Translating Data into Images

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Transforming
Translating
Projecting
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.
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.

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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.
Affinity Map

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
Representing Academic Practice

the exercise, the thesis
Academic Practice

Many activities
Different according to discipline
Not only literature
Collaboration

An academic practice
Multidimensional (writing, teaching, etc.)
Multi-scale (scholars, laboratories, etc.)
Affinity

Intellectual and operational closeness between individuals

Actual and potential

A way to describe the academic practice
Visualization

Mostly hidden
Can be made visible
Can be made visible through affinities
Questions about Representing Academic Practice

Which data describes the academic practice?
How to translate these data using visual grammar?
Is there an ethics concerning scholar representation?
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><strong>Focus topics (thematics)</strong></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><strong>Keywords</strong></td>
<td>Lab’s websites (metadata &quot;keywords&quot;, from audit 2011)</td>
<td>Idem</td>
<td>Idem</td>
</tr>
<tr>
<td><strong>Expertise areas</strong></td>
<td>Symphony database</td>
<td>Lab’s websites (expertise box)</td>
<td>Idem</td>
</tr>
<tr>
<td><strong>Publications keywords and contents/abstract</strong></td>
<td>Infoscience</td>
<td>Idem</td>
<td>Idem</td>
</tr>
<tr>
<td><strong>Publications co-authors and their institutions</strong></td>
<td>Infoscience (but institutions may be abbreviated variously...)</td>
<td>People’s publication page</td>
<td>No</td>
</tr>
<tr>
<td><strong>Alumni a3 (activity sector, localization)</strong></td>
<td>Alumni database (with probable confidentiality issues?)</td>
<td>People’s teaching page</td>
<td>No</td>
</tr>
<tr>
<td><strong>Co-teaching</strong></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><strong>Industrial partners</strong></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><strong>Main funding organizations</strong></td>
<td>EPFL Grant database (maybe not possible?)</td>
<td>Lab’s annual reports</td>
<td>Yes (proposing a selectable list?)</td>
</tr>
<tr>
<td><strong>Link to flagship projects</strong></td>
<td>Audit 2011 or lab’s annual reports</td>
<td>Lab’s annual reports</td>
<td>Yes (proposing a selectable list, if possible?)</td>
</tr>
<tr>
<td><strong>People &amp; Team</strong></td>
<td>People’s pages (Expertise+Biography+Work+Teaching)</td>
<td>News flux</td>
<td>Maybe</td>
</tr>
<tr>
<td><strong>Lab’s activities (events co-organised, guest speaker invitation, ...)</strong></td>
<td>Memento</td>
<td>News flux</td>
<td>Maybe</td>
</tr>
</tbody>
</table>

Note: There are several handwritten notes and comments on the page, indicating suggested changes or additional considerations.
GROUPES DE L’ENAC QUI PARTAGENT DES COLLABORATEURS
ENSEIGNEMENTS DE L'ENAC QUI PARTAGENT DES COLLABORATEURS
LABORATOIRES DE L'EPFL QUI PARTAGENT DES COLLABORATEURS

Blanc, A.
de Preux, L.
Rochat, D.
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Mertin, S.
Teuscher, M.
Bachmann, V.
Maritz, K.
Boillat Kireev, V.
Cerri, F.
Buehl-Brauch, Y.

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Chef d'atelier
Collaborateur scientifique
Secrétaire
Secrétaire
Administrateur
Collaborateur
Ingénieur ETS/HES
Etudiant en projet
Assistant
Assistant
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LABORATOIRES DE L'ENAC QUI PARTAGENT DES COLLABORATEURS
ENSEIGNEMENTS DE L'ENAC QUI PARTAGENT DES COLLABORATEURS
LABORATOIRES AVEC LES PUBLICATIONS PARTAGÉES
<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>
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<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>
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<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.*
**Potential affinities** were generated as **keywords** through an algorithm of text mining working on the publication abstracts of the ENAC laboratories.

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

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.
Visual Investigation

drawing laboratories
Network Visualization

size, isolement, and 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.”

A Portolan chart that represents the Mediterranean Sea and its winds during the second quarter of the 14th century. © Library of Congress
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.
Making individuals and affinities visible together.
Satellites

intermediary connectivity level
Intermediary level: Meso
“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.
“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.
Hexagonal network is unified with the visualizations of the nodes.
It is incorrect [...] to think that maps [...] prove the reality of the zoom effect: when one shifts from a map on a scale of 1 cm to 1 km to one on 1 cm to 10 km, the latter does not contain the same information as the former: it contains other information that might (or might not) coincide with what appears in the former.
- Ego network
- Multidimensional
- Proportional distance
- Position quality
- Improve overlapping
“Micro and macro [...] are really two faces of the same thing”
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

"id": 53310,
"authors": ["Bradley, Joseph", "Loucks, Jeff", "Macaulay, James", "Noronha, Andy", "Wade, Mike"],
"title": "Digital vortex: How digital disruption is redefining industries",
"description": "Digital business transformation is a journey to adopt and deploy digital technologies.

"keywords": ["DIGITAL DISRUPTION", "DIGITAL BUSINESS TRANSFORMATION", "DIGITAL VORTEX"],
"terms": {
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  "disruption": 12.672948161851869,
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  "models": 7.666426688112432,
  "technologies": 7.558292245571881,
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  "reshape": 5.624972813284271,
  "resulting": 5.624972813284271,
  "step": 5.624972813284271,
  "deploy": 5.624972813284271,
  "position": 5.33729074083249,
  "proposition": 5.33729074083249,
  "effect": 5.11414718951828,
  "force": 5.11414718951828
}
Keywords as potential affinities.

**Characteristics**

- Use of hexagonal grid
- Justification of closeness
- Semantic layer on links
- Color meaning
Collaboration and Lexical distance
Walkable Visualization
Conclusions
Translation is a process of design
It is reduction and amplification at the same time
It is a collage (remix)
Graphical grammar has to be developed
Readers are curious to see their representation
Visualize someone is a delicate task
It exists a threshold of privacy
Assembling individuals changes such a threshold
Glitches

inconveniences during programming