Unsupervised Transcription For Piano Music

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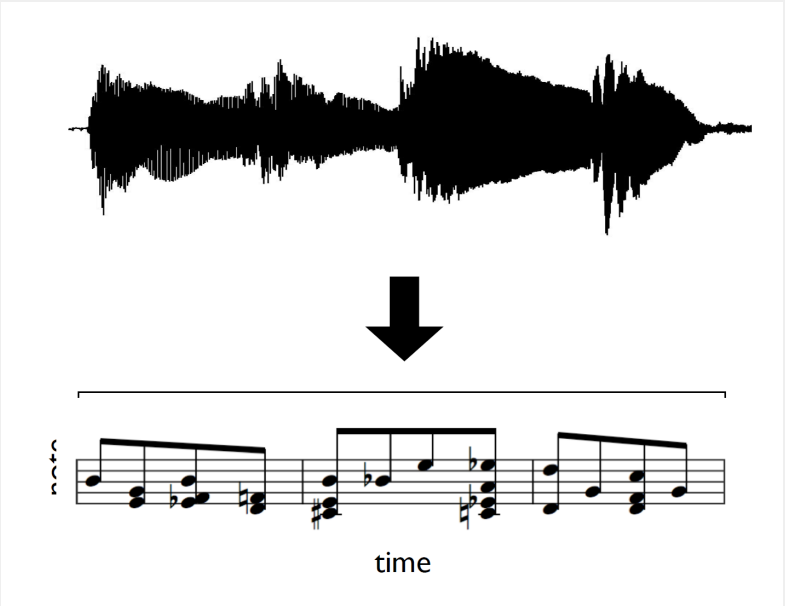
Introduction

This paper outlines a model for symbolising piano music using the timbral properties in an unsupervised fashion to address the source separation problem by learning recording-specific spectral profiles and temporal envelopes.



Setting

Problem addressed:

- Source separation
  - Polyphonic structure of piano
  - Spectrum of harmonics

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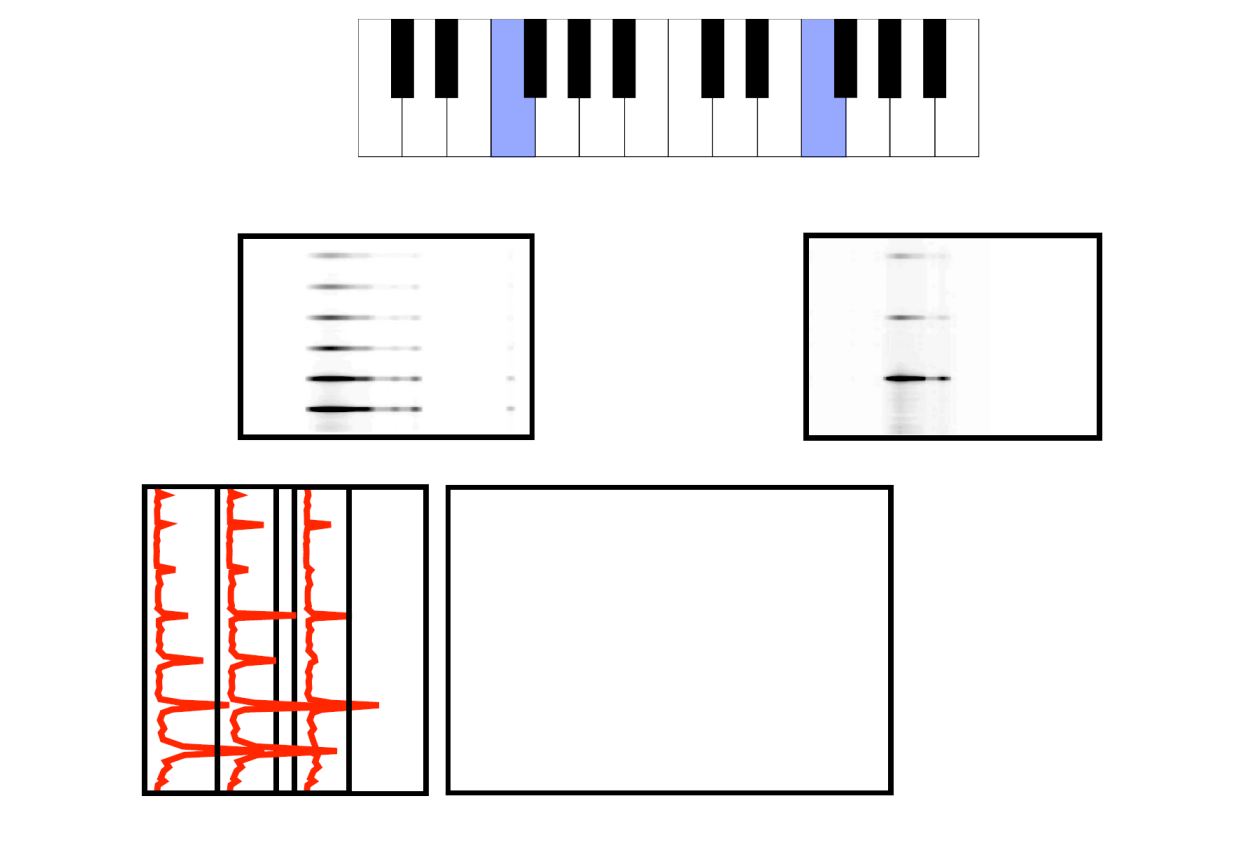

