

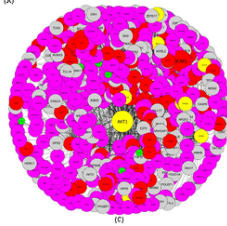
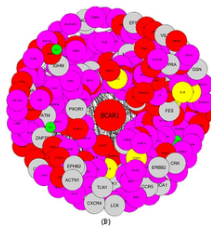
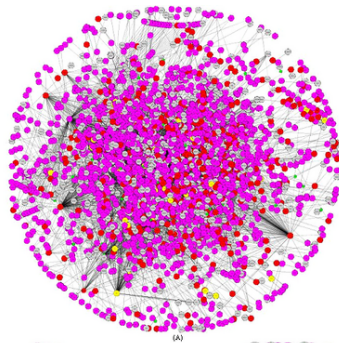
Visually Comparing a Set of Graphs

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Graph Drawing with Applications to Bioinformatics and Social
Sciences



Motivation



Problem Definition

Original Problem

Given a set of graphs $\{G_1, \dots, G_k\}$, where $|(G_i \cup G_j) \setminus (G_i \cap G_j)|$ is small, find a visualisation that focuses on the differences.

We focus on

- a pair of graphs $\{G_1, G_2\}$
- discrete values and changes
- large (but not huge) graphs (500+ vertices)



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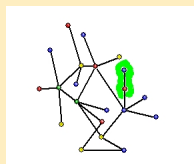
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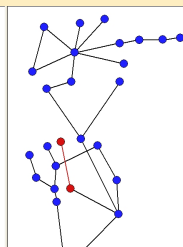
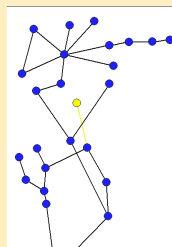
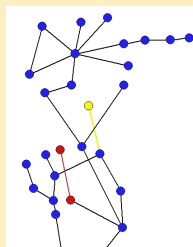
Concept / Approach

Overview Graph



providing
orientation and
mental map
preservation

Detailed View



- similar layout approach
- clear and concise display of the differences in detail



Construction of the Overview Graph

Node types

C– for areas of change. Adjacent changes are accumulated to a single *C*-node.

S– for important structures (application specific input).

L– for landmark nodes (defined by the topology of the graph).

R– for representing remaining parts, that are not covered by the previous types.

Edges

Represents connections between subgraphs corresponding to the different node types (may be weighted).



Layout of the Overview Graph

Properties

- Locality of change (neighborhood of the C - nodes should not span very large areas when possible).
- Overview graph needs to be evaluated using application data.
(→ new properties)
- Possible approach for the layout:
 - Force directed method with special focus on the S - and C - nodes and possibly guided by additional application specific information.



Construction of the Detail Graph

Detail Graph

Subgraph of $G_1 \cup G_2$, induced by the expansion of the C - node + local neighborhood in $G_1 \cap G_2$ + local neighborhood in overview graph (maybe also expanded).



Visualizing the Detailed Graph

Properties

In priority order

- Atomic differences drawn nicely (short edges, . . .)
- C - node subgraph close to center if possible
- L - node positions according to overview graph layout
- Avoid mixing different subgraphs.

