

CNAM - spécialité Informatique
NSY116 - Multimédia et IHM - 2007-8

Visualisation d'information

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Janvier 2009

plan de l'exposé :

1. Introduction
2. Représentation
3. Présentation
4. Bibliographie, logiciels

1. Introduction

- Exemples d'application
- Définition du sujet
- Exemples de techniques

Un exemple :

choisir dans une grande
masse d'informations

metro | 05
septembre 2007

égalité des Français
ont que leur pouvoir
sé en un an, selon
Sofres citée hier
Christine Lagarde.

s laitiers

re

4%

de l'alimentation
get des ménages.

évoit un chiffre
hausse de 7 à 8%.
nt, la hausse de
cée chez Danone
e les prix prati-
près des distribu-
este donc à savoir
nent les ensei-
la répercuteront.
Danone, cela sera
r, début décem-
groupe Lactalis
Président...)
gmenter ses tarifs
e 15 et 17%. "Il y a
être trop de
trations dans ce
", avance François
ier, qui évoque
ne la possibilité
e "entente sur les
entre les groupes.

JUDITH KORBER

e intégral
etrofrance.com

net - SE22168 Lund - Suède - RCS Paris B 439 951 905

sonyericsson.com/musitrip

J'la musique qui me ressemble

Choisissez votre musique et faites vos playlists*
selon votre humeur avec la fonction SensMe™
du nouveau mobile Walkman™ W910i.

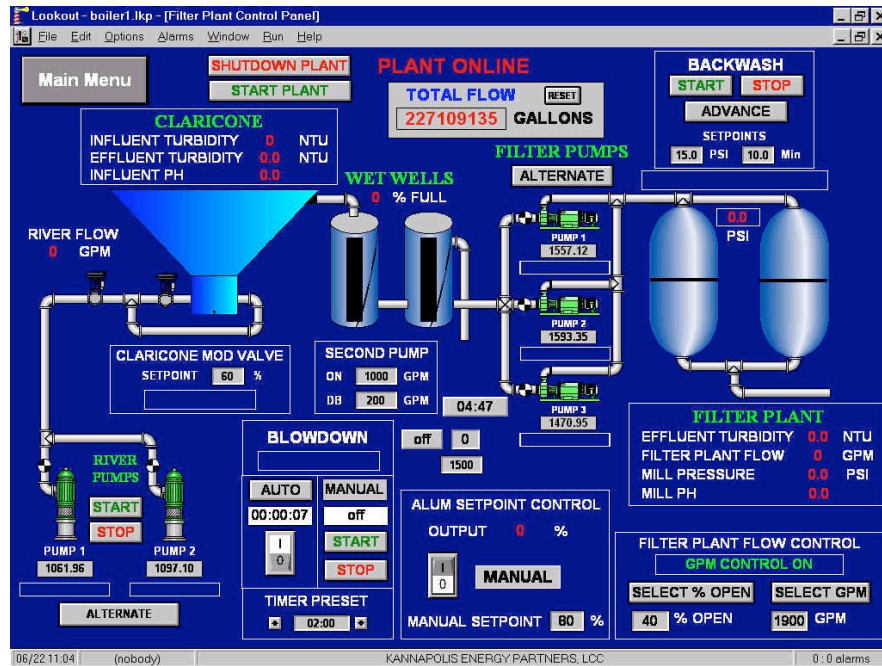


The image shows a Sony Ericsson W910i mobile phone, a black slider phone, positioned diagonally. The screen displays the 'SensMe' music selection interface, which features a circular radar-like chart with four quadrants labeled 'Triste' (top-left), 'Rapide' (top-right), 'Joyeuse' (bottom-right), and 'Creer' (bottom-left). A central point is labeled 'Ajouter'. The phone's keypad is visible at the bottom, and the background of the advertisement is a warm, orange-brown color with several translucent, glowing spheres containing silhouettes of people dancing or moving.

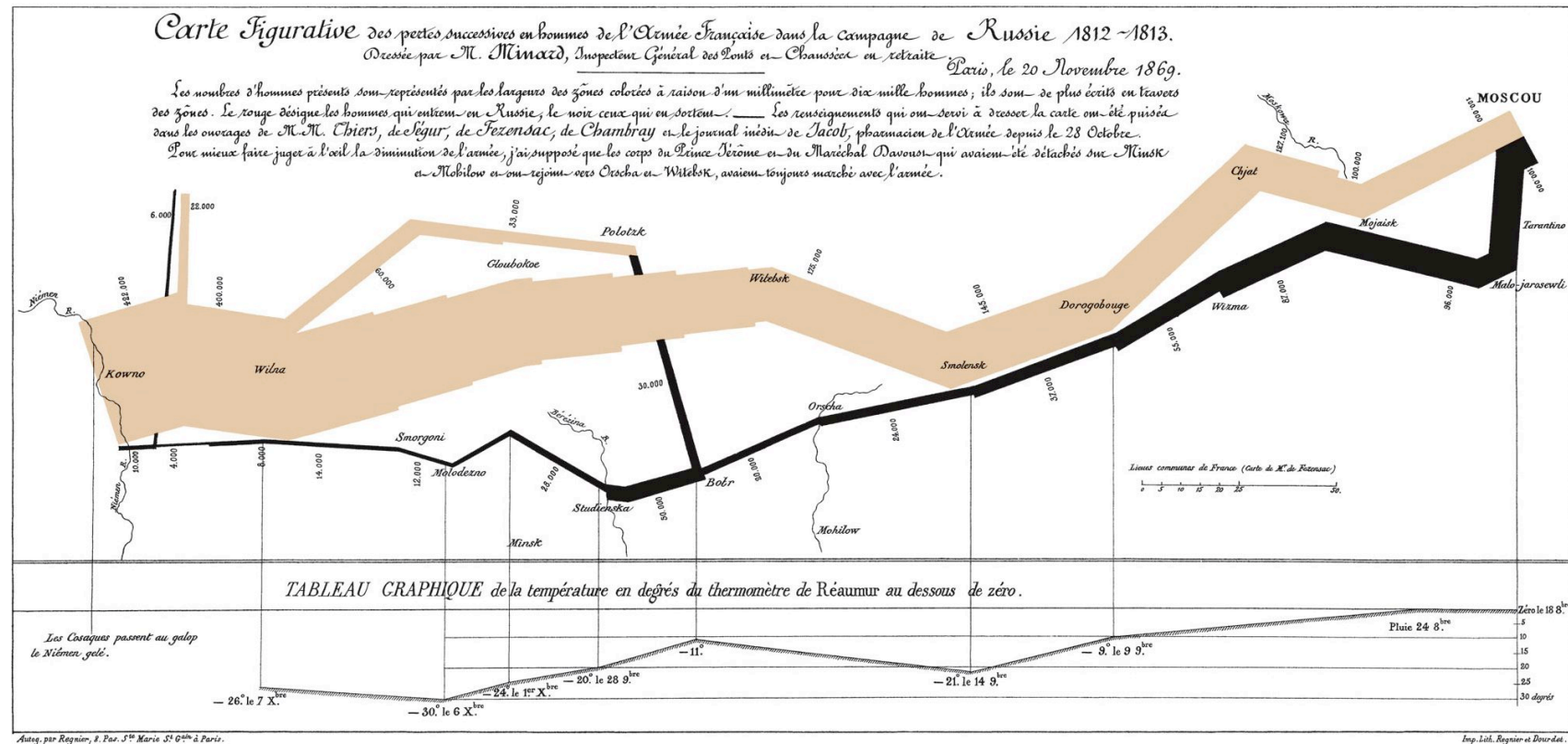


« cover flow » Apple Ipod Touch

Autre exemple : piloter un processus complexe



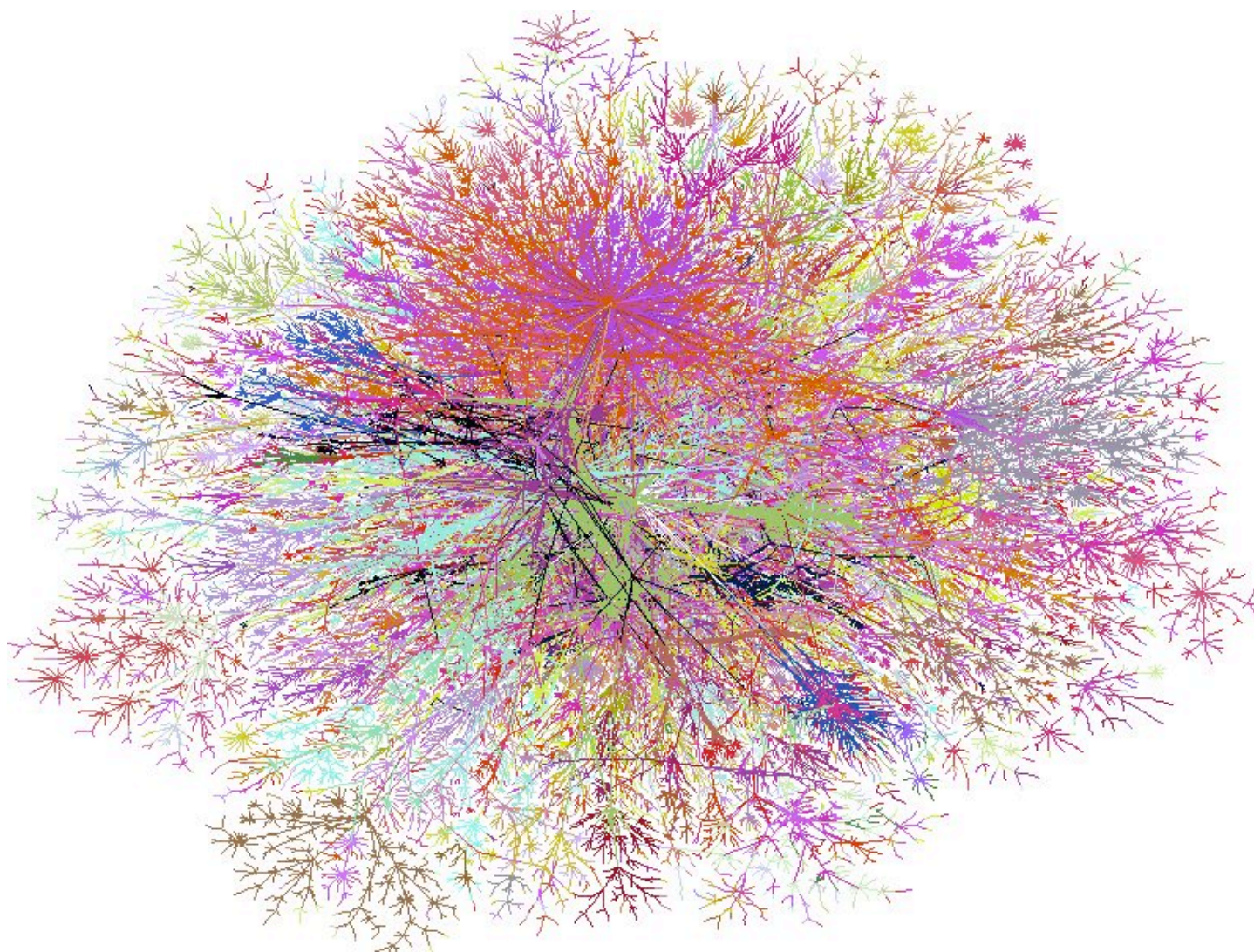
Autre exemple : comprendre un phénomène



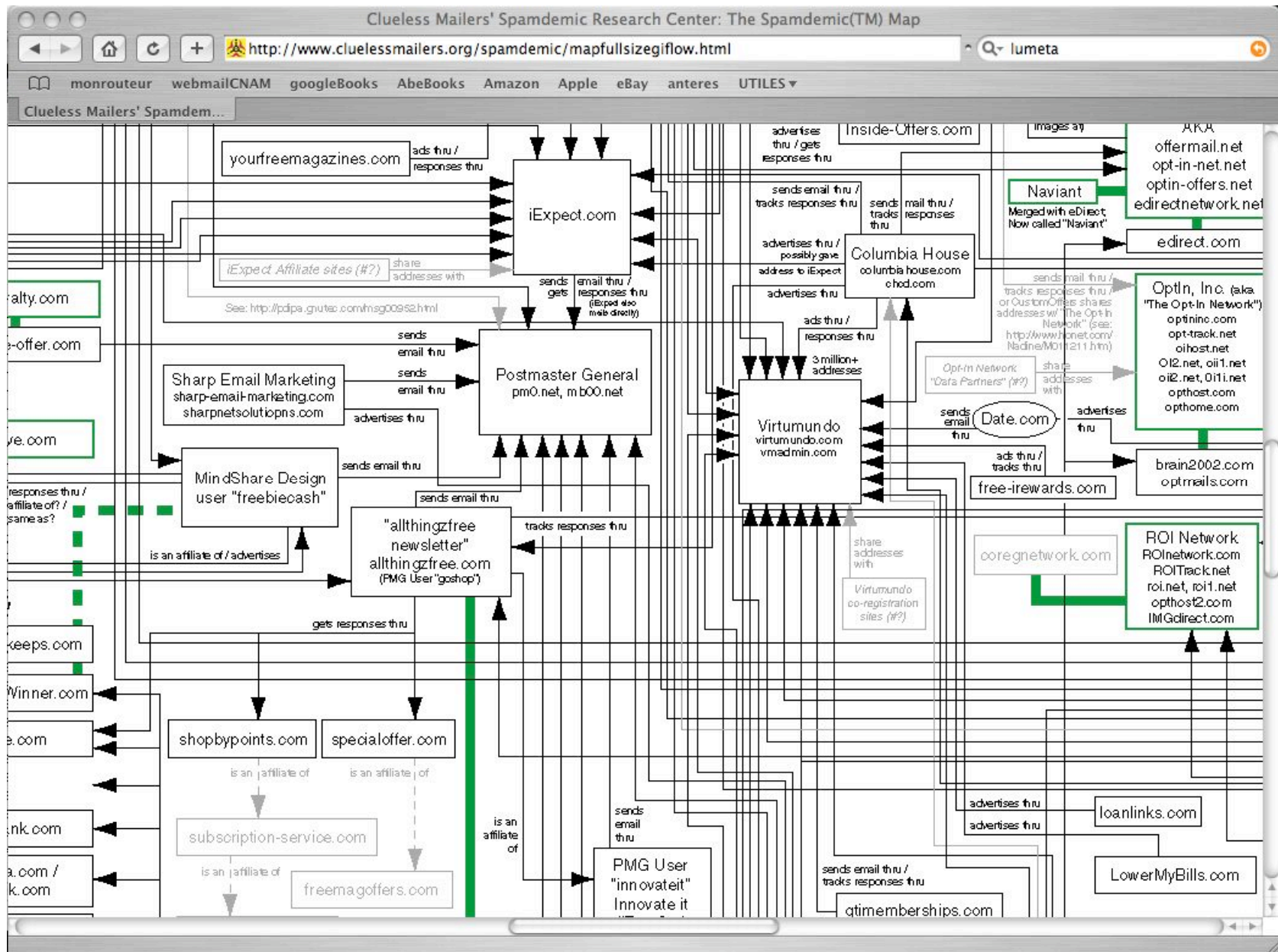
Edward R. Tufte (1992). The Visual Display of Quantitative Information

Minard (1869) : carte augmentée par des flots
« graphics reveals data » (Tufte)

