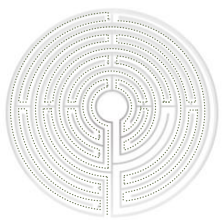


UE MAP Modèles informationnels pour l'analyse du bâti
infovis [visualisation et abstraction]

1



Des pratiques graphiques

(Graphic) Representation
Visualisation

Infovis (Information Visualisation)

Scientific visualisation,

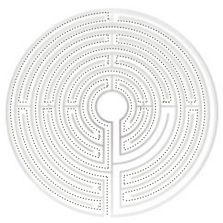
Knowledge visualisation

Visual analytics,

*Des méthodes, des concepts, et des
exemples*

Clustering, data mining,
formalismes, métaphores,
modèles, master visualisation
(dispositif d'intégration)

+ quelques règles

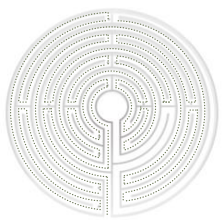


(graphic) Representation

A description of a thing or person (mental or concrete)

* Graphic representation is one of the systems of signs that man has built in order to retain, understand and communicate observations that are necessary to him [...]

[...] It constitutes the rational part of images.



(graphic) Representation

A description of a thing or person (mental or concrete)

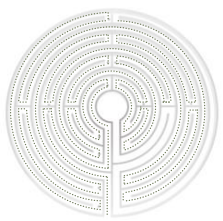
Visualisation

* Visualisation can be defined as the use of visual representations to aid in the analysis of quantitative or qualitative information.

** Visualisation [...] is a cognitive activity

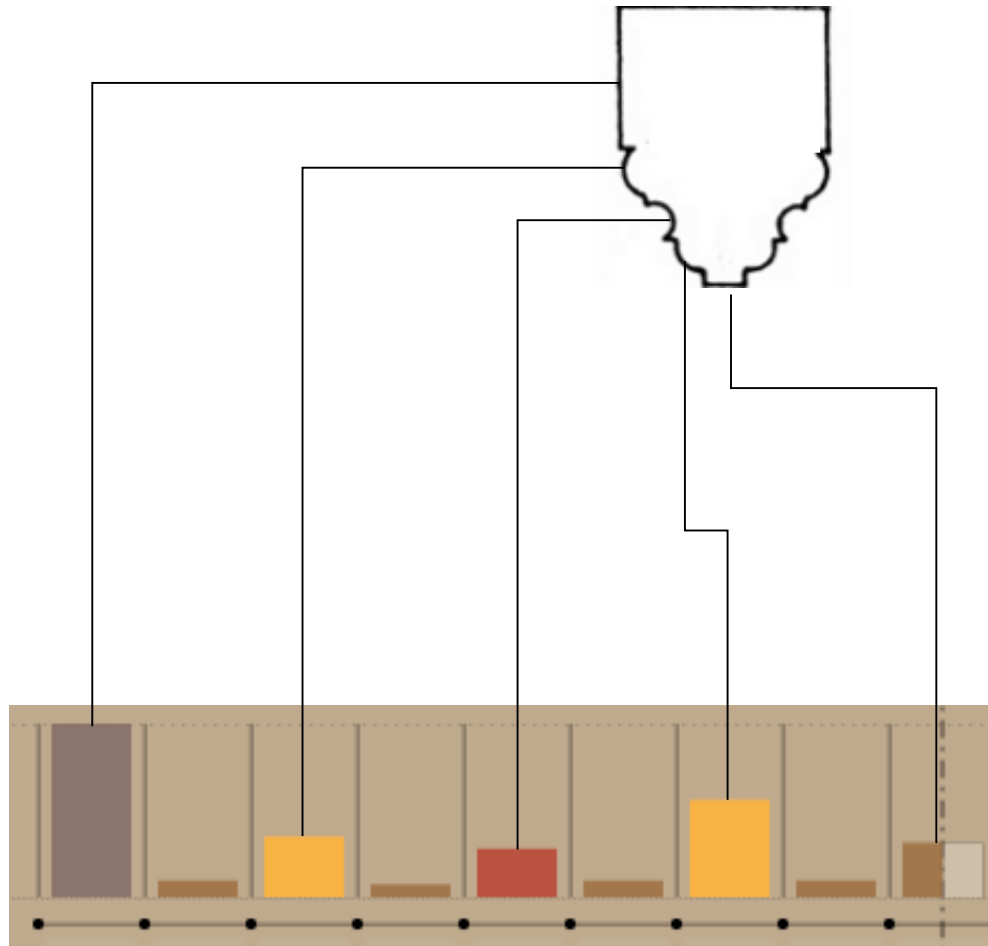
* *W.Kienreich Information and knowledge visualisation: an oblique view*,
MiaJournal vol0, 2006

