



Introduction to **Audio Content Analysis**

Module 3.3.3: Time-Frequency Representations — (Log) Mel-Spectrogram

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introduction

overview

corresponding textbook section

section 3.3.3

■ 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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mel spectrogram

introduction

- 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

computation

- 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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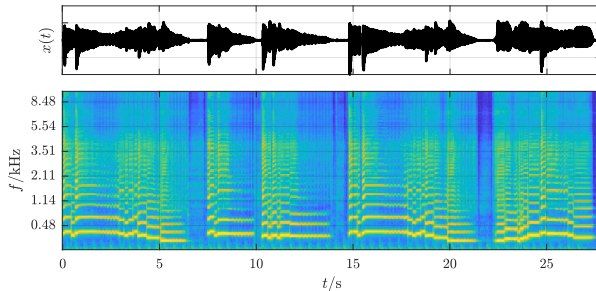
mel spectrogram

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mel spectrogram

example



summary

lecture content

■ Mel spectrogram

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

