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(Virtual [World) Music]: Virtual World, World Music— Folkways in Wonderland

Rasika Ranaweera,* Michael Cohen,† Nick Nagel,‡ and Michael Frishkopf §

Spatial Media Group; University of Aizu; Aizu-Wakamatsu, Fukushima-ken 965-8580; Japan
Media Grid Institute; 13 Bridge St.; Danvers, MA 01923; USA
Dept. of Music, Faculty of Arts; U. of Alberta; 3-67 Fine Arts Building; Edmonton, AB T6G 2C9; Canada

Abstract

As immersive virtual environments and online music networks become increasingly popular, it behooves researchers to explore their convergence: groupware music browsers populated by figurative avatars. Collaborative virtual environments (CVEs), like Second Life, offer immersive experiential network interfaces to online worlds and media. We are developing a virtual environment, based upon and similar to the "Music in Wonderland" proof-of-concept by Sun Microsystems, that enables a place that avatar-represented users can go to browse musical databases. At first this environment will support simple virtual explorations of music, but we have ambitions to map geotags to projected spaces, enabling location-aware browsing. A dome-shaped sphere whose nodes are populated with representative album art is an attractive idiom, since it leverages against our natural spatial intuition and experience, but allows a large number of samples to be scalably displayed and juxtaposed. A user "teleports" into this dome, and can browse data in multiple fashions.

Keywords: spatial music, immersive environment, collaborative virtual environment, database browsing

1 Introduction

As immersive virtual environments and online music networks become increasingly popular, it behooves researchers to explore their convergence: groupware music browsers populated by figurative avatars. Moreover, as CVEs such as, for example, Second Life and Sun Microsystem's open source Wonderland project become increasingly applied to learning and education, the need for 3D representational systems and user interfaces enabling browsing and retrieval of wide ranges of mutimedia assets is becoming increasingly manifest. Collaborative virtual environments (CVEs), like Second Life, offer immersive experiential network interfaces to online worlds and media. The Smithsonian Institution, the national museum of the U.S.A., curates a world music archive, the "Folkways Collection," founded by the legendary Moe Asch, and is engaged in a partnership with the folkwaysAlive! Project at the U. of Alberta (Edmonton, Canada), whose mandate is to develop the Folkways Collection in new ways. We have developed an immersive browser for this collection, "Folkways in Wonderland."

2 Implementation

We have developed a simple virtual environment, based upon and similar to the "Music in Wonderland" proof-of-concept provided by Sun Microsystems, that enable a place that avatar-represented users can go to browse and search the Folkways database. Users can search by keywords or select from among a set of browsable categories (perhaps hierarchical), and the system responds by arraying matching album covers on the inside of the sphere. The user can move about in the VE, and click to hear track samples. The system is collaborative: multiple users can hear the same music together, and they can hear each others' speech via voice chat. This would be useful for distance education, etc. - one could sponsor lectures about the collections. An attractive feature to be highlighted here is the new ways to present search results, i.e. in a multidimensional multimedia VE rather than in textual list form.

We suggest the sphere as structure well suited for representing collections in collaborative 3D spaces. From the user perspective the spherical shape provides a readily navigable structure onto which symbolic representations of collection content can be easily mapped. From the developer perspective, the sphere is a well-known structure which can be easily defined and projected in the 3D environment either declaratively or procedurally.

The sphere is structurally suited for representing collections in the 3D space because it can be tessellated in a variety of ways, and symbolic representations of content can be projected onto nodes or points of intersection of curve segments resultant from the tessellation [5]. Sequential browsing can be achieved by limiting the projection to specific bands of nodes and allowing spherical rotation about the perpendicular axis. Alternatively, content projections can span multiple bands enabling rapid spatial-oriented browsing across the entire viewport field.

*E-mail address: m5121205@u-aizu.ac.jp
†E-mail address: mcohen@u-aizu.ac.jp
‡E-mail address: nickn@u-aizu.ac.jp, nick.nagel@mediagrid.org
§E-mail address: michaelf@ualberta.ca

To explore the applicability of these ideas we implemented a version of the spherical 3D collection browser as a means to enable world-wide access to the Smithsonian Folkways Collection.

At first this environment will support simple virtual explorations of music, but we have ambitions to map geotags to projected spaces, enabling location-aware browsing. A dome-shaped sphere whose nodes are populated with representative album art is an attractive idiom, since it leverages against our natural spatial intuition and experience, but allows a large number of samples to be scalably displayed and juxtaposed. A Folkways in Wonderland user "teleports" into this dome, and can browse data in multiple fashions.