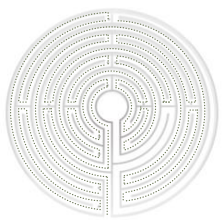
** *R.Spence Information Visualization*
Addison Wesley 2001



(graphic) Representation

Visualisation





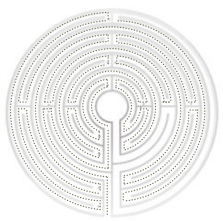
Information Visualisation (Infovis)

* Information Visualisation is commonly defined as the use of computer-supported, interactive, visual representations of abstract data to amplify cognition.

* Information Visualisation is distinguished by [...] :

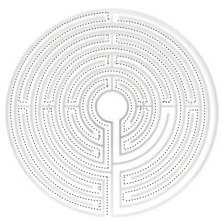
- abstract information
- information seeking [...]
- large, complex information spaces

* *W.Kienreich Information and knowledge visualisation: an oblique view, MiaJournal vol0, 2006*

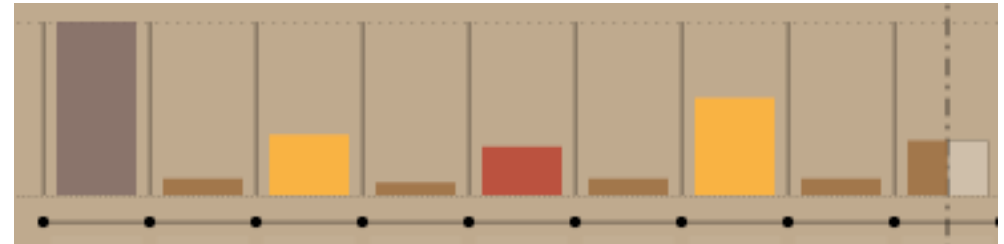


Scientific Visualisation

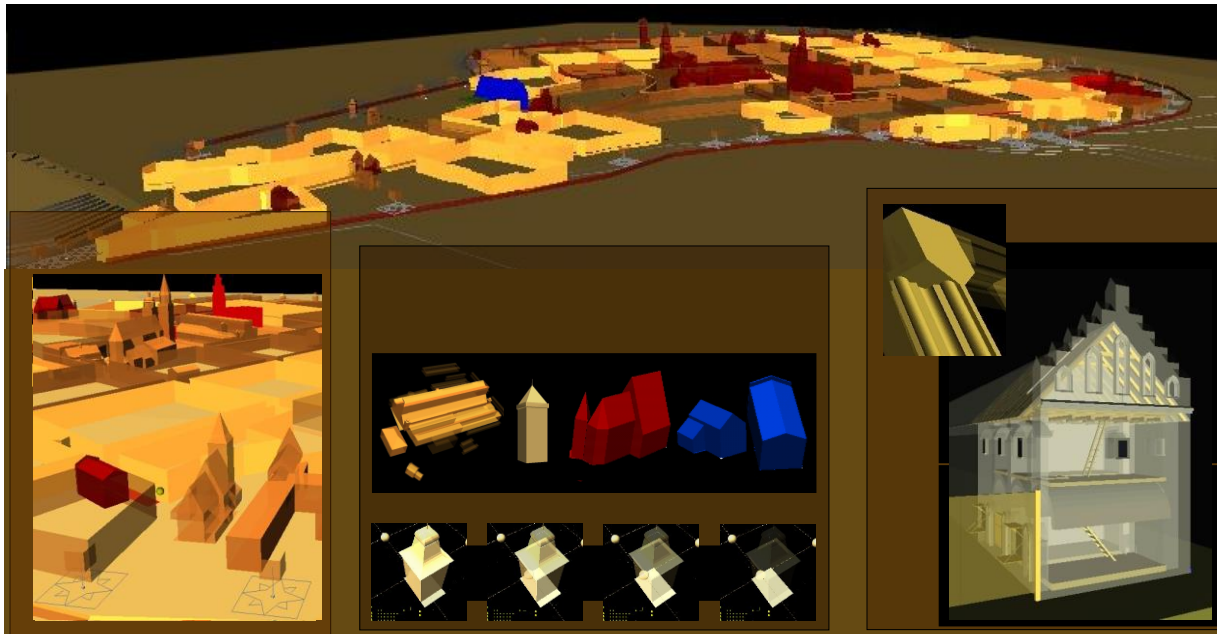
- * A related, and somewhat overlapping field
- * In scientific visualisation [...] what is primarily seen relates to, and represents visually a physical “thing” [...].