Figure: Polyphonic Structure of Piano

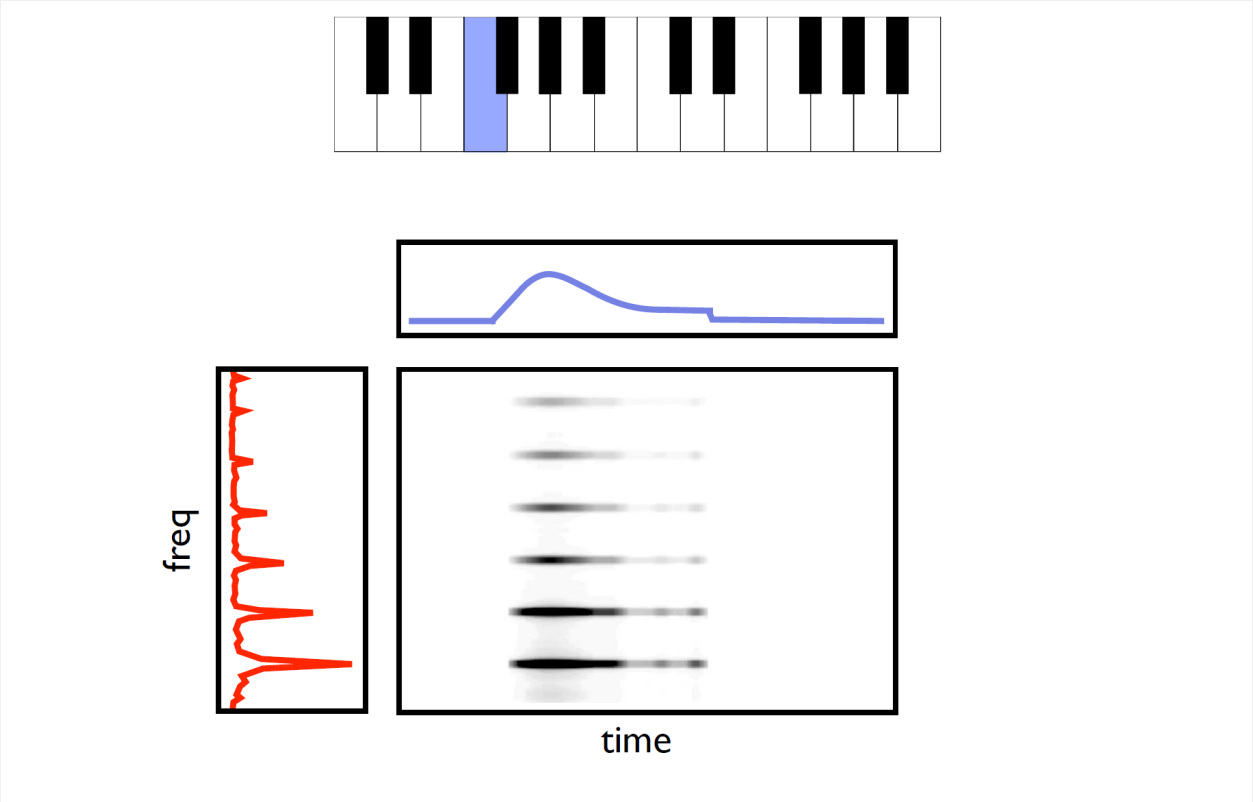

Figure: Spectrum of harmonics

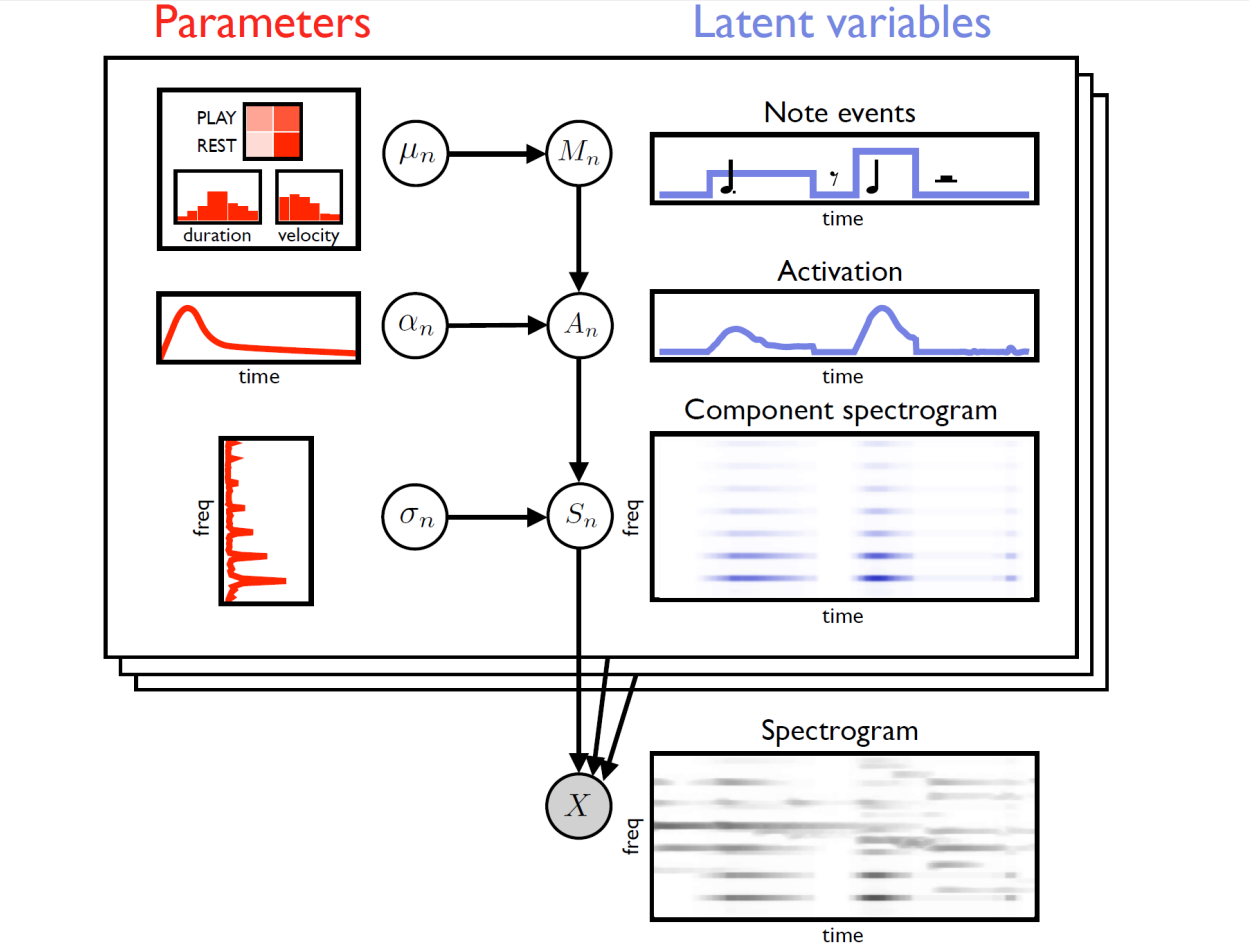

