Research on Tangible Virtual Museum

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Introduction

• Technology in the 21st Century
  – IT (Information Tech.), BT (Bio Tech.), NT (Nano Tech.)
  – CT (Culture Technology)

• New Technology for Human in the 21st Century
Virtual Heritage Technology

• Fusion: Technology + Technology
  • IT + BT (Bio-Informatics)
  • IT + NT (Nano-Informatics) etc.

• Fusion: Technology + Culture
  – IT + Heritage

  Virtual Heritage Technology
Research Issues

• How to Model VH
• How to Manage VH
• How to Present VH

• How to use Network for the Share and Exchange of VH
Outline of Talking

• Virtual Heritage Modeling
• Virtual Museum Service
• DHX (Digital Heritage Exchange)
Virtual Heritage Modeling
Virtual Heritage Modeling

• **3D Modeling**
  - Image-based 3D Modeling (IBM) Approach
  - 3D Laser Scanning Approach

• **Camera Imaging**
  - Infrared Reflectography: Mural Painting
  - X-Ray Imaging: Old Sword
  - Digital Camera: Panorama, TIP
UNESCO World Heritage

† † (BC57- AD935) SukGulAhm
UNESCO World Heritage

 spons (BC57-AD935) Gyeongju South Mountain Seven Buddhas
(BC37 ~ AD668) Stone Monument (Replica)

KIST, Solutionix Co., & Inus Technology Inc.
The Tripitaka Koreana consisting over eighty thousand blocks

(Replica)

KIST, Solutionix Co., & Inus Technology Inc.
(AD1392~ AD1910) Mural Underdrawings
X-TEK X-Ray System

X-RAY Image Capture & Synthesis
Tour Into the Picture, 한국의 봄 (한국의 봄)

Listen to Gayakeum (twelve-stringed Korean Harp), Look over Lotus Flower
Virtual Heritage Database

3D Scanning
- 3D Laser Scanner
- Point Cloud

3D Scanning
- Registration, Merge
- Texture Mapping
- Level of Detail

Buddha Stone Monument
- Wooden engraving block

3D Modeling
- IR reflectography
- IR image mosaic

IR Camera
- IR reflectography
- IR image mosaic

IR Camera
- Registration, Merge
- Texture Mapping
- Level of Detail

X-ray Camera
- X-ray imaging
- X-ray image mosaic

X-ray Camera
- Multiview image
- IBR & IBM

CCD Camera
- Multiview image
- IBR & IBM

Mural Underdrawing

Old Sword

3D Environment
Virtual Museum Service
Our Researches for Virtual Museum

- Web-based VM
- CAVE-based VM
- VR Theater-based VM
Web-based Museum

3D Mountain + 3D Heritage

3D Model + Time Chronicles
CAVE-based Museum

4-Sided CAVE System: Left, Front, Right, and Bottom

4 PCs, Linux Redhat, Open GL Performer
VR Theater based Museum
DHX (Digital Heritage Exchange)
IST-2001-333476
DHX

Digital Artistic and Ecological Heritage Exchange: transcontinental Guidance and Exploration in globally shared cultural heritage

IST Key Action III – Multimedia Contents & Tools
Action Line III.5.1 x- Contents futures
(Shared- cost RTD)

KIST Matching Project

2001-2002: 3D Cyber Museum Technology, MIC
2003-2005: Tangible Space Initiative (TSI), KIST
Research Direction

- Cultural Heritage (traditional)
  - Single site
  - Limited knowledge/heritage sharing and discussion
  - Multimedia animations / terminals

- Virtual Reality
  - Multiple site, distributed
  - Highly collaborative and interactive knowledge / heritage sharing and discussion
  - New era of museum applications
  - Added value for industry
Virtual Experience of Shilla Culture

- Immersive Display + Haptic
CAVE (KIST, Korea) + SPIDAR (TIT, Japan)

Immersive Display

Haptic Display
Virtual Force Exp. with SPIDAR

Hit Bell

Feel Shape of Pagoda

Open Wooden Door
Summary

• Introduction of Our Researches on Virtual Heritage Modeling

• Virtual Museum Services

• DHX (Digital Heritage Exchange) Research
Thank you

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