

Steering Circularity Between Musical Anticipation and Repetition

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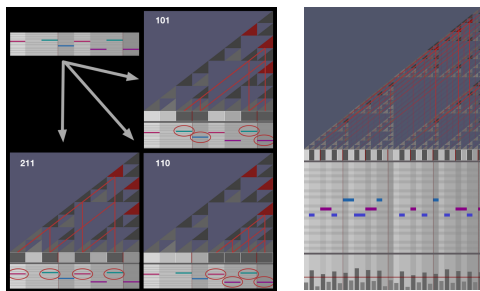
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Abstract

An approach to computer-aided improvisation that leverages aspects of low-level rhythmic coherence is demonstrated. A connection to number theory provides a self-similar map of rhythmic building blocks, enabling real-time rhythmic analysis and manipulation. The result is real-time navigation and manipulation of rhythmic patterns.

Introduction

This show-and-tell session provides an overview of interrelated systems for computer-aided music composition and improvisation presented at MUME workshops held in conjunction with ICCC in 2016 and 2018. The systems inject musical variations and hybrids of individual musical parts into the context of existing musical compositions. Music generation is steered during playback by human action and judgement.



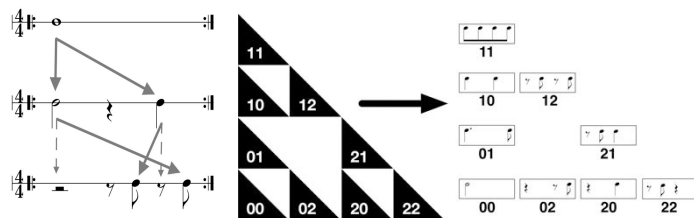
Goals and Systems

The aim is to harness the structure by which listeners make sense of rhythmic patterns, in order to steer composition of new patterns. The assumption is that musician practiced in improvisation navigate these structures intuitively, and that algorithmic co-processing can provide some degree of that capability in the form of a real-time computer interface.

Algorithmic method

This system detects and manipulates expectation-based configurations composed of nested anticipation outcomes. An emergent map of rhythmic building blocks results from a

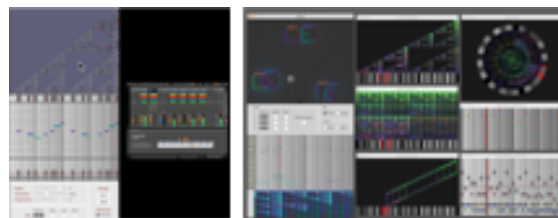
correspondence between number theory and a tiny set of generative music operations. These building blocks encapsulate nested circularity between anticipation and repetition.



Modes of Interaction

A pair of macOS apps implement these algorithms, extracting and reinjecting note patterns into Ableton Live. One app affords direct manipulation of structure within an individual Live clip, the other app provides a landscape for morphing between multiple Live clips.

The software does not model compositional strategies or evaluate musical results; those activities are left in the hands and ears of the user.



References

- Hardesty, J. 2016. Building Blocks of Rhythmic Expectation. Proceedings of the Fourth International Workshop on Musical Metacreation, Paris.
- Hardesty, J. 2018. Navigating Outcomes of Rhythmic Anticipation. Proceedings of the Sixth International Workshop on Musical Metacreation, Salamanca.