NETWORK DATA

VISUAL ADJACENCY LISTS FOR DYNAMIC GRAPHS

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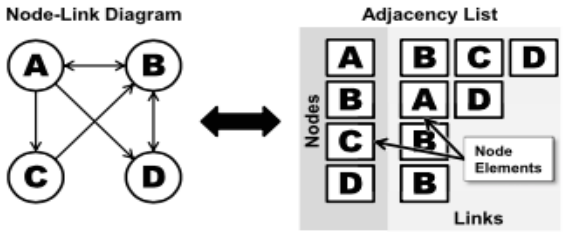
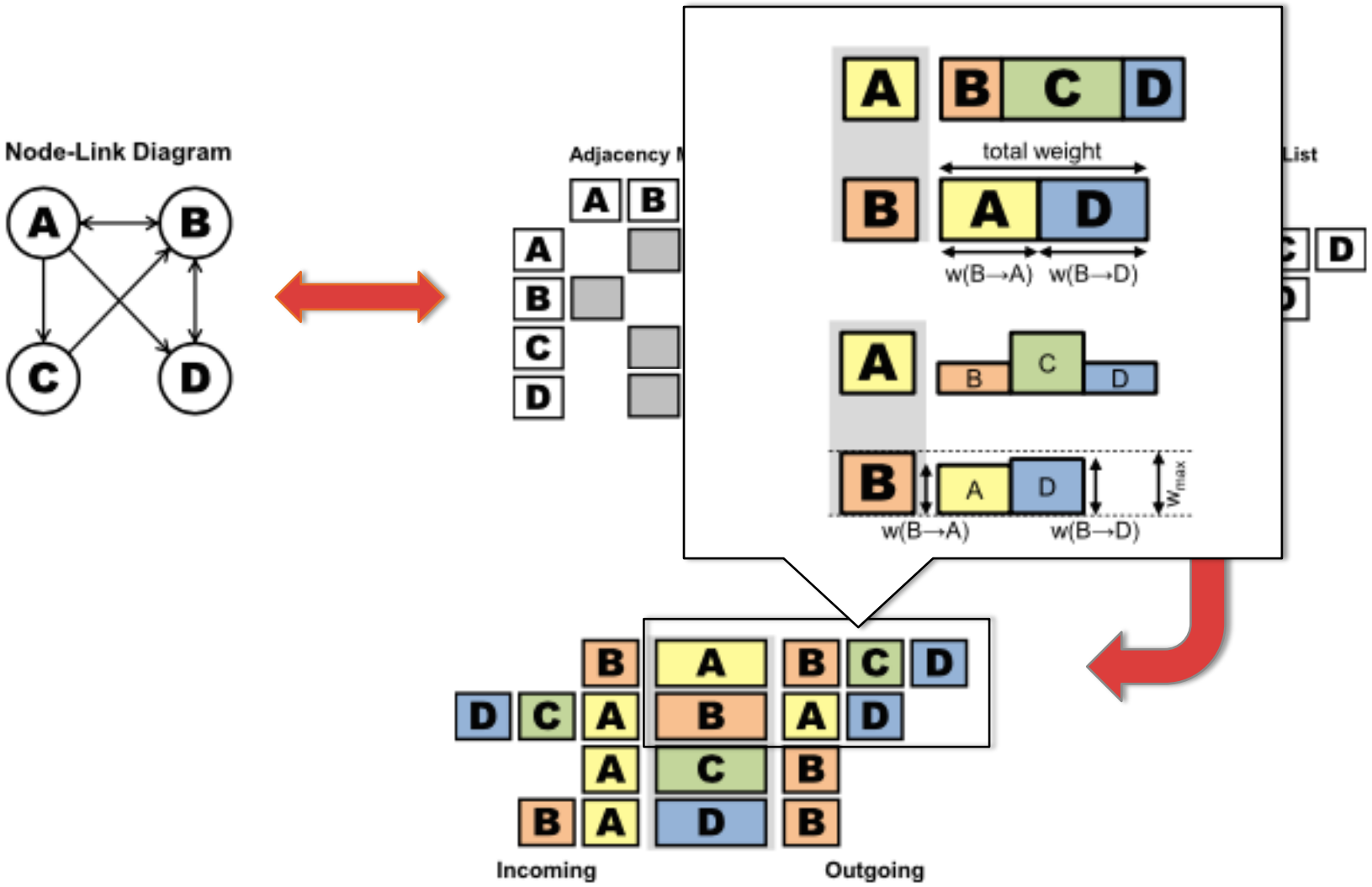
Overview

