

Evaluating Visual Analytics Toolkits

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Evaluation

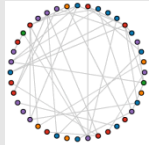
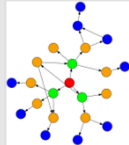
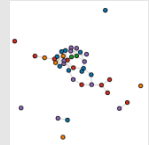
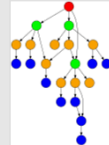
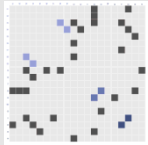
- Phase 1 – Functional Comparison
 - Visualization
 - Analytical
 - Development Environment
- Phase 2 – Benchmark Application
 - Benchmark = Document Explorer
 - Top 3 Toolkits from Phase 1
 - Prefuse Flare
 - Tulip
 - Titan



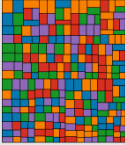
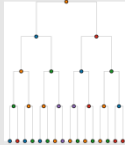
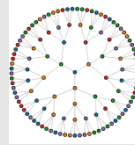
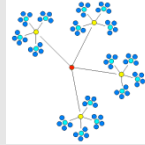
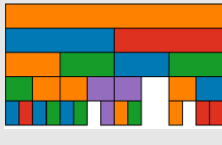
Document Explorer

- Load document similarity graph
- Display graph (nodes = documents)
 - Color-code by concept label
 - Force-directed layout
- Selection - Display node's text contents
- Analysis
 - Adjacency (color edges if node concepts !=)
 - Compare connected components to labels

Graph Visualization

	Circular Layout 	Radial Layout 	Force Directed 	Hierarchical Layout 	Adjacency Matrix 
Axiis					
birdeye	X	X	X		
ESTAT					
GeoVista Studio					
Gephi			X	X	
Google Vis. API					
GraphViz	X	X	X	X	
Improvise				X	
Infovis Toolkit	X		X		X
JIT		X	X		
JFreeChart					
JGraphX	X		X	X	
JUNG	X		X		
Mondrian					
NetworkX	X	X	X		
Prefuse	X		X		
Flare	X		X		
Protovis			X		X
R					
Titan	X		X	X	
Tulip	X			X	
VisAD					
WilmaScope			X		
Zest		X	X		

Tree Visualization

	TreeMap 	Dendrogram 	Radial 	Balloon/Cosmic 	Icicle 
Axiis	X				
birdeye	X	X	X		
ESTAT					
GeoVista Studio					
Gephi					
Google Vis. API	X				
GraphViz					
Improvise					
Infovis Toolkit	X	X	X		X
JIT	X	X	X		X
JFreeChart					
JGraphX		X			
JUNG		X	X		
Mondrian					
NetworkX					
Prefuse	X	X	X	X	
Flare		X	X		X
Protovis	X	X	X		X
R					
Titan	X	X	X	X	X
Tulip	X	X	X		
VisAD					
WilmaScope					
Zest		X	X		

Tabular Data Visualization

	Bar chart	Line chart	Scatterplot	Box plot	Pie chart	Contour Plot	Stacked Bar Chart	Stacked Area Chart	Parallel Coordinates
Axisis	X	X	X		X		X	X	
birdeye	X	X	X		X		X	X	X
ESTAT		X	X						X
GeoVista Studio	X	X	X						
Gephi									
Google Vis. API	X	X			X			X	X
GraphViz									
Improvise	X		X		X				
Infovis Toolkit	X	X	X						X
JIT	X				X		X	X	
JFreeChart	X	X	X		X		X	X	
JGraphX									
JUNG									
Mondrian	X		X	X					X
NetworkX									
Prefuse	X	X	X				X	X	
Flare	X	X	X		X		X	X	
Protovis	X	X	X	X	X		X	X	X
R	X	X	X	X	X	X			
Titan	X	X	X		X	X			
Tulip	X	X	X						X
VisAD		X	X			X			
WilmaScope									
Zest									



Geospatial/Spatio Temporal Vis

	Map Overlays	Choropleth Maps	Graduated Symbol Maps	Map Projections	Dymaxion Maps	Cartograms	3D Globe
Axiis							
birdeye	X	X	X	X		X	
ESTAT		X					
GeoVista Studio	X						
Gephi							
Google Vis. API	X	X					
GraphViz							
Improvise							
Infovis Toolkit							
JIT							
JFreeChart							
JGraphX							
JUNG							
Mondrian		X					
NetworkX							
Prefuse							
Flare							
Protovis	X	X	X	X	X	X	
R							
Titan							X
Tulip	X						
VisAD							
WilmaScope							
Zest							

