Translating Data into Images

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Transforming, Projecting, Translating
transform (transformer)

verb [with object]

1 make a marked change in the form, nature, or appearance of: lasers have transformed cardiac surgery | he wanted to transform himself into a successful businessman.

2 Mathematics change (a mathematical entity) by transformation.

Neurath, Marie, and Robin Kinross. 2009.
project (projeter)
verb | prəˈjekt | [with object]

1 estimate or forecast (something) on the basis of present trends: spending was projected at $72 million.

2 [no object] extend outward beyond something else; protrude: I noticed a slip of paper projecting from the book | (as adjective projecting) : a projecting bay window.

3 throw or cause to move forward or outward: seeds are projected from the tree.

4 present or promote (a particular view or image): he strives to project an image of youth.

5 Geometry draw straight lines from a center of or parallel lines through every point of (a given figure) to produce a corresponding figure on a surface or a line by intersecting the surface.

6 make a projection of (the earth, sky, etc.) on a plane surface.

Lévy, Jacques, and Michel Lussault, eds. 2013.
translate (traduire)
verb [*with object*]

1 express the sense of (words or text) in another language: several of his books were **translated into** English.

2 move from one place or condition to another: she had been translated from familiar surroundings to a foreign court.

3 *Physics* cause (a body) to move so that all its parts travel in the same direction, without rotation or change of shape.

Representing Academic Practice

the case study
The Affinity Map is a visual representation of **ENAC**

ENAC is the school of building constructions that gathers **Architecture, Civil and Environmental Engineering**

The ENAC is composed by **three institutes**, **seventy laboratories** and a **thousand of scholars**
Personal view of Marilyne Andersen of ENAC
<table>
<thead>
<tr>
<th><strong>Academic Practice</strong></th>
<th><strong>Collaboration</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Many activities</td>
<td>Part of academic practice</td>
</tr>
<tr>
<td>Different according to discipline</td>
<td>Multidimensional</td>
</tr>
<tr>
<td>Not only literature</td>
<td>Multi-scale</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Affinity</strong></th>
<th><strong>Visualization</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A concept to develop</td>
<td>Academic practice is mostly hidden</td>
</tr>
<tr>
<td>Actual and potential</td>
<td>It can be made visible</td>
</tr>
<tr>
<td>Intellectual and operational closeness</td>
<td>It can be made visible using affinities</td>
</tr>
</tbody>
</table>
Research Questions

Which data?
How to translate?
Does exist an ethics?
Visual Investigation

drawing laboratories
Data Investigation

embrace all of the different practices
<table>
<thead>
<tr>
<th>Indicators</th>
<th>Primary source</th>
<th>Secondary source</th>
<th>To be specially required in online labs' activity report?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus topics (thematics)</td>
<td>Symphony database</td>
<td>Lab's websites (research)</td>
<td>Maybe (would be nice to have the user confirming existing data from Symphony/lab's website for instance)</td>
</tr>
<tr>
<td>Keywords</td>
<td>Lab's websites (metadata &quot;keywords&quot;, from audit 2011)</td>
<td>Idem</td>
<td></td>
</tr>
<tr>
<td>Expertise areas</td>
<td>Symphony database</td>
<td>Idem</td>
<td></td>
</tr>
<tr>
<td>Publications keywords and contents/abstract</td>
<td>Infoscience</td>
<td>Idem</td>
<td></td>
</tr>
<tr>
<td>Publications co-authors and their institutions</td>
<td>Infoscience (but institutions may be abbreviated variously...)</td>
<td>People's publication page</td>
<td>No</td>
</tr>
<tr>
<td>Alumni a3 (activity sector, localization)</td>
<td>Alumni database (with probable confidentiality issues?)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Co-teaching</td>
<td>IS-Academia</td>
<td>People's teaching page</td>
<td>Maybe (it could be provided by selecting the joint Professor from a list in the online formular?)</td>
</tr>
<tr>
<td>Industrial partners</td>
<td>Audit 2011 or lab's annual reports (extract from &quot;valorization, collaboration &amp; network&quot;)</td>
<td>Lab's annual reports</td>
<td>Yes (should be structured in an easy way for being extracted)</td>
</tr>
<tr>
<td>Main funding organizations</td>
<td>EPFL Grants database (maybe not possible?)</td>
<td>Yes (proposing a selectable list?)</td>
<td></td>
</tr>
<tr>
<td>Link to flagship projects</td>
<td>Audit 2011 or lab's annual reports</td>
<td>Yes (proposing a selectable list, if possible?)</td>
<td></td>
</tr>
<tr>
<td>People &amp; Team</td>
<td>People's pages (Expertise+Biography+Work+Teaching)</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Lab's activities (events co-organised, guest speaker invitation, ...)</td>
<td>Memento</td>
<td>News flux</td>
<td>Maybe</td>
</tr>
</tbody>
</table>

