



**VAST 2010**

**11<sup>th</sup> International Symposium on Virtual Reality, Archaeology and Cultural Heritage**

Workshop on Metadata for 3D: towards a practical approach

## **3DSSE – A 3D Scene Search Engine**

*:: Exploring 3D Scenes using keywords ::*



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## Cultural Heritage Dissemination

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### Some media for dissemination

- Sketches, designs, drawings, paintings
- Textual Information → Resource for metadata production and annotation
- Photographs, Video sequences (2D Digitization)
- 3D Digital Replicas (3D Digitization)

### 2D and 3D Digitization

- Two different worlds in terms of **complexity** and **potentiality**
- 3D digitization aims towards the production of **complete digital replicas**
- 3D Scanning → Despite it's small age → A **common practice** in the cultural heritage domain

### 3D Data

- More complex in terms of  
→ Parsing, Visualizing, Manual Exploring (Virtual touring)
- More demanding in  
→ Processing power, Data storage facilities and network bandwidth

## Enabling efficient access to 3D reconstructions' content

### Content of a 3D data file

- Just like in a 2D image, a 3D model might contain from a **Single artefact**, a **monument** up to a whole **urban area**

### Assuming a file that contains the 3D reconstruction of a traditional architecture settlement...

- Can it be considered as a **collection of objects**, thus a **static database** ?
- Maybe...It certainly contains **multiple ontologies** (*buildings, statues, artefacts, etc*)





## **Enabling efficient access to 3D reconstructions' content**

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There is a need to provide the **end-user** with

### **Efficient Access and Retrieval Mechanisms for 3D scenes**

A solution might be given by combining

- A 3D scene annotation and metadata generation tool (e.g. The **EPOCH – Viewer** )
- A **keywords-based** search engine that utilises metadata

Such a combination will **SHIFT** the end-user from the

- Time consuming **manual exploration** process of identifying areas of interest
- Into a more **efficient** and **user friendly** approach for exploring 3D scenes



## An experimental keyword-based search engine for 3D scenes

### A Case Study

- 3D reconstructions of urban areas in Northern Greece

### Working approach

- 3D reconstructions in VRML 2.0 format – **Internet Friendly properties**
- Annotate the 3D scene using a custom tool
  - Building façade viewpoint identification
  - Architectural properties and Historical details for each building

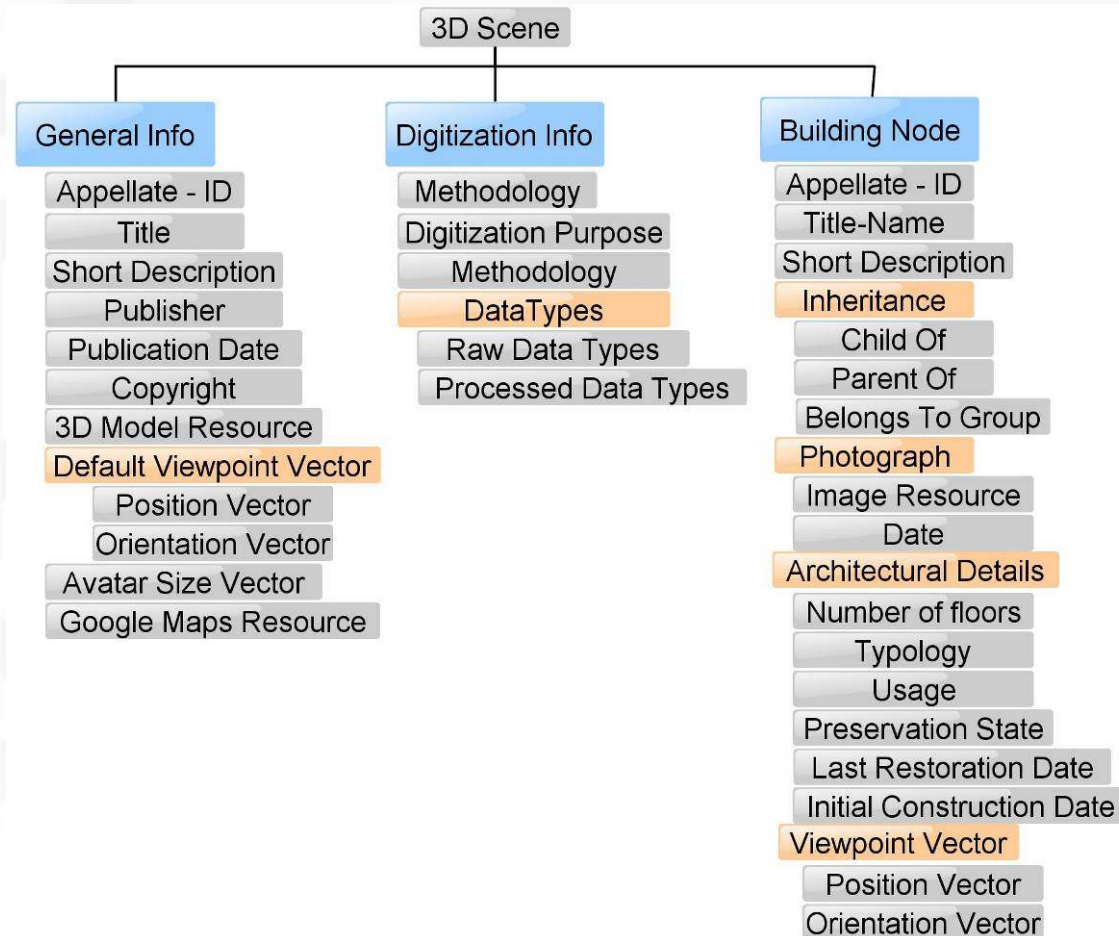




## An experimental keyword-based search engine for 3D scenes

Working approach continued...

- **Primitive XML based metadata schema** → Based on the available textual material  
→ Requires further development → Efficient for demonstration purposes





## Querying the search engine

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The user provides the search engine with a keyword-base query:

- The content of the query can referred to:
  - Architectural details
    - Number of floors
    - Usage
    - Preservation state
    - Initial construction dates
    - Restoration dates
  - Textual information included in the
    - Short historical descriptions of each building
  - Actually limited by the contents of the record schema



:: Exploring 3D scenes using keywords ::



## Querying the search engine

A query reply contains:

- A thumbnail image depicting the façade of a building
- Short descriptions for the building
- A link that will directly place the virtual visitor in front of the building in the 3D scene



<http://www.ipet.gr/3DSSE>

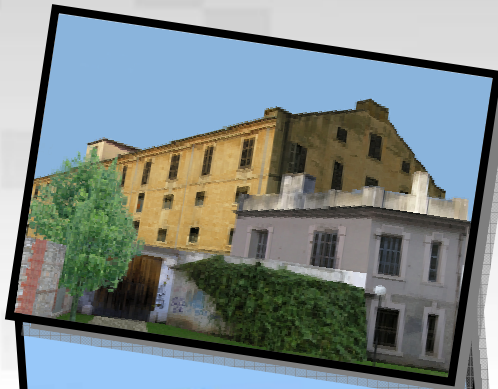




## Future Work

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- Adapt a metadata standard schema
- Create a more sophisticated query parsing mechanism
- Provide the end-user with directions on how to get there or proposed routes for touring
- Annotate more 3D scenes
- Consider the integration of content-based retrieval mechanisms within the 3D scene  
→ <http://polymnia.ipet.gr/akoutsou/museum>



**Thank you**