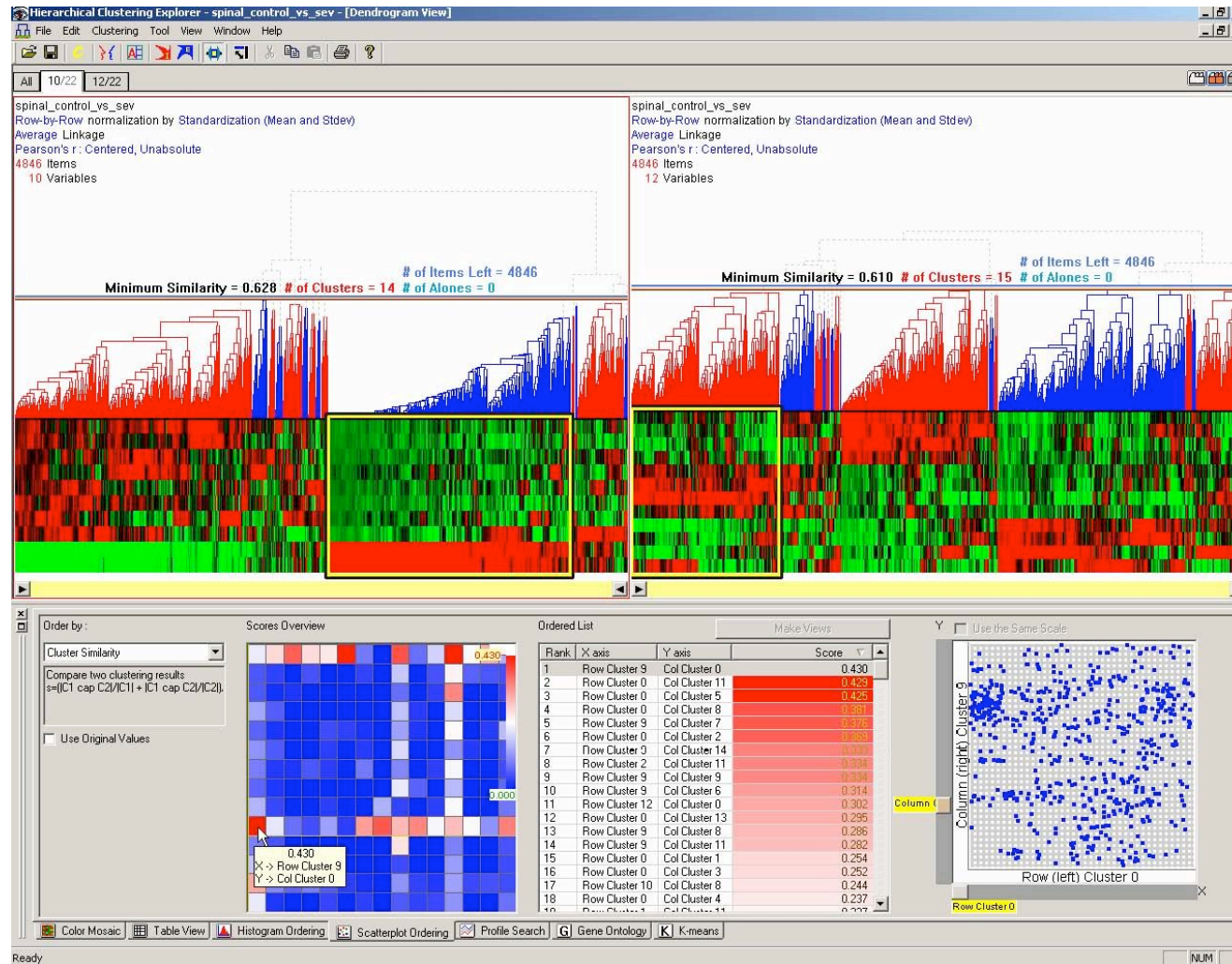
cybergéographie



Lumeta (revue Nature)



g n tique :



définition du sujet

"using vision to think" (Card et al.)

Compact graphical presentation and user interface for

- manipulating large numbers of items
- possibly extracted from far larger datasets

Enables users to make

- discoveries,
- decisions, or
- explanations

about

- patterns (trend, cluster, gap, outlier...),
- groups of items, or
- individual items.

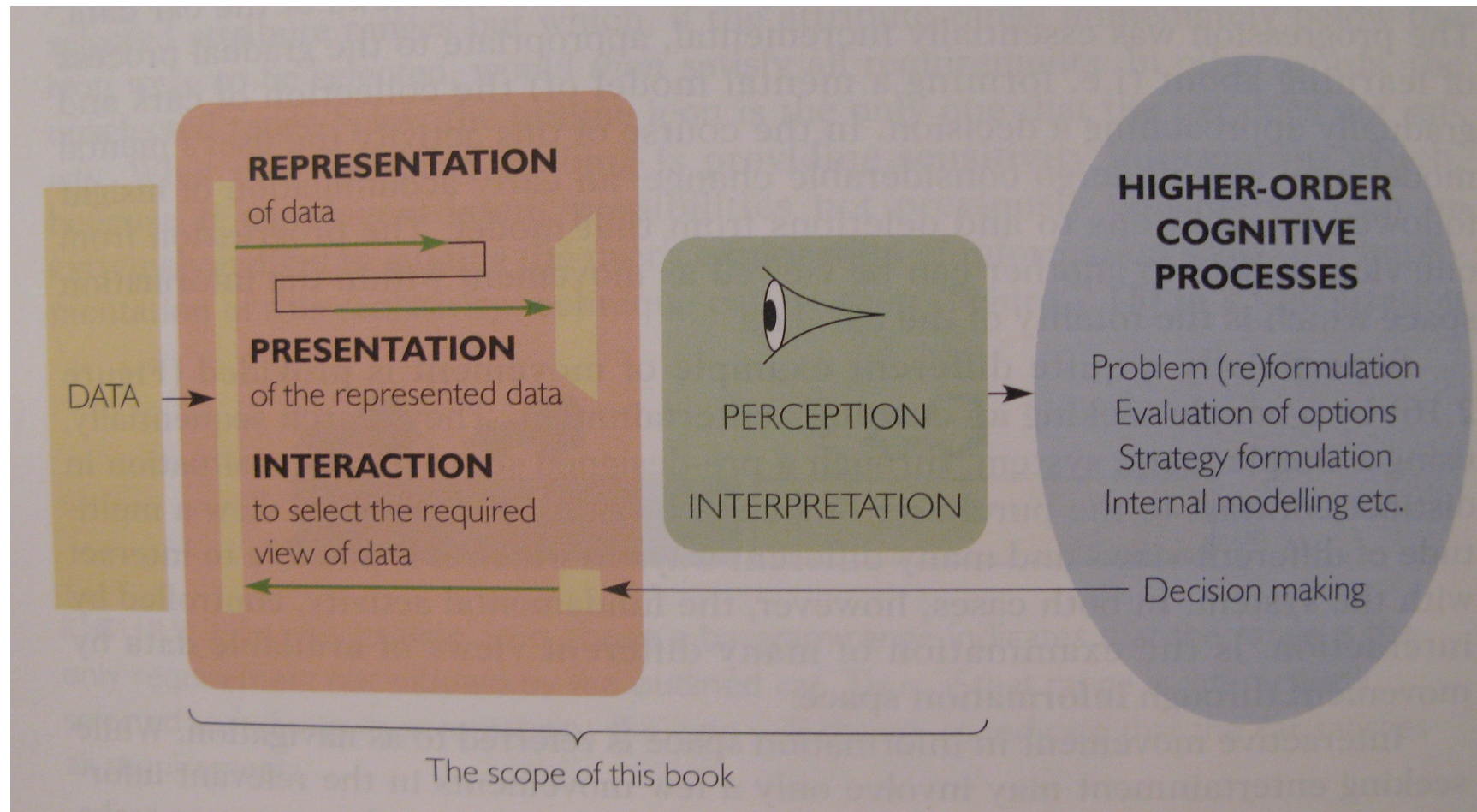
[Plaisant, 2001]

Visual representations of the semantics, or meaning, of information. In contrast to scientific visualization, information visualization typically deals with nonnumeric, nonspatial, and high-dimensional data.

[Chen, 2005]

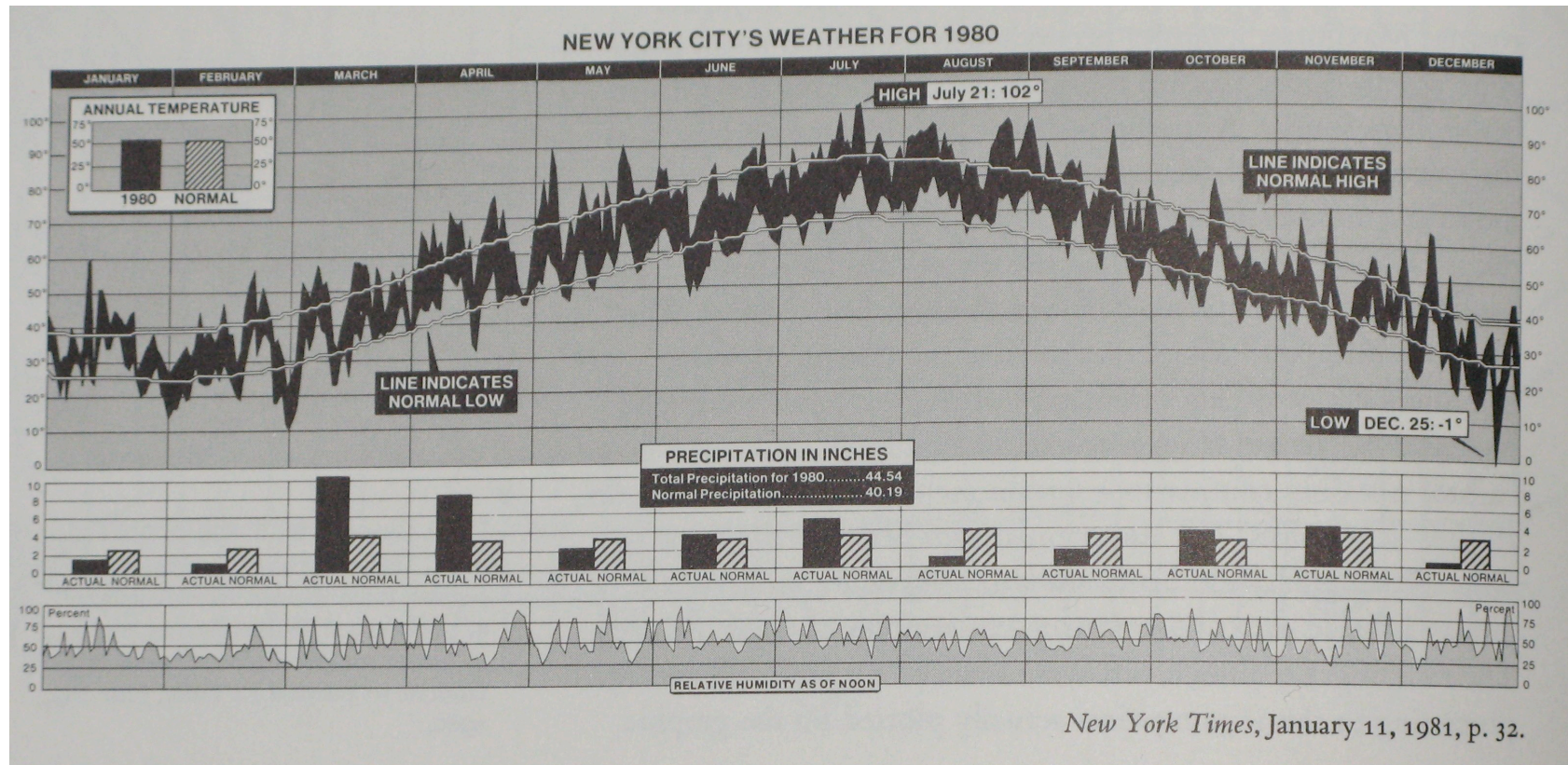
Information visualization (InfoVis) produces (interactive) visual representations of abstract data to reinforce human cognition and perception; thus enabling the viewer to gain knowledge about the internal structure of the data and causal relationships in it.

http://www.infovis-wiki.net/index.php/Information_Visualization



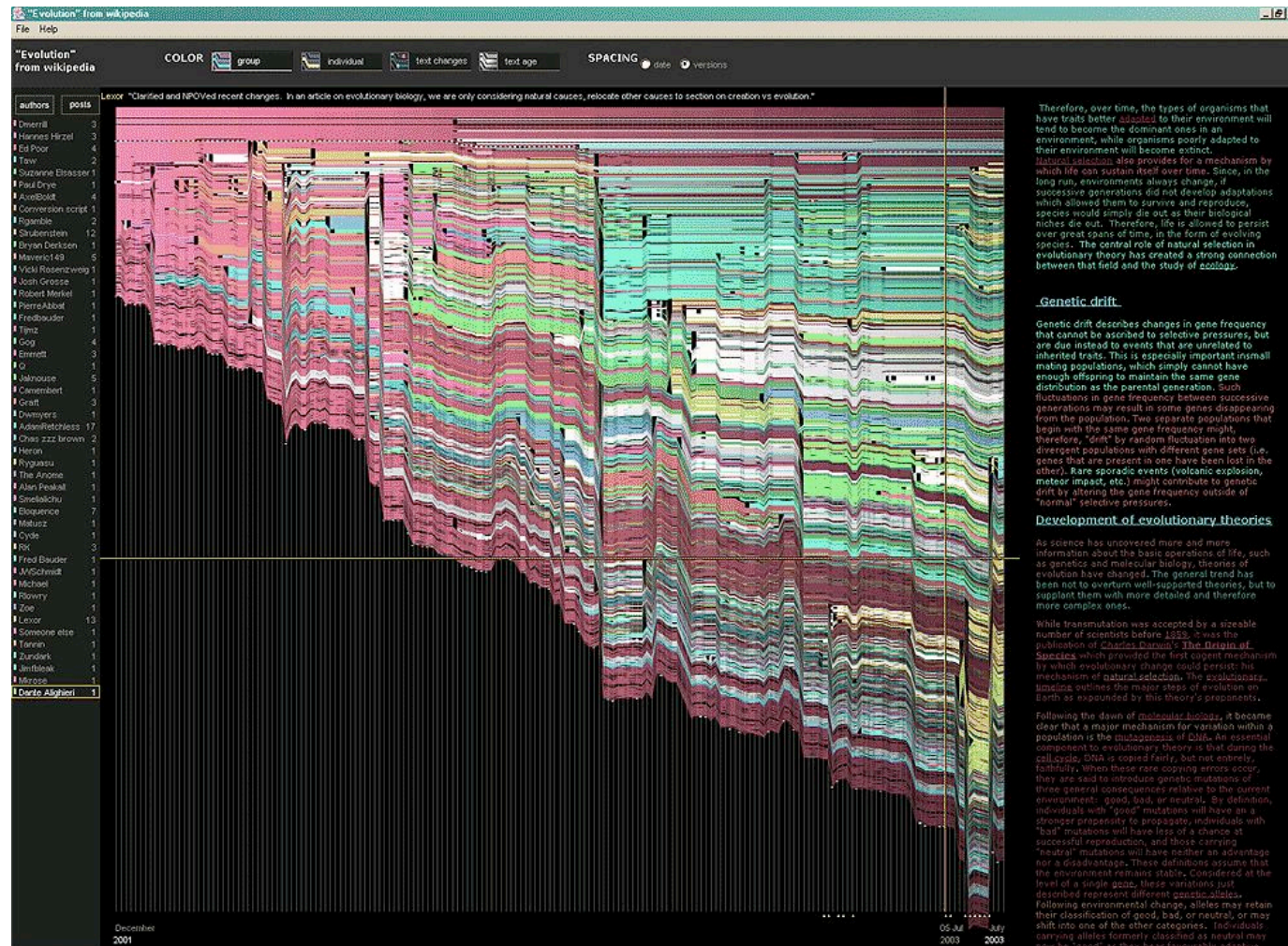
[Spence] p.26

Un schéma pour 1888 nombres



The graphics (...) tells a story [Tufte, Visual display ... p.30]