2.1 Cell Renderers and Scenegraph in Wonderland

Cell Renderers in Wonderland facilitates the ability to create visual representations of cells using jME (jMonkeyEngine), a high performance scene graph-based graphics API. For the jME Cell Renderers each renderer provides a scene graph which is added as a child of an 'attach point' node in the Cell Renderer of its parent cell, so child cells can inherit rendering state from the parent scene graph.

The populated sphere was a geometric 3D model rendered by jME; the music albums, the billboard which displays the current album selection, and the map screen are children nodes of the sphere. The album is also a 3D model with the cover image set as the texture and positioned according to the latitude and longitude. The users can select preferred music by simply clicking on the album, which then starts playing the localized audio stream and shows the geographical location in the real world using Google Map API.

3 Future Directions

We hope that an interface like Folkways in Wonderland might be useful for ethnomusicological research. We hope to act as evangelists for CVEs (collaborative virtual environments) and MUVEs (multiuser virtual environments), as such interfaces have applications in distance learning, telecommuting, and CSCW (computer-supported collaborative work).

The implementation we created demonstrates the efficacy of the spherical collection browser and the utilization of a tesselated sphere to define a 3D projection space for items in a collection. The implications for the representation of collections in 3D CVEs are broad and immediate. For example, our prototype can be leveraged immediately to render the Smithsonian Folkways Collection available to the users around the world given the distributed architecture of the Wonderland platforms. Beyond that, work is currently underway to to define standards and best practices for the representation of content collections and learning resources in immersive 3D educational environments for which components similar to the Folkways browser are ideally suited [6].

In further research efforts, we intend to add informational elements to our working prototype. In particular, we will include geographic information associate with collection elements through an interface with the Google Earth API and in so doing explore ways in which cross-cutting taxonomic catagories can be leveraged by the browser. Beyond that, we also hope to explore the extensibility of the browser through procedural generation of the spherical projection space, which would enable easier configurability of the browser contents by enabling, for example, the autogeneration of 3D browser object in the virtual space based on end-user defined configuration files.

4 Conclusion and Future Research

With the 0.5 release of Project Wonderland the 3D rendering architecture was changed from Java 3D to jME, which made most of the modules including MiW incompatible. Our rewrite of the MiW module for compatibility with the latest sources of Wonderland along with the integration of the Google Map API was successful. The geometric nodes newly added to the schema enable retrieving the map and localizing the music, so the music is heard from location specified by the latitude and longitude in the real world, and that the avatar-represented user can recognize whence the music originates. The populated sphere VE model is particularly useful for a diverse collection such that various "spheres" of music are exactly what one wants to display, and coupled geographical amplifies such usefulness. Using a bridge between Wonderland and our legacy application suite, which includes iαppli Java MicroEdition interfaces, we hope to add mobile computing [1] [3] [2] [4] capabilities to this music browser.

References

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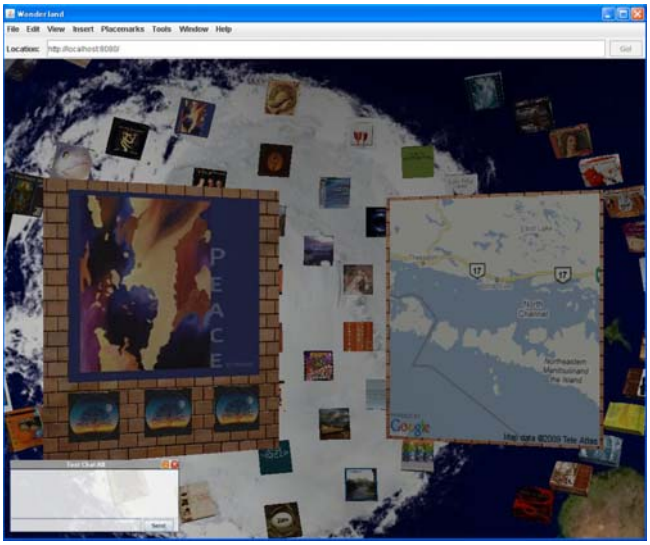
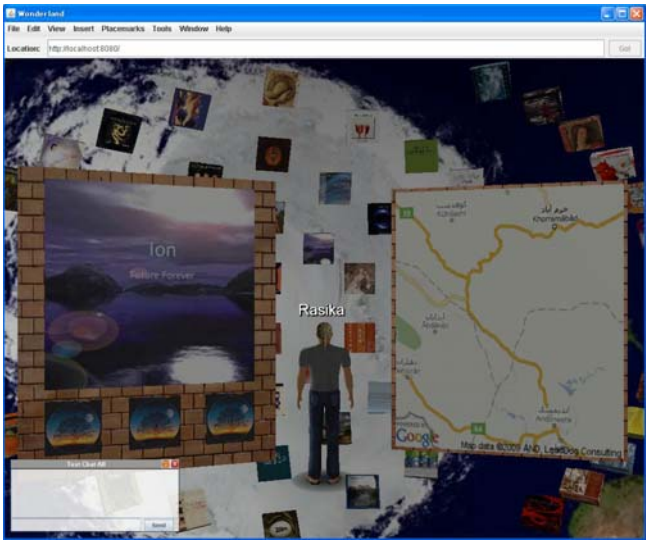
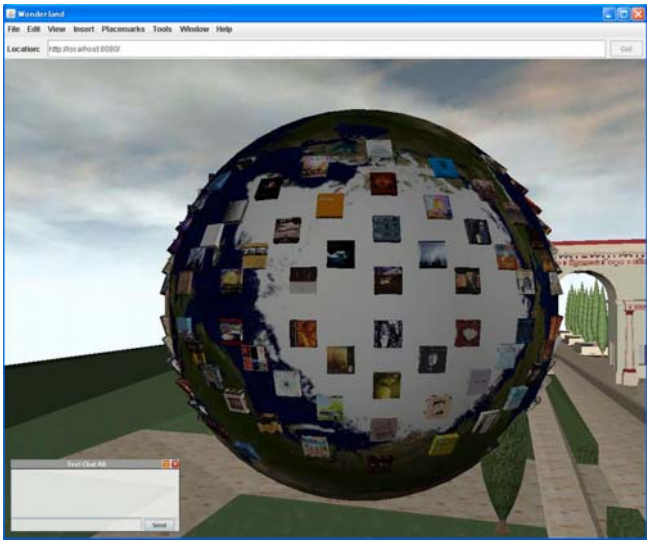


