Cultural Heritage Applications of Virtual Reality

Web3D 2003 Workshop W3

Overview

There are a number of ongoing projects that use VR/Web3D technologies in the domain of cultural heritage. Solutions are being developed for digitization and interactive visualization of cultural heritage objects ranging from small museum artifacts to entire cultural heritage cities. The aim is to provide technology that would aid the preservation and protection of these objects, while at same time making them widely available to scientists, archaeologists, curators, historians, and citizens for their enjoyment and learning.
To efficiently use the VR/Web3D technology in cultural heritage applications the problems of automatic or semi-automatic creation of virtual representations of cultural objects, efficient storage, management and retrieval of cultural object collections, and advanced interactive visualization of virtual representations of cultural objects must be addressed.
The goal of this workshop is to bring together researchers and practitioners in the area of cultural heritage applications of virtual reality and create a forum for presenting their work and exchanging research ideas.

Workshop Organizers

Dr Krzysztof Walczak
Department of Information Technology
The Poznan University of Economics
Mansfelda 4
60-854 Poznan, Poland
e-mail: walczak@kti.ae.poznan.pl
www: http://www.kti.ae.poznan.pl/

Dr Martin White
University of Sussex, School of Engineering and Information Technology
Centre for VLSI and Computer Graphics
Falmer, Brighton, East Sussex BN1 9QT, UK
e-mail: m.white@sussex.ac.uk
www: http://www.sussex.ac.uk/Units/vlsi/

Duration

full-day

Intended Audience

The intended audiences are people from both academia and industry interested in:

1. using virtual reality in cultural heritage applications,
2. methods of automatic and semi-automatic creation of virtual representations of objects,
3. methods of creating and managing large searchable repositories of digitized objects,
4. methods of advanced interactive visualization of virtual representations

Detailed Information

The workshop will consist of presentations of several projects that use VR/Web3D technologies in the domain of cultural heritage. Each presentation will last 30 minutes including 10 minutes for questions and answers.

ARCO – Augmented Representation of Cultural Objects
Martin White, m.white@sussex.ac.uk, Krzysztof Walczak, walczak@kti.ae.poznan.pl
ARCO (IST-2000-28336) is a three-year European project aiming to develop the technology, systems and expertise to help create, manipulate, manage, and present cultural object collections both within museums and over the Internet. The 3D object representations are captured with photogrammetry techniques in a semi-automatic way, stored and managed in an XML enabled object-relational database, and presented to users in augmented reality interfaces dynamically generated with original X-VRML technology. The system components are integrated with XML to enable internal and external data interoperability.

Project URL: http://www.arco-web.org/

SCULPTEUR – Semantic and content-based multimedia exploitation for European benefit
Fabrizio Giorgini, GIUNTI Ricerca S.r.l., Italy, f.giorgini@giuntilabs.com
SCULPTEUR (IST-2001-35372) is a three-year European project which objectives are: create a distributed multimedia digital library, with significant support for 3D objects; develop a sophisticated semantic layer for distributed multimedia information management and a knowledge structure linking multimedia representations; populate the semantic layer using automated tools using classifying agents and web search agents for structured and unstructured information; build a semantic knowledge base in a specific targeted area; exploit the developed semantic knowledge base by developing e-learning products that use it.

Project URL: http://www.sculpteurweb.org/

3DMURALE – 3D Measurement and Virtual Reconstruction of Ancient Lost Worlds of Europe
John Cosmas, Brunel University, UK, John.Cosmas@brunel.ac.uk
The EU funded project 3D MURALE is creating a set of low-cost multimedia tools for recording, reconstructing, encoding, and visualising archaeological artefacts and sites. The project develops generic tools that can handle a variety of shapes and object types, ranging from landscapes, over buildings, to ornamental structures, statues, pottery sherds and stratigraphic layers. In parallel, a database is being designed, that allows the finds to be linked to a site's stratigraphy, that supports the retrieval of the finds, and that helps to visualize them within a freely selected spatial and/or temporal context.

Project URL: http://www.brunel.ac.uk/project/murale/

ARCHEOGUIDE – Augmented Reality-based Cultural Heritage On-site Guide

Vassilios Vlahakis, Intracom S.A., Greece, vvla@intracom.gr

ARCHEOGUIDE (IST-1999-11306) is a European IST project that ended successfully in October 2002. ARCHEOGUIDE developed and deployed in Ancient Olympia the first mobile augmented reality guide for outdoor archaeological sites. AR binoculars allow the visualization of the real world enhanced with computer-generated monument reconstructions, animated scenes from ancient life, and personalized audio narration. Navigation information and access to museum exhibits are made available. The system offers archaeologists a multimedia repository and graphical tools for virtual monument reconstructions.

