



Introduction to **Audio Content Analysis**

module 2.0: audio content analysis process

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introduction

overview

corresponding textbook section

chapter 2

■ lecture content

- audio content
- processing steps in a typical ACA system

■ learning objectives

- discuss typical forms of content in an audio signal
- describe the typical signal flow in an ACA system



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audio content sources

what are the sources of (musical) audio content?



audio content

sources



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1 score/composition:

- definition of musical ideas
- “blue-print” of the music
- *examples*: melody, key, harmony, rhythmic patterns, ...

audio content

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- unique acoustic rendition
- information in the score is interpreted, modified, added to
- *examples*: (micro-)tempo, dynamics, intonation, ...

audio content

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3 production:

- aesthetic choices
- editing & processing
- *examples*: sound quality (EQ, microphone positioning), changes in timing and pitch

audio content

categories

audio content can be structured into **4 basic categories**:

1 tonal: related to pitch

- *examples*: melody, chords, intonation, vibrato, ...

2 timbral: related to sound quality

- *examples*: instrument(ation), playing technique, venue, audio processing, ...

3 intensity-related: related to musical dynamics

- *examples*: accents, loudness, ...

4 temporal: related to rhythm and tempo

- *examples*: timing, meter, rhythmic patterns, ...

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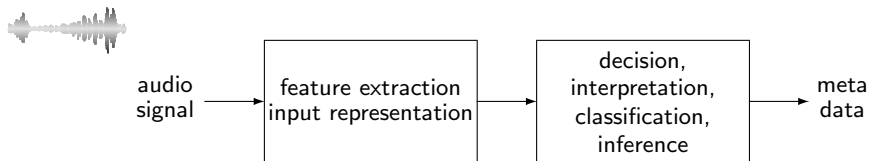
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other non-musical content descriptions: e.g., statistical, technical

audio content analysis

system overview



feature representation

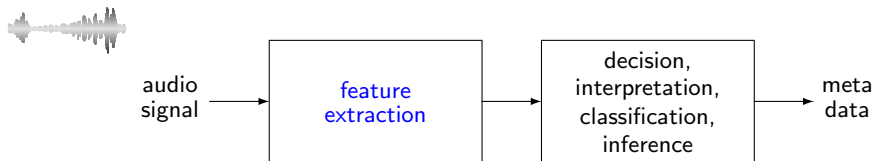
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- task-relevant
- easy to analyze

classification/inference

- map or convert feature to comprehensible domain

audio content analysis

system overview



feature representation

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audio content analysis

system overview



audio
signal



feature
extraction



decision,
interpretation,
classification,
inference



meta
data

feature representation

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classification/inference

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summary

lecture content

■ audio content

- is shaped by the musical ideas (score), the music performance, and the (studio) production
- can relate to timbre, pitch, intensity, tempo and rhythm (but there is both lower level and higher level content)

■ the **flow chart of an ACA system** at its most fundamental level shows

- a feature extraction step to extract meaningful descriptors
- a classification or inference step to produce a “human” result