Visualisation



* In scientific visualisation [...] what is primarily seen relates to, and represents visually a physical “thing” [...].

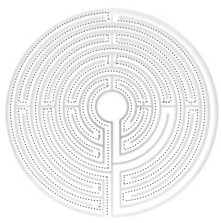


Scientific Visualisation

“Analysing architectural mouldings with 3Dobject-independent metrics and encoding” [in] Proceedings CGVCVIP ISBN 978-972-8939-22-9 pp201-209 (aut.)

«From artefact representation to information visualisation: genesis of informative modelling» (aut) Proceedings of 8th Smart Graphics International Conference, pp 230-236 Springer, LNCS (2005) ISBN 978-3-540-28179-5

* R.Spence Information Visualization Addison Wesley 2001



Knowledge Visualisation

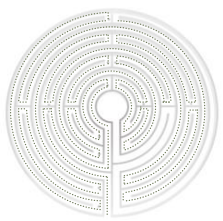
- * [...] focuses on the transfer of knowledge among persons.
- * [...] often works on smaller, but highly organized sets of information.

* W.Kienreich *Information and knowledge visualisation: an oblique view*, MiaJournal vol0, 2006

Visualisation et abstraction:: terminologie

A PERIODIC TABLE OF VISUALIZATION METHODS

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|------------------------------------|---|-----------------------------------|---|-------------------------------------|-----------------------------|--|-----------------------------------|-----------------------------------|----------------------------------|------------------------------------|------------------------------------|---------------------------------------|---|----------------------------------|------------------------------------|--------------------------------|--|--|--|--|--|--|--|--|---------------------------|
| C continuum | | | | | | | | | | | | | | | G graphic facilitation | | | | | | | | | | | |
| Tb table | Ga cartesian coordinates | Data Visualization Visual representations of quantitative data in schematic form (either with or without axes) | | | | | | | | | | | | Strategy Visualization The systematic use of complementary visual representations in the analysis, development, formulation, communication, and implementation of strategies in organizations. | | | | | | | | | | | | Ct cartoon |
| Pi pie chart | L line chart | Information Visualization The use of interactive visual representations of data to amplify cognition. This means that the data is transformed into an image, it is mapped to screen space. The image can be changed by users as they proceed working with it. | | | | | | | | | | | | Metaphor Visualization Visual Metaphors position information graphically to organize and structure information. They also convey an insight about the represented information through the key characteristics of the metaphor that is employed. | | | | | | | | | | | | Ri rich picture |
| | | Concept Visualization Methods to elaborate (mostly) qualitative concepts, ideas, plans, and analyses. | | | | | | | | | | | | Compound Visualization The complementary use of different graphic representation formats in one single schema or frame. | | | | | | | | | | | | |
| B bar chart | Hi histogram | T timeline | Pa parallel coordinates | Hy hyperbolic tree | Cy cycle diagram | Sa sashay diagram | Ve vean/ester diagram | Mi mindmap | Sq square of opposition | Co concentric circles | Ar argument side | Co communication diagram | Gc gant chart | Pe perspectives diagram | D dilemma diagram | Pr parameter ruler | Kn knowledge map | | | | | | | | | |
| Ar area chart | Sc scatterplot | R radar chart | Ch chernoff faces | E entity relationship diagram | Fb feedback cycle diagram | Pa pareto chart | Cl clustering | L layer chart | Py pyramid technique | Ca cause-effect chains | Ti toulmin map | Dt decision tree | Cp cpm critical path method | Ev evocative knowledge maps | Co concept map | Ic iceberg | Em cognitive mapping | | | | | | | | | |
| Tk takey box plot | Sp spectrogram | Te tensor diagram | Tr treemaps | N nassi shneiderman diagram | Se semantic network | Fl flow chart | Sy system dyn./loop diagrams | So soft system modeling | Sm synergy map | Fo force field diagram | Ib ibn argumentation map | Pr process event charts | Pe pert chart | Sw swim lane diagram | V tee diagram | Hh heaven 's' heli chart | I informal | | | | | | | | | |



