

# COMPUTATIONAL MUSIC ANALYSIS: FROM AUDIO TRANSCRIPTION TO STRUCTURAL AND STYLISTIC ANALYSES, EVERYTHING IS TIGHTLY INTERTWINED

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## Abstract

The aim of this research is to conceive a comprehensive computational model for automated music analysis where a large range of analytical and cognitive rules are combined and the interdependencies observed. Besides the purely scientific interest of a cognitive modeling, this should facilitate the development of tools for computer-aided musicology and interfaces for augmented music listening and discovery.

On the structural level, beyond a strict vision based on hierarchical segmentation, a concept of prolongational syntagmatic network is introduced, characterized by general rules and culture-dependent modal specifications. This model explains the syntagmatic role of ornamentation and allows automated motivic analysis that takes into account melodic transformations. This also models the emergence of metrical and complex structures, freeing the structural analysis from strong hierarchies and forced schemas.

The analysis of audio content is integrated in the framework, allowing the study of timbre, performance, improvisation and electro-acoustic music. The whole analysis is carried out in parallel to the progressive transcription, which can be guided by these higher-level musical expectations.

The framework is applied to the analysis of free guitar improvisation by Teemu Viinikainen that we recorded, and traditional maqam improvisations.

**Keywords:** automated music analysis, computer-aided musicology, cognitive modeling

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