GLO-STIX: Graph-Level Operations for Exploratory Network Visualization

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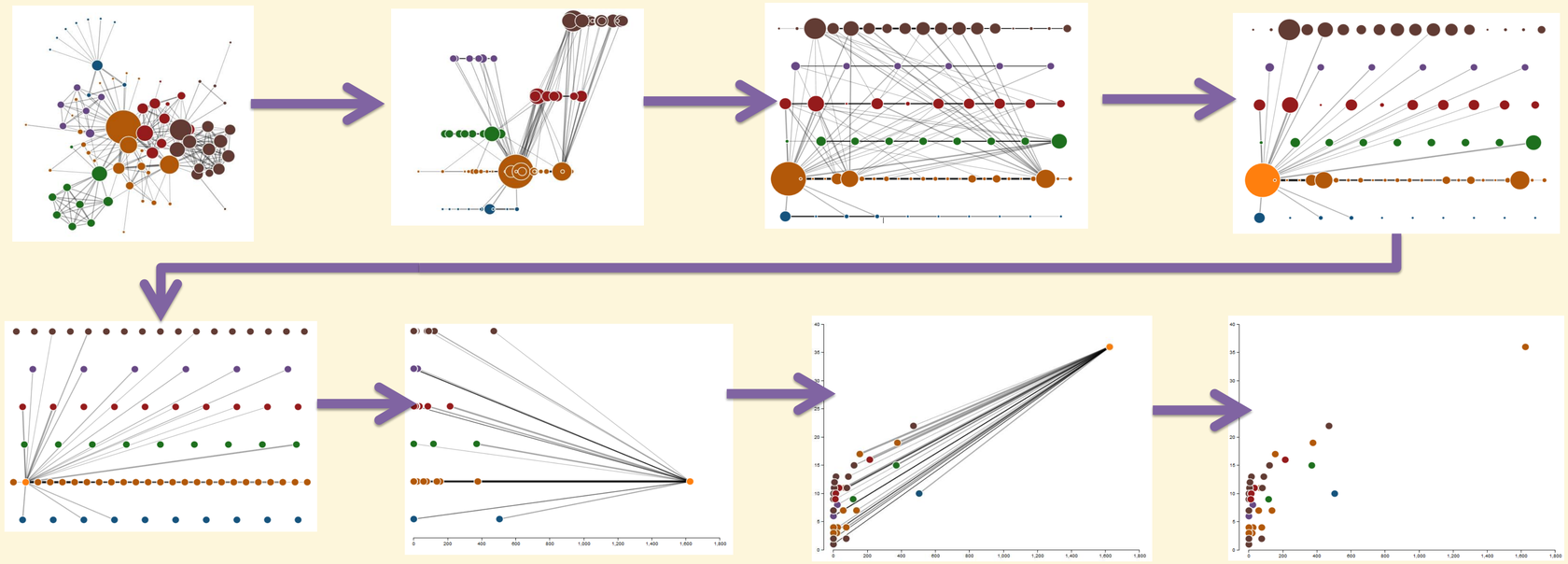
Summary

There are a wealth of graph visualization techniques for accomplishing a variety of analysis tasks. Analysts often rely on a suite of different techniques, and visual graph analysis application builders strive to provide this breadth of techniques. To provide a holistic model for specifying network visualization techniques (as opposed to considering each technique in isolation) we present the Graph-Level Operations (GLO) model. We describe a method for identifying GLOs and apply it to identify five classes of GLOs, which can be flexibly combined to re-create canonical graph visualization techniques.

Examples of Applying GLOs

Results of the GLOs making up the transition from a force-directed layout to semantic substrates to scatterplot.



Identifying GLOs

1. Identify as many different graph visualization techniques as possible
2. Form all pairs of techniques
3. For each pair, transition one technique to and from the other, recording each step
4. Each step represents a single GLO

Graph-Level Operations (GLOs):
Atomic operations on some or all graph visualization elements

Five categories of GLOs

Positioning Nodes:
Align Nodes, Evenly Distribute Nodes, …

Modifying Elements Properties:
Size Nodes by Attr, Display Links as Curved, …

Cloning Nodes:
Clone Active Generation, Select Gen k

Aggregating Nodes and Edges:
Aggregate by Attr & Attr, Deaggregate Gen k, …

Modifying Display Properties:
Show Axis, …

Benefits

Seeing different views onto graph
Discovering new visualization techniques
Easing the engineering challenge

Future Work

Subgraph selections (enables NodeTrix)
Interactions (filtering, etc.)
Dynamic graphs or more complex data

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References

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