Large Scale Radial Graph Drawing

Cody Robson
Graph Exploration

Radial Layout: Constrains graph to rings

User can shift focus to avoid panning.
Radial Layout Papers

*NicheWorks—Interactive Visualization of Very Large Graphs*

*Animated Exploration of Graphs with Radial Layout*
Goal:

Scale up radial graph drawing

Human Limit

Performance Limit

Label Placement

Solution
Data:

Network-focused

InfoVis 2003 Contest: Trees
Human Limit:
- Radial Animation
- Slow-in Slow-out
- Maintain neighbor ordering

Possible:
- Intermediate focus for large transitions
- Aggregate nodes
- Hide nodes
- Fade-out Fade-in transitions
- Focus + Context
Performance Limit:

• Use shading, not outlining
  • Tilt quads to exploit fog
• Texture lookups for coloring
  • Utilize texture filtering

Possible:

• Point sprites / Imposters
• GPGPU graph layout

Interactive Information Visualization of a Million Items

Multi-Level Graph Layout on the GPU
Yaniv Frishman and Ayellet Tal. Proc InfoVis 2007
Fallback: Label Placement

- Greedy with priority
- 2D Bounding box collision detection
- Layout at multiple scales and filter

Possible:

- Alter layout to avoid filtering?
TreeJuxtaposer: Scalable Tree Comparison using Focus+Context with Guaranteed Visibility
Tamara Munzner, Francois Guimbretiere, Serdar Tasiran, Li Zhang, and Yunhong Zhou. SIGGRAPH 2003

Dynamic Map Labeling
Ken Been, Member, IEEE, Eli Daiches, and Chee Yap, InfoVis2007

On labeling in graph visualization
Ugur Dogrusoz Konstantinos G. Kakoulis, Brendan Madden and Ioannis G. Tollis, Information Sciences: an International Journal
Tools:
- OpenGL
- FLTK (Fast Light Toolkit)
- IrrXML

Shaders?
- GLSL

GPGPU?
- BrookGPU, libSH
Progress:

- Week 1: Initial OpenGL setup
- Week 2+3: Animated Radial Layout
- Week 4: Scale, determine path
- Week 5+6: Complete program
- Week 7: Presentation / Write-up
Program:
• UI Skeleton
• Picking, node info display
• Radial graph layout

In Progress:
• Slow-in Slow-out

Next:
• Animation

~~ End of Week 3 ~~