An Ontology for 3D Visualisation in Cultural Heritage

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Odeon of Agrippa, Athens. Model by Martin Blazeby. KVL
3D Visualisation in Cultural Heritage.
Virtual reconstruction of the House of the Faun in Pompeii. MAV Museum, Herculaneum

http://www.museomav.it
"a perfect reconstruction based on historical documents and reliefs of the present ruins."

http://www.museomav.it
Visibility, accessibility and movement through space

Lights and Shadows

Water features

Virtual unification of dispersed collection

Contextualisation of artefacts

Comparison of restoration hypotheses
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To understand how a building might have appeared, there is no better method than to attempt to reconstruct it digitally (or physically, if there are sufficient resources). The effort itself creates a new form of knowledge consisting of the type of information used and the design constraints applied.

Johanson 2009
Principle 4
Sufficient information should be documented and disseminated to allow computer-based visualisation methods and outcomes to be understood and evaluated in relation to the contexts and purposes for which they are deployed.
Why there are not many documented 3D visualisations?

Documentation for 3D digital visualisation is:

- *(Really)* Long and time consuming
- Too verbose
- Not standardised
- Not easily searchable
There is hope?

Can we think of a faster, not expensive, accessible, searchable, standardised way to express information about the visualisation, making it a proper piece of academic research?

Can we describe the elements of the model, their relationships with the actual remains, the documents and the literature?

Archimedes Thoughtful, by Domenico Fetti.
Do we really need a new one?

What makes this new ontology different from the many others that already exist?

- Not material object oriented,
- Not only qualities and relationships of the object (material or digital), but also the methodology used by the modellers and their interpretations of the available information.
1. Preservation and sustainability

@prefix "obj": <http://hypothetical3donthology.kcl.ac.uk/objects/>

Breaking (Virtual) Reality into pieces
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Breaking (Virtual) Reality into pieces
More detailed metadata

@prefix "CultHer": <http://hypothetical3donthology.kcl.ac.uk/CHVocabs/>

- Creation of a standard vocabulary for Cultural Heritage (or an integration of the existing ones)
- Translation issues (pointing out inconsistencies)
2. Joining and enriching the linked network of digital resources to study the past

http://pelagios-project.blogspot.co.uk/
URIs for Ancient Buildings

http://pleiades.stoa.org/places/638753/odeon
Photographs (and 3D visualisations?)

http://www.flickr.com/photos/tags/pleiades:*=638753
3. Rating certainty
tdvo:HasCertainty

@prefix "tdvo": <http://hypothetical3dontology.kcl.ac.uk/threedvisontology/>
Quantitative or Qualitative?

http://dlib.etc.ucla.edu/projects/Forum/reconstructions/IuliusDivusAedes_1/issues
From 6 (maximum) to 0 (minimum)

- LEVEL 6: the element is still in situ, and its dimensions and position can be measured
- LEVEL 5: the element is not in situ but it has been visually documented in the past and the documentation is still available
- LEVEL 4: the element is not in situ but it can be geometrically derived from the surviving elements
- LEVEL 3: the element is not in situ but it can be visualised according to well accepted standards and precedents
- LEVEL 2: the element is not in situ but it can be visualised according to the modeller’s experience, knowledge, intuition
- LEVEL 1: the element is not in situ and it has been added for communicative purposes
- LEVEL 0: the element has not been created for scholarly purpose and does not aim to historical accuracy. However, some characteristics of an original referent can still be recognised
4. Connecting each element to the sources

"the 3D element can be compared with specific verbal or visual evidence such as video/photographic documentation or official excavation records"

Personal photographic documentation
Crowd sourcing

VIII.7.28 Pompeii. Temple of Isis or Tempio di Iside.

http://pompeiiinpictures.net/R8/8%2007%2028%20p1.htm
Digital Repositories

http://arachne.uni-koeln.de/item/bauwerksteil/2085
“the shape, dimensions or decoration of the element is based on visual or written information contained in a relevant document describing established practices, standards and rules”

Vitruvius, De Architectura
the visualised building (or part of it) is mentioned in an ancient (or modern) text

the visualised building (or part of it) is described in an ancient (or modern) text

http://www.perseus.tufts.edu/hopper/searchresults?q=pompeii
5. Enabling citations and collaboration

- It is very difficult to identify authorship of different elements
- There is no conventional way to cite another model or its components
- No peer-review
- Lack of collaboration
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http://publicvr.org/html/collaborate.html
6. Annotations

Le più belle pareti di Pompei. E. Preshun
An ontology for 3D visualisation would:

* constrain the documentation, creating a standard,

* speed up the recording process thus reducing time/cost and making the documentation more likely to be retained in a project,

* allow and encourage comparison of different visualisations and interpretations of ancient heritage,

* contribute to transform 3D visualisation from univocal display of traditional research to a collaborative virtual environment that can be shared and implemented by different scholars,

* allow citations and re-use of the visualisation of entire buildings or single elements and peer-review,

* make 3D visualisations (human- and machine-) searchable, connecting them with the literary and historical sources
THANK YOU
FOR YOUR ATTENTION

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