Project URL: http://www.archeoguide.com/

LIFEPLUS – Innovative revival of LIFE in ancient frescoS and creation of immerse narrative sPaces, featuring reaL scenes with behavioUr fauna and flora

Athanasios M. Demiris, Intracom S.A., Greece, dema@intracom.gr

LIFEPLUS (IST-2001-34545) proposes an innovative 3D reconstruction of ancient frescos-paintings through the real-time revival of their fauna and flora featuring groups of virtual animated characters with artificial life, and dramaturgical behaviours in an immersive AR environment. LIFEPLUS aims at developing, real-time realistic virtual life in AR environments, automatic real-time camera tracking in unknown environments, design of successful character-based installations, and expressive autonomous cinematography for interactive virtual environments. It will be trialed in Pompeii.

Project URL: http://www.miralab.unige.ch/subpages/lifeplus/

ViHAP3D – Virtual Heritage: High-Quality 3D Acquisition and Presentation

Michael Goesele, Max-Planck-Institut fuer Informatik, Germany, goesele@mpi-sb.mpg.de

ViHAP3D (IST-2001-32641) is a three-year European project that aims at preserving, presenting, accessing and promoting cultural heritage by means of interactive, high-quality 3D graphics. ViHAP3D will use 3D scanning technologies to acquire accurate and visually rich 3D models. Post-processing, data representation, and efficient rendering techniques will enable detailed interactive display and inspection of such models even on low cost platforms. Furthermore, virtual heritage tools for the creation and presentation of high-quality digital model collections will be developed.

Project URL: http://www.vihap3d.org/

VITRA - Veridical Imaging of Transmissive and Reflective Artefacts

Cristiano Bianchi (keepthinking), University of Derby, cristiano@keepthinking.it

A thirty-month European project developing methods for the acquisition, storage and visualisation of high quality digital images of details in historic buildings. It will combine the use of robotic technologies with digital imaging to capture artefacts up to 15 mt above ground level without the need for scaffolding. Deliverables will include interactive *pseudo-3D* panoramas, to illustrate often inaccessible buildings and enhance the awareness of cultural heritage. We aim at shifting the focus of 3D representation away from technological issues towards the effective perception of the space by visitors.

Project URL: http://www.vitra.org/

VS – Virtual Showcases — Presenting hybrid Exhibits

Jorg Voskamp, Fraunhofer-Institute for Computer Graphics Rostock, Germany, joerg.voskamp@rostock.igd.fraunhofer.de

The Virtual Showcase project aims at developing the knowledge and technology for Virtual Showcases making them standard equipment for museums and other public exhibitions spaces. Recent and anticipated advances in computer and graphics systems, projection systems, tracking technology, input devices, and networking technology form the basis for realising this vision. The three main objectives are: Develop the hardware and software technology for Virtual Showcase systems, develop the knowledge and technology to design and implement Virtual Showcase scenarios, evaluate setups.

Project URL: http://www.virtualshowcases.com/

Using 3D data in the restoration of Michelangelo's David

Roberto Scopigno, ISTI, National Research Council, Pisa, Italy, roberto.scopigno@cnuce.cnr.it

The Michelangelo's David restoration started recently (Sept. 2002). In the framework of this important restoration project, we are using a 3D scanned digital model of the David to support restorers' activity: the 3D model is used both as an instrument for the execution of specific researches or investigations on the artwork, and as a supporting media for the documentation and integration of all the restoration-related information. In both cases, special purpose tools have been designed, to fulfill the specific needs of the restorers, including interactive visualization tools and a web-based archive for the access to multimedia information.

Project URL: http://vcg.iei.pi.cnr.it/restaurodavid/restaurodavid.htm

'Creating and Using Virtual Reality: A guide for the Arts and Humanities', ARENA / ADS

Kate Fernie, Archaeology Data Service, UK, kmf2@york.ac.uk

'Creating and Using Virtual Reality' is a guide to good practice for those who are interested in using virtual reality in the cultural heritage domain. The guide has been produced by the Archaeology Data Service and is part of a series of standards and guidelines that are being made available through ARENA, a three year European project which is concerned with conservation and presentation of the European archaeological heritage through new information technologies. The workshop session will focus on strategies for preserving virtual reality presentations of cultural heritage sites for the longer term.

Project URLs: http://ads.ahds.ac.uk/arena/ http://ads.ahds.ac.uk/ http://vads.ahds.ac.uk/guides/vr_guide/