ECS7006 Music Informatics

Week 12 - Revision (for weeks 1-2 & 9-12)
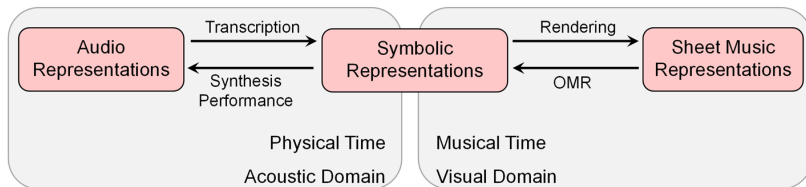
Emmanouil Benetos

School of Electronic Engineering and Computer Science
Queen Mary University of London

2023

Queen Mary
University of London

Week 1

Music Representations

- Sheet music representations
- Symbolic representations
- Audio representations
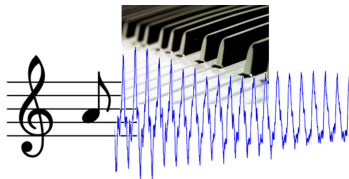
Sheet music representations

Visual representations of a score in printed form or in digitised images.

Symbolic music representations

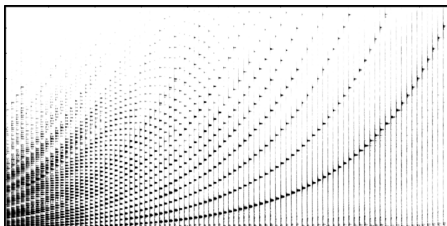Machine-readable data formats that represent musical entities.

Audio representations

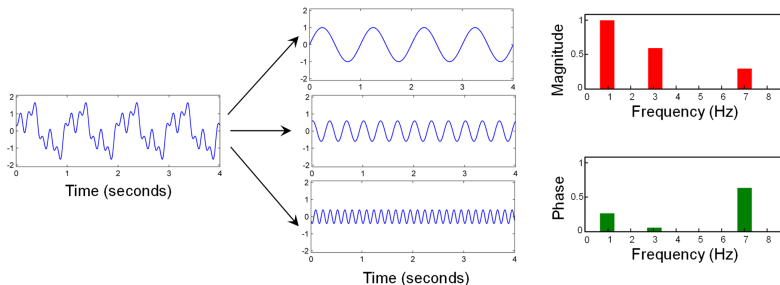Representations of acoustic sound waves.

Week 2

Time-Frequency Representations

- Signals
- Fourier Transform
- Discrete Fourier Transform (DFT)
- Short-Time Fourier Transform (STFT)
- Perceptually-motivated representations

Queen Mary
University of London

Week 2 - Fourier Transform

Idea: Decompose a given signal into a superposition of sinusoids (elementary signals).
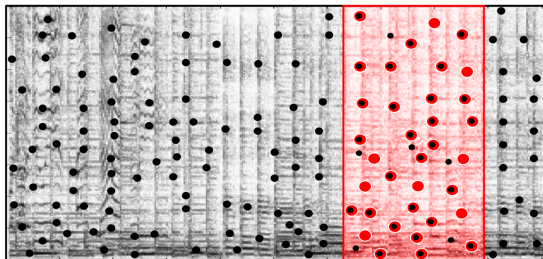

Interpretation:

- The magnitude A reflects the intensity at which the sinusoid of frequency ω appears in the signal.
- The phase ϕ reflects how the sinusoid has to be shifted to best correlate with the signal.
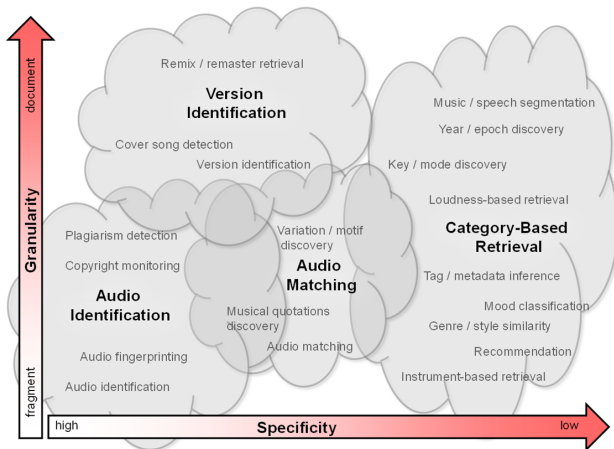
Audio Identification

- Intro: content-based audio retrieval
- Audio identification
- Audio fingerprints
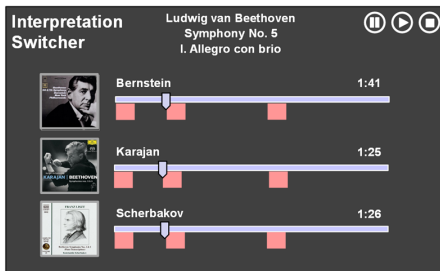- Indexing techniques for audio identification
- Evaluation measures

Content-based IR strategies can be loosely classified according to:

- Specificity: degree of expected similarity between the query and the database items.
- Granularity: the temporal level considered in the retrieval scenario

Audio Matching & Cover Song Detection

- Audio matching: requirements and feature design
- Diagonal matching
- DTW-based matching
- Cover song detection requirements
- Cover song detection procedure

Week 10 - Audio Matching

Database:

- Several recordings of the same piece of music
- Different interpretations by various musicians
- Arrangements in different instrumentations

Goal: Given a short query audio fragment, find all corresponding audio fragments of similar musical content.

Notes:

- Instance of fragment-based retrieval
- Medium specificity
- A single document may contain several hits

Week 10 - Cover Song Detection

Goal: Given a music recording of a song or piece of music, find all corresponding music recordings within a huge collection that can be regarded as a kind of version, interpretation, or cover song.

- Live versions
- Versions adapted to particular country/region/language
- Contemporary versions of an old song
- Radically different interpretations of a musical piece

Instance of document-based retrieval!

Cross-Modal and Multimodal Music Informatics

- Introduction
- Audio-symbolic music retrieval
- Audiovisual analysis of music
- Optical music recognition
- Lyrics alignment and transcription