Visualization: From Pixels to Insight

March 3, 2007
UBC CS TechTrek
Computer Graphics

- create or manipulate images with computer
- movies, games, photorealistic simulation
Computer Graphics

- create or manipulate images with computer
  - movies, games, photorealistic simulation
- but wait, there’s more!
Visualization

- Using interactive computer graphics to help people understand information better
  - Substitute visual perception for cognition
  - Make the computer do the hard work
- Some ways we've used it so far
  - Untangling biology
  - Seeing what we speak
  - Finding who's who in the movies
  - Playing with math
Evolutionary Relationships

Small Frogs, Small Tree

Big Planet, Big Tree of Life

Big Planet, Big Tree of Life

You are here!

Animals

Plants

Protists

Fungi

The Old Way...

focus

classification tree

context
The New Way: TreeJuxtaposer

- side-by-side comparison of evolutionary trees
- stretch and squish to navigate
- demo at http://olduvai.sf.net/tj

more info at www.cs.ubc.ca/labs/imager/tr/2003/tj
Protein-Gene Pathways: Cerebral

- pathway-style diagrams familiar to biologists
- automatically place items with minimal clutter
- demo at http://www.pathogenomics.ca/cerebral/

www.biocarta.com

more info at www.cs.ubc.ca/labs/imager/tr/2007/barskya_cerebral_appnote
Untangling the Ball of Yarn: TopoLayout

- breaking it up into the right pieces
- using the right tool for the job to draw each piece

GRIP

FM$^3$

TopoLayout

more info at www.cs.ubc.ca/labs/imager/tr/2006/Archambault_TopoLayout_TVCG
Who's Who in the Movies: Grouse

more info soon at www.cs.ubc.ca/labs/imager/tr/2007/Archambault_Grouse
Seeing What We Speak: Constellation

- computational linguistics

more info at graphics.stanford.edu/papers/const
Mapping Out Math: Movies

- topology and geometry

The Shape of Space

Outside In

more at www.geom.uiuc.edu/video/sos

more at www.geom.uiuc.edu/docs/outreach/oi
Symmetries of Space

- play with patterns to learn underlying principles

more info at www.scienceu.com/geometry/articles/tiling
Yet More Information

- pictures, videos, software, papers, talks
  - http://www.cs.ubc.ca/~tmm

- these talk slides
  - http://www.cs.ubc.ca/~tmm/talks/techtrek07