Figure: Generative Model

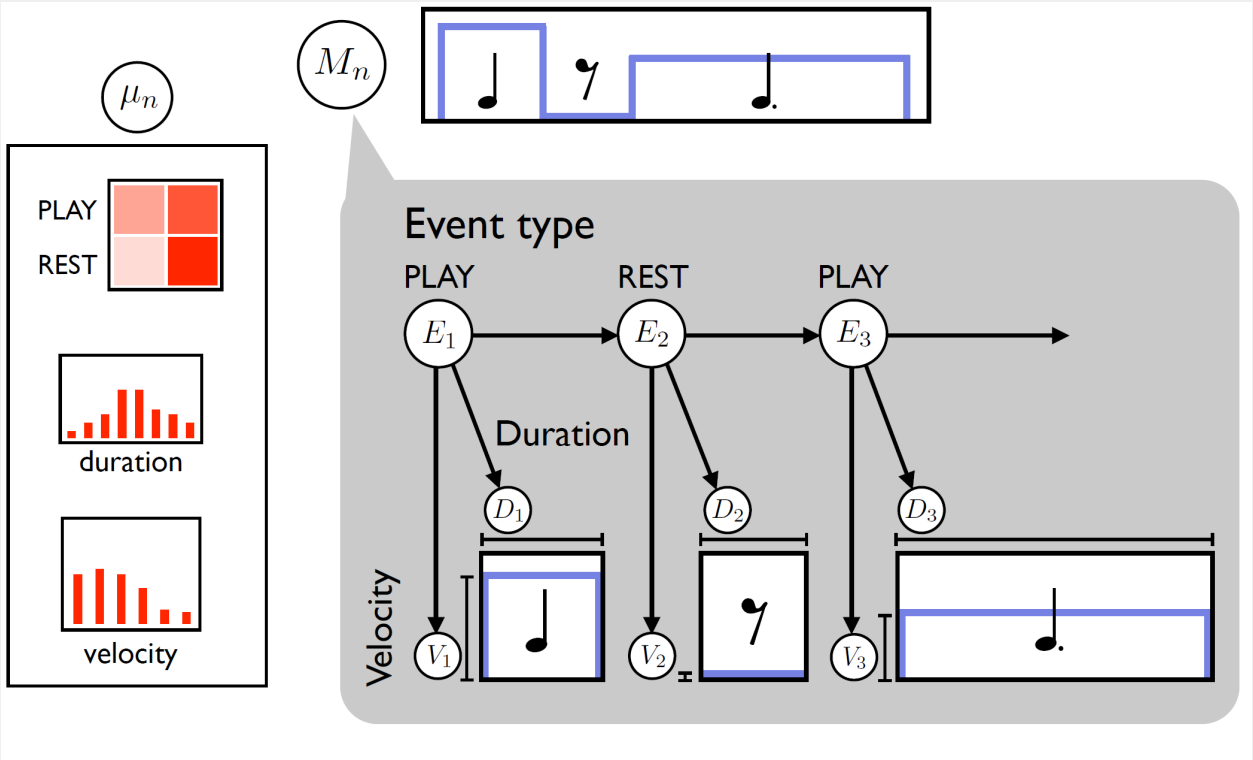

Figure: Activation Model

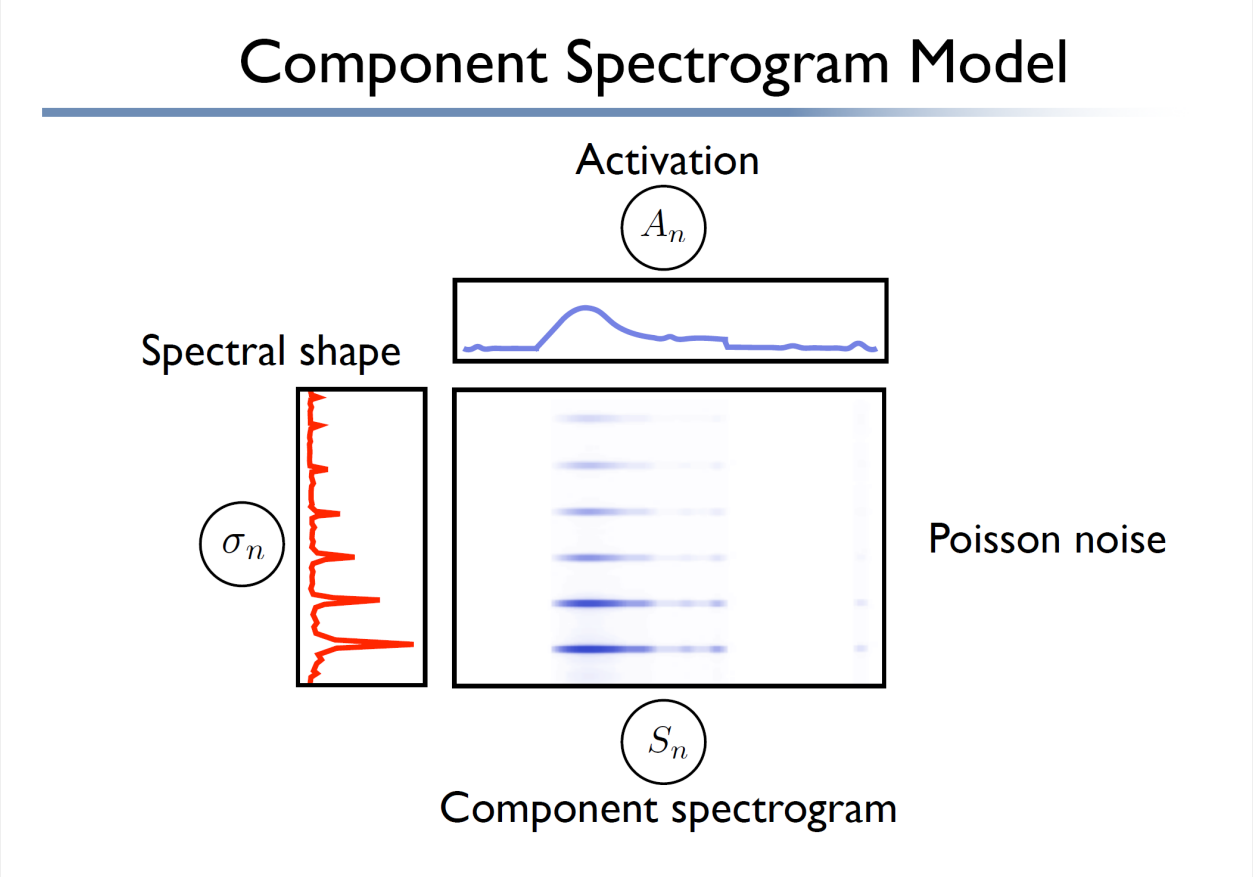

Figure: Component Spectrogram Model

Experiment

- Data:Midi Samples from MAPS and IMSLP.
- Prepossessing: Input audio as a magnitude spectrum short-time Fourier transform.
- Initialization and Learning: To fit the spectral and envelope parameters and predict transcriptions,running block-coordinate ascent procedure

