



Tutorial T3
**A Basic Introduction to Audio-Related
 Music Information Retrieval**

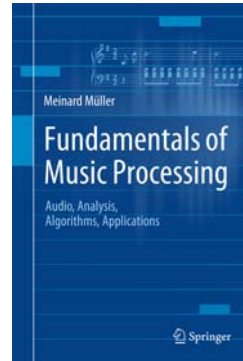
Music Representations

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Book: Fundamentals of Music Processing



Meinard Müller
 Fundamentals of Music Processing
 Audio, Analysis, Algorithms, Applications
 483 p., 249 illus., hardcover
 ISBN: 978-3-319-21944-8
 Springer, 2015

Accompanying website:
www.music-processing.de

Book: Fundamentals of Music Processing

Chapter	Music Processing Scenario
1	Music Representations
2	Fourier Analysis of Signals
3	Music Synchronization
4	Music Structure Analysis
5	Chord Recognition
6	Tempo and Beat Tracking
7	Content-Based Audio Retrieval
8	Musically Informed Audio Decomposition

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Chapter 1: Music Representations

- 1.1 Sheet Music Representations
- 1.2 Symbolic Representations
- 1.3 Audio Representation
- 1.4 Further Notes

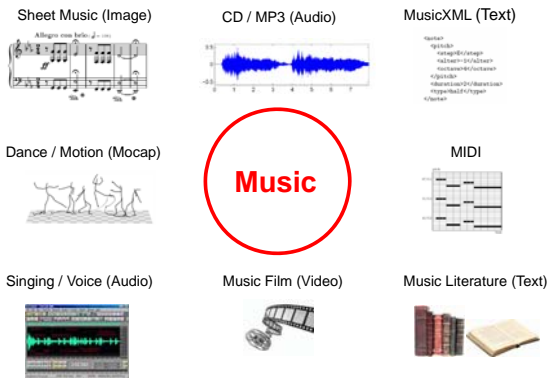


Musical information can be represented in many different ways. In Chapter 1, we consider three widely used music representations: sheet music, symbolic, and audio representations. This first chapter also introduces basic terminology that is used throughout the book. In particular, we discuss musical and acoustic properties of audio signals including aspects such as frequency, pitch, dynamics, and timbre.

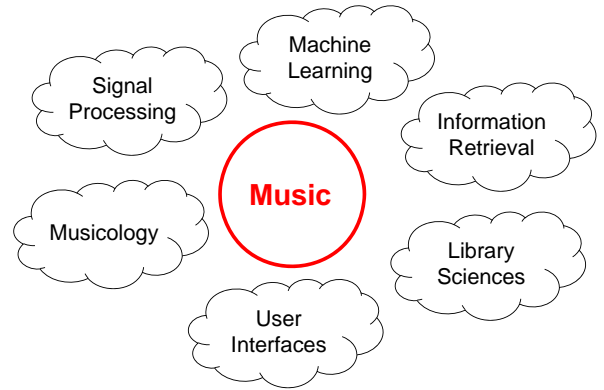
Music



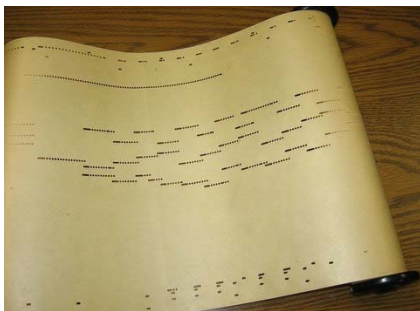
Music Information Retrieval (MIR)



Music Information Retrieval (MIR)



Piano Roll Representation

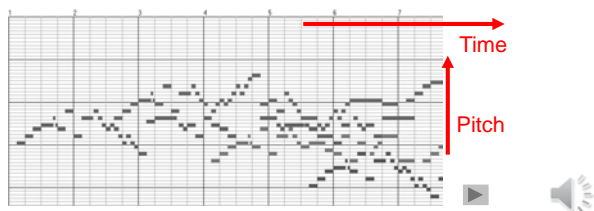


Player Piano (1900)