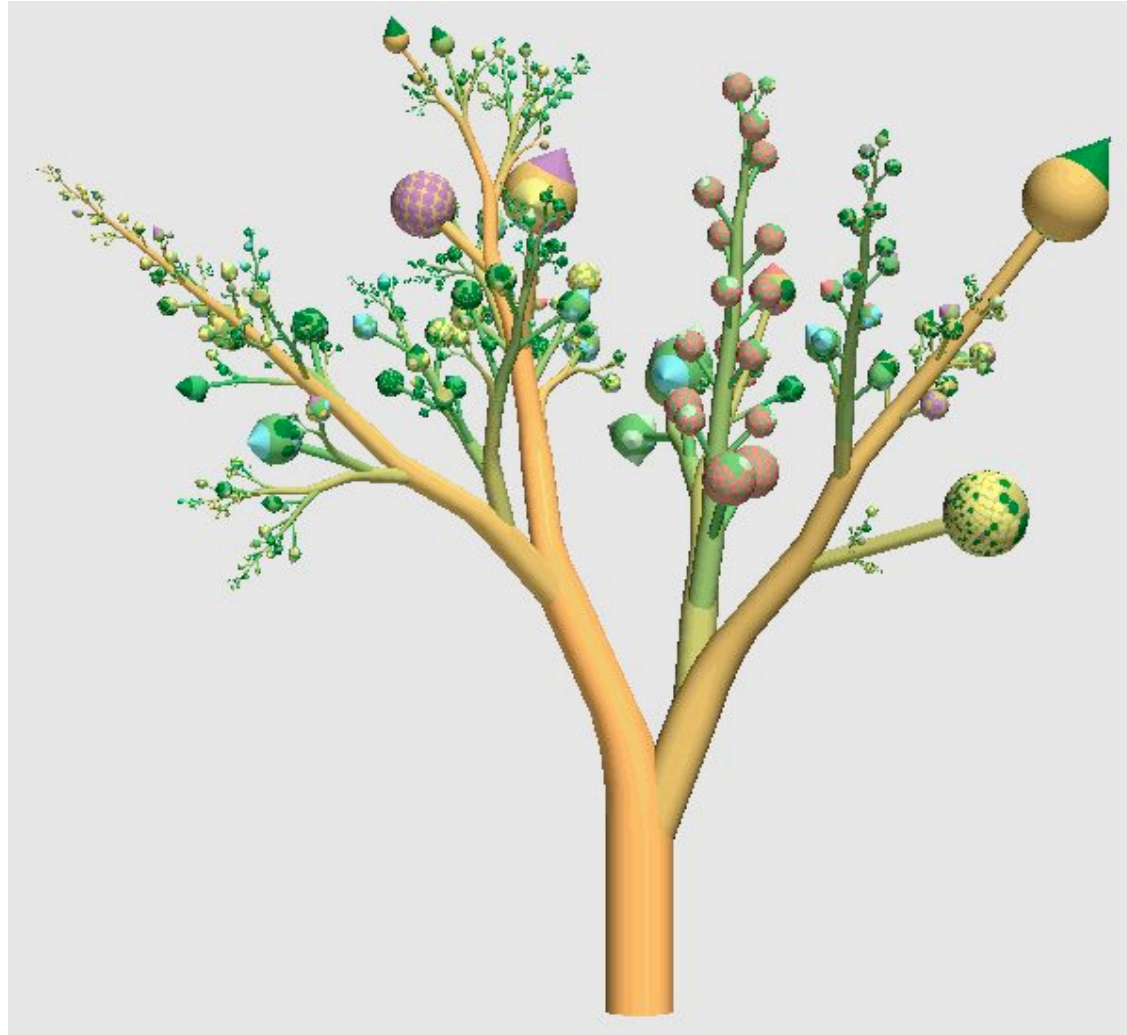
Si + de données, une interaction indispensable (zoom, etc.)



versions de l'article "evolution" sur Wikipedia

http://www.research.ibm.com/visual/projects/history_flow/

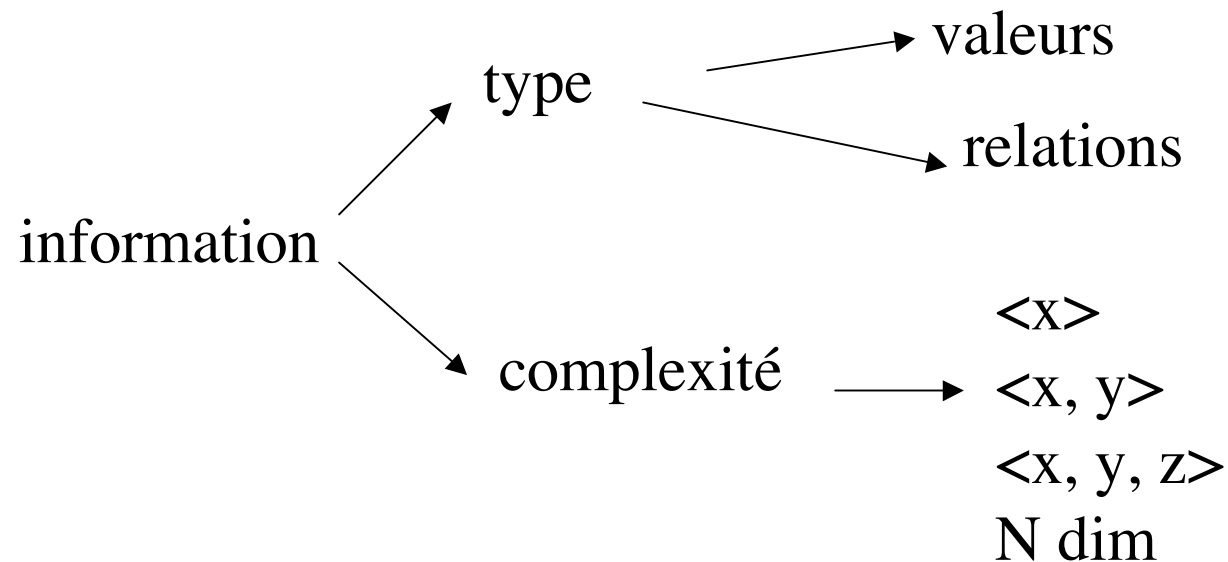
Représenter l'abstrait ? une usabilité à évaluer...



<http://www.infovis-wiki.net/index.php?title=Image:Boom.gif>

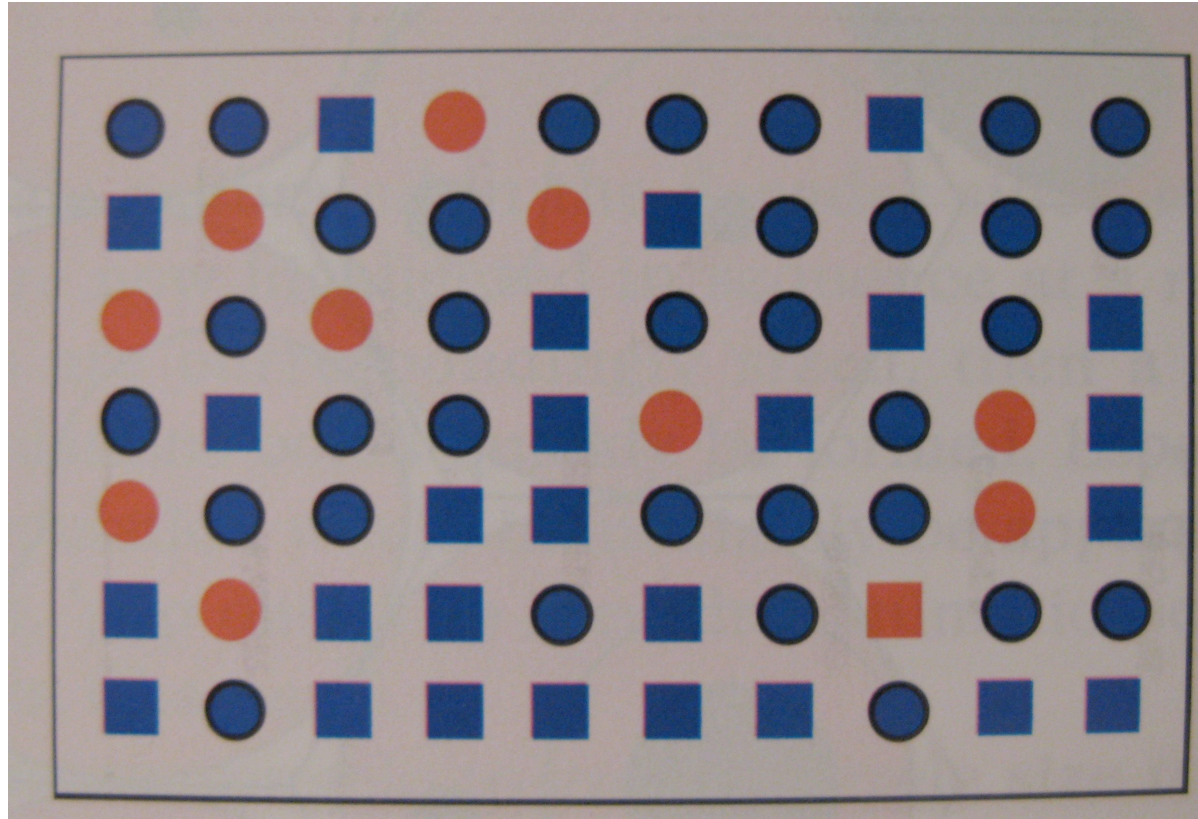
2. Représentation

Taxonomie de [Spence]



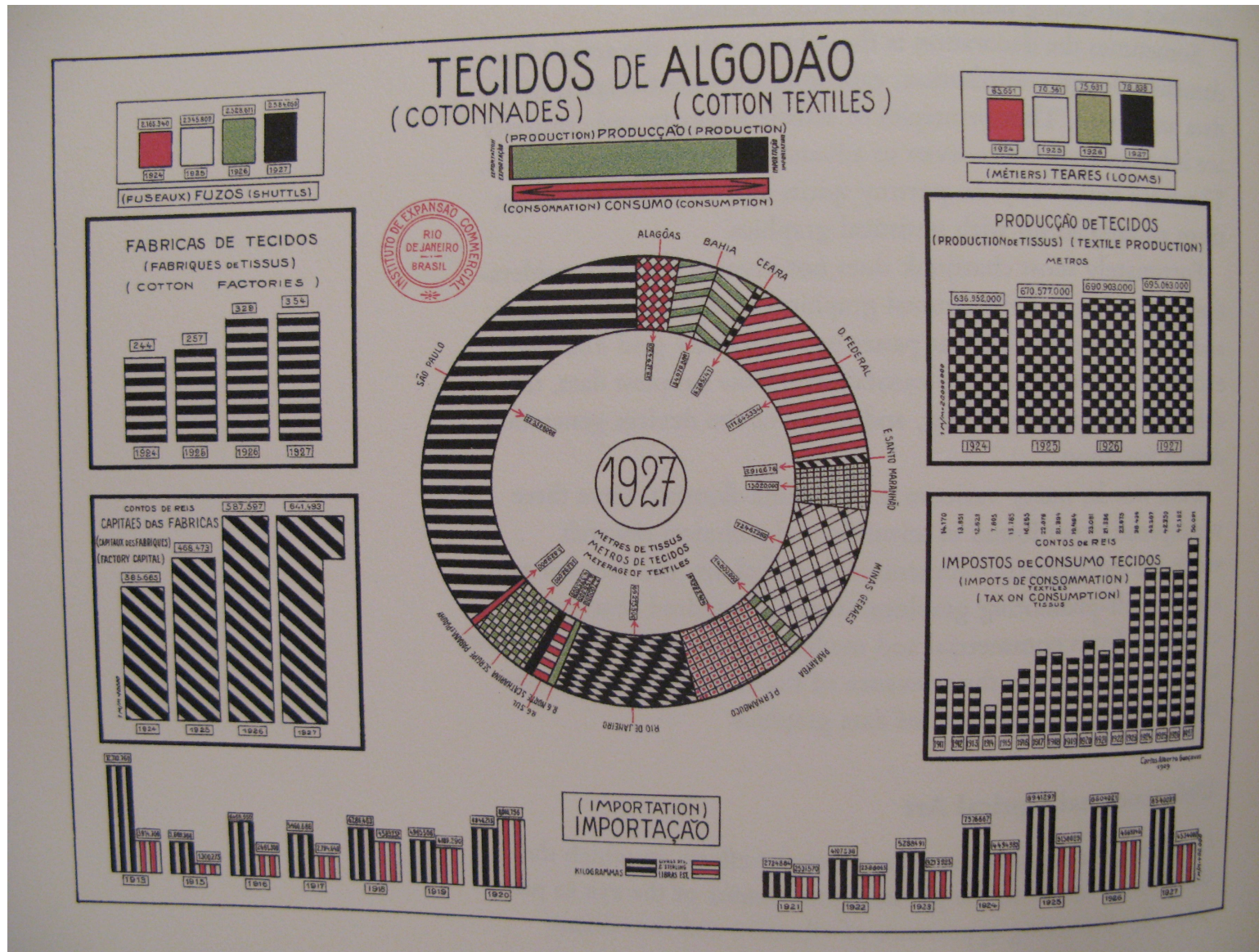
PB : cas d'une photo ? d'un texte ?

2.1 Codage des valeurs



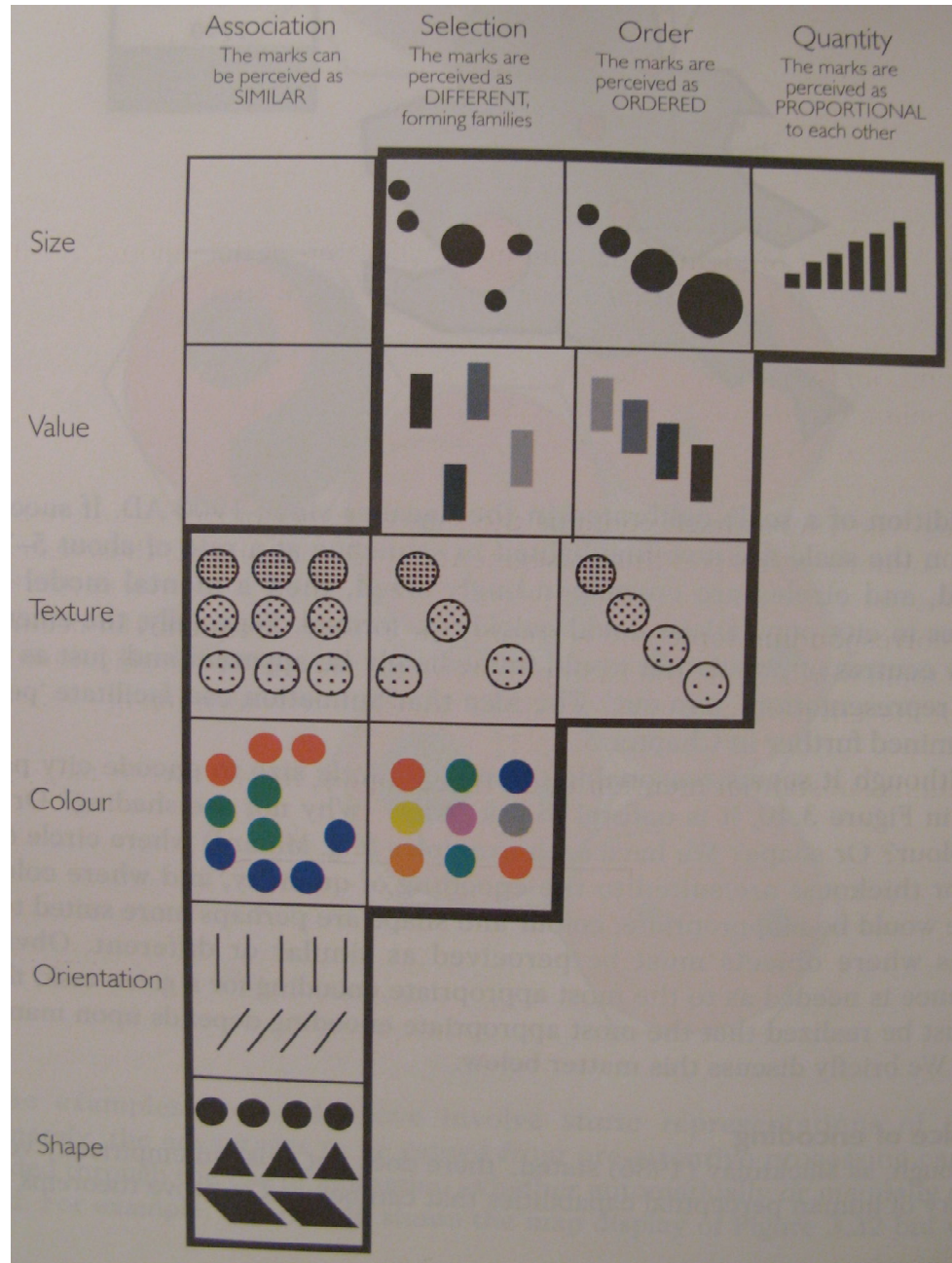
Éviter l'aveuglement au changement ?

