Increasing Awareness for Urban Cultural Heritage using Information and Communication Technology (ICT)

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Background

Motivation and Literature Review
Background

- Definition of cultural heritage
- The importance of cultural heritage
  - Connection to certain social values, beliefs, religions and customs
  - Understand previous generation and history
  - Sense of belonging of a community
- Why people should care cultural heritage
  - Identity of a city
  - Value of a city
  - Knowledge pass from previous to next generation
Background

- Cultural heritage problem: Preserve
  - Destroyed
  - Demolished
  - Forgotten (Reused)—Strijp-S

- Increasing awareness for cultural heritage
  - Public engagement
  - Enhance communication about cultural heritage
Literature Review
-- CH communication

- Static information
  - Books: cannot get information efficiently
  - Maps: lack of stories
  - Panels: brief
- New technologies:
  - Virtual reality– ignore feedback from tourists
  - Augmented reality– basic information on screen
  - Webpage– cannot participate

Question: combine 3D visualization and static information?
The proposed solution is.....

To enhance the awareness for cultural heritage

by

3D Narrative System
02 Objectives

The Aim and Sub-goals of the Study
Objectives

1. To increase the awareness for urban cultural heritage by using 3D narrative system
   - To understand the importance of urban cultural heritages and why the public ignore the values by designing the theoretical model

2. To build 3D model of Strijp-S and input them into virtual reality
   - by using Vizard or Unity tool in CityGML format

3. To develop a new narrative platform for cultural heritage
   - by using ADE (Application Domain Extension) in CityGML format

4. To integrate virtual reality model and narrative platform to a new system
   - by using XML as a bridge

5. To test the new system whether it can be used to increase the awareness for urban cultural heritage
   - by conducting experiments
03 Framework

Big Picture of the Study
Framework

GIS (Geographic Information System)
- 3D city model
- 2D maps
- 3D visualization

Interactive Narrative
- Stories
- Pictures
- Audio
- Video
- Storytelling

3D narrative system
- Education
- Entertainment

Awareness improved
Methodology

Theoretical model;
System development;
Experiments;
Case study—Strijp-S

- Old factory of Philips, was built since 1891
- The factory buildings have been changed to other uses based on the society development
- The young generation and people who live here ignore the value of these histories
Theoretical model of cultural heritage awareness

(Kaddu, 2015; Endsley & Smolensky, 1998)

- **Understanding the basic information of cultural heritage** Level 1
- **Value the worth of cultural heritage** Level 2
- **Care about the history of cultural heritage** Level 3
- **Enjoy immersing into the cultural heritage atmosphere** Level 4

**Environment factors:**
- Type of cultural heritage
- Reasons for changed
- Reuse of buildings

**Individual factors:**
- Age
- Gender
- Income
- Region
- Knowledge level
System development

• Creating 3D city model of Strijp-S by Sketchup
• Applying CityGML (City Geography Markup Language) format to build model and input into virtual reality
• Cultural Heritage Extension from CityGML—base of narrative platform
• XML (Extensible Markup Language) as a bridge between narrative system and VR model
System Interface — Laptop

3D Narrative System (on laptop)

Stories
Pictures
Videos
comments

Stories about buildings

360°degree view

VR model

Writing comments or user’s own experience
System Interface

—Smart phone

3D Narrative System (on smart phone)

Stories
Pictures
Videos
comments

VR video

Stories about buildings
360° degree view
Writing comments or user’s own experience
System Interface
—Data collection

Data collection:

Pictures and videos:
  • Philips Museum
  • Strijp-S manager

Stories, memories and experience:
  • Previous workers
Experiments

<table>
<thead>
<tr>
<th>Group</th>
<th>Participants</th>
<th>Detail</th>
<th>Test the system</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Mixed Group</td>
<td>One group uses the new 3D narrative system before the visit</td>
<td>To find appropriate timing to use the system</td>
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<tr>
<td></td>
<td>(30 to 50)</td>
<td>One group uses the new 3D narrative system during the visit</td>
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<tr>
<td>Second</td>
<td>2</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Mixed Group</td>
<td>One group visits the site without access to the new 3D narrative system</td>
<td>To examine the variance for awareness</td>
</tr>
<tr>
<td></td>
<td>(30 to 50)</td>
<td>One group visits the site with access to the new 3D narrative system</td>
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</tbody>
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Data collection:
- Surveys on “cognitive content”, “spatial knowledge” and “affective states” before and after site visits to test awareness
  - Cognitive content: knowledge on historical context
  - Spatial knowledge: Geographical information, layout of site
  - Affective states: Value of cultural heritage
- Post-hoc Interviews to understand attitudes towards the new system and how it can be improved - > Future implementations in the system
Q&A

Thank you