Piano Roll Representation (MIDI)

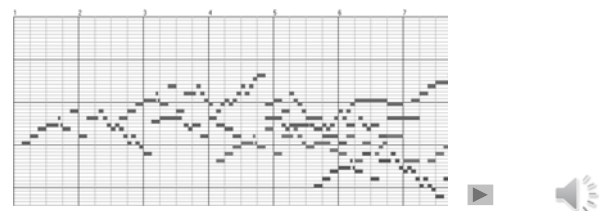
J.S. Bach, C-Major Fuge
(Well Tempered Piano, BWV 846)



Piano Roll Representation (MIDI)

Query: 

Goal: Find all occurrences of the query



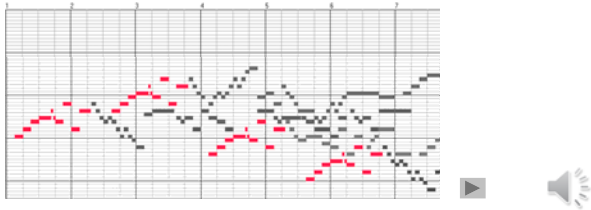
Piano Roll Representation (MIDI)



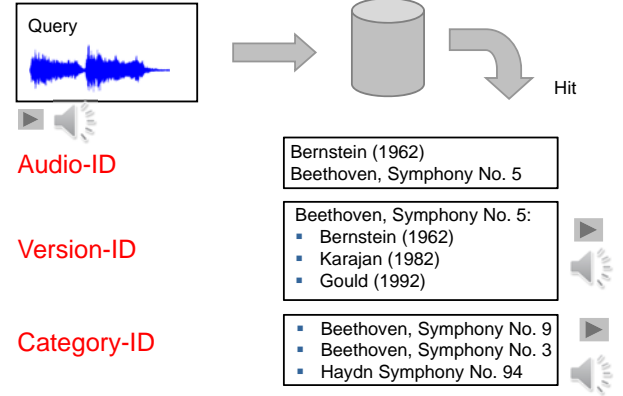
Query:

Goal: Find all occurrences of the query

Matches:



Music Retrieval



Music Synchronization: Audio-Audio

Beethoven's Fifth

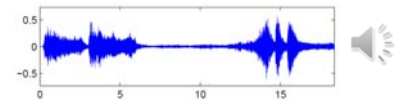


Music Synchronization: Audio-Audio

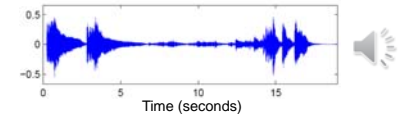
Beethoven's Fifth



Orchester
(Karajan)



Piano
(Scherbakov)

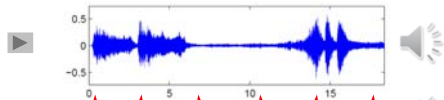


Music Synchronization: Audio-Audio

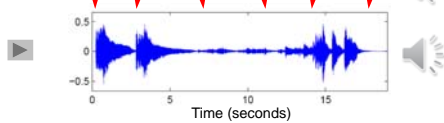
Beethoven's Fifth



Orchester
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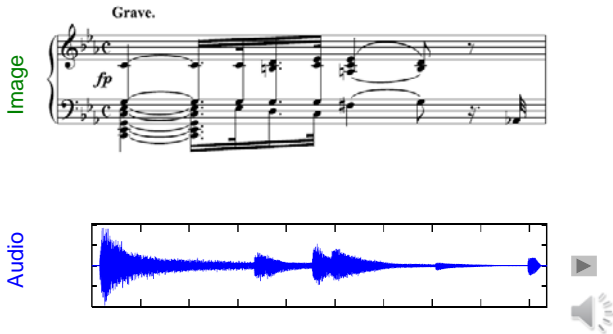
Piano
(Scherbakov)



