Lecture 3: Focus+Context
Information Visualization
CPSC 533C, Fall 2007
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Papers Covered

Focus+Context Intuition
- move part of surface closer to eye
- stretchable rubber sheet
- borders tacked down
- merge overview and detail into combined view

Bifocal Display
transformation magnification
1D 2D

Perspective Wall
transformation magnification
1D 2D

Polyfocal: Continuous Magnification
transformation magnification
1D 2D

Fisheye Views: Continuous Mag
transformation magnification
1D 2D rect polar norm polar

Avoiding Disorientation
- problem
- maintain user orientation when showing detail
- hard for big datasets
- exponential in depth
- node count, space needed
global overview

Overview and detail
- two windows: add linked overview
- cognitive load to correlate

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Noneuclidean Geometry
- Euclid's 5th Postulate
  - exactly 1 parallel line
- spherical
  - geodesic = great circle
  - no parallels
- hyperbolic
  - infinite parallels

Parallel vs. Equidistant
Euclidean:
- inseparable
- hyperbolic: different

Exponential Amount Of Room
room for exponential number of tree nodes
2D hyperbolic plane embedded in 3D space
hemisphere area
hyperbolic: \(2\pi \sinh^2 r\)
euclidean: \(2\pi r^2\)
[Thurston and Weeks 84]
Models, 2D

Klein/projective Poincare/conformal Upper Half Space

Klein vs Poincare
▶ Klein
  ▶ straight lines stay straight
  ▶ angles are distorted
▶ Poincare
  ▶ angles are correct
  ▶ straight lines curved
▶ graphics
  ▶ Klein: 4x4 real matrix
  ▶ Poincare: 2x2 complex matrix

Upper Half Space
▶ cut and unroll Poincare
  ▶ one point on circle goes to infinity
▶ the hyperboloid itself embedded one dimension higher

Minkowski
▶ 1D
▶ 2D
[www-gap.dcs.st-and.ac.uk/˜history/Curves/Hyperbola.html]
[www.geom.umn.edu/˜crobles/hyperbolic/hypr/modl/mnkw/]

SpaceTree
▶ focus+context tree: filtering, not geometric distortion
  ▶ animated transitions
▶ semantic zooming
▶ demo