THE MUSIC INTER-VISUALIZER – INTEGRATING NAVIGATION AND VISUALIZATION

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ABSTRACT

Recent research in MIR has produced interesting results in the area of audio-based music visualizations [1][2] and navigation of large music collections [3]. However, integration of the two seems to be less researched. The Music Inter-Visualizer (MIV) is a graphical interface for integrating track (micro) and collection (macro) level information in one single system.

Pairing with the *Gordon Music Database* [4] results in a flexible framework where various types of information (e.g. musical structure, chord progressions and musical motives) or navigation schemes (i.e. distance metrics between tracks) can be incorporated.

The main goal is to design a single visualization that works on the macro and micro levels. This is achieved in two ways: first by wrapping time into a self-contained object - a radial convergence diagram (RCD) of the temporal structure of a given track (see Figure 1) - that can be placed anywhere in a similarity space; and second, by making the density of the representation variable, such that detailed information is only available when specific neighborhoods are visited.

The RCD is generated from the recurrence plot (RP) according to methods outlined in [2] using either chroma or MFCCs as signal features.
Looking at the RCD, time increases clockwise along the perimeter of the circle, starting and finishing at the topmost point. Groups of repetitions are represented using translucent ribbons connecting two time segments, such that each edge of a ribbon connects the beginning of one segment to the end of the other. Time segments can be assigned color values, increasing contrast in the diagram.

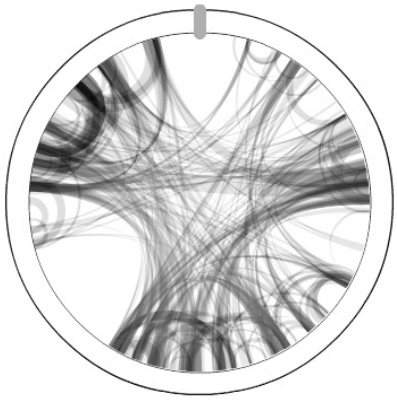

Figure 1 - RCD of Michael Jackson - ABC (gray-scale)

By clicking any part of the RCD, the user can hear the audio stream of that specific point in time and make a visual or auditory comparison between two or more connected segments.

The MIV interface is developed according to good Human-Computer Interaction practice, with an intuitive and attractive design. This is supported by two simple navigation methods, providing a fluent transition between the micro and macro levels. One automatically gives suggestions on similar tracks to a user's query. The other is a text-based ranked list of the top 100 most similar tracks to that query. Similarity is measured by comparing the Gaussian distributions of one tracks signal features to another's, using the symmetric Kullback-Leibler divergence (G1) [5].

Each time the user makes a query, a detailed RCD of the chosen track is presented in the center of the screen. It is surrounded by 8 RCDs of similar tracks in the formation of a sun (see Figure 2), a design inspired by the MusicSun [6]. Choosing another RCD from the sun formation will enlarge and move that track to the center, surrounded by its 8 most similar tracks.

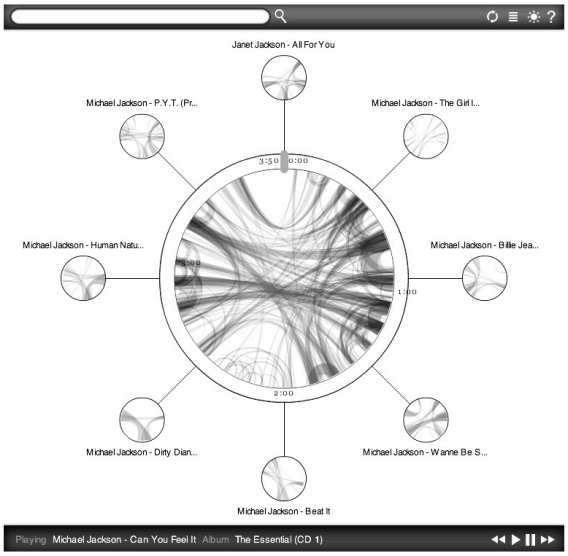

Figure 2 - Screenshot of MIV application. RCD of Michael Jackson - Can You Feel It, surrounded by 8 RCDs of similar tracks (grayscale)

The MIV's interface is developed in AS3 (Flash) and connects to a Python server running Gordon. The current version of the MIV is a preliminary, exploratory product to investigate an integrated visualization framework. However, it is extensible as other visualization tools can be included. Connection with Gordon furthermore enables use of other data types, organization strategies or feature extraction algorithms.

1. REFERENCES

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