Un schéma raté.... [Tufte, Visual p.108]

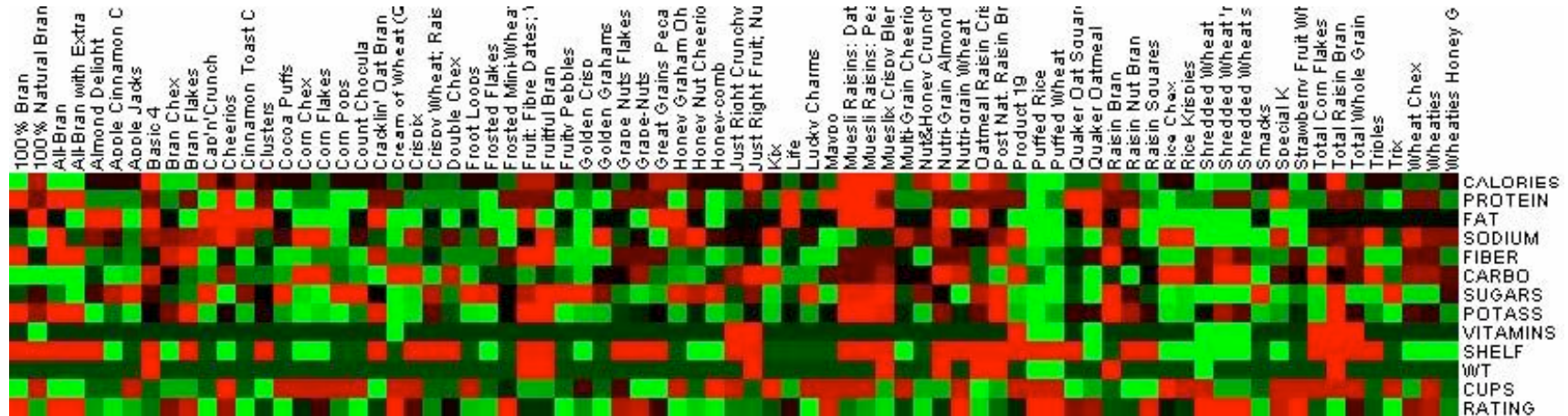


Les « variables rétinienne » de J. Bertin (1962)

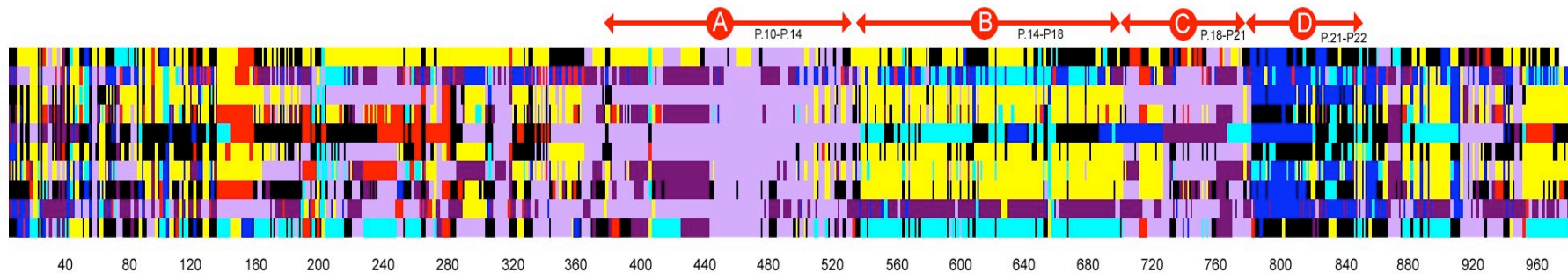
Taille
Valeur
Grain
Couleur
Orientation
Forme



Matrices ordonnables (Bertin, 70')

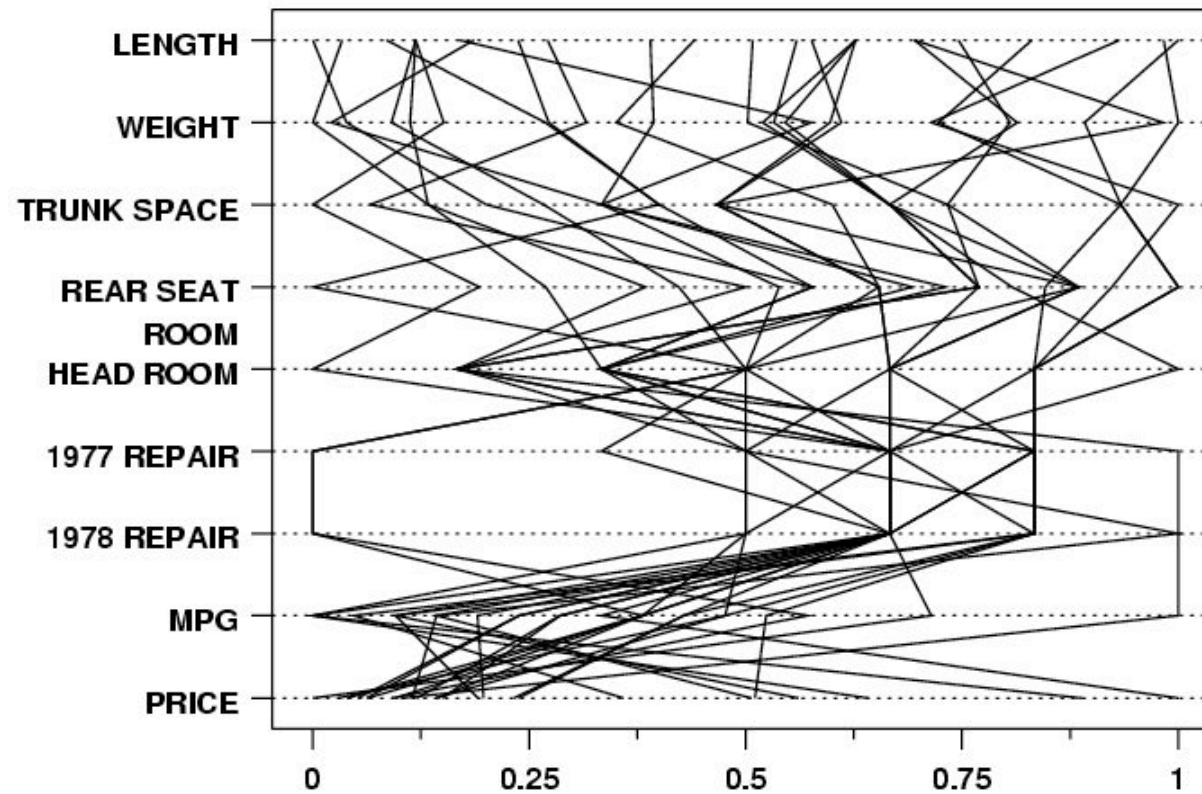


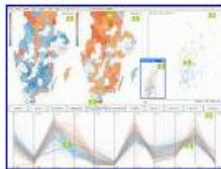
<http://hcil.cs.umd.edu/trs/2005-20/2005-20.html>



Hsu & Cubaud, HCI'2009

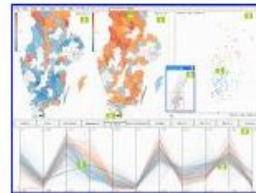
(parallel) coordinate plot :





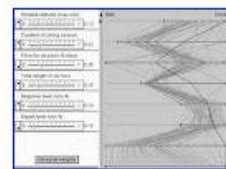
... and can **coordinate** with others ...

490 x 369 - 195 ko - png
servus.itn.liu.se



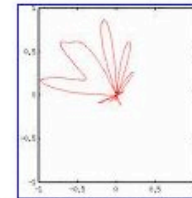
... and can **coordinate** with others ...

1280 x 965 - 552 ko - png
servus.itn.liu.se



... the parallel **coordinate plot** in

553 x 398 - 24 ko - gif
esds.mcc.ac.uk



to plot data in the 2-dimensional

289 x 299 - 2 ko - png
t16web.lanl.gov



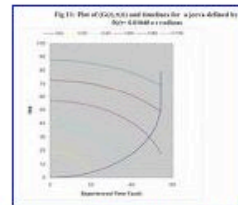
... parallel **coordinate plot**, ...

1024 x 616 - 213 ko - jpg
www.esri.com



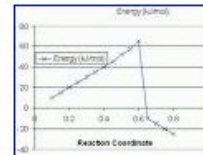
A parallel **coordinate plot** for the ...

550 x 400 - 70 ko - jpg
rosuda.org



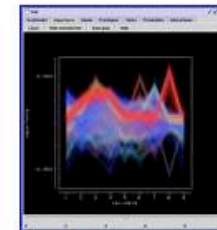
... the polar **coordinate plot** of Fig

692 x 603 - 58 ko - jpg
advaitamath.blogspot.com



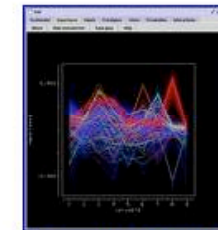
Active **coordinate selection**

352 x 267 - 4 ko - gif
superbeton.wordpress.com



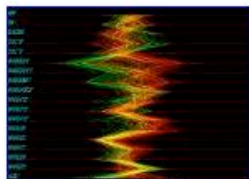
... the parallel **coordinates plot**.

576 x 620 - 31 ko - jpg
oz.berkeley.edu



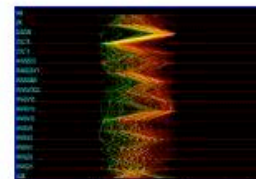
This is a parallel **coordinate plot**

576 x 620 - 48 ko - jpg
oz.berkeley.edu



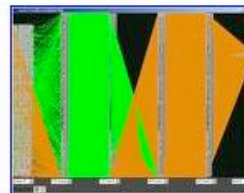
... the parallel **coordinate plot**.

927 x 656 - 68 ko - gif
www.biomedcentral.com



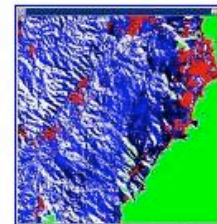
... the parallel **coordinate plot**.

929 x 657 - 67 ko - gif
www.biomedcentral.com
[Plus de résultats sur
www.biomedcentral.com]



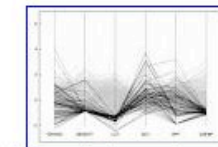
... **coordinate plot** (source IP, ...

900 x 698 - 138 ko - gif
seviz.org



... parallel **Coordinate Plot** above.

525 x 525 - 126 ko - gif
www.geocomputation.org



... The parallel **coordinates plot**

360 x 252 - 23 ko - gif
www.evl.uic.edu

Diagramme en étoile (star plot)



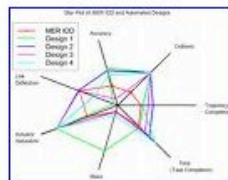
[Images – Recherche avancée](#)
[Préférences](#)

Images Afficher Toutes les tailles

Résultats 1 - 20 sur un total d'environ 2 280 000 pour **star plot** (0,28 secondes)

Essayez avec cette orthographe : [starpot](#)

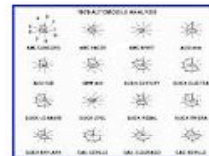
« Afficher tous les résultats de recherche pour [star plot](#)



In this **star plot**, ...
 560 x 438 - 28 ko - gif
start1.jpl.nasa.gov



Star plot of selected peak ratios
 253 x 248 - 7 ko - gif
www.humble-inc.com



... analysis using **star plot**
 380 x 280 - 4 ko - gif
www.itl.nist.gov

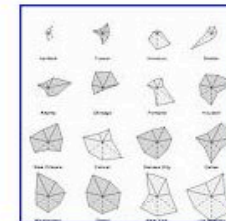
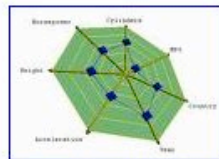


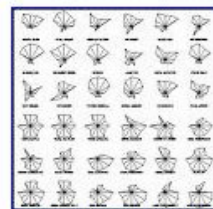
FIG: **Star plot** of crime rates in US ...
 504 x 505 - 9 ko - gif
www.math.yorku.ca



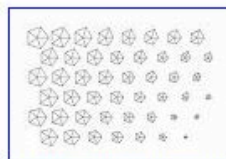
... assignment key for **star plot**.
 342 x 316 - 4 ko - gif
www.math.yorku.ca



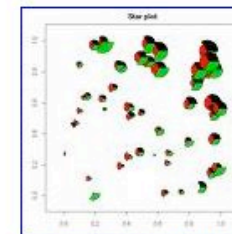
Parallel coordinates.
 426 x 309 - 52 ko - png
www.cscs.ch



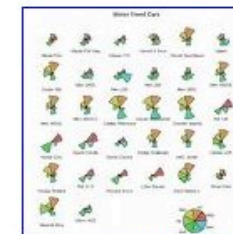
Rys.11 **Star plot** dla danych AUTO.
 376 x 370 - 9 ko - gif



SOM representatives **star plot**
 600 x 400 - 9 ko - png
addictedtor.free.fr



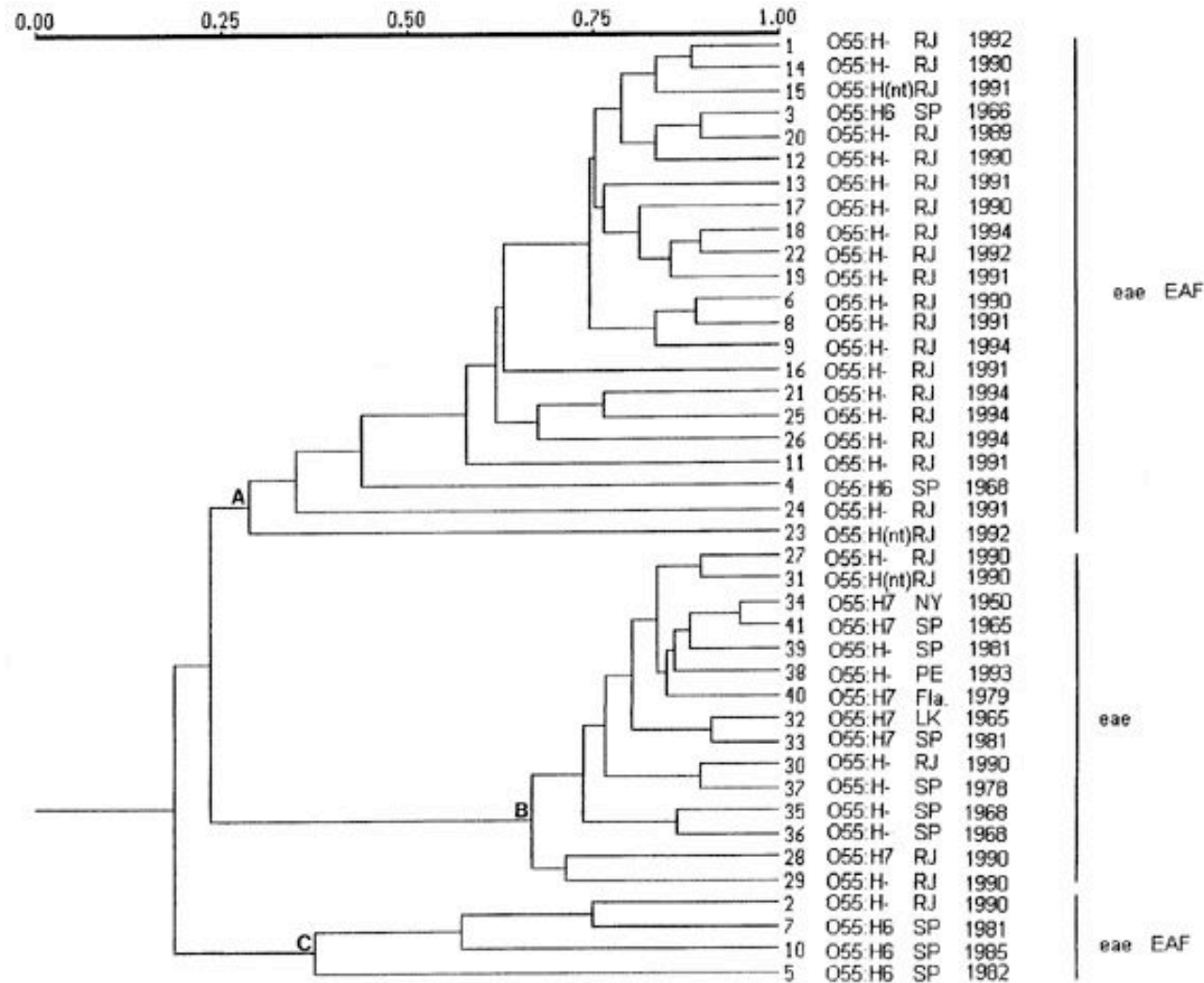
... 1:5, main = "**Star plot**")
 600 x 600 - 8 ko - png
zoonek2.free.fr



