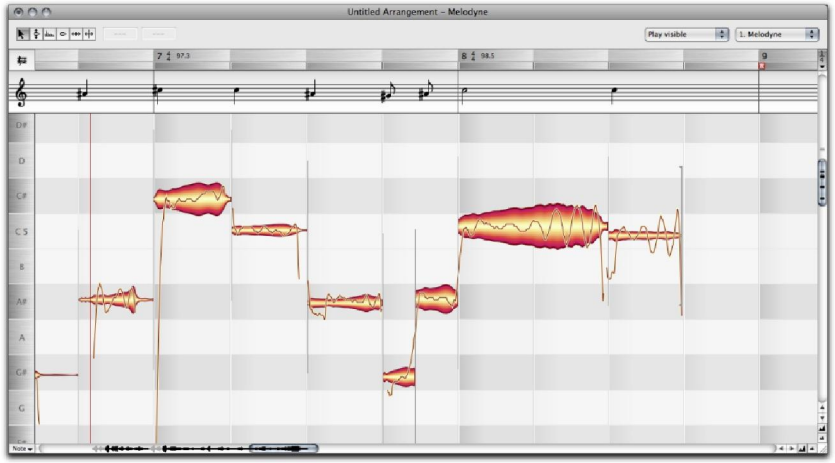
DECOMPOSITION OF GUITAR SIGNALS BASED ON CLUSTERING

PROFESSOR MADS GRÆSBØLL CHRISTENSEN
AUDIO ANALYSIS LAB, AD:MT
AALBORG UNIVERSITY

AALBORG UNIVERSITY
DENMARK

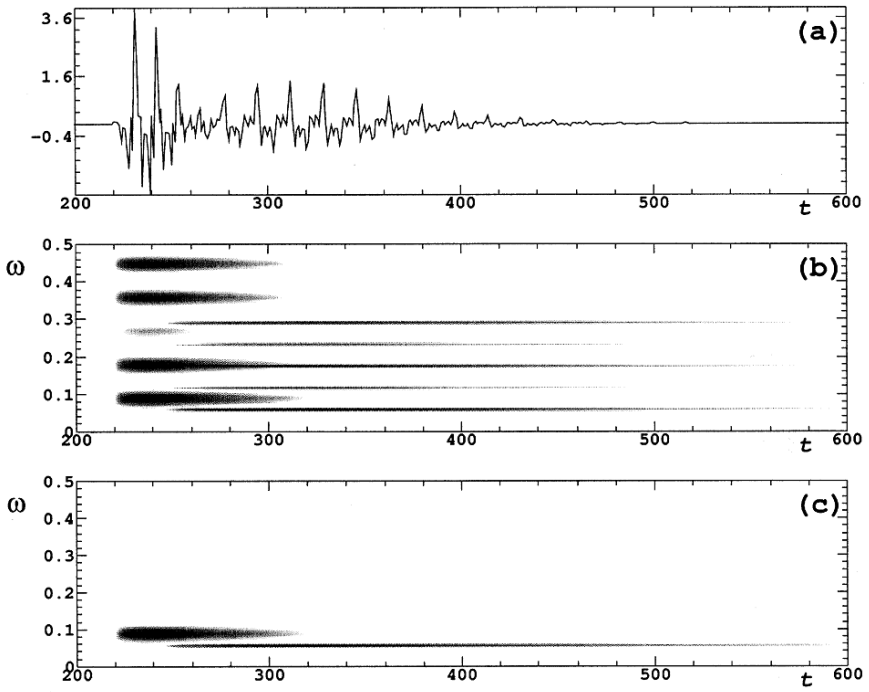
Introduction

- Music signals are very complicated, particularly when many instruments are playing at the same time.
- There exists many methods for signal decomposition, but they are difficult to apply to audio signals.
- Decompositions can be used for many things, like separation, tuning, classification, transcription, and auto-tuning ☺



The Idea

- Maching pursuit and similar methods offer simple and effictive means of decomposing signals into so-called atoms.
- The problem is to determine what atoms belong together (i.e., which are part of the same note).
- Suppose that we extract a bunch of atoms and we track the modulation characteristics of these over time.
- Then we should be able find out which are part of the same molecule using clustering!



The Project

- A signal decomposition model and methods must be chosen (or developed) for finding the atoms.
- A way of linking the atoms across time, to form tracks must be found, using, e.g., M&Q's classical peak matching procedure.
- Features of each atoms must be found (for example, amplitude and frequency modulation speeds).
- A way of linking the atoms must be developed, based on, for example, clustering.
- A demo application must be developed (e.g., in MATLAB), like a transcription application or an auto-tuner.

Literature

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