Graph Analysis

	Adjacency	Accessibility	Centrality	Common Connection	Connectivity	Minimum Spanning Tree	Connected Component Analysis
Axiis							
birdeye	X				X		
ESTAT							
GeoVista Studio							
Gephi	X	X	X	X	X		
Google Vis. API							
GraphViz							
Improvise							
Infovis Toolkit	X	X			X		
JIT							
JFreeChart							
JGraphX	X	X			X	X	
JUNG	X	X	X		X	X	
Mondrian							
NetworkX	X	X	X	X	X	X	X
Prefuse	X						
Flare	X		X		X	X	
Protovis							
R							
Titan	X	X	X	X	X	X	X
Tulip	X	X	X		X	X	
VisAD							
WilmaScope							
Zest							



Statistical Analysis

	Univariate	Bivariate	Multivariate	Dimensionality Reduction	Clustering	Latent Semantic Analysis (LSA)	Latent Dirichlet Allocation (LDA)
Axiis							
birdeye							
ESTAT							
GeoVista Studio							
Gephi					X		
Google Vis. API							
GraphViz							
Improvise							
Infovis Toolkit							
JIT							
JFreeChart							
JGraphX							
JUNG					X		
Mondrian							
NetworkX					X		
Prefuse							
Flare					X		
Protovis							
R	X	X	X	X		X	X
Titan	X	X	X	X	X	X	X
Tulip					X		
VisAD							
WilmaScope							
Zest							

Development Environment

	Platform	Languages	GUI	SQL	File Formats	Documentation
Axiis	Web (Flex)	ActionScript	Flash	-	-	API Reference, examples
birdeye	Web (Flex)	ActionScript	Flash	-	GeoRSS, GeoML, KML, SHP	Wiki, API Reference, several examples
ESTAT	Java	Java	Swing	-	CSV, SHP	Tutorial, papers
GeoVista Studio	Java	Java	Swing	-	CSV, DBF, SHP	Quickstart guide
Gephi	Java	Java	Swing	MySQL, SQL Server	CSV, Dot, GML, GraphML, GEXL, Tulip, GDF, NET	Wiki, user manual, plugin API reference
Google Vis. API	Web	JavaScript	HTML	-	CSV, JSON, XML	User guide, reference
GraphViz	Linux, OSX, Cygwin	C	-	-	Dot	User guides, papers, DOT language spec.
Improvise	Java	Java	Swing	JDBC	CSV, XML, DBF, SHP	Paper, Ph.D Thesis
Infovis Toolkit	Java	Java	Swing	-	CSV, TM3, Dot, TreeML, GraphML	API reference, unfinished user manual
JIT	Web	JavaScript	HTML	-	JSON	Examples/demos w/ source, API reference
JFreeChart	Java	Java	Swing	JDBC	CSV, XML	Demo app w/ source, API reference, developer guide (!\$)
JGraphX	Java	Java	Swing	-	GraphML, GD, VDX	Getting started guide, API reference
JUNG	Java	Java	Swing, SWT	-	GraphML, NET	Tutorial, very short manual, API reference
Mondrian	Java	-	Swing	JDBC	Tab, R	No developer documentation
NetworkX	Python	Python	matplotlib	-	CSV, GML, GraphML, NET	Several tutorials, API reference
Prefuse	Java	Java	Swing	-	CSV, GraphML, TreeML	API reference, unfinished user manual
Flare	Web (Flex)	ActionScript	Flash	-	GraphML, JSON, Tab delim.	Tutorial, API reference
Protovis	Web (SVG)	JavaScript	HTML	-	-	Tutorials, user guide, API reference
R	Windows, Linux, OSX	C, Fortran, R	-	ODBC	Many	User guides, API reference
Titan	Windows, Linux, OSX	C++, Java, Python, TCL	Qt, TK	MySQL, PostgreSQL, Qt	XGML, VTK, Tulip, HDF5, XML, JSON, CSV, Tab	Wiki, VTK user guide, API references
Tulip	Windows, Linux, OSX	C++	Qt	-	GML, Tulip, Dot	Developer guide, incomplete API reference
VisAD	Java	Java	Swing	-	Many	Tutorial, incomplete API reference
WilmaScope	Java	Java	Swing	-	Dot, GML	API reference, plugin developer guide
Zest	Eclipse	Java	SWT	-	-	Tutorial