MUSCLE

Network of Excellence

Multimedia Understanding through Semantics, Computation and Learning

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PU	Public	✓
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CO	Confidential, only for members of the consortium (including the Commission Services)	

Keyword List:

Software Prototype: 3D Multimedia Environment

We present The MediaSquare, a synthetic 3D multimedia environment, developed within the workpackage 4 of the MUSCLE NoE and its Showcase on « Shaping 3-dimensional Multimedia Environments ». The MediaSquare enables users, impersonated as avatars, to browse and experience multimedia content by literally walking through it. Users may engage in conversations with other users, exchange experiences as well as collectively explore and enjoy the featured content. The combination of algorithms from the area of artificial intelligence with state-of-the-art 3D virtual environments creates an intuitive interface that provides access to manually as well as automatically structured multimedia data while allowing to take advantage of spatial metaphors.

Introduction

Millions of users interact, collaborate, socialize and form relationships with each other through avatars in online environments such as Massively Multi-User Online Role-Playing Games (MMORPGs). While the predominant motivation to participate in MMORPGs is still "playing", an increasing number of users is spending a significant amount of time in 3D virtual worlds without following a predefined quest. Generating, publishing and, most importantly, experiencing content in 3D virtual spaces is an emerging trend on the Internet with *Second Life* being the most prominent representative at the time of writing. On the one hand, such 3D virtual worlds address the aspect of social interaction by providing instruments to interact and to exchange experiences with other users that go beyond the possibilities of conventional text-based chat rooms. Especially one's inherent presence in space and the awareness of others facilitate the initiation of social contacts. On the other hand, using 3D virtual worlds has the advantage of communicating via commonly accepted spatial metaphors. Similarity of objects can be expressed by spatial relations, i.e. the more similar two objects are, the closer they are placed together. Furthermore, users can interpret each other's interests by how close they are to one another and to the objects in space. Having a common point of reference and orientation within the virtual space as well as being aware that other users can see one's actions and objects in the same way, are important features regarding communication between users about particular locations. Consequently, users are supported in building a mental model of the information space, to understand its characteristics and to grasp which information is present and how the respective items relate to each other.

The MediaSquare, a synthetic 3D multimedia environment, takes advantage of these spatial metaphors and allows users to explore multimedia information that is structured and organized within space (cf. Figure 1). The information is either organized based on the actual content or by transforming a branch of a directory into architectural structures. Currently, *The MediaSquare* implements the following scenarios :
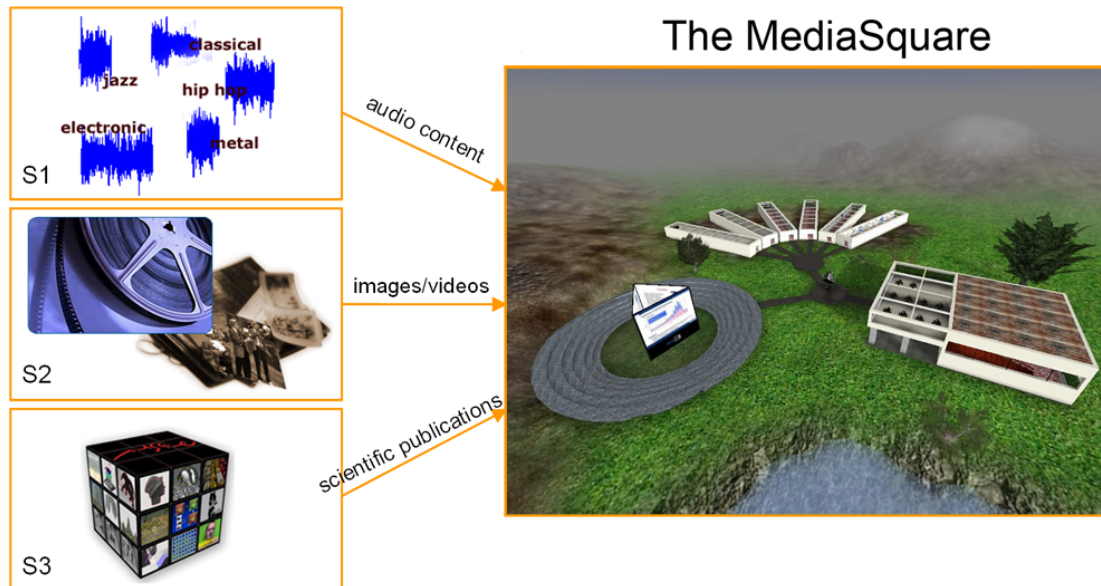
Figure 1: *The MediaSquare* implements the following scenarios: S1, *3D Music Showroom*; S2, *3D Image and Video Showroom*; S3, *3D Scientific Library*.

