USING 3D VISUALIZATIONS TO EXPLORE AND DISCOVER MUSIC

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ABSTRACT

This paper presents *Search Inside the Music* an application for exploring and discovering new music. Search Inside the Music uses a music similarity model and 3D visualizations to provide a user with new tools for exploring and interacting with a music collection. With Search Inside the Music, a music listener can find new music, generate interesting playlists, and interact with their music collection.

1 INTRODUCTION

Tools that help listeners find new music, re-find forgotten music, and create coherent playlists become increasingly important as music collections grow in size. At the same time, it is important to remember that the primary purpose of music is entertainment. As such, activities surrounding music such as music discovery and playlist generation should be engaging and entertaining activities.

In this paper we describe the *Search Inside the Music* application. SITM uses interactive 3D visualizations of a music similarity space to allow a music listener to explore their music collection, to receive recommendations for new music, to generate interesting and coherent playlists, and to interact with the album artwork of a music collection. The resulting user interface is arguably more engaging and enjoyable to use than currently available commercial music interfaces.

2 MUSIC SIMILARITY

The visualizations in the Search Inside the Music system rely on a music similarity model. The system is decoupled from the similarity model such that any music similarity model that can quickly determine the distance between any two songs in a music collection can be used. We've successfully used models based on the Marysyas system [3] as well as models developed here at Sun Microsystems [4]. Experience has shown that similarity models based upon maximum-margin classifiers such a support vector machines generate poor visualizations since these classifiers tend to result in a number of tight clusters that are not well-suited for exploration and visualization.

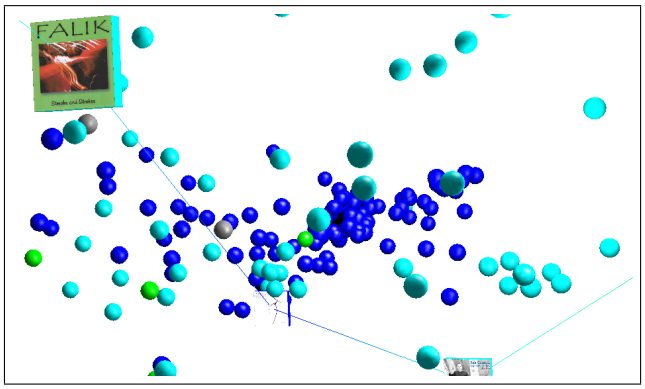

Figure 1. 3D View of the Music Space

3 VISUALIZATIONS

Having a model of the musical similarity space allows us to represent a music collection in new and interesting ways. Figure 1 shows a 3-dimensional visualization of the music space. In this visualization songs are represented by spheres floating in space. Spheres that are close together in this space represent songs that are musically similar. The current playlist is shown by a connected sequence of floating album covers. Larger spheres represent songs that are favored by the listener. The music listener can interact with this visualization to explore the music space. Clicking on a sphere will cause the represented song to play. Clicking on the 'More like this' button will add more songs to the visualization that sound similar to the current song. The listener can generate interesting and varied playlists by selecting two end point songs and having the browser generate a path through the music collection that best connects the songs, minimizing jarring song transitions. Interacting in this way with the music collection can provide interesting insights into its contents and composition and provides an arguably more enjoyable interaction than is typically found in a more traditional music browser that relies primarily on lists of song titles and artist names.

SITM uses a multi-dimensional scaling technique to project the high-dimensional music space into three di-

Figure 2. The Album Cloud

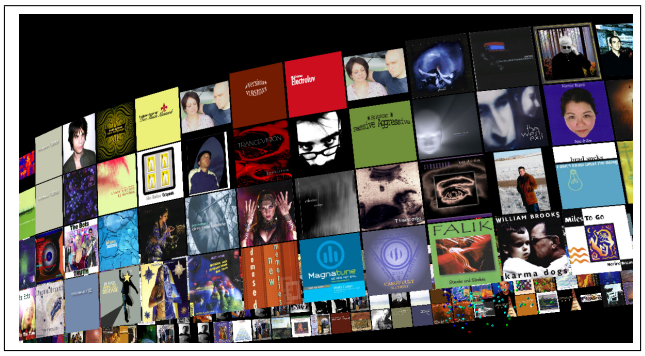

Figure 3. The Album Grid

mensions similar to the approaches used in [2] with optimizations described in [1].

3.1 Album Cloud

Album artwork has always been an important part of music collecting. However, with the shift to digital music, opportunities to interact with the album artwork have diminished. In SITM, we hope to bring back some of the opportunities to enjoy the artwork associated with a record album. Figure 2 shows the SITM album cloud. When a song is playing, SITM displays the artwork for the current album, surrounded by the artwork for albums that have similar sounding songs. With the album cloud, a music listener can quickly see a set of albums containing similar music, enhancing the opportunities for serendipitous music discovery. SITM uses a real-world physics model to manage the motion of the album artwork, yielding smooth, realistic album artwork transitions.

3.2 Album Grid

SITM provides tools for exploring a music collection. One such tool is the album grid shown in Figure 3. The album grid shows the artwork for all of the albums in a music collection. The album artwork is arranged in a grid such that musically similar albums appear adjacent to each other, while musically dissimilar albums appear far apart. At a glance, a music listener can view their entire music collection or focus in on particular neighborhoods within the collection. A listener can click on any album in the grid to audition songs on the album. As with the album cloud, the album artwork in the album grid is represented using a real-world physics model, allowing for smooth, realistic motion of the album artwork. The album grid is not constrained to be a planar grid. It can be shaped into rings, boxes, ellipses and various other shapes. Figure 4 shows the album grid in the form of a spiral. The album artwork reshapes itself into the various forms following smooth trajectories generated by the physics model. These animations present a highly engaging experience for a music listener interacting with their music collection.

Figure 4. The Album Spiral

4 CONCLUSION

In this paper we describe the visualizations used in the Search Inside the Music project. SITM uses 3D visualizations to allow a music listener to explore and interact with their music collection, to help them to generate interesting playlists and to discover new music. The user interface provides a dynamic environment that is engaging and fun to use, helping to make the task of music exploration and discovery be more entertaining.

Acknowledgments

Album artwork images used courtesy of Magnatune.com

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