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Mass customization for cultural heritage 3D models

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Massive digitalization projects produce an increasing amount of cultural heritage digital data. As an engineering team working on industrial techniques for reverse engineering we are deeply affected by this fact. In this poster, we propose a way to combine semantic information on the top of 3D models in order to manage heterogeneous historical data. Our approach focuses on a use case: the industrial harbour of Nantes in the 20th century.

A *Transporter Bridge* B *Halles Alstom* C *Harbour scale model*

3 linked industrial objects of the Nantes harbour in the 20th century

1. Each object contextualize others

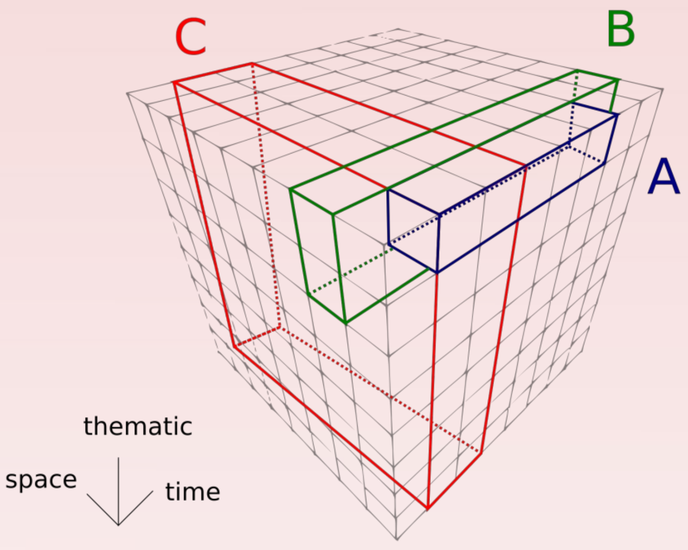
Observations:

- many 3D models are available
- the information need to be contextualized
- data are under different types: texts, illustrations, archives
- data access should not depends on 3D models
- data access should be specific to the user demands

Multi-dimensional modeling

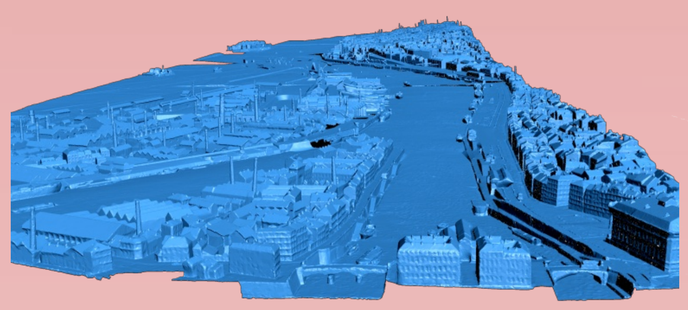
Hypothesis: 3 dimensions describe any data:

- Time
- Space
- Thematics



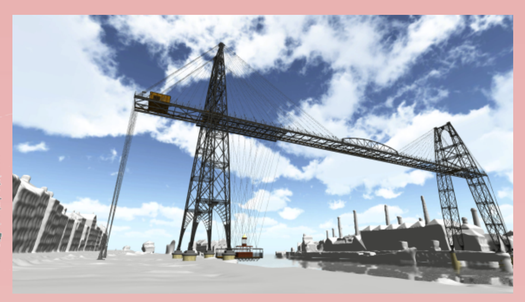
A *Transporter Bridge* B *Halles Alstom* C *Harbour scale model*

Representing the basic model for cross referencing objects



Nantes 1900 harbour scale model

Halles Alstom's Overhead crane



Nantes transporter bridge

2. Linking the data

The goals

We aim to build a network where:

- historical data drives the access to 3D models (and not the opposite)
- the context of each piece of information are other ones
- heterogeneous data (text, 3D models, pictures, ...) are equally related
- we can access the information through different dimensions