Note: There are different ways to obtain this information. You can propose it to the user themselves as a flagship.
Keywords
Teaching
GROUPES DE L'ENAC QUI PARTAGENT DES COLLABORATEURS

LABORATOIRES DE L'EPFL QUI PARTAGENT DES COLLABORATEURS

Shared Scholars
<table>
<thead>
<tr>
<th>Information</th>
<th>Affinity type</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab thematics</td>
<td>Potential</td>
<td>Symphony</td>
</tr>
<tr>
<td>Lab thematics</td>
<td>Potential</td>
<td>EPFL website</td>
</tr>
<tr>
<td>Individual expertise</td>
<td>Potential</td>
<td>Symphony</td>
</tr>
<tr>
<td>Individual expertise</td>
<td>Potential</td>
<td>EPFL website</td>
</tr>
<tr>
<td>Keywords</td>
<td>Potential</td>
<td>Audit 2011</td>
</tr>
<tr>
<td>Keywords</td>
<td>Potential</td>
<td>Infoscience</td>
</tr>
<tr>
<td>Co-authoring</td>
<td>Actual</td>
<td>Infoscience</td>
</tr>
<tr>
<td>Co-teaching</td>
<td>Actual</td>
<td>IS-Academia</td>
</tr>
<tr>
<td>Co-advising</td>
<td>Actual</td>
<td>IS-Academia</td>
</tr>
<tr>
<td>Grants</td>
<td>Actual</td>
<td>Grant database</td>
</tr>
<tr>
<td>Industrial partners</td>
<td>Actual</td>
<td>Audit 2011</td>
</tr>
</tbody>
</table>

Table of digital traces, the strikethrough identifies not usable data.
The *structure of the school* was used to reassemble laboratories and institutes. In particular, the **personal ID** (SCIPER), the **affiliations** of the staff and the **hierarchical structure** of the EPFL.

We identifies three types of *actual affinities*: the **publications** stored in the *Infoscience system*, the **courses** and the **supervision** recorded in *IS-Academia*.

*Potential affinities* were generated as **keywords** through an algorithm of text mining working on the publication abstracts of the ENAC laboratories.
Hexagonal Network Visualization

size, isolement, continuity
Education (Supervision and Courses)
Publications
“Design is the conscious and intuitive effort to impose meaningful order. [...] Our delight in the order we find in frost flowers on a window pane, in the hexagonal perfection of a honeycomb, in leaves, or in the architecture of a rose, reflects man’s preoccupation with pattern.”

Pre and post Harry Beck’s London underground map.
“Regular graphs are unique in that each node has exactly the same number of links. Indeed, in a two-dimensional mesh of perpendicular lines forming a simple square lattice each node has exactly four links, or in a hexagonal lattice of a beehive each node is connected to exactly three others [links].”
Back to Individual

the whole is different than the sum of its parts
Making individuals and affinities visible together.
Satellites

intermediary connectivity level
“Visual Information-Seeking Mantra: overview first, zoom and filter, then details on demand.”

Shneiderman, Ben. 1996. The Eyes Have It: a Task by Data Type Taxonomy for Information Visualizations.
Intermediary level: Meso
“In this awesome journey to the ends of the universe, you have learned an immense amount about its structure and the beings and things that occupy it, and above all about the relationships of things to each other, in their various scales of dimension, with a vividness that words cannot express.”

Boeke, Kees. 1957. Cosmic View.
- Ego network
- Multidimensional
- Proportional distance
- Position quality
- Improve overlapping
Semantic Background

defining potential affinities
“In information retrieval, tf–idf or TFIDF, short for term frequency–inverse document frequency, is a numerical statistic that is intended to reflect how important a word is to a document in a collection or corpus.”

— Wikipedia 2018
Network visualization of 400 publications
Characteristics

- Use of hexagonal grid
- Justification of closeness
- Semantic layer on links
- Color meaning

Keywords as potential affinities.
Collaboration and Lexical distance
Walkable Visualization
Conclusions
Process of design
  Collage
  New visual grammars
  Reduction and amplification
  Self-recognition
  Ethics
  Threshold of privacy
  Assembling individuals