Visual analytics

* Visual analytics has some overlapping goals and techniques with information visualization and scientific visualization. There is currently no clear consensus on the boundaries between these fields, but broadly speaking the three areas can be distinguished as follows:

- Scientific visualization deals with data that has a natural geometric structure.
- Information visualization handles abstract data.
- Visual analytics is especially concerned with sensemaking and reasoning.

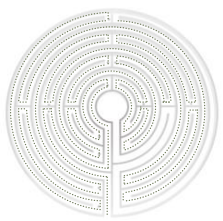
** [...] is an outgrowth of the fields of information visualization and scientific visualization, that focuses on **analytical reasoning** facilitated by interactive visual interfaces.

*** [...] a process that combines automatic and visual analysis methods with a tight coupling through human interaction [...]

* Wikipedia (en)

** Pak Chung Wong and J. Thomas. "Visual Analytics".
•IEEE Computer Graphics and Applications, Volume 24, Issue 5, 2004

*** D.Keim, J.Kohlhammer, G.Ellis, F.Mansmann (Eds). « solving problems with Visual Analytics".
•Eurographics digital library <http://diglib.org>



concernés par toutes ces pratiques,

Pas *toutes* les méthodes sous-jacentes:

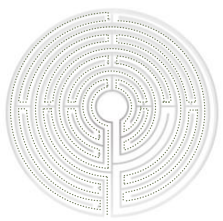
-Clustering techniques

Clustering

* En analyse de données statistiques, le clustering (data clustering pour les anglophones) décrit des méthodes de classification de données (méthode de regroupement hiérarchique ou méthode de partitionnement de données).

En sciences historiques, se faire une idée préconçue sur le phénomène, opérer des regroupements dans les faits est le plus souvent dangereux :

- parce que nos données sont partielles
- parce qu'elles sont contradictoires
- parce qu'elles sont imprécises
- (etc.)



concernés par toutes ces pratiques,

Pas *toutes* les méthodes sous-jacentes:

-Clustering techniques

- data mining

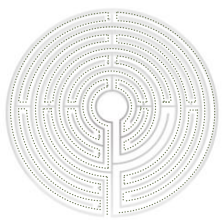
Data mining

* L'exploration de données, connue aussi sous l'expression de fouille de données, data mining (« forage de données »), ou encore extraction de connaissances à partir de données, « ECD » en français, « KDD » en anglais, a pour objet l'extraction d'un savoir ou d'une connaissance à partir de grandes quantités de données, par des méthodes automatiques ou semi-automatiques.

Même problème :

- nos données sont partielles
- elles sont contradictoires
- elles sont imprécises

- elles ne sont pas toutes également fiables
- elles sont hétérogènes
- (etc.)



Formalismes visuels

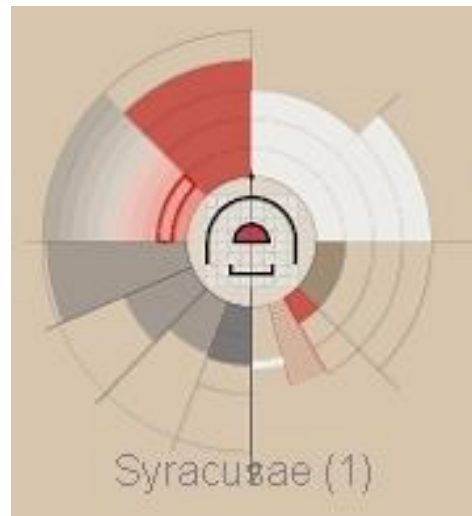
* [...] diagrammatic visual representations displaying information in an abstract way.

pie charts

histograms

Hyperbolic browser

Etc...