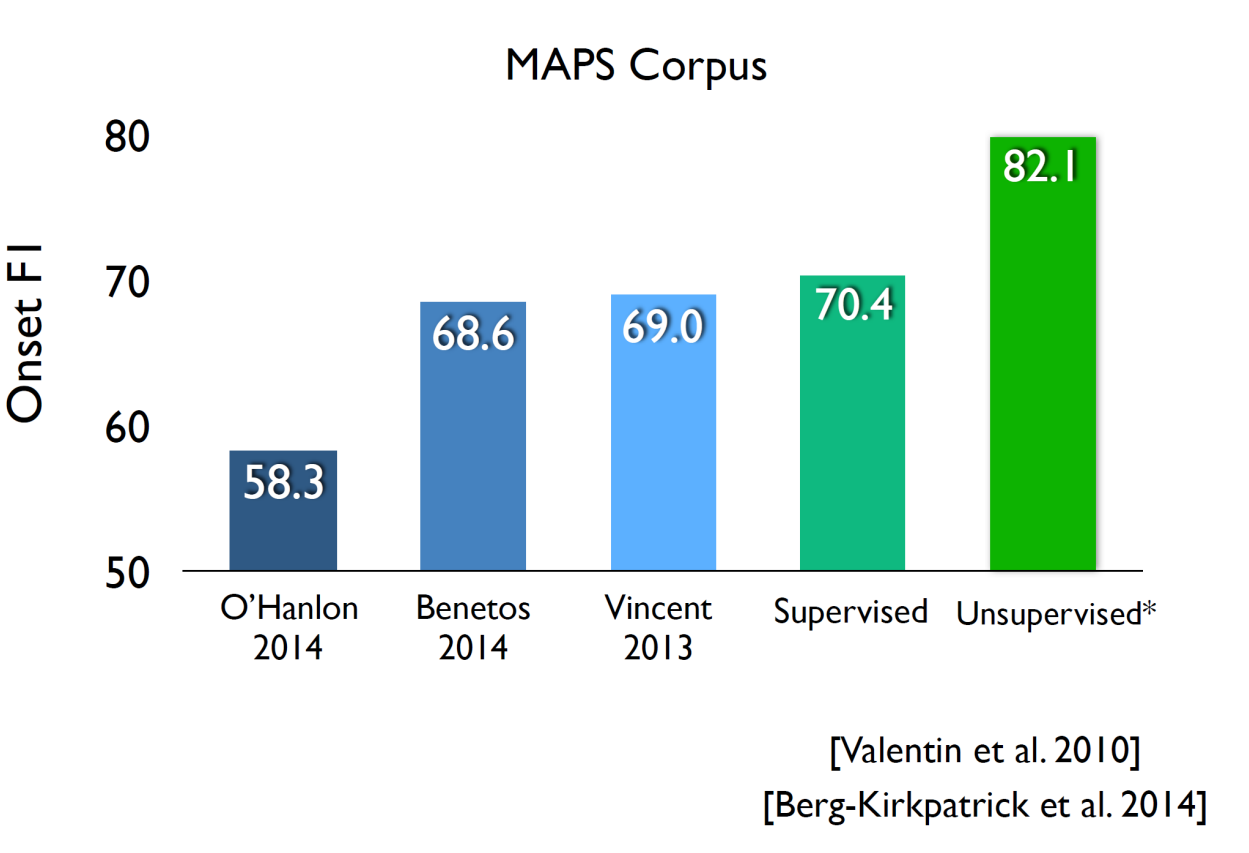

Figure: Results

Conclusion

Combining unsupervised timbral adaptation with a detailed model of the generative relationship between piano sounds and their transcriptions can yield state-of-the-art performance.