Music Showroom (S1)

The first scenario, S1, is a *3D Music Showroom* that enables users to browse and listen to songs within the virtual environment. To this end, acoustic characteristics are extracted from music tracks by applying methods from digital signal processing and psycho-acoustics. The features describe the stylistic facets of the music, e.g. beat, presence of voice, timbre, etc. and are used as features for the training of a self-organizing map (SOM) that arranges similar music tracks in spatially adjacent regions. More precisely, the self-organizing map is an unsupervised neural network model that provides a topology-preserving mapping from a high-dimensional input space onto a two-dimensional output space.

Image/Video Showroom (S2)

The second scenario, S2, pursues the implementation of a *3D Video and Image Showroom* that allows users to experience content such as images or videos. To this end, characteristic features are extracted from the respective images or videos. The training of a self-organizing map is based on these features and, in analogy to the first scenario, the resulting 2-dimensional map identifies the actual position of each particular image or video source within the *3D Video and Image Showroom*. This particular scenario will be fully integrated in the final version of *The MediaSquare*.

Muscle Scientific Results Showroom (S3)

In the third scenario, S3, a *3D Scientific Library* has been implemented. This library enables users to explore scientific documents such as posters or papers in this immersive 3D environment. On the one hand, a directory structure is used to create a room layout in which the content is presented. On the other hand, characteristic text features are extracted from documents and are used for the training of a self-organizing map. Again, the resulting 2-dimensional map defines the actual position of each document in the 3D representation.

System requirements

- 3D Graphics Card (min. 64MB)
- Windows XP (DirectX9)
- Linux (currently alpha, see below)

Note for Linux users: We have included a Linux binary (TheMediaSquare.bin), a wrapper script (runTheMediaSquare.sh) and some necessary libraries (libfmod and a special version of libSDL). You should be able to login and walk through the 3D virtual environment and watch the featured content. Regarding the audio streams in the Music Showroom, your mileage may vary depending on the sound system you use (OSS, ALSA, or esd). You may want to try different settings of the variable $pref::FMod::LinuxOutput = "driver"; (valid values for driver are oss, alsa, or esd) in the file prefs.cs. After a first run of the demo, a .garagegames directory is created in your home. Due to the strange behavior of the game engine we use, the preference file has to be edited in the according subdirectory of .garagegames from there on. Description

Download
The MediaSquare is available from:
http://mediasquare.ec3.at/downloads/The_MediaSquare.zip

Installation
1. extract (unzip) to any directory
2. open directory
3. run themediasquare.exe (Windows) or
   ./runTheMediaSquare.sh (Linux)

Usage Guide

On the start screen you can either change the display settings or start the showcase. When you click on the start-button, select your favourite avatar and enter your name. Then, your avatar will be placed in the center of the showcase world. In order to move your avatar use the following keys: (a) move left; (d) move right; (s) move backwards and (w) for moving forward. The area is divided into three main parts.

In the 3D Music Showroom you can listen to streamed music originating from loudspeakers on coffee tables. Playlists on the table show you which music is playing there. In addition a HUD on the upper right of the screen shows the playlist of the nearest table too. This HUD can be toggled with F6. On the lower left you can see the current track. If you are close to a table you can click the left mouse button to skip to the next track.

In the Arena you can watch slide shows giving an overview of current work done within the MUSCLE network and which research projects are carried out at EC3. In the MUSCLE presentation rooms you can watch presentations from various MUSCLE meetings. On pressing F4, a little chat window appears. To start a conversation, press "c". Everything you say will be heard by others in your vicinity.H