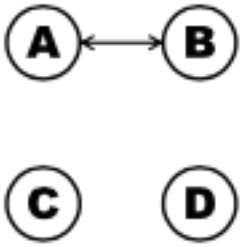


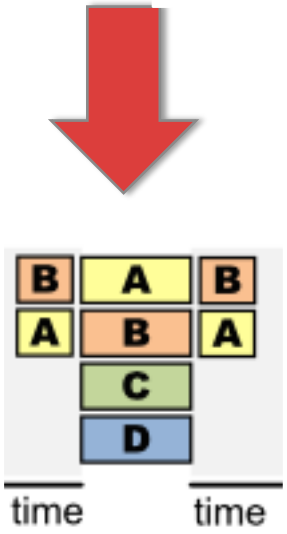
Idiom	Visual Adjacency Lists
What: Data	Network: **Static and Dynamic Graphs**
What: Derived	Derived a list: Vertical axis for all the nodes, horizontal for corresponding target nodes
Why: Tasks	Detecting **link distributions** (static graphs) and **node traffic over time** (dynamic graphs)
How: Encode	Nodes ordered by certain properties (e.g. summed weight of outgoing links), coded with colour, size reflects weight
Scale	Good scalability with respect to the number of nodes. Cluster structures have lower resolution.

Adjacency Lists for Static Graphs

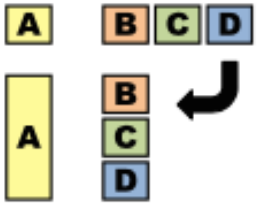


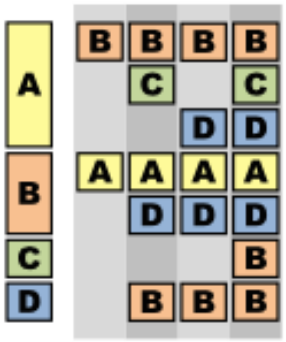
Adjacency Lists for Dynamic Graphs





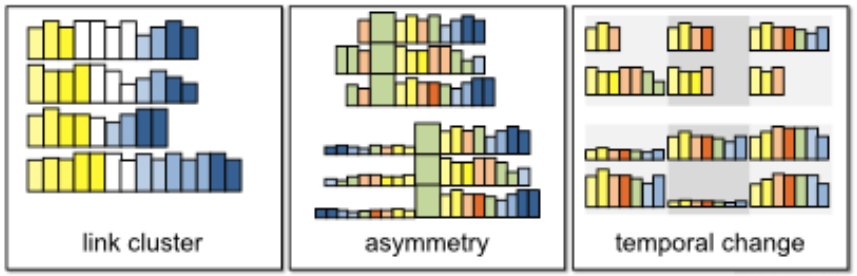
Gantt Layout:



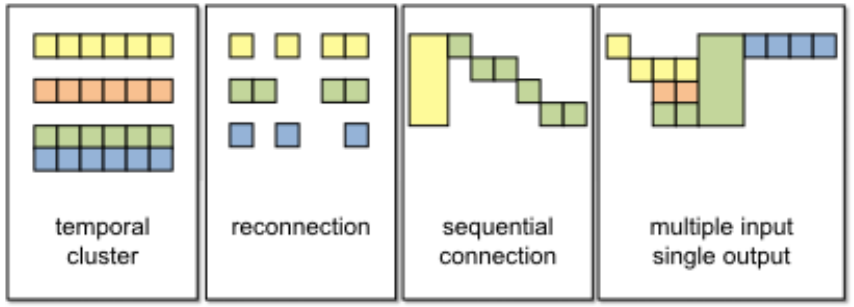


Advantages and Disadvantages of Adjacency Lists

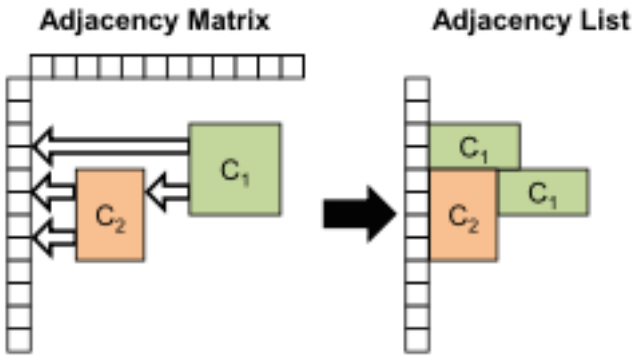
- **Advantage: Pattern Detection**
  - Normal Layout:



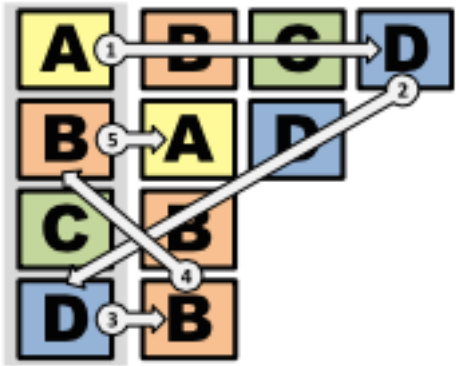
  - Gantt Layout:



