Introduction to Audio Content Analysis

Module 3.4.3: Time-Frequency Representations — (Log) Mel-Spectrogram

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overview

corresponding textbook section

Section 3.4.3

- **■** lecture content
 - log mel spectrogram
- learning objectives
 - discussing advantages and disadvantages of different time-frequency transforms
 - explaining the computation of the mel spectrogram



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- the log mel spectrogram is a normal spectrogram with a logarithmic frequency axis
- more musically and perceptually meaningful
- usually less frequency bins
- often used as audio input representation to neural networks

mel spectrogram

1 compute STFT

- 2 compute magnitude
- 3 aggregate frequency bins into bands with increasing width (logarithmic frequency)
- 4 optional: compute the aggregated magnitudes to dB

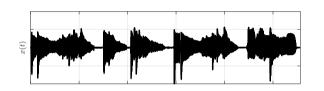
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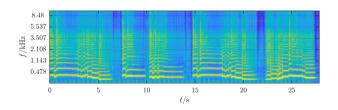
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mel spectrogram example

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■ Mel spectrogram

- logarithmic frequency axis (musically and perceptually more meaningful)
- logarithmic magnitude (perceptually more meaningful)
- usually a more reduced representation than STFT