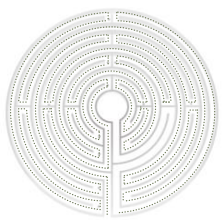
Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

Dispositifs d'intégration,

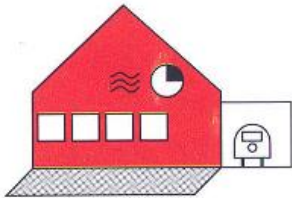
* W.Kienreich *Information and knowledge visualisation: an oblique view*,
MiaJournal vol0, 2006

«Spatial distribution and visual analysis of architectural semantic features» (aut.),
Journal Of Universal Computer Science, pp 498-506 I-Know 2006, ISSN 0948-695x

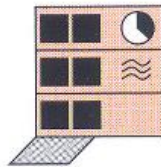


“Passer des chiffres aux lettres”: *symbolic encoding*

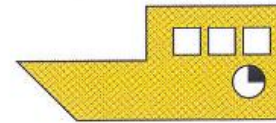
Multidimensional icons (multivariate data)



house
£400,000
garage
central heating
four bedrooms
good repair
large garden
Victoria 15 mins



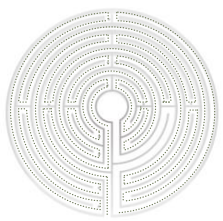
Flat
£300,000
no garage
central heating
two bedrooms
poor repair
small garden
Victoria 20 mins



houseboat
£200,000
no garage
no central heating
three bedrooms
good repair
no garden
Victoria 15 mins

Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles



Métaphores

*[...] use a form of representation based on a real-world equivalent to display information. The semantics used by a visual metaphor are implicitly determined by the real-world equivalent.

Trois unités fondamentales:

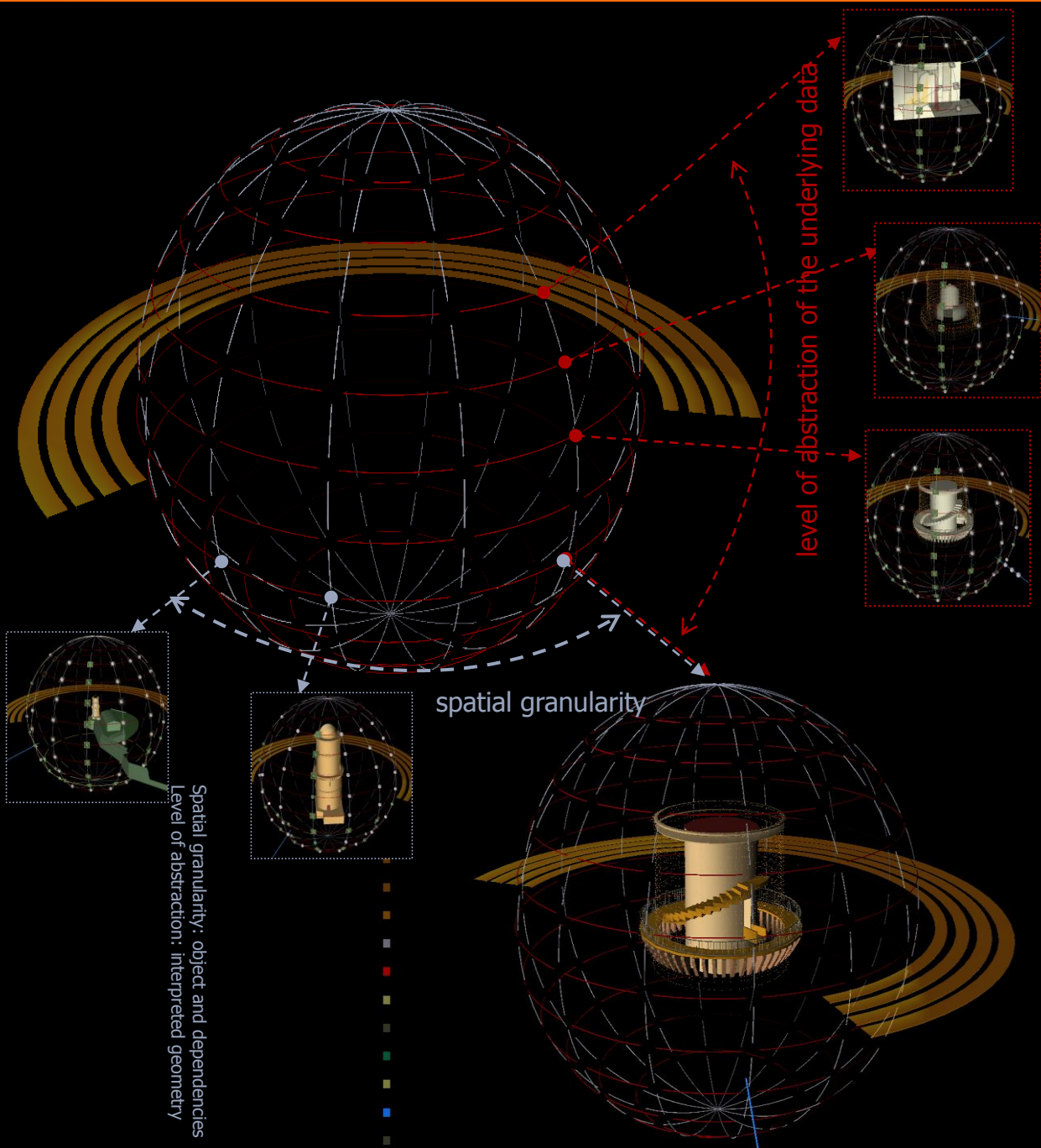
Formalismes visuels,
Métaphores,
Modèles