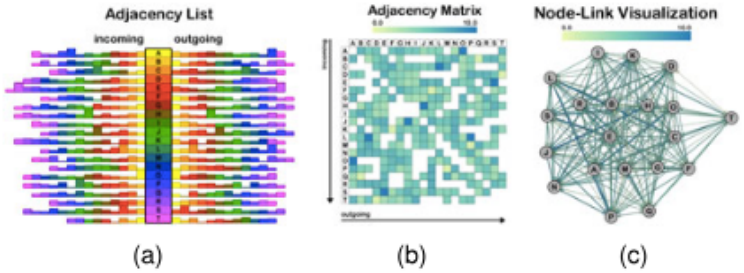
- **Disadvantage: Cluster Detection**



- **Disadvantage: Following a Path**



User Study and Tasks



- **24 university student subjects**
- **Independent variables:**
  - Visualization technique
  - Size (Small: 8 nodes, 22-40 links; Large: 20 nodes, 147-264 links)
- **1x4 within subjects design. Tasks were presented in order:**
  - Task 1: Decide if a link exists between the two marked nodes.
  - Task 2: Decide if incoming or outgoing links are more equally distributed over the nodes.
  - Task 3: Select the node, where the weights of its incoming links cover the largest value range.
  - Task 4: Select the node, where the weights of all incoming links have a large increase between two subsequent time steps.
- **Dependent variables:**
  - Error rate
  - Time

User Study Results

- **Task 1:**

  Links between two nodes.

- **Task 2:**

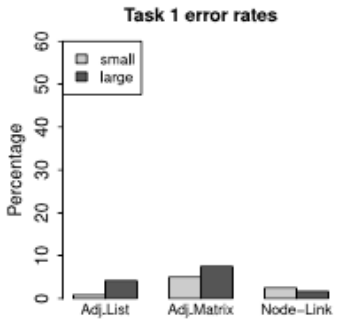
  Distribution of incoming and outgoing links.

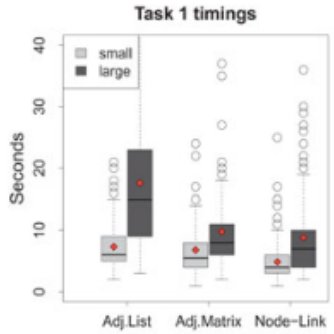
- **Task 3:**

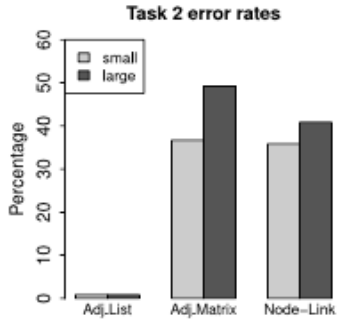
  Weights of incoming covers largest value.

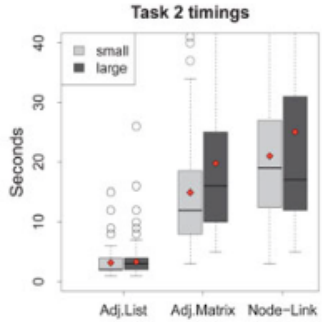
- **Task 4:**

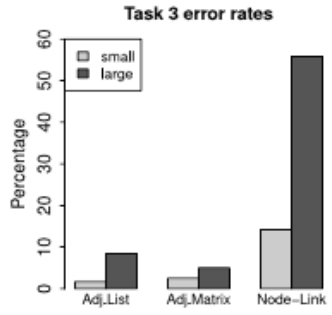
  Weight of incoming increases over time.

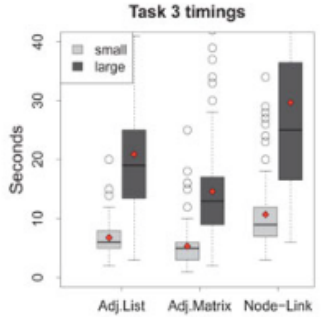


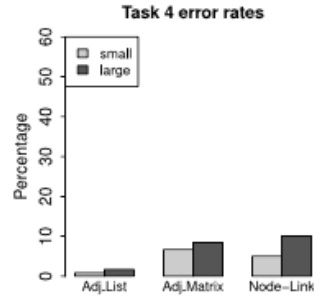


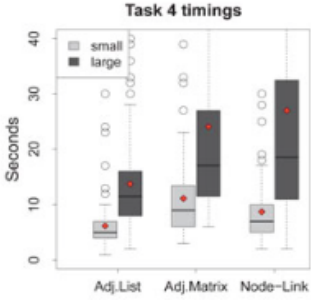












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QUESTIONS?