Expressive Completeness Versus Structural Generality: Can a Single Music Representation Support Both?

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ABSTRACT

As the call for papers suggests, there are a variety of digital and cognitive musical representations. Audio waveforms, symbolic notation, and instructions for synthesizing or manipulating sounds are examples from the digital category. They span what Wiggins et al. [3] refer to as a spectrum from "expressive completeness" (e.g., audio waveforms) to "structural generality" (e.g., sheet music), with representations such as "performed" or unquantized MIDI files somewhere in between.

Recent developments in music software and underlying representations tend to be dedicated either to expressive completeness or structural generality, but not both. For example, the Web Audio API [2] supports sample-level timing accuracy, such that now it is possible to interact with and dynamically alter expressively complete audio waveforms in the browser, but symbolic representations are not within this API's remit. In terms of structural generality, there are efforts concerned primarily with symbolic browser-based representations of music (such as the W3C Music Notation Community Group or the Music Encoding Initiative), but where the quality of audio rendered in resulting interfaces is of secondary concern.

There are exceptions: Tido Music and Soundslice are two interfaces/entities we are aware of where the music representations achieve both expressive completeness and structural generality. Being commercial initiatives, however, the details of this representational feat are not publicly available. Our organization, Music Artificial Intelligence Algorithms (MAIA), Inc., has also developed a representation that achieves expressive completeness and structural generality. For instance, the following links comprise expressively complete and structurally general views, respectively, on the same underlying representation of Thomas Tallis' "If ye love me":

- http://jam.musicintelligence.co/#!/editor/if_ye_love_me
- http://crunchy.musicintelligence.co/composition

As MAIA, Inc. straddles academia and industry, we decided it would be appropriate to release our specification as a public Bitbucket repository.[1] The specification consists of a Composition object and an Instrument object. Both are JSON documents, since we develop all-JavaScript systems. The Composition object is responsible primarily for when sounds will be triggered and how they will appear visually; the Instrument object is responsible primarily for what sounds will be triggered.

Neither of the interfaces linked above is particularly polished, but it is timely to discuss representations that achieve both expressive completeness and structural generality, and what types of musical interactions they may support – interactions that may not be possible if the focus is exclusively on audio waveforms or symbolic notation. We are also interested in exploring the ramifications of recasting our representation in a Semantic Web mould, and what costs and benefits that would entail.

Central to our current development stack is a RethinkDB database, which is useful in part because of changefeeds, enabling a client to receive change notifications from the database, and so support real-time collaboration in our applications. We are particularly interested to discuss the compatibility of RethinkDB and the Semantic Web. This design choice is based on the notion that "music is a form of living, influencing and influenced by every other form of living" [1, p. 11]. In other words, the expressively complete and structurally general representation we have developed is not a comprehensive, pristine endpoint, but a starting point or springboard for supporting established and as-yet unimagined musical activities and interactions.

KEYWORDS

music representations, audio, symbolic notation

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[1] https://bitbucket.org/micmaia/maia-specification/

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