2D & 3D Information Visualization: The Next Big Revolution

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What is Information Visualization?

• “The use of computer-supported, interactive, visual representations of abstract data to amplify cognition.”

Other definitions from the literature...

• “The process of analyzing and transforming nonspatial data into an effective visual form”
• “A highly efficient way for the mind to directly perceive data and discover knowledge and insight from it”
• “The visual appearance of data objects and their relationships”
• “The transformation of abstract data to a visual representation, which is rapidly understood by the user”
Why is it important?

• Human beings are tremendously influenced by sensory perceptions...

• The way that we learn, grow, understand, and adapt is based on our ability to view, perceive, and conceptualize thoughts and ideas...

• The power to visualize and graphically represent results, ideas, solutions, and problems in multiple dimensions, as well as to manipulate data and virtually collaborate with others, is the next big revolution in technology.
“Tell me and I’ll forget...
Show me and I may remember...
Involve me and I’ll understand.”

Ancient Chinese proverb
Who is doing it right now?

- **Your users everyday**
  - **Students**
    - Virtual collaborative gaming
    - Collaborative spaces on the Internet
    - On their Gameboys and home entertainment systems
  - **Faculty**
    - In the sciences (David Rumsey Map Collection at [http://www.davidrumsey.com/GIS/3d.htm](http://www.davidrumsey.com/GIS/3d.htm))
    - In history ([http://www.visionarywebsites.com/portfolio_3d.htm#2](http://www.visionarywebsites.com/portfolio_3d.htm#2))
Areas of study already established in visualization...

- Data visualization
- Geographic visualization
- Scientific visualization
- Software visualization
Dimensional types of information visualization

- Temporal
- One-dimensional (1D)
- Two-dimensional (2D)
- Three-dimensional (3D)
- Multi-dimensional (MultiD)
- Tree
- Network
- Workspace

3D information visualization presentation techniques

- Benediktine space
- Cityscapes
- Cluster maps
- Concept mapping
- Fish-eye views
- Graphs
- Landscapes
- Networks
- Perspective walls
- Rooms
- Spheres
- Topic maps
- Trees
Programming languages for 3D

• Virtual Reality Modeling Language (VRML)/ eXtensible 3D (X3D)

• Scalable Vector Graphics (SVG)
  [http://www.w3.org/TR/ SVG/](http://www.w3.org/TR/ SVG/)

• Many other ones, by gamers and techies
An Atlas of Cyberspaces

http://www.cybergeography.org/atlas/atlas.html

Provides examples of graphic representations of cyberspaces like the Internet, the World Wide Web, and other digital environments. Divided into topics such as historical, geographical, MUDS and virtual worlds, weather maps, conceptual, surfmaps, website maps, artistic, cables and satellites, topology, census, etc.
Resources

The Geography of Cyberspaces Directory
http://www.cybergeography.org/vis_infospaces.html

Information Visualization website
http://iv.homeunix.org/
OPACs experimenting with 2D/3D

- Lexington Public Library
  http://www.lexpublib.org/
  AquaBrowser
    - Topic map

- Belmont Abbey College Library, North Carolina
  http://www.dlib.org/dlib/june03/beagle/06beagle.html
  Antarctica Systems, Inc. (MapNet and VisualNet softwares)
  http://www.antarctica.net
Stanford Grokker

http://www-sul.stanford.edu/about_sulair/special_projects/stanford_grokker.html

Available only to Stanford faculty, students, and staff

http://www.grokker.com/
Interesting websites to explore

- LivePlasma
  http://www.liveplasma.com

- CubicEye
  http://www.2ce.com/

- 3D Virtual Reality Worlds
  http://vw.indiana.edu
More interesting websites

• 3D Insects
http://www.ento.vt.edu/~sharov/3d/3dinsect.html

• Visualization website
http://visualcomplexity.com/vc/

For more information, see 3D Information Visualization Techniques: 2D and 3D Information Visualization Resources, Applications, and Future (Library Technology Report, Jan./Feb. 2005)
Innovative Projects in the Humanities

• *Library Technology Report, July/August 2005*

• *10 x 10: 100 Words and Pictures That Define the Time*
  
  [http://www.tenbyten.org/10x10.html](http://www.tenbyten.org/10x10.html)

• *Theban Mapping Project*
  

• *Virtual Vaudeville*
  

• *The Lost Museum*
  
  [http://www.lostmuseum.cuny.edu/intro.html](http://www.lostmuseum.cuny.edu/intro.html)
Companies and software

ActiveWorlds ($6.95 per month)
http://www.activeworlds.com/

Grokker (free 30-day trial)
http://www.groxis.com/service/grok

VisualNet
http://www.antarctica.net/products/visualnet.shtml

Pacific Northwest National Laboratory (PNNL)
http://www.pnl.gov/infoviz/
Galaxies, ThemeView™, Starlight, OmniViz Pro™, and IN-SPIRE™

Anacubis (free 10-day trial)
http://www.anacubis.com

Aquabrowser
http://www.medialab.nl/

Inxight
http://www.inxight.com/about/
SmartDiscovery™, VizServer™, Categorizer™, LinguistX®, Star Tree™, Summarizer™, Table Lens®, and Thing Finder™

Vivisimo
http://vivisimo.com/
http://clusty.com/

Visual Thesaurus and ThinkMap (free 5-click demo)
http://www.visualthesaurus.com
http://www.thinkmap.com

xrefer Research Mapper (free 30-day trial)
http://www.xrefer.com/research/
See also Judy Luther and Maureen Kelly, and Donald Beagle. “Visualize This.” *Library Journal*. March 1, 2005, p. 34-37.


http://www.cvrlab.org/research/images/CVR%20to%20CVRO.pdf
From *CVR to CVRO*:

If the ten-year rule of thumb holds true, personal computer enthusiasts by the millions a decade from now will be interacting directly with virtual worlds through their desktop reality engines.

Howard Rheingold (1991)
All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. For not only with a view to action, but even when we are not going to do anything, we prefer seeing (one might say) to everything else. The reason is that this, most of all the senses, makes us know and brings to light many differences between things.

Aristotle, *Metaphysics* 980a (ca. 330 B.C.)
Questions?

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