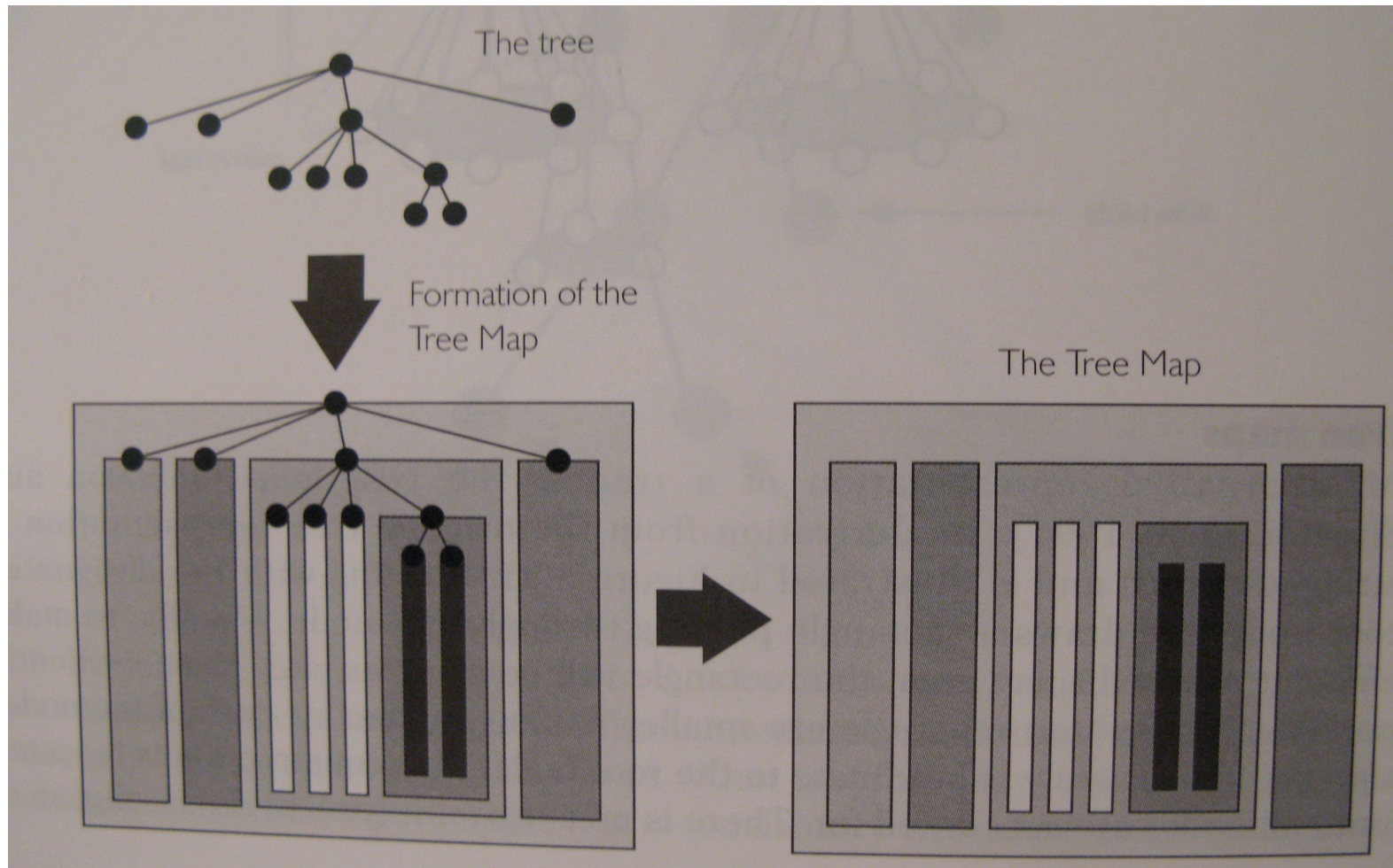
Graphiques étoilés (**star plots** or ...
 600 x 600 - 13 ko - png
zoonek2.free.fr

CAIDA : routage dans l'internet

Dendogrammes

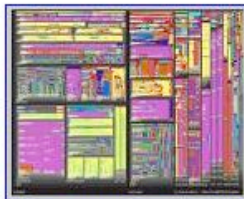


Tree-maps (Johnson & Schneiderman, 1991)



[Spence p. 86]

[illegible]



This toolkit includes **treemaps**, ...
895 x 715 - 763 ko - jpg
www.cs.umd.edu



Treemaps are a family of algorithms ...
400 x 400 - 15 ko - gif
www.cs.umd.edu
[[Plus de résultats sur www.cs.umd.edu](#)]



Treemaps enable users to compare ...
516 x 365 - 25 ko - gif
services.alphaworks.ibm.com



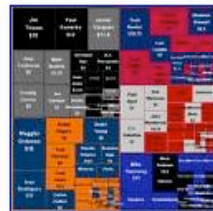
Home
526 x 328 - 83 ko - png
www.cems.uwe.ac.uk



... examples that utilize **treemaps**.
554 x 437 - 187 ko
sambbioblog.spaces.live.com



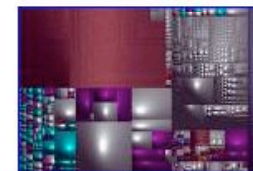
... **Treemaps** and other tree ...
627 x 461 - 37 ko - jpg
www.ifs.tuwien.ac.at



I'm a pretty big fan of **treemaps**.
400 x 399 - 32 ko - gif
www.detroitigersweblog.com



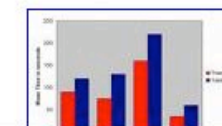
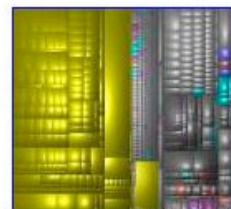
... got a face lift... and **treemaps** ...
400 x 278 - 38 ko - png
blog.dotnetwiki.org



This tool uses **treemaps** to show a ...
1021 x 673 - 633 ko - png
flardi.net

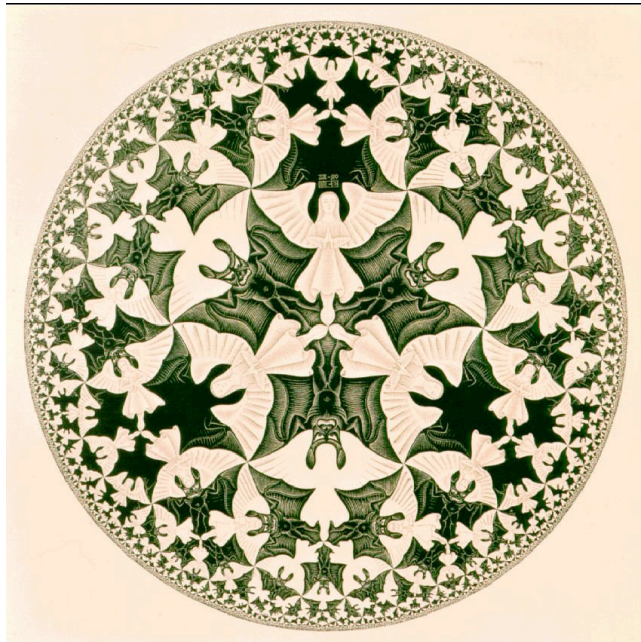


Circular **treemaps** are used to ...
800 x 640 - 89 ko - jpg
blog.semiphore.net

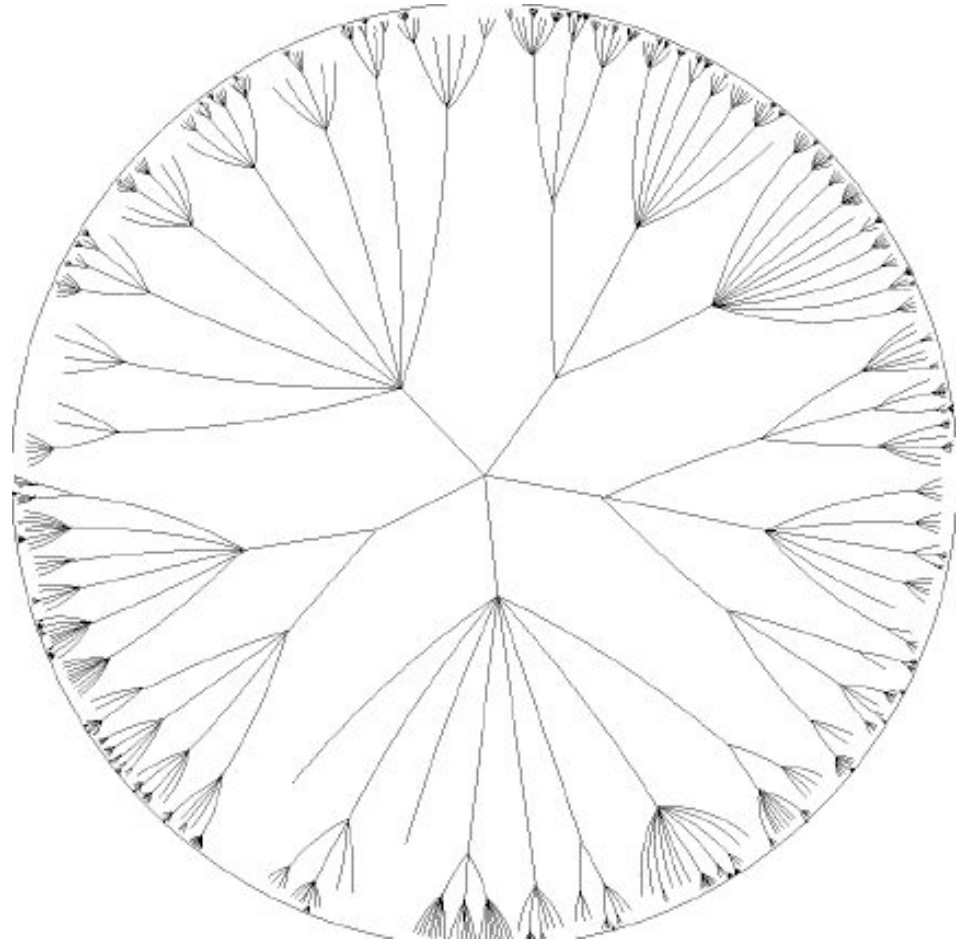


Arbres hyperboliques (Lamping & Rao, 1995)

Inspiré d'Escher



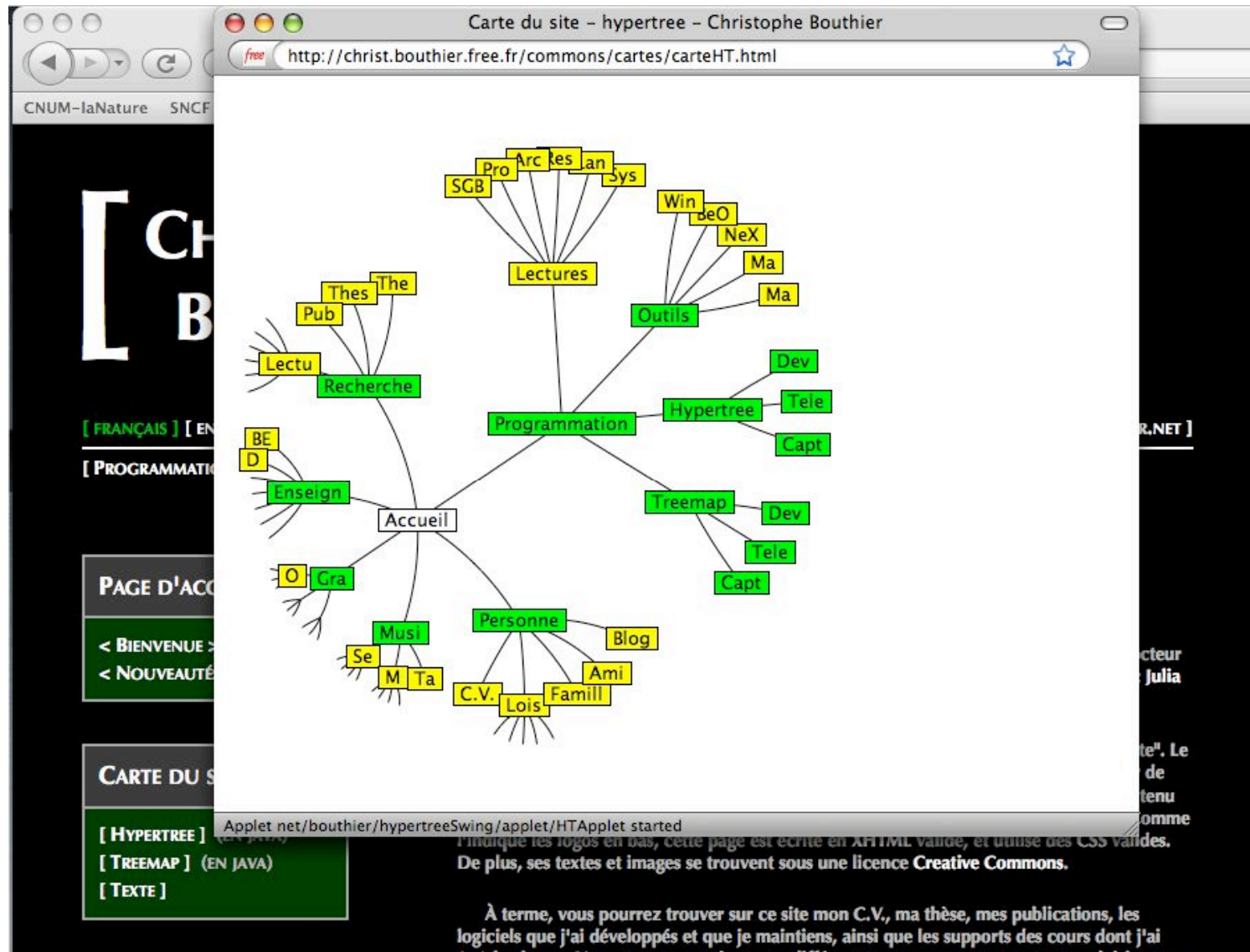
<http://www.mcescher.com/Gallery/recogn-bmp/LW436.jpg>



http://www.infovis-wiki.net/index.php?title=Image:Hypertree_original.jpg

1004 sommets, distrib. Poissonienne du nbre de fils

Exemple : hypertree



Images Afficher

Toutes les tailles

Résultats 1 - 20 sur un total d'environ 22 500 pour **hyperbolic trees** (0,18 secondes)

« Afficher tous les résultats de recherche pour **hyperbolic trees**



... Abb. 11b: Hyperbolic Trees (2) ... Abb. 11a: Hyperbolic Trees (1)

385 x 395 - 10 ko - gif
coli.lili.uni-bielefeld.de



411 x 437 - 12 ko - gif
coli.lili.uni-bielefeld.de



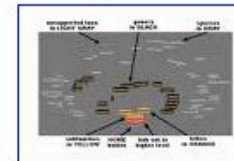
Figure 2-15: Hyperbolic tree.