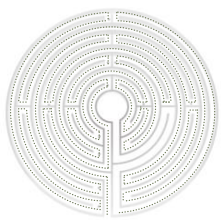
Dispositifs d'intégration,

Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

Dispositifs d'intégration,

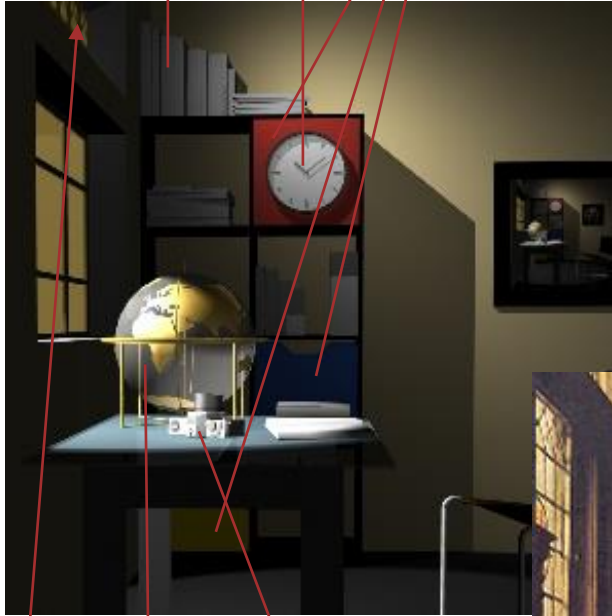




Sort by authors

Sort by date

colours



openings

Sort by icons

Sort by localisation



Méthodes, concepts, techniques

La métaphore "3 en 1"

Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

Dispositifs d'intégration,

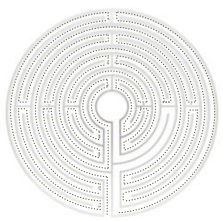
Requête par métaphore:
Quelle requête derrière quel
objet?

Une métaphore des codes
architecturaux du
« mouvement moderne » au
20^{ème} s.

