Audio Transformations for the Enhancement of a Multiband Mosaicing Algorithm and Textures

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The re-appropriation of audio has become a standard compositional tool within the fields of electro-acoustic and electronic music. From the works of John Cage to the genres within Hip-hop and Electronic Dance music, sampling has become increasingly popular as a means of enhancing the sonic palette available to composers. Sampling can provide a means of re-contextualising modern compositions by infusing a piece with sonic material often associated with alternative musical contexts. These could be as simple as the crackle of a vinyl record as it spins to provide a lo-fi ambience or as complex as re-arranging the notes of a recorded violin performance to create an entirely new piece.

Audio mosaicing and concatenation synthesis have recently been introduced as a means to aid the composition of electro acoustic music using samples. These systems select samples within a database based on a number of criteria selected by the composer. These criteria could be based on a simple scalar value such as loudness or they could use similarity matching algorithms to select audio material that is of a similar timbre to that of an audio input. Audio mosaicing systems can make the process of selected samples for composition more efficient and even amenable to live performance. Systems such as D. Schwartz's 'Cahart' and E. Costello et al's. 'Multiband mosaicing system' provide a means to perform musical compositions in real-time using concatenation synthesis.

Unfortunately, audio mosaicing or concatenation synthesis systems are dependent on the amount of acoustic material the systems contain within their databases. The output from such systems may be constrained to a narrow frequency range or timbre, resulting in an output of limited compositional use. One technique to address this issue is to re-synthesise the output from a concatenation synthesis system using segments from a number of different frequency bands as demonstrated in the 'Multiband mosaicing system'.

This paper proposes a further extension to this Multiband approach to enhance the database and the matching process. Using algorithms for the transformation of the pitch and spectral envelope the audio segments can be manipulated to extend their timbral variety, which can then be used to increase the database population without the need for extra recorded material, and ultimately, expand the sonic range of the mosaicing process. Furthermore, this transformation process can be adapted to include the identification and tagging of a range of specific features from the audio segments that can be exploited prior to the signal matching process so as to help speed it up and increase the procedural efficiency of the algorithm.