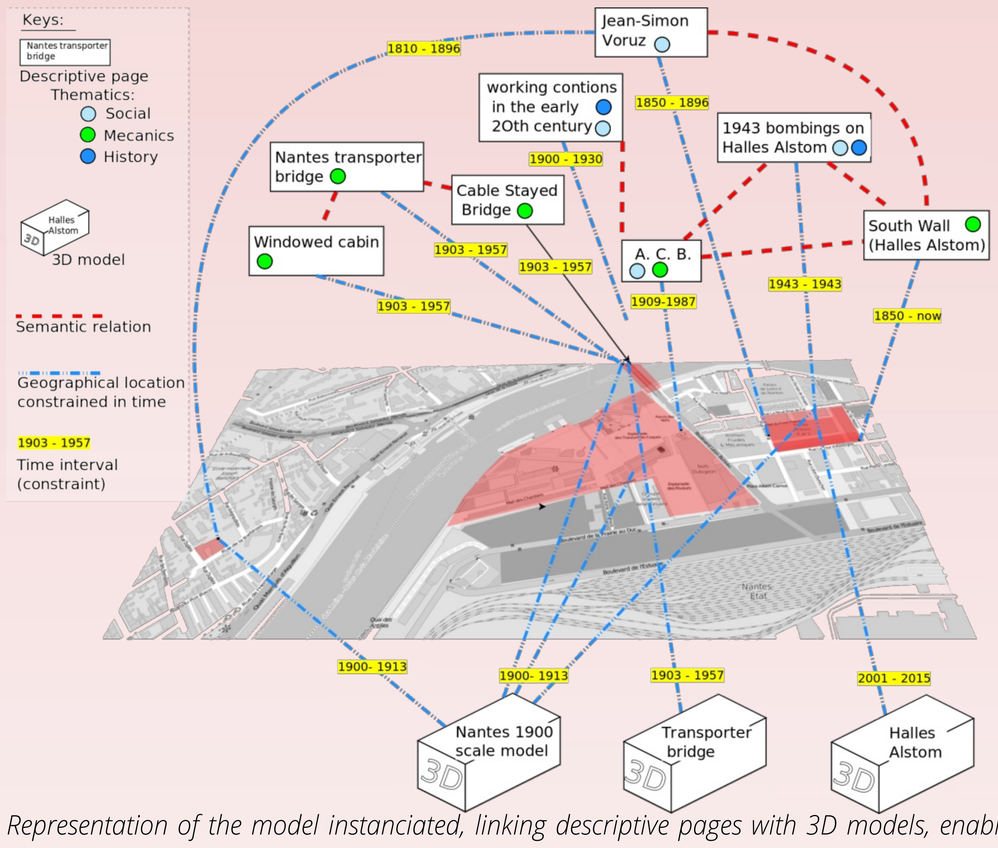
Modeling the data

We build 2 networks

- One of "descriptive pages" containing text related to other files (e.g. pictures). Each page is "situated" in the 3 dimensions mentioned before.
- A similar one of 3D models that does not contain "thematics" dimension.

Instanciation

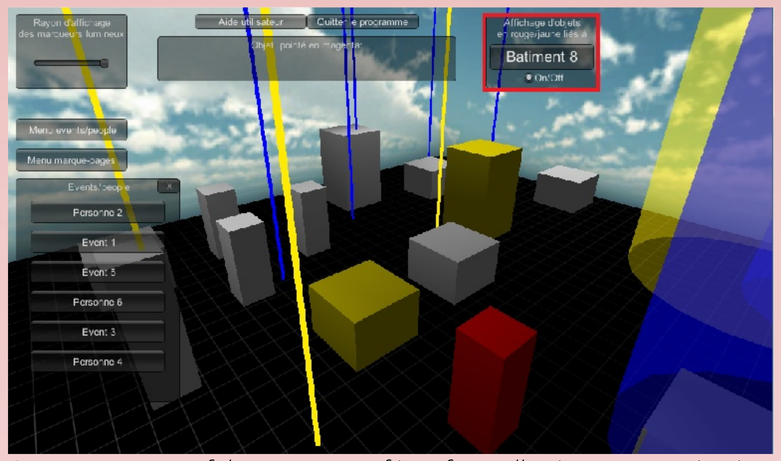
Among hundreds of existing descriptive pages, 8 of them have been selected to represent an instanciation of the model.



Representation of the model instanciated, linking descriptive pages with 3D models, enabling a space, time, thematics cross navigation.

3. Accessing the data

A prototype of interface enables to access the 3D models driven by historical information. Each object context is made of other objects linked by the 3 dimensions: time, space, thematics. The user can choose the area he wants to explore, i.e. the extend of the dimensions.



A screen capture of the prototype of interface, allowing cross navigation.

After years of work with historians specialized in industrial heritage, connecting information is now the main challenge. Also this historical information has to be independant from a geometrical representation. Our model respects theses expectations.

Nevertheless a 3D interface is interesting to access the structured data. It makes possible building in real time a modulated context for the object(s) specific to user's request. The user retrieves customized information and object environment. We can speak about massive customization for multiple access to cultural heritage information and 3D models.

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