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MUMT 306

*A Brief Survey of Music Representation Issues,*

*Techniques and Systems*  - a Synopsis

In the article *A Brief Survey of Music Representation Issues, Techniques and Systems* Roger B. Dannenberg enlightens the reader in the multiple facets and problems that accompany the computational representation of the aspects of music. Dannenberg mentions multiple times throughout the article the disconnect between the mathematical and semantic facets of music.

In discussing the representation of music Dannenberg explores this point by recognizing that there are often hybrids between structural and emotional characteristics of music. He uses the example of a conductor saying, “play the downbeat with more conviction”, where a downbeat is a relatively concrete concept and ‘conviction’ is a concept interpreted emotionally by the performer(s). He further elaborates this theme throughout the rest of the article by providing many convincing examples of where a computer may lack the ‘human’ element that makes music so appealing such as interpreting vibrato (section 4), correctly interpreting pitch and rhythm (section 5, 6 and 8), despite the fact that these two previous components of music may appear to map to the mathematical nature of computers fairly well.

The article is not, however, a completely cynical homage to the emotionless capabilities of computers. Dannenberg gives many examples of computers effectively representing musical phenomena.

Dannenberg powerfully shows the strong affinity for music that computers and programming languages have by spearheading this point with the concept of hierarchy, something that computer scientists and audition participants are all to well familiar with. It is worth noting that, specifically in object oriented programming languages, hierarchy is an integral part of many programs. In Java, objects can be given hierarchy that aids in distinguishing subsets of objects (an example would be that dogs, cats, rhinos, etc. can all be stored as subsets of a mammal object, whereas snakes, salamanders and geckos can be stored as subsets of a reptile object). Dannenberg mentions musical hierarchy explicitly (section 3) in terms of “Phrase markings, ties, and slurs”. These two parallels show the compatibility of computer systems and musical representation.

Musical notation representation is a lengthy part of the article (section 8). Dannenberg introduces the concept of ‘views’. He outlines the inefficiency of editing scores of music and then transferring the changes to the individual parts by pointing out that individual parts may need to have more information than just music, such as page breaks, cues, written commands, etc. Dannenberg juxtaposes the idea of storing musical scores centrally and representing the individual parts as ‘views’ of the score containing the relevant information. Dannenberg urges the reader to think of the extreme uses of views, specifically that of using views to represent the structure of music, which would ultimately lead to many interesting problems that have much in common with the areas of “artificial intelligence, programming languages, and databases”. This interesting section of the article not only shows the usefulness of computers in musical tasks, but also strengthens the bond between the musical and computer-science worlds.

Throughout the article, Dannenberg writes interestingly, and engages the reader while informing them on the problems he has encountered whilst representing musical ideas via computer and provides insight into some solutions that take advantage of similarities between the two fields. He introduces common formats such as MIDI and Music V to demonstrate the problems he has come across.

Many of the problems that Dannenberg expresses are due to the semantic nature of music: many aspects of music (tempo, rhytm, pitch, timbre, notation, etc.) are interpreted very differently from how they are strictly expressed on paper, often at the choice of the performer and because of the styles and opinions of the listeners as well. Dannenberg does a wonderful job of providing some solutions to these problems by showing how mathematical and computational processes can effectively ‘map’ to musical phenomena. He also leaves many problems unsolved, merely presenting them to the reader, and, in doing so, may inspire some of us to further research and experimentation in the field.