336 x 308 - 50 ko - gif
www3.sympatico.ca



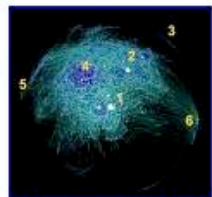
Hyperbolic geometry: Spectacular

888 x 964 - 198 ko - png
www.infovis.net



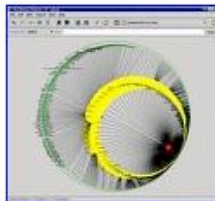
CGDP - HYPERBOLIC TREE

KEY
600 x 404 - 31 ko - gif
www.flmnh.ufl.edu



... are two more hyperbolic tree ... Eye or Hyperbolic Tree Viewer

300 x 288 - 111 ko - jpg
dd.dynamicdiagrams.com



400 x 368 - 58 ko - gif
www.sorice.com



Hyperbolic Tree

350 x 339 - 76 ko - png
vw.indiana.edu



Tree Text: Hyperbolic Tree

729 x 743 - 174 ko - jpg
www.itl.nist.gov



... zum Begriff "Hyperbolic Tree"

864 x 804 - 16 ko - png
beat.doebe.li

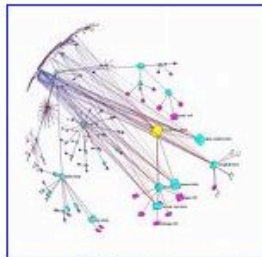


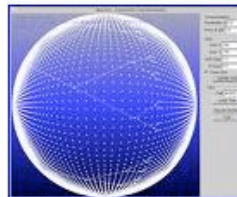
Figure 3.19: Non-tree links



Hyperbolic trees - InfoVis-Wiki



an original hyperbolic tree with



Hyperbolic Tree Visualization



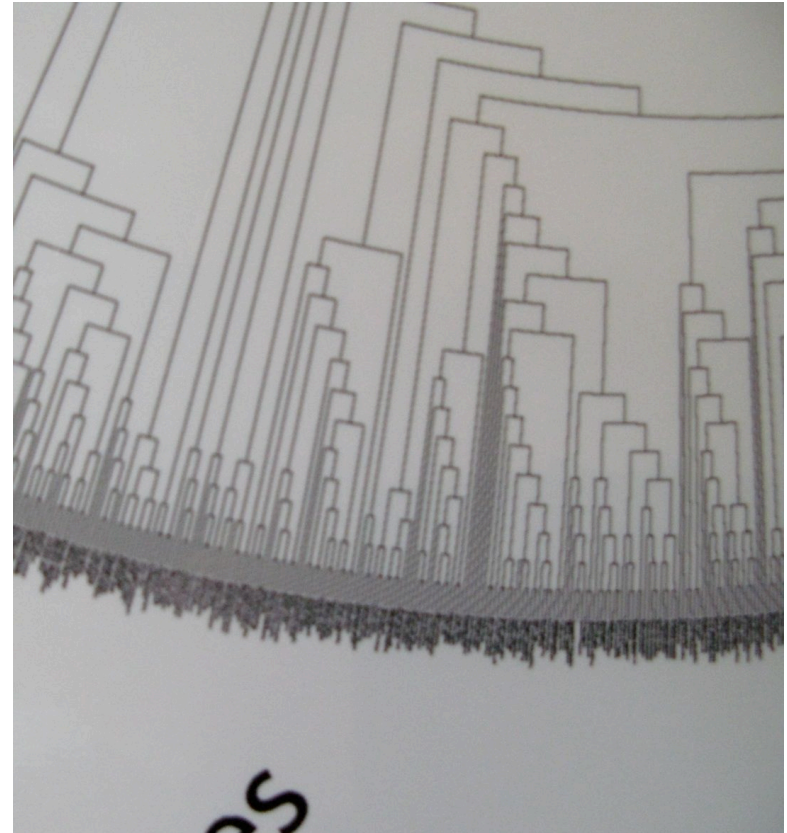
We will use the hyperbolic tree

Ouvrir "http://images.google.com/imgres?imgurl=http://beat.doebe.li/bibliothek/ref_w/w0083...Dhyperbolic%2Btrees%26svnum%3D10%26um%3D1%26hl%3Dfr%26client%3Dsafari%26rls%3Dfr%26sa%3DN"

3. Présentation



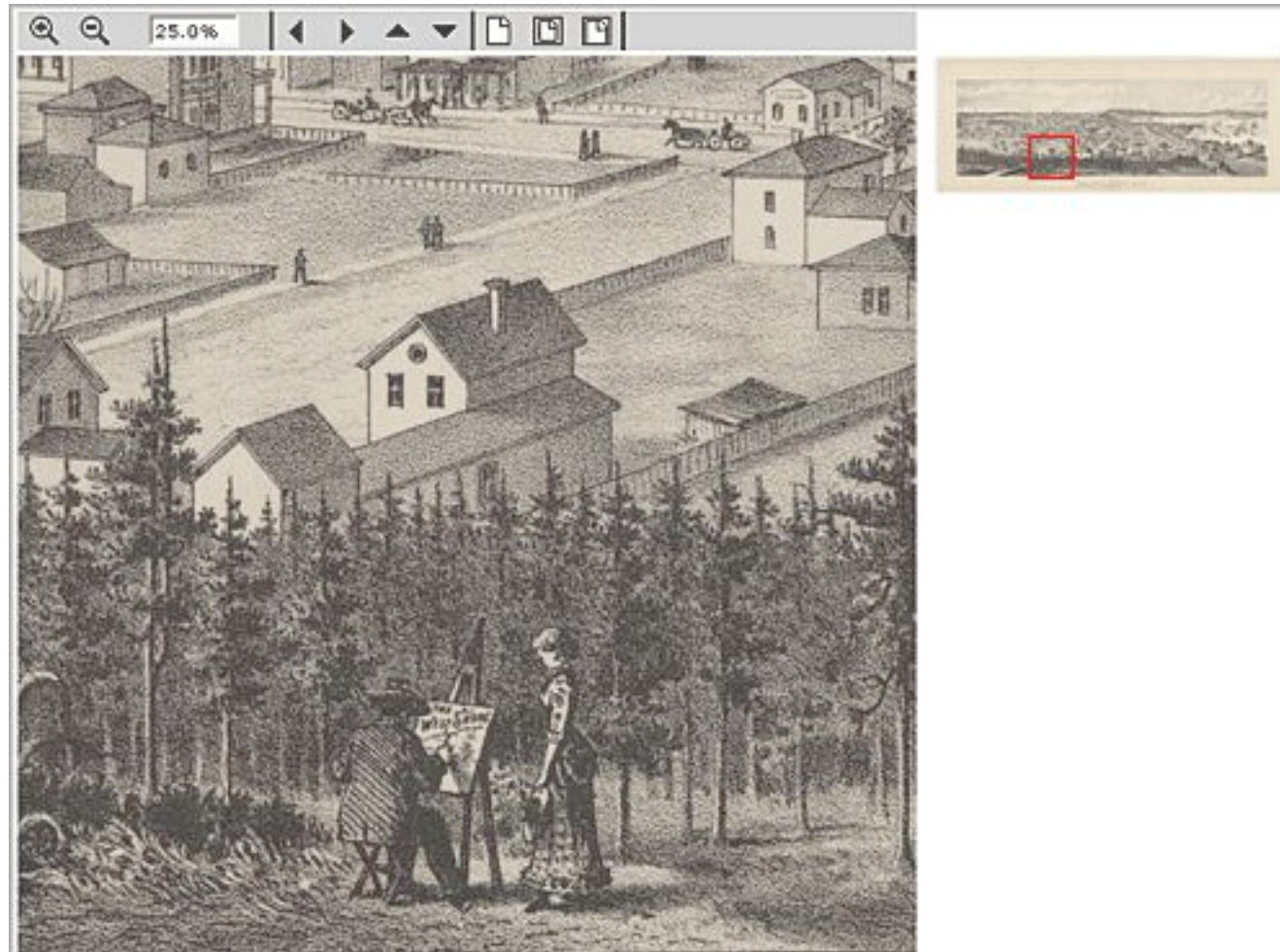
Un exemple : classer les espèces vivantes sur Terre



Panneau 1.50x1m env.

=> noms illisibles....

Overview/detail



<http://www.oclc.org/americalatina/es/contentdm/about/displaying/seattlemap2.gif>

Exercice

Citer 5 logiciels qui emploient cette technique :

#1 : acrobat reader (page courante + miniatures sur le côté)

#2 :

#3 :

#4 :

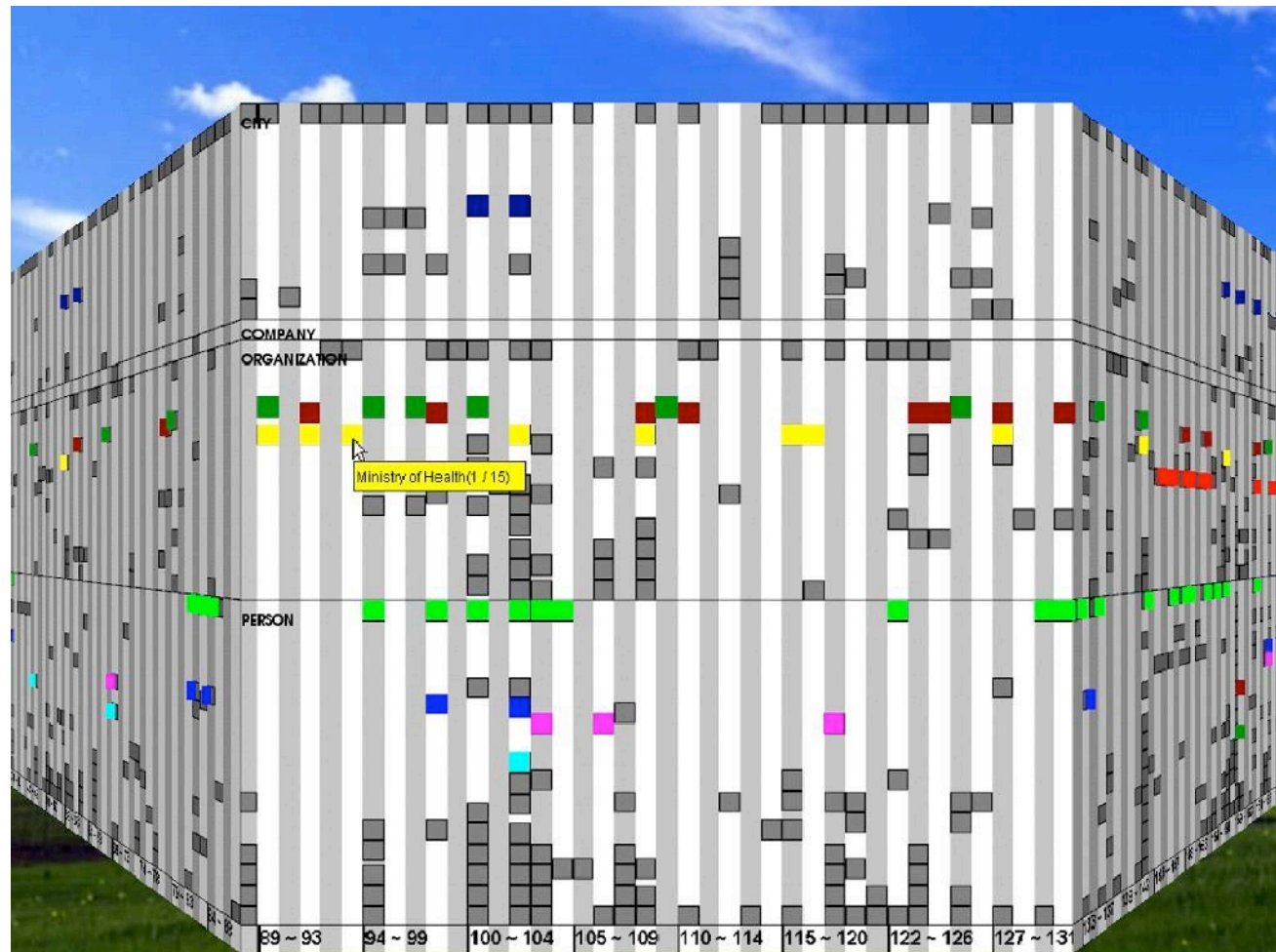
#5 :

Distorsion

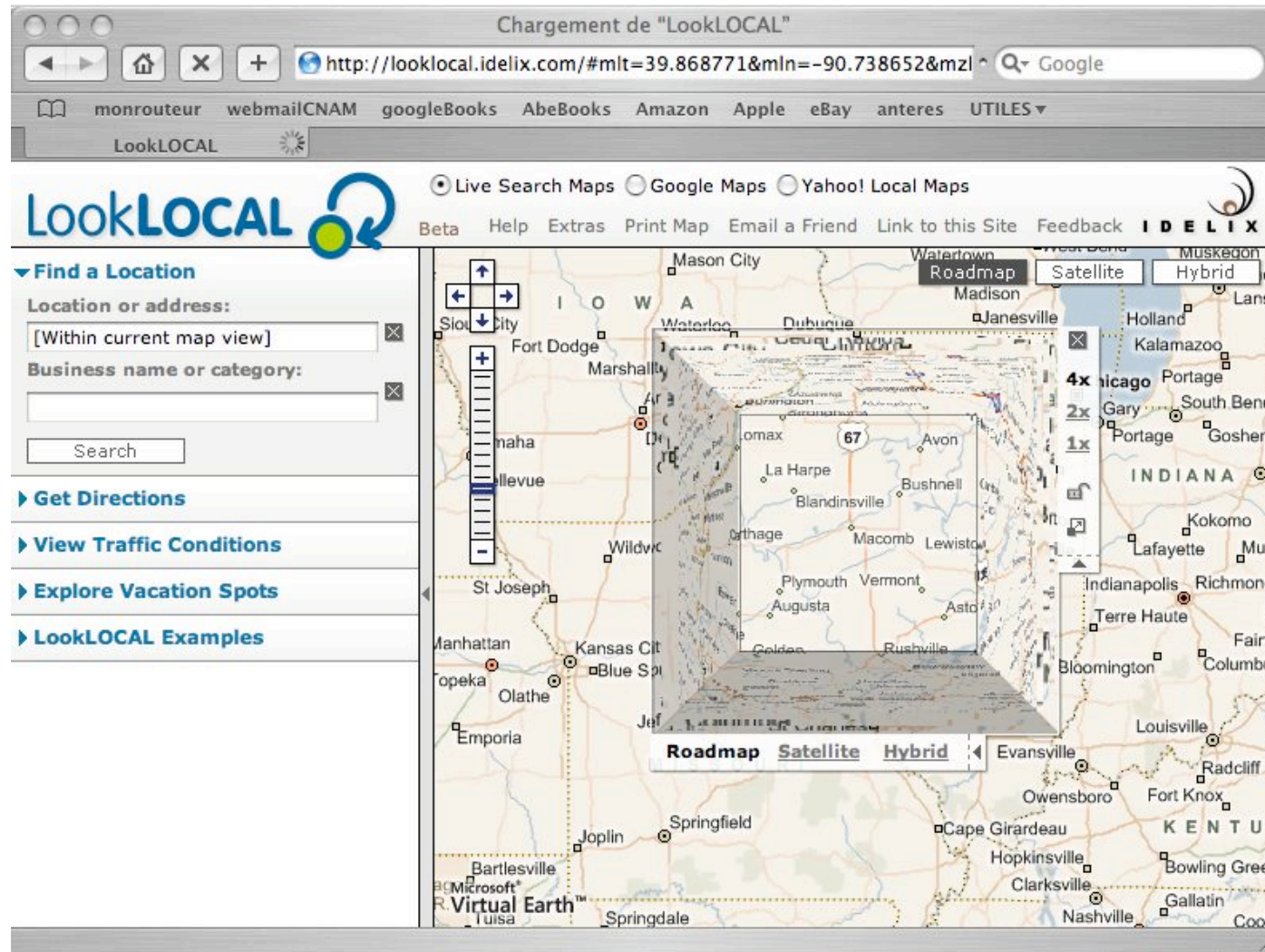
Video
#12



Bifocal display (Spence et al., 1980-2)

