10T1: Beyond Audio Signal Processing in Music Applications

Xavier Serra

Universitat Pompeu Fabra, Barcelona

Index

- Audio signal processing beyond this course
- Beyond audio signal processing

Audio signal processing beyond this course

- Detection/estimation of sinusoids
- Partial tracking
- Transient modeling

STFT-based approaches have a problem with transients, because they are fast, and STFT is based on the time-frequency resolution compromise

- Multi-resolution

We have considered the spectrum being linear in the frequency domain, but that's not how sounds are actually perceived. lower frequencies need larger window sizes, and viceversa.

- Residual analysis/modeling

Ideally, we need a multi-resolution based residual model, so that the stochastic model built on top of that is more perceptually relevant.

- Synthesis of sinusoids and noise

- Other sound modeling approaches

e.g. Excitation + residual model
(on top of harmonic + residual model)

Beyond audio signal processing

- Other music signals/data
  - Scores, lyrics
  - Gestures, video
  - Contextual and community information
- Data processing methods
  - Statistical analysis
  - Pattern analysis
  - Machine learning
- Semantic technologies
  - Network analysis
  - Ontologies

References and credits

- http://mtg.upf.edu/technologies/sms
- “Roadmap for Music Information ReSearch": http://mtg.upf.edu/node/2737
- http://en.wikipedia.org/wiki/Statistics
- http://en.wikipedia.org/wiki/Machine_learning
- http://en.wikipedia.org/wiki/Knowledge_representation_and_reasonin
- http://en.wikipedia.org/wiki/Music_psychology
- http://en.wikipedia.org/wiki/Human-computer_interaction
- Slides released under CC Attribution-Noncommercial-Share Alike license and available from https://github.com/MTG/sms-tools

10T1: Beyond Audio Signal Processing in Music Applications

Xavier Serra

Universitat Pompeu Fabra, Barcelona