Abstract

As an algorithmic composer I have been looking at a more abstract meta-level of musical composition: style and structure of a musical composition. To accomplish this I looked at certain techniques from the domain of (Music) Information Retrieval, in particular at some (common) general data mining algorithms.

Other well-known approaches, such as the use of Augmented Transition Networks (ATN) from the field of Music Information Retrieval are, to a certain extent, adequate as long as one keeps the underlying tonal constraints and rules as a guide to understanding the structure one is looking for. But since a large proportion of algorithmic music, including music composed by the author, is atonal, tonal constraints and rules are of little use.

Analysis methods from the field of Information Retrieval such as *k*-means and Expectation-Maximisation (EM), both Hierarchical Clustering Techniques (HCT), facilitate other approaches. HCT are Information Retrieval and general data mining tools that are better suited for finding (clustered) structures in large data sets. Other techniques as the ART2 Neural Networks (Adaptive Resonance Theory) can be used for analysing and categorising these data sets. And even more conventional statistical tools as histogram analysis, mean, variance as well as correlation calculations can tell us something about certain connections between members in a data set. Altogether a most promising palette of usable data analysis methods and strategies for creating algorithmic atonal music is now at our disposal. Now acting as (software) strategy tools, their use is determined by the quality of their output and usability in a musical context as I demonstrate when developed and programmed into my Computer Assisted Composition Environment: CACE4. We therefore turn Music Information Retrieval techniques the other way around and use their specific techniques and their associated methods of Information Retrieval and general data-mining to access the organisation and constraints of abstract (non-specific musical) data in order to use and transform it in a musical composition.

In this thesis I will review and discuss obtained results from the previously mentioned IR techniques and their specific adaptation(s) for use as building blocks in the CACE4 software application. By using them in this way as mathematical principles and methods, without the musical context, it is possible to use them as techniques in order to find structure and relationship in large(r) amounts of data. By using the data in this way we are now able to develop strategies to satisfy our musical goals: generating musical material with certain musical characteristics (i.e. style, structure, form and aesthetics).
This project consists of a thesis outlining the analytical methods as previously mentioned and

implementing the methods in an application (CACE4) together with a portfolio of a number of compositions and their analysis.