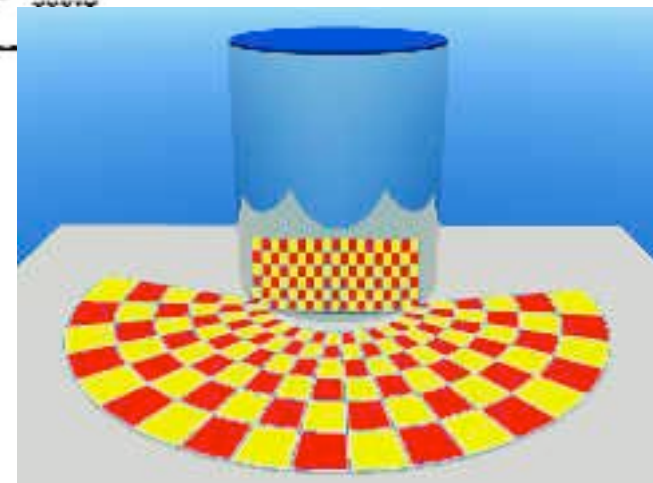
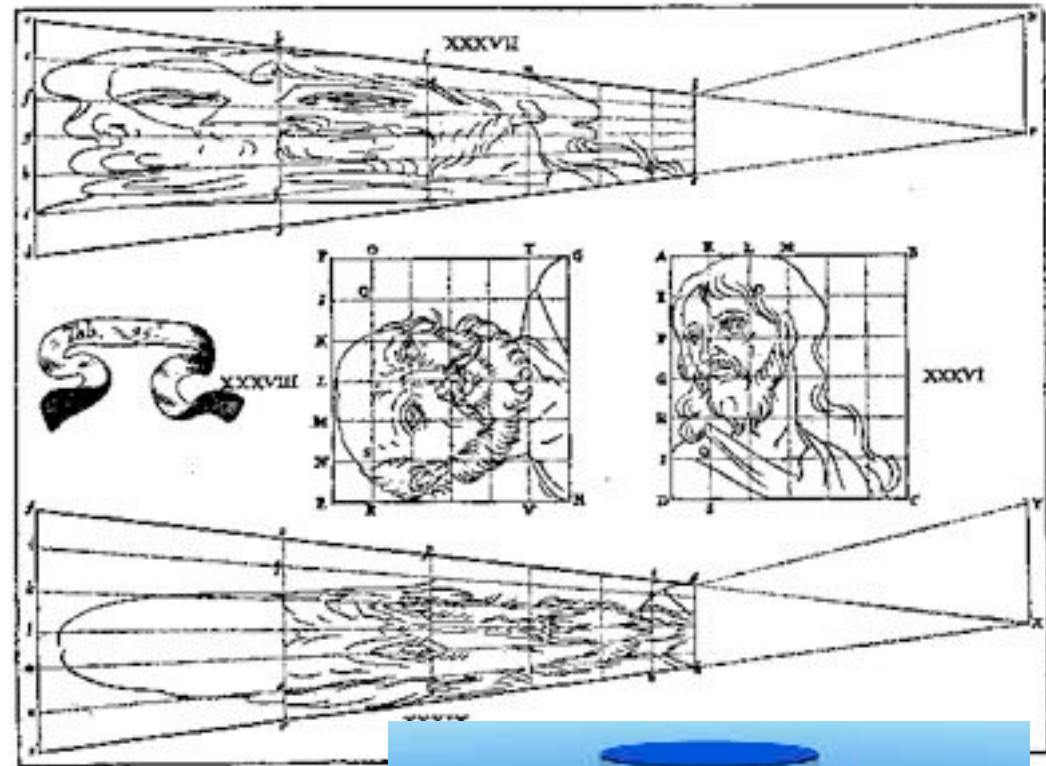
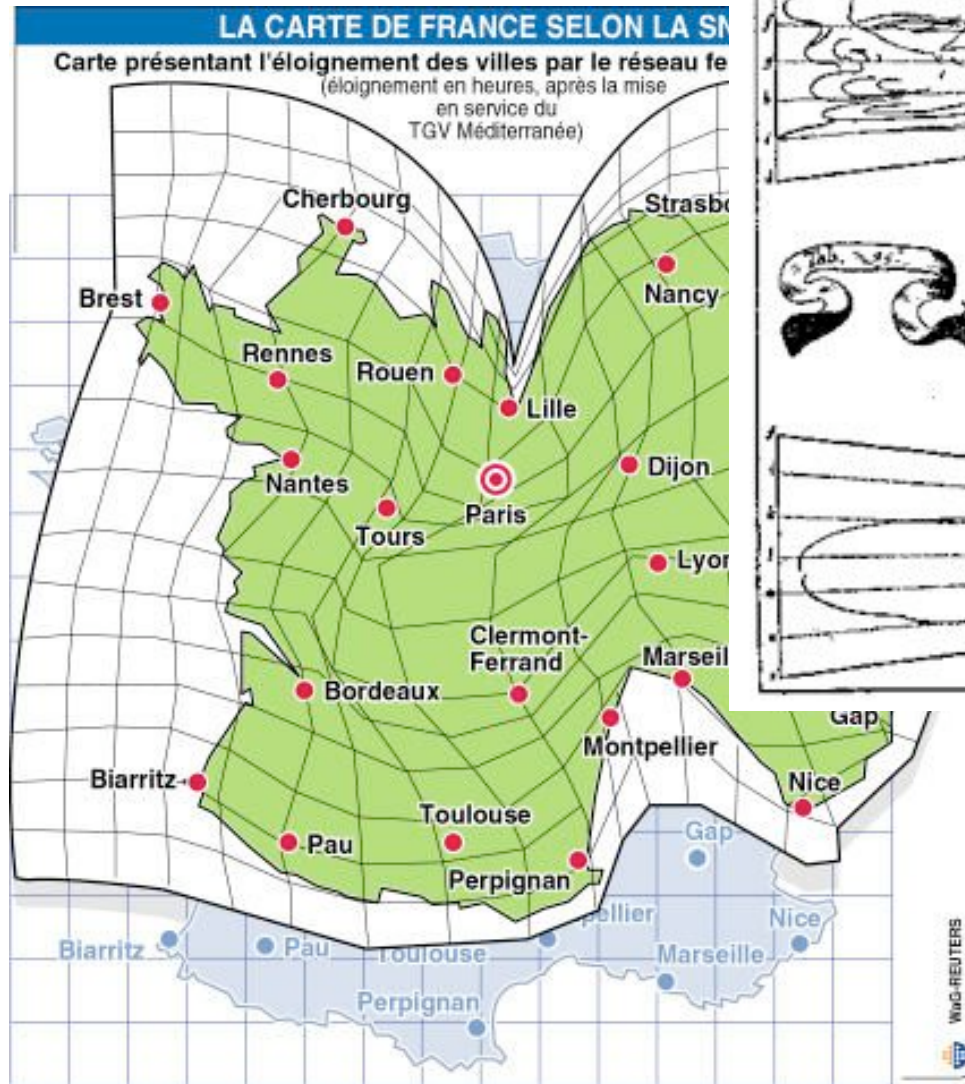


Le dock de MacOSX



IDELIX : Application de cartographie sur le web (ou PDA)

Lien avec les anamorphoses (géographiques ou autres) ?



Suppression (filtrage)

Furnas : generalized
fish-eye views (CHI'86)

Degree of interest (DOI) =
Fonction de

- a priori importance (API)
- distance au focus courant (D)

Saul STEINBERG

View of the World from 9th Avenue, 1976.

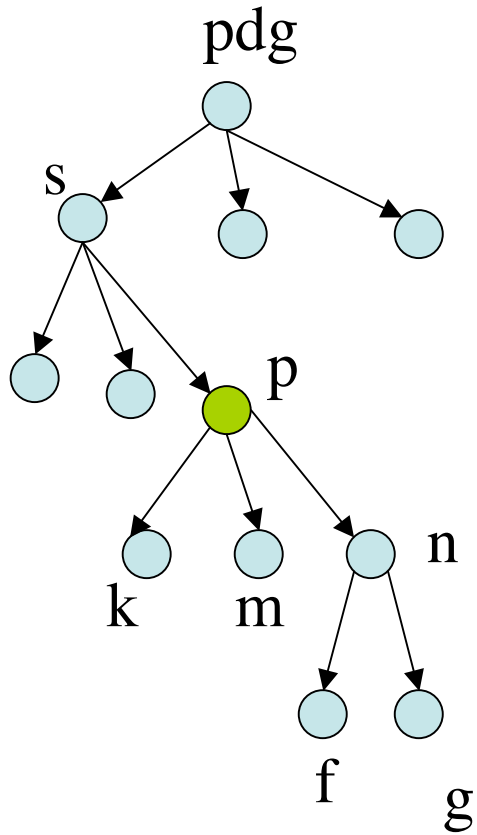
Ink, pencil, colored pencil, and watercolor on paper, 28 x 19".

Cover drawing for The New Yorker, March 29, 1976.

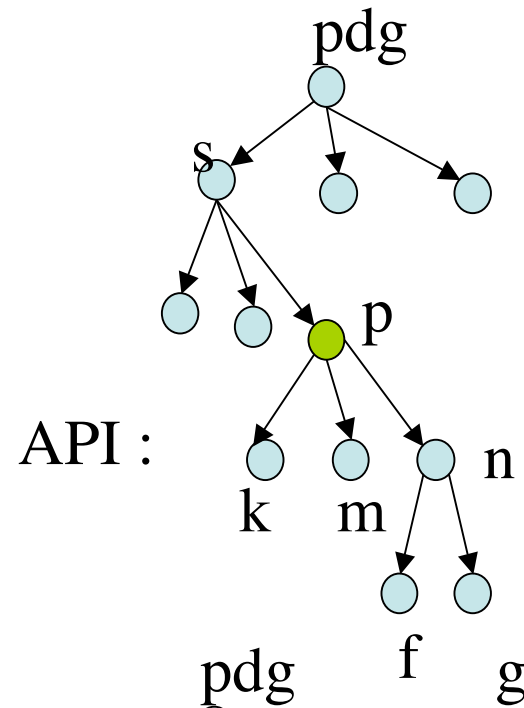
http://www.saulsteinbergfoundation.org/gallery_24_viewofworld.html



Exemple sur un arbre

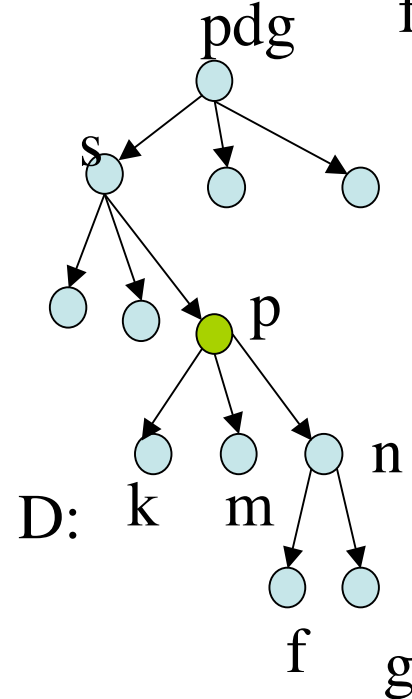


Focus en p



API :

API-D = ?



D:

Rapid Serial Visual Presentation (RSVP)

