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 Information Retrieval (MIR)

Music

Sheet Music (Image)  CD / MP3 (Audio)  MusicXML (Text)

Dance / Motion (Mocap)  MIDI

Singing / Voice (Audio)  Music Film (Video)  Music Literature (Text)

Music Information Retrieval (MIR)

Music

Signal Processing  Machine Learning

Musicology  Library Sciences

User Interfaces

Piano Roll Representation

Piano Roll Representation (MIDI)

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

Player Piano (1900)

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

Query

Audio-ID

 Bernstein (1962)
 Beethoven, Symphony No. 5

Version-ID

 Beethoven, Symphony No. 5:
  Bernstein (1962)
  Karajan (1982)
  Gould (1992)

Category-ID

 Beethoven, Symphony No. 9
 Beethoven, Symphony No. 3
 Haydn Symphony No. 94

Music Synchronization: Audio-Audio

Beethoven’s Fifth

Orchester (Karajan)

Piano (Scherbakov)

Application: Interpretation Switcher
Music Synchronization: Image-Audio

How to make the data comparable?

Image Processing: Optical Music Recognition

Audio Processing: Fourier Analysis
Application: Score Viewer

Music Representations