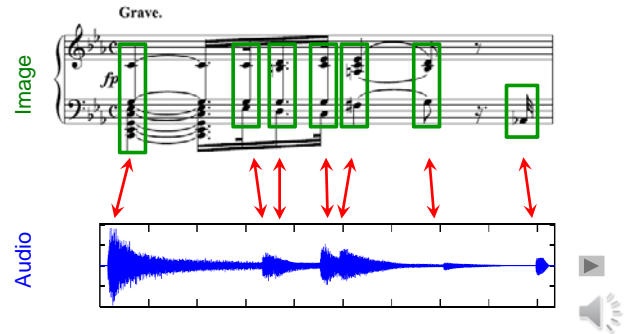
Application: Interpretation Switcher



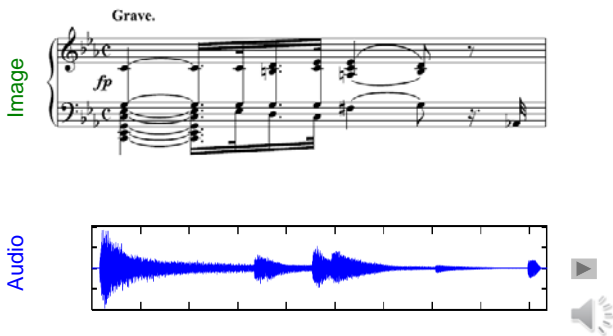
Music Synchronization: Image-Audio



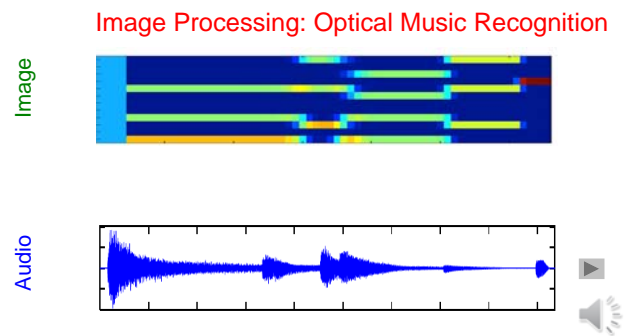
Music Synchronization: Image-Audio



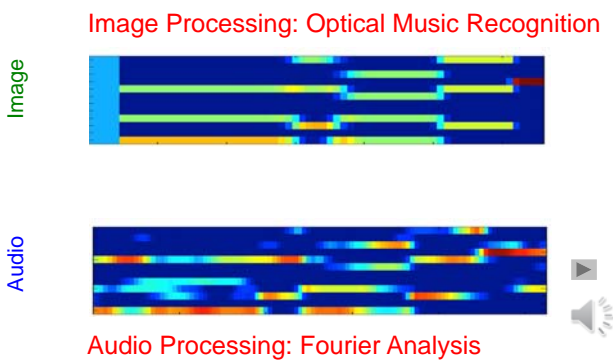
How to make the data comparable?



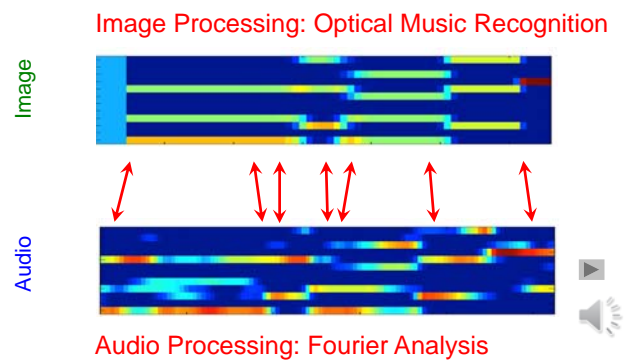
How to make the data comparable?



How to make the data comparable?



How to make the data comparable?



Application: Score Viewer



Music Representations

