACT

Filter banks with fixed time-frequency resolution, such as the Short-Time Fourier Transform (STFT), are a common tool for many audio analysis and processing applications allowing effective implementation via the Fast Fourier Transform (FFT). The fixed time-frequency resolution of the STFT can lead to the undesirable smearing of events in both time and frequency. In this paper, we suggest adaptively varying STFT time-frequency resolution in order to reduce filter bank-specific artifacts while retaining adequate frequency resolution. Several strategies for systematic adaptation of time-frequency resolution are proposed. The introduced approach is demonstrated as applied to spectrogram displays, noise reduction, and spectral effects processing.