(a) Endocentric (1^{st}-person) Perspective



(b) Egocentric (2^{nd}-person) Perspective



(c) Exocentric (3^{rd}-person) Perspective

Fig. 1. Points-of-View

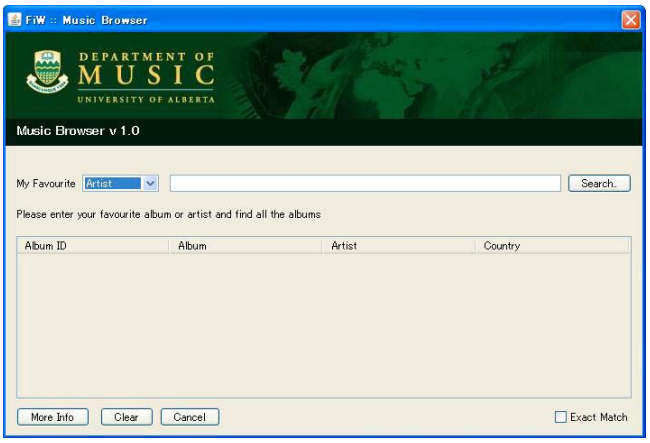


Fig. 2. Pop-up Browser

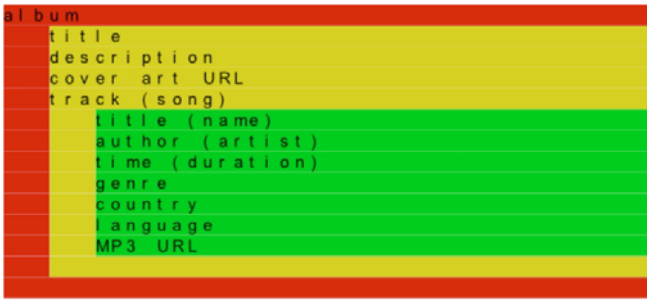


Fig. 3. XML Schema

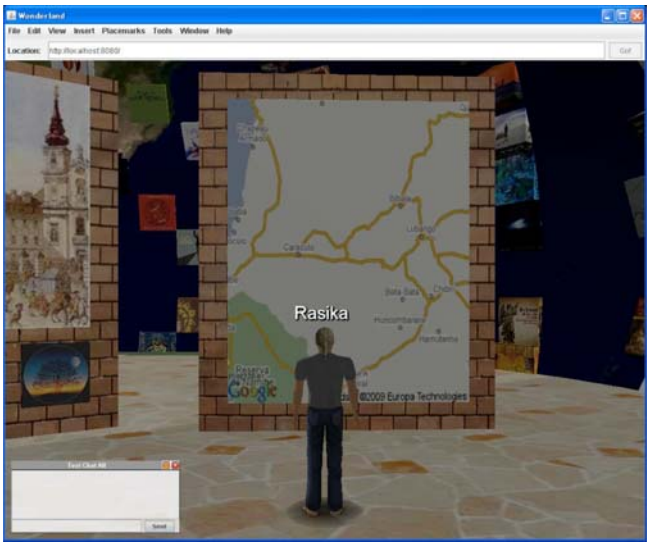


Fig. 4. Map Pane Screen Shot