Métaphore de la notion
même de patrimoine

J. Vermeer, « The geographer »

Visualisation et abstraction:: terminologie



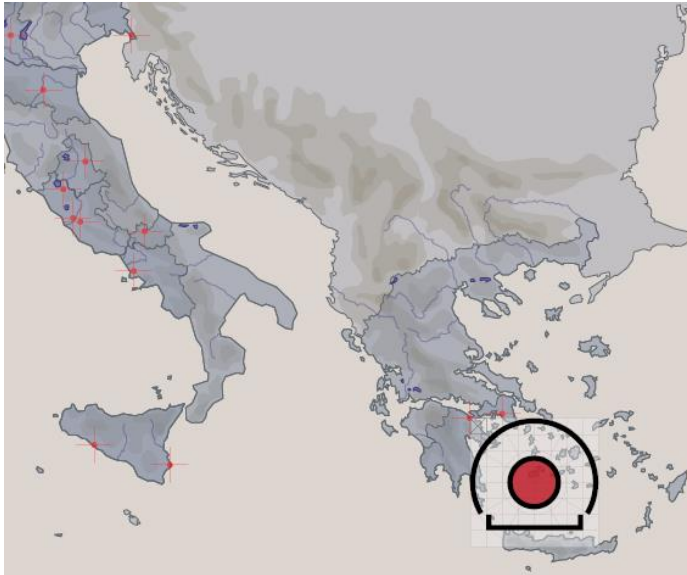
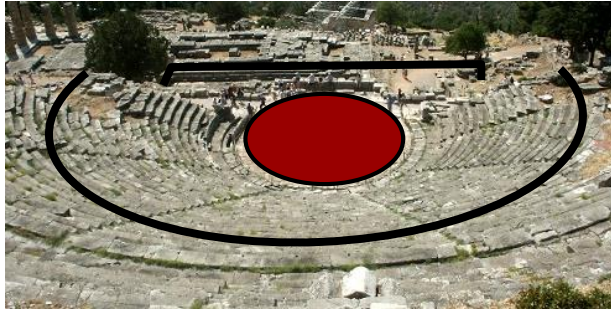
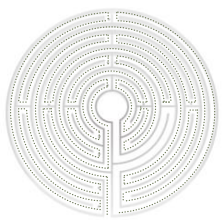
Modèles

* [...] visual models are applied in cases where the information to be presented is itself based on a real-world equivalent [...].

Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

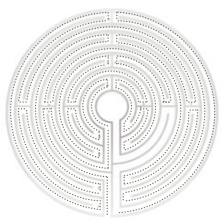
Dispositifs d'intégration,



Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

Dispositifs d'intégration,



Master visualisation

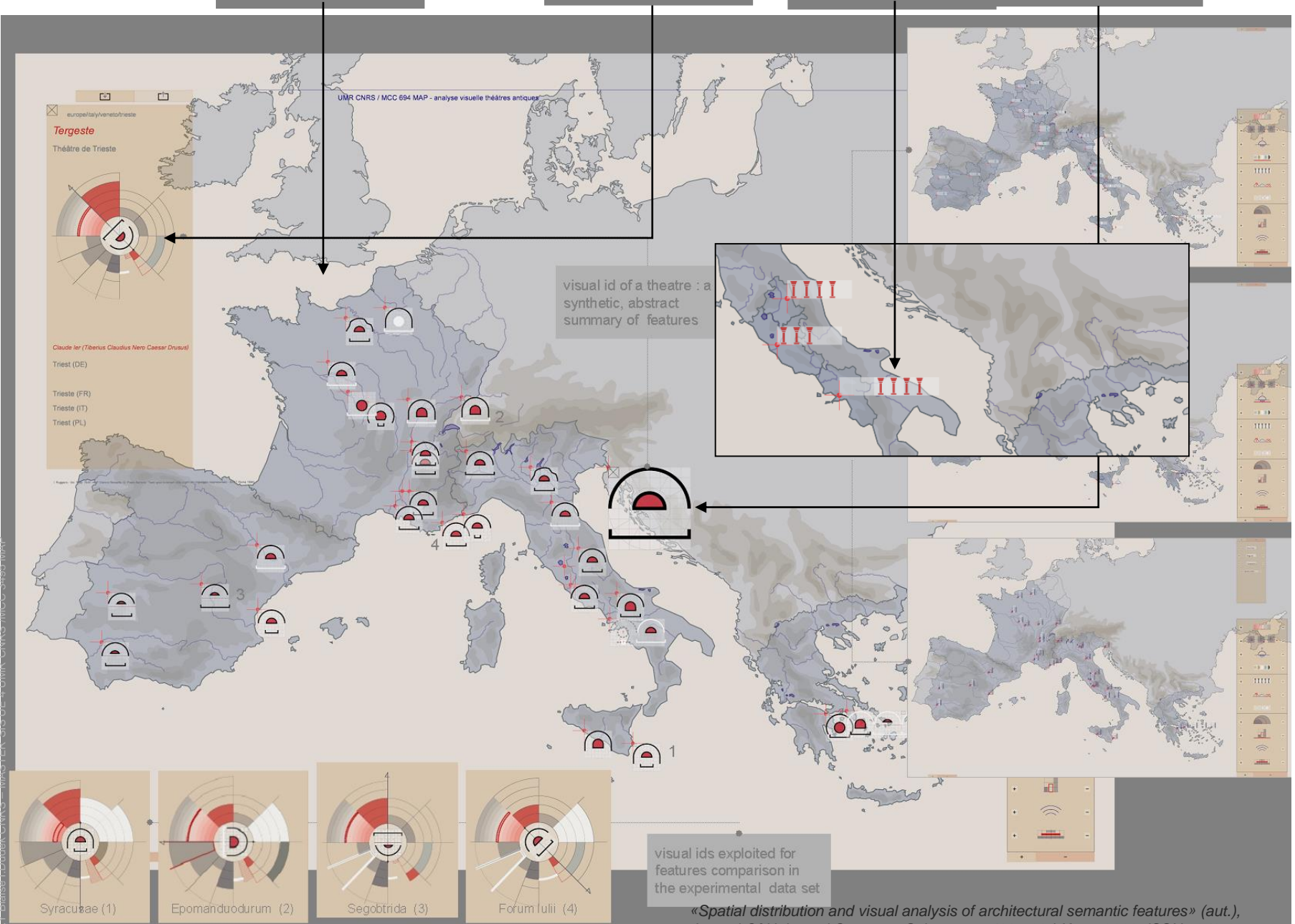
* [...] In most cases, the combined use of formalisms, metaphors and models will be required. Usually, one master visualisation will be employed[...].