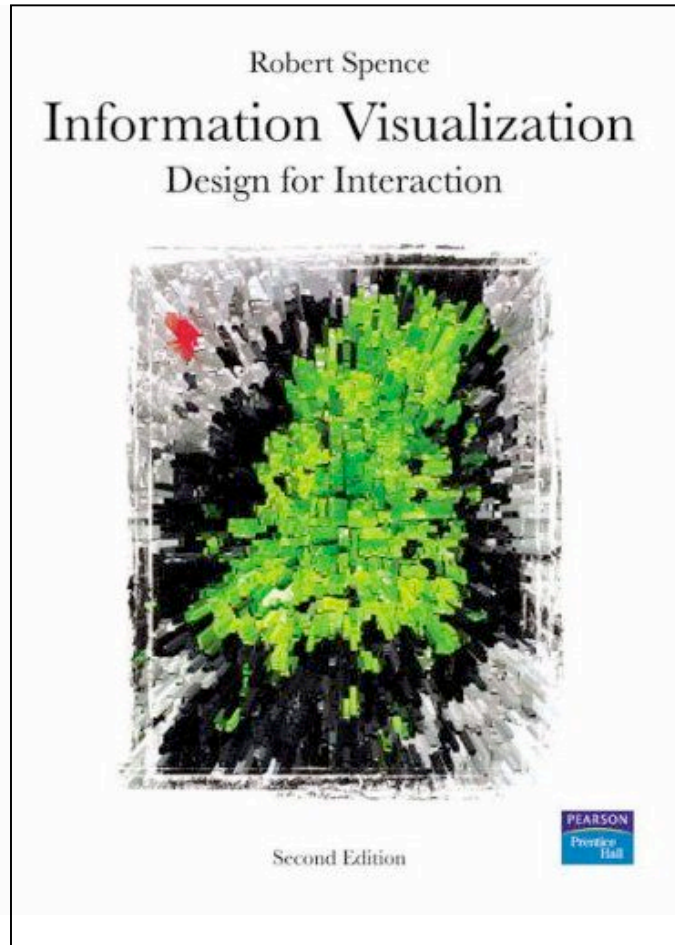
Remplacer
l'espace par le
temps

Video#21 Spence

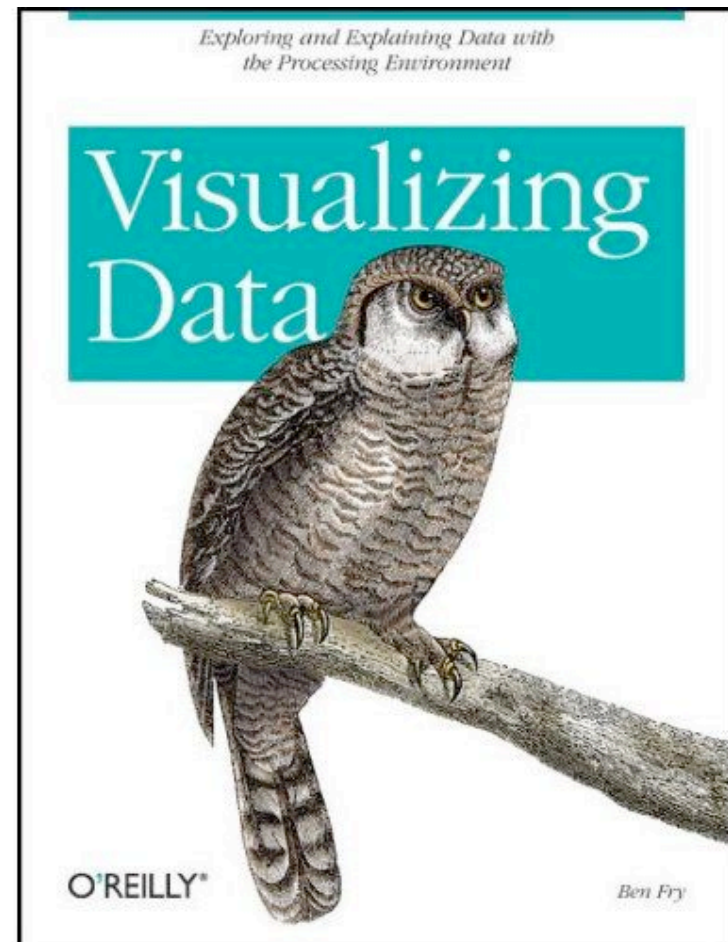
0.1s / image



4. Bibliographie et logiciels

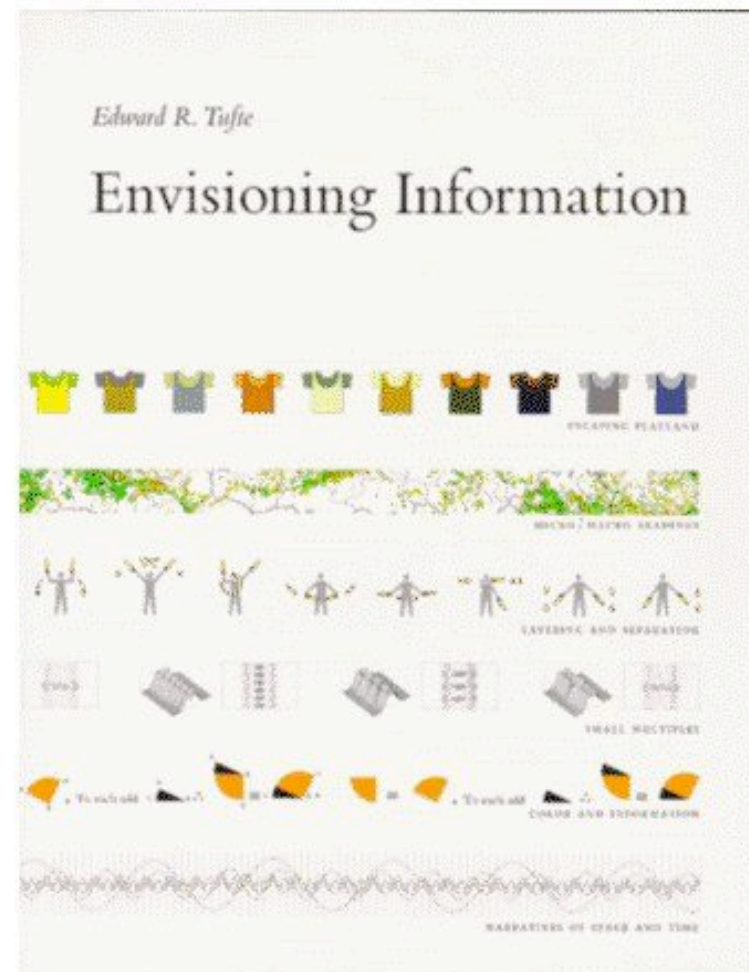
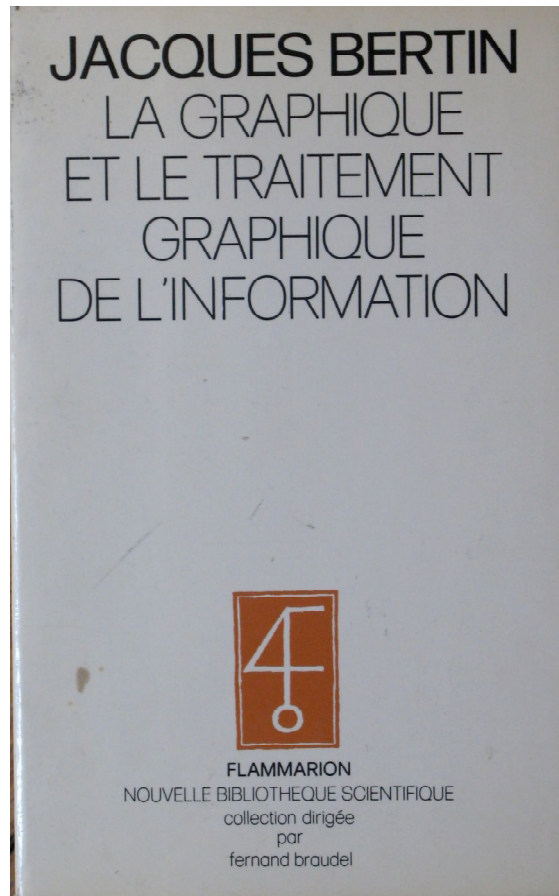


R. SPENCE

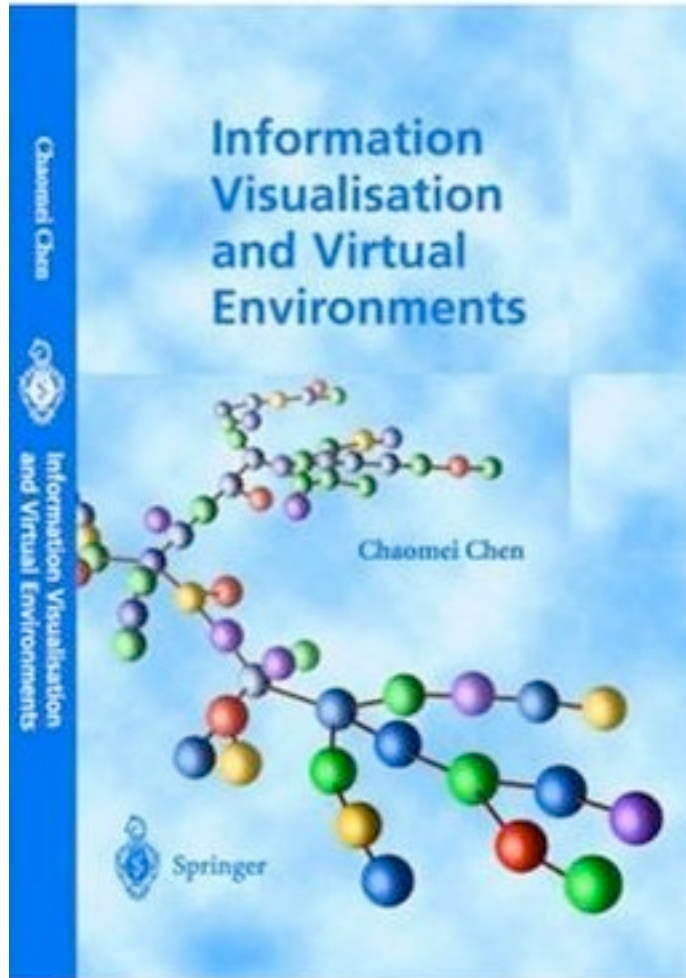


B. FRY (processing)

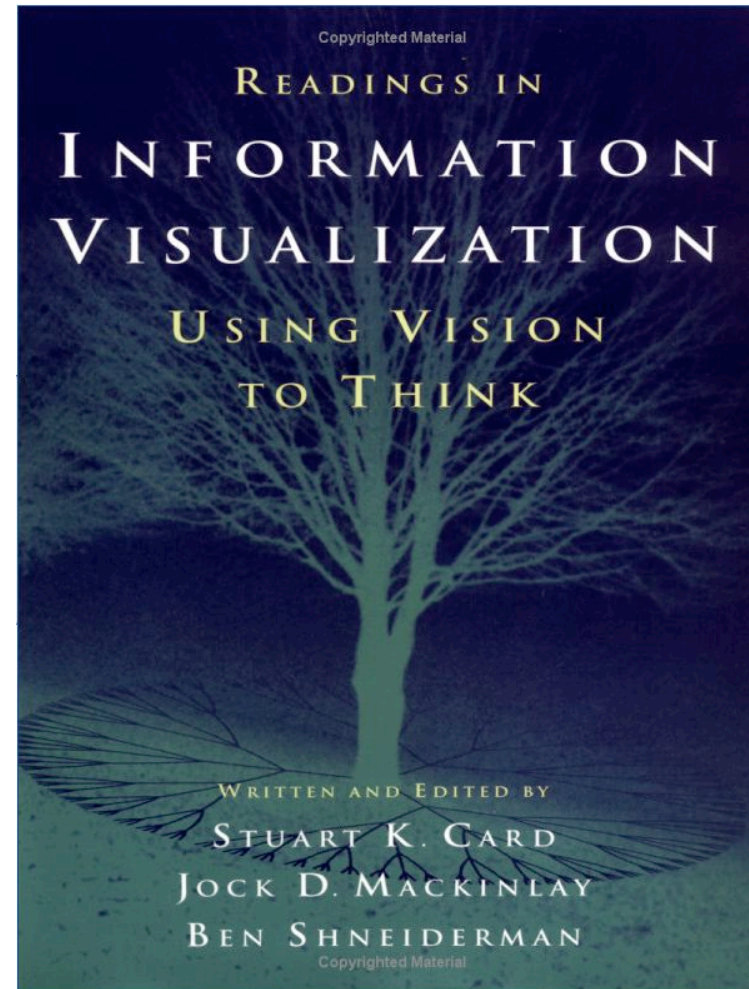
Les classiques



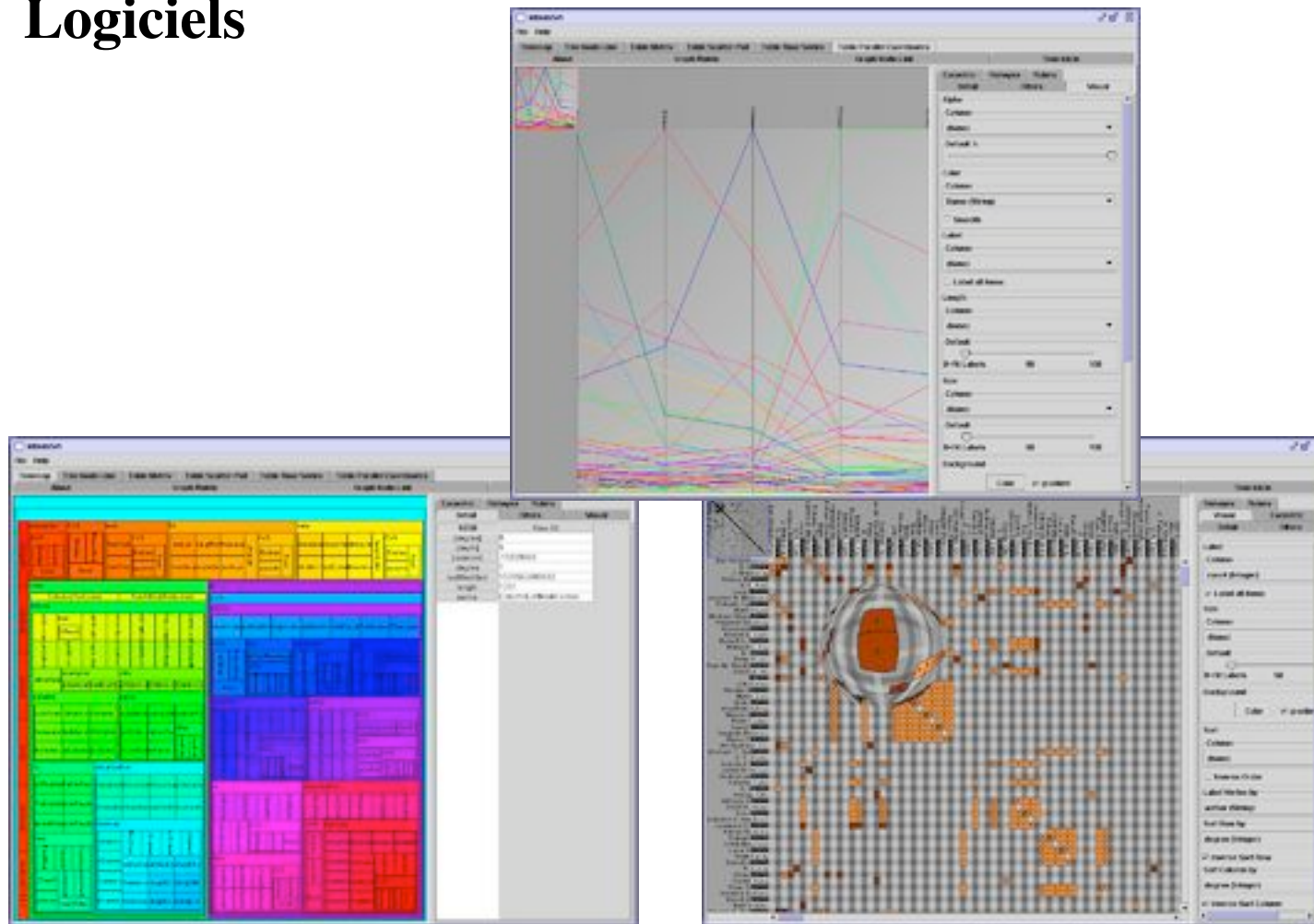
Niveau recherche :



(existe en 2eme ed.)



Logiciels



The InfoVis Toolkit

<http://ivtk.sourceforge.net/>
J.D. Fekete (INRIA, 2003-5)

http://www.tableausoftware.com/learning/gallery

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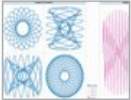
TRAINING | **VISUAL EXAMPLES** | CUSTOMER APPLICATIONS | ABOUT VISUALIZATION | WEB SEMINARS AND EVENTS

visual examples | entire gallery


seeing is learning



AIDS in Perspective




Tricked Out Trochoids



Economic Davids vs Goliaths



Per Capita Energy Use



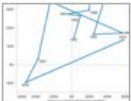
"Blue-Hairing"




Hard Crash Tech Stocks



Dot.com Bubble Burst




Skittish Investors?



Buying Condos in FL?



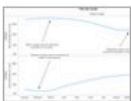
English League Soccer




Who's Online




Hurricane Tracks




Monthly Ice Cycle




Sales Pipeline



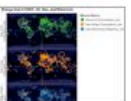
Hurricane Influences



Tropical Storm Tracks



Hot Enough Yet?



Worldwide Energy Use

1 2 next > last »

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Tableau (Jock Mackinlay)

prefuse | interactive information visualization toolkit

http://prefuse.org/

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release 2007.10.21
source zip (.zip) 4.1mb

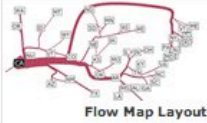
Gallery

 sense.us

 DocuBurst

 StudiAnalyse

 Social Action

 Flow Map Layout

Feeds (Atom | RSS)

the prefuse visualization toolkit

Prefuse is a set of software tools for creating rich interactive data visualizations. The original **prefuse** toolkit provides a visualization framework for the Java programming language. The **prefuse flare** toolkit provides visualization and animation tools for ActionScript and the Adobe Flash Player.

Prefuse supports a rich set of features for data modeling, visualization, and interaction. It provides optimized data structures for tables, graphs, and trees, a host of layout and visual encoding techniques, and support for animation, dynamic queries, integrated search, and database connectivity. Prefuse is written in Java, using the Java 2D graphics library, and is easily integrated into Java Swing applications or web applets. Prefuse is licensed under the terms of a **BSD license**, and can be freely used for both commercial and non-commercial purposes.

The **visualization gallery** and **demonstration video** provide numerous examples of the types of applications that can be built with the prefuse toolkit.

To learn more about prefuse, take a look at the **user's manual** or the **frequently asked questions**. For users of the alpha version of the toolkit, there is also a **porting guide** for migrating to the beta version.

Need help? Visit the **Help Forum on SourceForge.net** (You'll need a SourceForge login to post). Please be sure to include detailed information (e.g., stack traces, source code, etc) if you need debugging help.

If you are interested in tools for ActionScript and Flash, see the **prefuse flare** project instead.

announcements

2007.10.22: We're happy to announce the first alpha release of **prefuse flare**, a new prefuse-based visualization library written in ActionScript 3! Flare brings the visualization capabilities of prefuse to the web and runs in the Adobe Flash Player.

2007.06.11: The Toronto Star, Canada's most highly circulated daily, just ran a **story on the prefuse-based DocuBurst visualization!** Congrats to Chris, the author of DocuBurst! Check out the prefuse gallery for DocuBurst and other great visualization projects.

2007.02.11: A number of new projects have been added to the **prefuse gallery**. Check them out!

2006.05.18: The prefuse.org website has moved to a new server, with better performance and new features. For example, you can now add comments to pages of the user manual. Apologies to any visitors who have encountered 404 errors by using outdated prefuse.sourceforge.net URLs.

2006.04.16: Prefuse has now surpassed 10,000 downloads! Thanks to everyone who has contributed to the toolkit along the way.

2006.03.03: The prefuse-based **Vizster** visualization appeared on the CBS crime drama **Numb3rs!** **Watch the video clip (WMV, 4.7M).**

2006.02.09: The new **prefuse.org** website launched.

releases

Prefuse (UC Berkeley)