GLO-STIX: Graph-Level Operations for Specifying Techniques and Interactive eXploration

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GLO and GLO-STIX

- **GLO**: Graph Level Operations
  - 34 GLO’s categorized into 5 classes.
  - Example: Evenly distribute nodes on $x$ or $y$ by \{categorical attribute\}.

- **GLO-STIX**: Application for applying these GLO’s to graphs
Why?

- Even though there are many graph visualization techniques, each technique captures different aspects of the data and is good for separate tasks.

- If an analyst wants to perform multiple tasks, he would need multiple visualizations.
Finding Graph Level Operations

- Force – Directed Diagram
- Circle Plot
- Scatterplot
- Semantic Substrates
- PivotGraph
- Adjacency Matrix
Advantages of GLO’s

- Graph Exploration and Discovering New Techniques
- Easing the Engineering Challenge

Multi-dimensional technique akin to a hive plot or star diagram.
Arc Diagram–Semantic Substrates-PivotGraph
Types of GLO’s

- Positioning Nodes
  - Evenly Distribute Nodes on $x$ or $y$

- Modifying Element Properties
  - Size nodes by \{constant\}

- Cloning Nodes
  - Clone Active Generation

- Aggregating Nodes and Edges
  - Aggregate by \{categorical attribute\}

- Modifying Display Properties
  - Show $x$ or $y$ axis
Properties of GLO’s

- Duplication of GLO’s
- Parameterized GLO’s
- Complementary GLO’s
- The Generation Parameter
- Application of Techniques
GLO-STIX

- Implemented as a browser-based application.
- Written in Javascript using D3.js, jQuery, Bootstrap and jQueryUI
- Example dataset used: Les Misérables character co-occurrence graph.
  - 76 nodes
  - 254 edges
A screenshot of the GLO-STIX user interface showing a user exploring the Les Misérables character co-occurrence graph using graph-level operations (GLOs).
Critique

- Limitations mentioned in the paper
  - Does not support sub-graph selection or edge bundling.
  - No support for undirected graphs, or advanced directed graph such as trees.
  - Usability: length of list of active GLO’s can become very long and confusing – No user study.

- Limitations not mentioned in the paper
  - How does GLO-STIX work for bigger graphs?
  - A user may end up creating visualizations which are completely useless by applying different GLO’s. Too much flexibility may not be good.
Thank you!

Questions?