Trois unités fondamentales:

Formalismes visuels,
Métaphores,
Modèles

Dispositifs d'intégration,

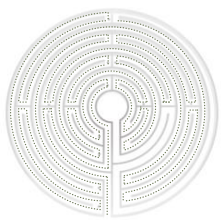
Master visualisation // Formalisme visuel // Métaphores // Modèles



visual id of a theatre : a synthetic, abstract summary of features

visual ids exploited for features comparison in the experimental data set

M. Brisser-Dwéck, CNRS - MASTER-SIS-UE - UMR-CNRS/MCC-694-MAP



assurer lecture d'ensemble (collection) + fouille terme
à terme (individus)

Context + focus principe

exploiter les capacités d'interactivité des solutions
informatiques pour faciliter les basculements entre
context view et focus view

Overview first, details on demand

Placer **toutes** les données dans un espace visuel
permettant de les comparer de façon
systématique

Enforce comparisons within the eyespan

Si plus rien ne peut être retiré d'une visualisation
(plus aucun élément graphique, plus aucune
variable graphique) sans perte d'informations,
alors la visualisation est aboutie.

Data/ink ratio principe

W.Kienreich

Information and knowledge visualisation: an oblique view, MiaJournal vol0, 2006
<http://www.infovis-wiki.net/index.php>

R.Spence

Information Visualization Addison Wesley 2001

E.R Tufte

The visual display of quantitative information , Graphic Press, Cheshire 2001
Envisioning Information, Graphic Press, Cheshire 1990
Visual Explanations, Graphics Press, Cheshire 1997
Beautiful evidence, Graphics Press, Cheshire 2006

J.Bertin

Semiology of graphics : diagrams, networks, maps , Ann Arbor, Mich. : UMI, 2007.

M. Friendly

Milestones in the history of thematic cartography, statistical graphics, and data visualization".
<http://www.math.yorku.ca/SCS/Gallery/milestone/milestone.pdf>
<http://datavis.ca/milestones>
<http://www.datavis.ca/papers/hbook.pdf>

S.K. Card, J.D. Mackinlay, B. Shneiderman

Readings in information visualization: using vision to think - Morgan Kaufmann, 1999

D.Keim, J.Kohlhammer, G.Ellis, F.Mansmann (Eds).

Solving problems with Visual Analytics - Eurographics digital library <http://diglib.org>, 2011

